Chapter 5:
Land

Land

1. Introduction

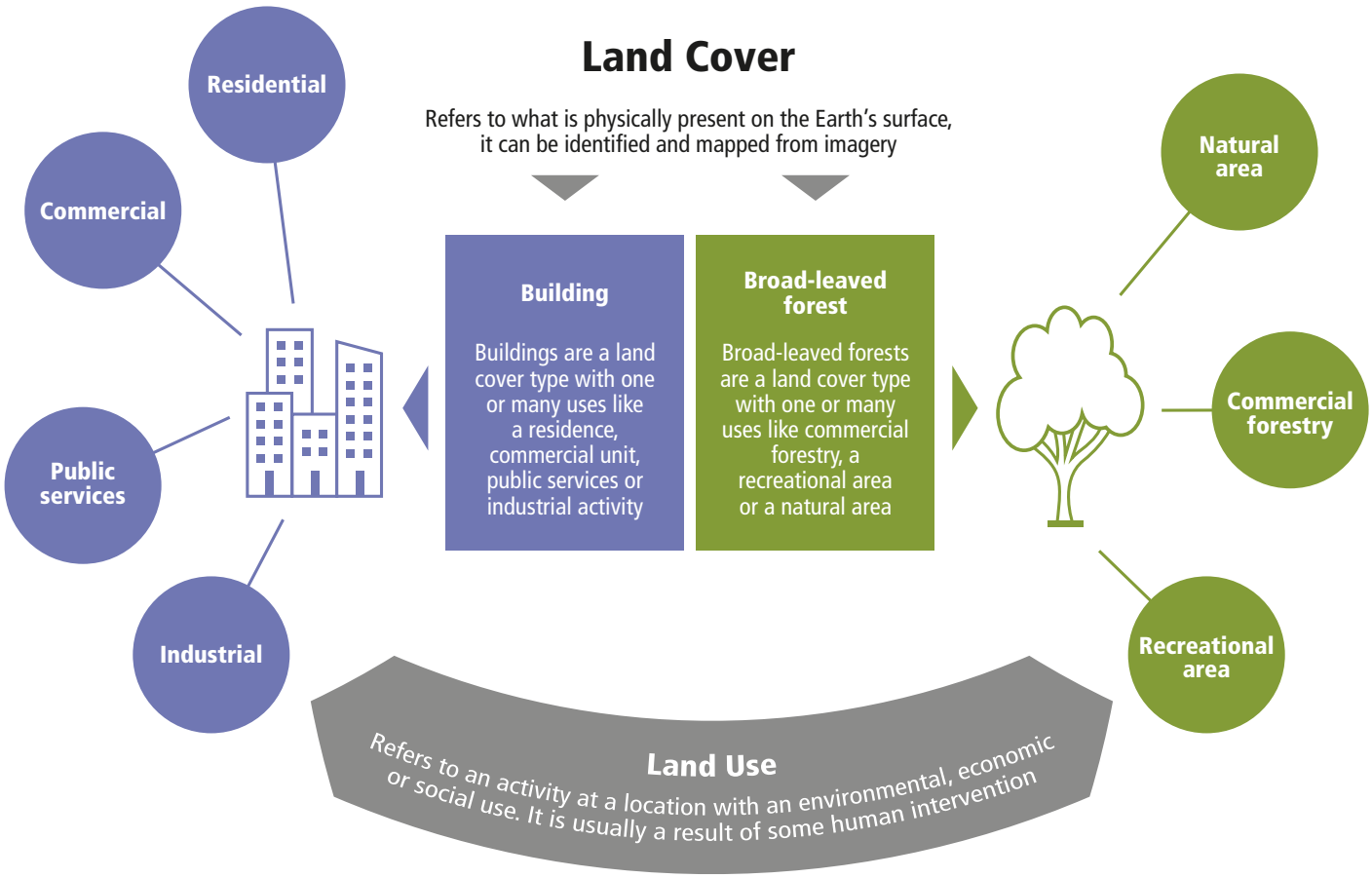
When we see land as a community to which we belong, we may begin to use it with love and respect.

Aldo Leopold

People rely on the land for all aspects of daily life. We use land to grow our food and to supply the materials and space for our homes. Land provides the infrastructure to transport people and materials and the green space that we use for recreation. Land is an inseparable part of the natural cycles that supply clean air and water and it provides habitats for terrestrial species, estimated to make up more than 80% of the Earth's species (Grosberg *et al.*, 2012).

This chapter discusses two aspects of Ireland's land: land cover and land use (Figure 5.1). Land cover refers to that which is physically present on the Earth's surface, e.g. farmland, natural forests, wild areas, inland waterways, built-up areas. Land use describes the human activities that are making use of land, e.g. residences and physical development of various kinds, including agriculture, commercial forestry, peatlands and waterways. A land cover type can have more than one use.

Figure 5.1 Land cover versus land use



2. Land cover

Land cover mapping

The development of the National Land Cover Map of Ireland marks a significant improvement in Irish land evidence. Since 1990, land cover in Ireland has been tracked at 6-yearly intervals by Corine Land Cover, the pan-European land cover map. While Corine Land Cover data are valuable for identifying broad trends in Ireland's land use, they have a coarser resolution than the National Land Cover Map. Corine Land Cover has a minimum mapping unit of 25 ha, while the National Land Cover Map (Topic Box 5.1) has a minimum mapping unit of 0.1 ha.

Topic Box 5.1 The new National Land Cover Map

The new National Land Cover Map became available for Ireland in 2023. Produced by Tailte Éireann (formerly Ordnance Survey Ireland) in partnership with the Environmental Protection Agency (EPA), the map provides very detailed data on land cover types in Ireland based on data from 2018. A classification system that includes 36 land cover classes or types was designed in collaboration with national land experts.

Previous State of the Environment Reports used Corine Land Cover data to assess land cover status in Ireland. Corine data are produced under the European Commission's Copernicus Land Monitoring Service.

While Corine provides a useful time series data set, it is best suited to high-level pan-European assessments, as smaller areas (below 25 ha) are not mapped. This means that important land cover types are not identified (e.g. smaller crop areas, hedgerows or buildings). Figure 5.2 illustrates that some land cover types are underestimated in Corine, while others (such as grasslands and peatlands) are overestimated.

Figure 5.2 Comparison of peatland areas using 2018 data from Corine Land Cover (left) and the National Land Cover Map (right)

Note: Corine Land Cover data overestimates the peatland area, as small forest and grass areas are not mapped. Meanwhile, the increased detail in the National Land Cover Map captures these areas

The improved land evidence provided by the new National Land Cover Map has many uses in environmental assessments of water, climate, air, noise and biodiversity. It is important to note that the new map does not provide data on land cover changes when compared with Corine; instead, it is a reassessment of land cover status based on new, more detailed, data. Differences are highlighted in Figure 5.3 and explained in Table 5.1.

Figure 5.3 Comparison of the National Land Cover Map and Corine Land Cover data sets by land cover type, 2018

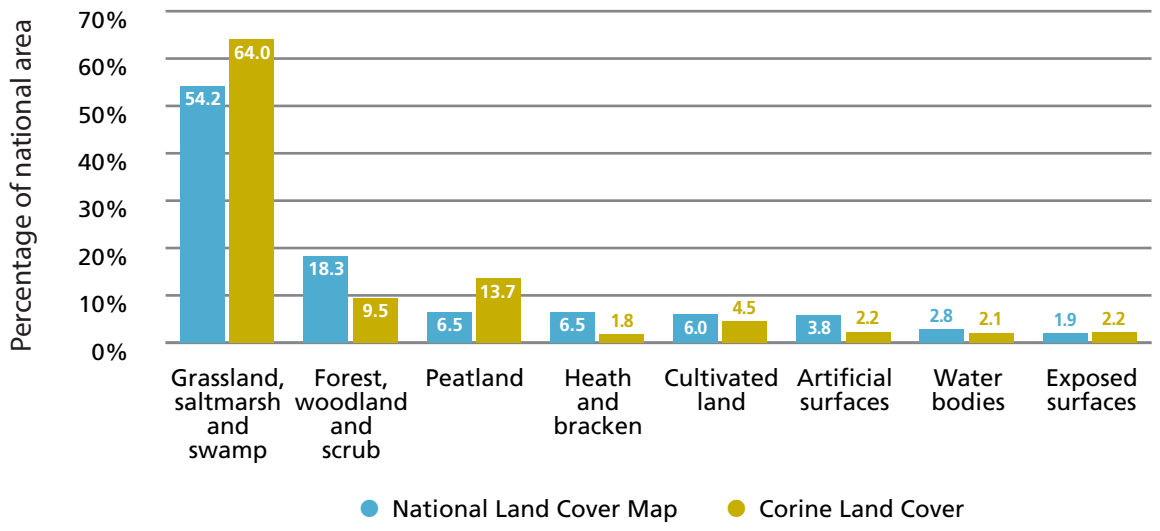


Table 5.1 Primary reasons for the main statistical differences between the National Land Cover Map and the Corine Land Cover data sets

Land cover type	Difference	Primary reason for differences
Grassland, saltmarsh and swamp	–9.8%	Smaller areas of forest, cropland and artificial surfaces previously generalised in CLC are now identified
Forest, woodland and scrub	+8.8%	Small areas of forest, hedgerows, treelines and scrub are now identified, transitioning from mainly CLC grass and peatlands The NLC Map does not measure forestry percentage cover in the same way as the National Forestry Inventory. The forest classes of the NLC Map make up 12.2% of the land cover area. The National Forestry Inventory provides the official statistic for Ireland's forestry cover (11.6%)
Peatland	–7.2%	The CLC mapping process struggles to distinguish heath and bracken from peat. The NLC Map is able to do this, accounting for over 50% of the reduction. Otherwise, smaller areas in CLC peatland are identified as grassland and forest in the NLC Map It is important to note that the NLC Map only maps the land cover at the surface and does not map peat soils

Table 5.1 (continued)

Land cover type	Difference	Primary reason for differences
Heath and bracken	+4.7%	New mapping methods allow heath and bracken to be distinguished from peat, accounting for most of the increase. Some smaller areas in CLC grassland and exposed surfaces were also identified
Artificial surfaces	+1.6%	Buildings, roads and other small artificial areas that were not mapped in CLC have been identified in the NLC Map. These additional areas transitioned primarily from CLC grassland
Cultivated land	+1.5%	Smaller areas of cultivated land, previously generalised into CLC grassland areas, are now identified in the NLC Map

CLC, Corine Land Cover; NLC: National Land Cover

In summary, the National Land Cover Map provides greater detail and evidence on land cover in Ireland by identifying smaller areas of importance that are not visible in the coarser Corine Land Cover. As well as providing a powerful tool for decision-making on land management, the detail of the National Land Cover Map improves our ability to monitor and assess impacts on water, climate, air, noise and biodiversity.

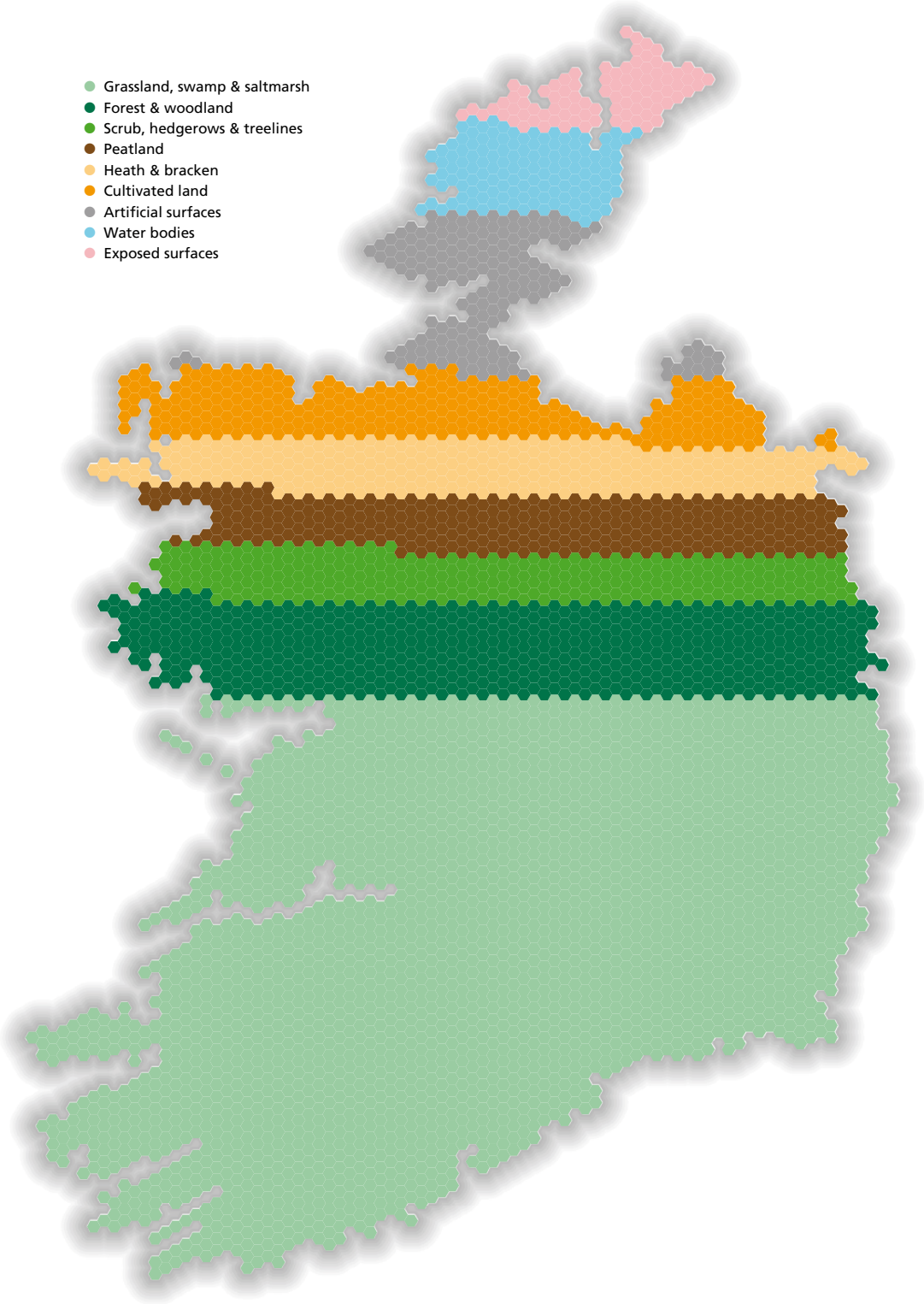
Corine Land Cover data show the following four broad trends since 1990:

1. Ireland's main land cover type is agriculture. This figure has stayed consistently around 67% in Corine Land Cover data since 1990.[1] There have been changes in agricultural land cover: agricultural land has been lost to artificial surfaces through development and road building and gained through other activities, including drainage of wetlands.
2. Artificial surfaces have increased. Although they cover a small area, artificial surfaces have almost doubled since 1990 from 1.45% of Ireland's area in 1990 to 2.4% in 2018, mainly at the expense of agricultural land.
3. Wetland area has decreased, from 18.5% cover in 1990 to 14.8% in 2018 (extensive drainage activity also occurred before 1990).
4. Forest and semi-natural areas have increased, from 10% in 1990 to 13% in 2018.

Changes in Ireland's land cover (both before and after 1990) can be partly attributed to policy formulated for specific national interests that had unforeseen consequences for Ireland's land cover profile. The decrease in wetland areas can be linked to more than one policy decision. For example, one historical policy decision was to produce and market turf and turf products in the 'national interest', outlined in the Turf Development Act (No. 10 of 1946). Other drivers include policies that incentivised the agricultural productivity of land and the planting of more trees. The National Land Cover Map shows that Ireland's residential development pattern is the result of a long-term mix of urban centres and extensive single housing in the open countryside. Ireland's land cover profile according to the National Land Cover Map is shown in Figure 5.4 and Table 5.2.

1 The 2020 Census of Agriculture from the Central Statistics Office estimates that 60% of Ireland's land is used for agriculture. The higher figure in Corine Land Cover data is a result of these data's coarser resolution.

Figure 5.4 Stacked bar chart showing the proportion of Ireland's level 1 land cover types



Source: National Land Cover Map of Ireland

Table 5.2 Ireland's national land cover profile

Land cover type: level 1 (8 classes)	Land cover type: level 1 (km^2)	Land cover type: level 1 (% of area)	**Land cover type: level 2 (36 classes)**	Land cover type: level 2 (km^2)	Land cover type: level 2 (% of area)
Grassland, swamp and saltmarsh	38,279.7	54.2	Improved grassland	29,332.3	41.5
			Amenity grassland	1,285.6	1.8
			Dry grassland	795.4	1.1
			Wet grassland	6,685.5	9.5
			Saltmarsh	57.5	0.1
			Sand dunes	102.6	0.1
			Swamp	22.7	0.03
Forest, woodland and scrub	12,907.2	12.2	Coniferous forest	2,564.4	3.6
			Mixed forest	495	0.7
			Transitional forest	3,856.7	5.5
			Broadleaved forest and woodland	1,708.6	2.4
		6.1	Scrub	1,301	1.8
			Hedgerows	2,247.9	3.2
			Treelines	733.9	1
Peatland	4,622	6.5	Raised bog	462.7	0.7
			Blanket bog	2,497.4	3.5
			Cutover bog	1,102.5	1. 6
			Bare peat	529.6	0.7
			Fens	30.7	0.04
Heath and bracken	4,569.1	6.5	Bracken	281.3	0.4
			Dry heath	1,992.6	2.8
			Wet heath	2,295.3	3.2
Cultivated land	4,270.3	6.0	Cultivated land	4,270.3	6
Artificial surfaces	2,681	3.8	Buildings	416.8	0.6
			Ways	1,169.9	1.7
			Other artificial surfaces	1,093.5	1.6
Water bodies	n/a[a]	2.8	Rivers and streams	593.8	0.8
			Lakes and ponds	1,312.6	1.9
			Artificial water bodies	36.5	0.05
			Transitional water bodies	25	0.04
			Marine water	4,029.8	n/a[a]

Land cover type: level 1 (8 classes)	Land cover type: level 1 (km^2)	Land cover type: level 1 (% of area)	**Land cover type: level 2 (36 classes)**	Land cover type: level 2 (km^2)	Land cover type: level 2 (% of area)
Exposed surfaces	1,368.7	1.9	Exposed rock and sediments	659.8	0.9
			Coastal sediments	92.4	0.1
			Mudflats	324.4	0.5
			Bare soil and disturbed ground	236.6	0.3
			Burnt areas	19.5	0.03

[a] Marine water bodies are not included in the percentage land area calculation as they are not land features.

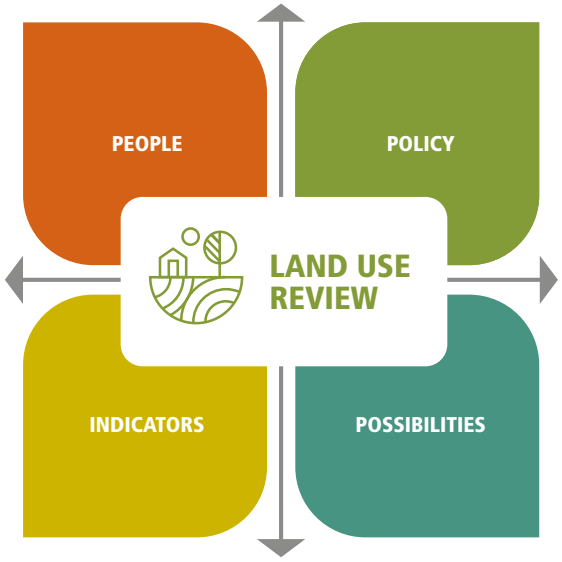
Source: Compiled from National Land Cover Map of Ireland data

3. Land use

Land use describes how humans make use of land and includes activities such as residential use, agriculture, commercial forestry and infrastructural uses such as transport or utilities.

In March 2023, the government published the outputs of phase 1 of the National Land Use Review, which was led by the EPA (DAFM and DECC, 2023a). The purpose of the review was to examine the environmental, socio-economic and ecological characteristics of Ireland's land use. Phase 1 of the review examined four broad areas (Figure 5.5) and made 19 recommendations.

Figure 5.5 The four themes of phase 1 of the Land Use Review



Source: DAFM and DECC, 2023a

Phase 2 of the Land Use Review is being led by three departments: the Department of the Environment, Climate and Communications, the Department of Agriculture, Food and the Marine and the Department of Housing, Local Government and Heritage. Phase 2 will identify the key demands on land (both public and private) to inform policies for land use across key government objectives. The work will note that the remaining years of this decade are critical to address the climate and biodiversity emergencies (declared by Dáil Éireann in 2019), recognising that farmers and farm families play a very significant role as custodians of Ireland's environment. The review will also recognise that any measures made available to farmers will be voluntary and done in partnership with government. This phase of the review will inform the preparation of future climate action plans, in particular actions to achieve reductions in emissions of greenhouse gases (GHGs) for the land use, land use change and forestry (LULUCF) sector.

Phase 2 of the Land Use Review has two working groups:

1. A technical working group to advance the land evidence recommendations from the first phase, to identify land use scenarios to achieve environmental and socio-economic objectives and to set out potential policy options.
2. A citizen engagement working group to communicate, inform, engage and motivate all stakeholders on the agreed national priorities that constitute a shared vision for the necessary transition in land use.

Both working groups report to an oversight group, which in turn reports to the Minister for the Environment, Climate and Communications, the Minister for Agriculture, Food and the Marine, and the Minister of State for Nature, Heritage and Electoral Reform.

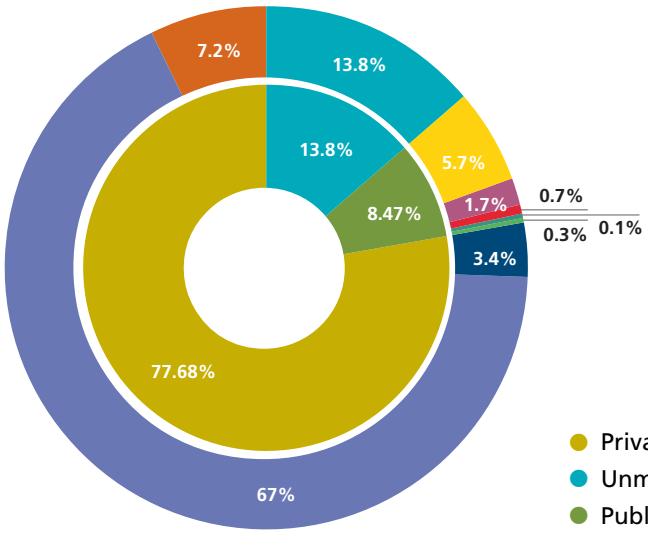
Land use and people

Ireland has a population of 5.3 million (CSO, 2023). The economic activities, residential needs and transport activities of the population influence Ireland's land use profile. As outlined above, at least 60% of Ireland's land cover is agricultural (grassland or cultivated land) reflecting the importance of agriculture to Ireland's economic and social profile. The National Land Cover Map (Table 5.1) shows that artificial surfaces (roads, residential development and commercial development) make up 3.8% of Ireland's land cover. Around 25% of all housing in Ireland tends to be in the form of single houses in the open countryside, developed on agricultural land. This can present challenges for service provision (e.g. delivery of public transport or active travel solutions for rural populations and provision of water and sanitary services).

Under Project Ireland 2040, the National Planning Framework (NPF) projects a population of approximately 5.8 million by 2040 and the Central Statistics Office (CSO) projects a population of up to 6.7 million by 2051. A growing population will influence demands for competing uses of land to support, variously, food production, and the development of new housing, services, infrastructure and amenity uses. Housing is currently in critical demand. More recently, the NPF committed to securing 50% of new housing through developments within the general boundaries of existing built-up areas and through brownfield development.

A high-level land ownership assessment (Figure 5.6) conducted during phase 1 of the Land Use Review identified that 78% of Ireland's land is privately owned (DAFM and DECC, 2023b). This influences how land use decisions are made and what land management practices may be adopted. The ownership profile demonstrates that high-level stakeholder engagement and buy-in are critical to underpin the development and realisation of any vision for overall land use in the longer term.

Figure 5.6 High-level assessment of Ireland's land ownership profile



- Private **77.68%**
- Unmapped **13.8%**
- Public **8.47%**

- Farmland (not commonage) **67%**
- Farmland (commonage) **7.2%**
- Unmapped **13.8%**
- Forestry (public) **5.7%**
- Local government **1.7%**
- Fuel and energy **0.7%**
- 'Public' **0.1%**
  combines transport, general public services, education/training, regional/local agency/corporate leisure/tourism, public order and safety, unknown, national corporation
- Central government/agency **0.3%**
- Forestry (private) **3.4%**

Source of data: DAFM and DECC, 2023b

Land use as an environmental pressure

Environmental indicators are measures that provide evidence about the status of the environment. In phase 1 of the Land Use Review, existing indicators were examined to assess the environmental impacts of land use (DAFM and DECC, 2023c).

Greenhouse gas emissions. Ireland's land is a net source of GHG emissions. It accounted for 9.3% of national total emissions (including LULUCF) in 2023 (EPA, 2023). The main sources of emissions are the drainage of grasslands on organic soils and the exploitation of wetlands for peat extraction (EPA, 2024). Forest land, on the other hand, is a carbon sink. However, this carbon sink is on a declining trend given the age profile of Ireland's forests. Ireland's Climate Change Assessment (Thorne *et al.*, 2023) notes that achieving net zero in this sector will require unprecedented rates of afforestation, rewetting of organic soils, peatland restoration and enhanced carbon sequestration in mineral soils.

Water quality. Current land use practices in Ireland are putting pressure on water quality. The Water Action Plan 2024 (DHLGH, 2024) identifies agricultural land use as the most common and significant pressure on water bodies, impacting over 1000 of Ireland's water bodies. Urban run-off and domestic waste water are also significant pressures on water bodies and are closely related to residential and industrial land use. Forestry and mining land use are also linked to significant pressures on water bodies.

Biodiversity. Current land use practices in Ireland are impacting biodiversity. Agriculture is the most prevalent pressure and threat to protected habitats (NPWS, 2019). Forestry impacts 35% of protected habitats, largely due to non-woodland habitats being converted to commercial forestry, forestry activities impacting water quality and drainage for afforestation. Mining and quarrying affected 32% of protected habitats; this was due to the negative direct effects on habitats of the extraction of minerals and the impacts of peat extraction. Such extraction removes peat bog habitats and has negative consequences for freshwater habitats. Industrial, infrastructure and residential land use all result in soil sealing, which destroys, reduces or fragments areas of natural habitat. Fragmentation is a pressure on all habitats and species because it can limit the area available for foraging for food and it breaks populations down into smaller (and less genetically diverse) communities. National Biodiversity Indicator C.1.i rates fragmentation in Ireland as 'amber' on a red-amber-green scale (NBDC, 2021). European Union (EU) strategies and objectives relating to no net land take are important for preserving intact habitats. The potential impact of urban development on habitats can be mitigated by land recycling and by the densification of urban areas, rather than by using land with higher biodiversity potential.

Soil sealing. Imperviousness (covering soil with an impermeable surface such as concrete) has increased in Ireland since 1990. Sealed soil cannot be used for other important services, including growing food, supporting ecosystems or flood mitigation. Most of the soil sealed in Ireland was originally grassland, unlike in other EU Member States, where mainly cropland has been sealed. Soil sealing arises from covering land with housing, industrial or other built-up areas and with infrastructure.

4. Land use commitments and constraints

Ireland's land use profile is influenced by economic activities, sociological factors, and national and regional policies and strategies. Some of the current range of policies and strategies that are highly relevant for land use are set out later in Table 5.3. Enacting national planning policies and legislation is done through planning legislation at the local level. The government's long-term strategy for physical and spatial development and the built environment, Project Ireland 2040, was published in 2018 and a Draft First Revision to the National Planning Framework (NPF) was published in July 2024.

Under Project Ireland 2040, the NPF guides development and land use investment. It influences the regional spatial and economic strategies of the three regional assemblies of local authorities. It also influences city and county development plans, local area plans and planning schemes in the strategic development zones of the 31 local authorities. The NPF sets high-level goals for managing the growth of Dublin, regional cities and the three regional assembly areas, for promoting sustainable rural regeneration and for promoting more compact urban development within the footprint of existing built-up areas to counteract a business-as-usual trend towards extensive urban expansion and urban sprawl. In tandem with the NPF, the National Development Plan 2021–2030 provides an investment framework (up to €165 billion) built around ten national strategic outcomes shared with the NPF under the overall Project Ireland 2040 initiative. An overview of the Irish planning system is set out in Figure 5.7.

A development plan is the main public statement of planning policies for each county or city. It sets out the land use, amenity and development objectives and the policies of the planning authority for a given 6-year period. The plan consists of a written statement of objectives and includes maps that give a graphical representation of how the city or county will develop over the period. Local area plans provide more detailed planning policies for areas where significant development and change is anticipated. Local area plans must be compatible with national and regional guidance documents and the core strategy and policies of the development plan.

The Office of the Planning Regulator (OPR) was established in 2019 as the independent oversight body for planning. The OPR reviews local authority development plans to ensure that they are consistent with relevant planning policies, including the NPF and the regional spatial and economic strategies, and to ensure compliance with environmental assessment and climate change obligations.

An expert group recommended that the first revision of the NPF should build on the current NPF strategy and strengthen it in three main areas:[2]

1. Compact growth targets should be more ambitious and more clearly defined.
2. The roles of the bodies involved in its implementation should be clarified and strengthened (particularly in relation to metropolitan area strategic plans) and mechanisms should be put in place for more detailed measurement and monitoring of its progress.
3. There should be greater coordination at whole-of-government level across all infrastructure projects (including the National Development Plan) and new efforts should be made to generate broader support for national spatial planning across all of society.

The Climate Change Advisory Council (CCAC) recommendations, included in the Climate Action Plan 2024, also support more ambitious targets for compact growth (denser housing) and a reassessment of how compact growth is measured from a spatial perspective. The Council also calls for more incentivisation of urban brownfield development to limit urban sprawl and urgent investment in accessible public transport (CCAC, 2023).

2 www.npf.ie/expert-group-report-on-the-national-planning-framework-published/ (accessed 2 July 2024).

Figure 5.7 An overview of the Irish planning system

Source: Adapted from Government of Ireland, 2018

The NPF sets out broad goals for how Ireland's land should be used, but there are also other policies and strategies that make commitments on how land should be used or managed. Many demands come from current economic and social contexts that are unlikely to change: we need land for housing and to grow our food, and these needs will continue. Other policies have land use implications (Table 5.3) either to use land for new and different purposes or to manage land in a different way.

The high-level review in Table 5.3 is not exhaustive: it does not catalogue every policy or strategy that has a land use impact. It highlights the main environmental policies and shows that, as pressures on Ireland's land continue, we must find a way to resolve competing demands while managing land in a manner that supports its ability to play its important role in air and water cycles and in supporting healthy ecosystems.

Table 5.3 High-level review of the main policies, strategies and legislation that influence land use

Policy/strategy/ legislation	Explicit conservation target (conserves or limits a land use)	Explicit expansion target (will use more land)	Possible consequential impact (the target is not explicit but could result in a land use change)
ECOSYSTEMS			
EU Biodiversity Strategy for 2030 (May 2020)	Carbon-rich ecosystems should be protected Stop the loss of green urban areas and implement urban greening plans	Set up ecological corridors Increase the quantity, quality and resilience of forests	Increase in protected areas for habitats and species, with an emphasis on high nature value areas
Bord na Móna's Enhanced Decommissioning, Rehabilitation and Restoration Scheme 2021–2026 (November 2020)	Rehabilitate 33,000 ha of post-production peatlands	N/A	N/A
EU Nature Restoration Law (June 2024)	No net loss in the total national area of urban green space and of urban tree canopy cover in urban ecosystem areas compared with 2021. After 2030 the areas must increase, with progress measured every 6 years through a national restoration plan	N/A	EU countries must restore at least 30% of Annex 1 habitat areas in poor condition by 2030, 60% by 2040 and 90% by 2050
EU Common Agricultural Policy Strategic Plan 2023–2027 (January 2023)	Protect wetland and peatland areas National ratio of permanent grassland to agricultural area should not decrease by more than 5% compared with 2018	N/A	Minimum of 4% of agricultural area devoted to space for nature
Food Vision 2030 (August 2021)	N/A	N/A	By 2030, 10% of Ireland's farmed area will be prioritised for biodiversity, spread across all farms throughout the country
Sectoral climate adaptation plans: biodiversity (November 2019)	N/A	N/A	Design corridors to enhance the resilience of protected areas and increase opportunities for dispersal across the landscape
National Biodiversity Action Plan (January 2024)	Tackle Invasive Alien Species and expand protected area network	N/A	Increase in protected areas

Policy/strategy/ legislation	Explicit conservation target (conserves or limits a land use)	Explicit expansion target (will use more land)	Possible consequential impact (the target is not explicit but could result in a land use change)
FORESTRY			
Food Vision 2030, Ag Climatise and LULUCF target	N/A	Increase afforestation from existing levels to at least 8000 ha per year and double the sustainable production of biomass from forests to 2 million tonnes by 2035	N/A
Ag Climatise (December 2020)	N/A	Construct 125 km of new forest roads per year to facilitate the movement of biomass and harvested wood products Through the forestry programme, continue to fund the planting of woodlands of different sizes (from 0.1 ha upwards) to increase connectivity between hedgerows and larger woodlands and provide corridors for wildlife	N/A
Ireland's Forestry Strategy 2023–2030 (September 2023)	N/A	Meet a forest cover target of 18% or more by 2050	N/A
Coillte Strategic Vision (April 2022)	N/A	Coillte to grow 100,000 ha of new forests by 2050	N/A
Ireland's National Energy and Climate Plan 2021–2030 (June 2020)	N/A	Deliver expansion of forestry planting and soil management to ensure that carbon abatement from land use is delivered in 2021–2030 and in the years beyond	Promote the increased use of domestic harvested wood in longer lived products, thus enhancing the storage of carbon in these products and replacing materials with a higher carbon intensity

Policy/strategy/ legislation	Explicit conservation target (conserves or limits a land use)	Explicit expansion target (will use more land)	Possible consequential impact (the target is not explicit but could result in a land use change)
BUILT LAND AND TRANSPORT			
EU Soil Strategy[a] (November 2021)	No net land take[b] by 2050 A no net land take goal requires reducing soil sealing and reusing existing abandoned land for development	N/A	N/A
Housing for All (September 2021)	Introduce a new tax to activate vacant land for residential purposes and to replace the vacant site levy	Increase supply of new housing, up to an average of at least 33,000 per year to 2030 State land bank to provide more land to the Land Development Agency to bring forward up to 15,000 homes and state to fund local authorities for land acquisition	N/A
Ireland's National Energy and Climate Plan 2021–2030 (June 2020)	Make growth less transport intensive through better planning, remote working and modal shift	Expand the network of cycling paths and park and ride facilities	N/A
National Sustainable Mobility Policy 2022–2025 (April 2022)	Support compact growth and transport-orientated development through better integrated land use and transport planning	Deliver improved active travel infrastructure, expansion of regional bus and rail services and local bus networks, and improved connectivity between different transport modes	N/A
National Demand Strategy (2024)	Includes examination of optimal use of space and integrated land use and transport planning	N/A	N/A
5-year local authority climate action plans	Climate Action Plan 2024 encourages local authorities to consider road space reallocation in their 5-year climate action plans	N/A	N/A
National Cycle Network and CycleConnects	N/A	N/A	Roll-out of walking and cycling infrastructure

Policy/strategy/ legislation	Explicit conservation target (conserves or limits a land use)	Explicit expansion target (will use more land)	Possible consequential impact (the target is not explicit but could result in a land use change)
AGRICULTURE			
Ireland's Fifth Nitrates Action Programme 2022–2025 (March 2022)	N/A	N/A	6 m buffer in critical source areas Limits on farm stocking rates
Ireland's National Energy and Climate Plan 2021–2030 (June 2020)	N/A	N/A	Reduced management intensity on at least 40,000 ha per annum of grasslands on drained organic soils Better management of grasslands, tillage land and non-agricultural wetlands (1.4 Mt CO_2 eq cumulative abatement) Specified range of improvements in farming practices in line with recommendations from Teagasc Support diversification in agriculture and land use to develop sustainable and circular value chains and business models for lower carbon intensity farming
Ag Climatise (December 2020)	N/A	Action 10: Increase the area under tillage production above the current area of 300,000 ha by 2030, producing more native-grown grains and legumes for the livestock industry while further enhancing the environmental credentials of the sector	N/A
Common Agricultural Policy (CAP) Strategic Plan 2023–2027 (January 2023)	N/A	N/A	Fund and plant more hedgerows

Policy/strategy/ legislation	Explicit conservation target (conserves or limits a land use)	Explicit expansion target (will use more land)	Possible consequential impact (the target is not explicit but could result in a land use change)
ENERGY			
Ireland's National Energy and Climate Plan 2021–2030 (June 2020)	Phase out coal and peat-fired electricity generation	N/A	Increase the share of electricity generated from renewable sources to 70%, underpinned by the Renewable Electricity Support Scheme Generate at least 3.5 GW of offshore renewable energy of mainly offshore wind, develop up to 1.5 GW of grid-scale solar energy, and increase onshore wind capacity to up to 8.2 GW Introduce a support scheme for micro-generation Increase the renewable biofuel content of motor fuels, underpinned by the biofuels obligation scheme Introduce legislation to ban the sale of new fossil fuel cars from 2030 Support efforts to increase the share of domestic renewable sources in the energy mix, including wind, solar and bioenergy Facilitate infrastructure projects, including private sector commercial projects, that enhance Ireland's security of supply and are in keeping with Ireland's overall climate and energy objectives
Renewable Energy Directive ((EU) 2023/2413) (October 2023)	N/A	N/A	A binding overall EU target to reach a share of at least 32% of energy from renewable sources

[a] See Chapter 6

[b] Land take occurs when soil is sealed for development use, meaning that the soil cannot be used for other important means including supporting ecosystems, flood mitigation or growing food

Mt CO_2 eq, megatonnes of carbon dioxide equivalent

GW, gigawatts

N/A, not applicable

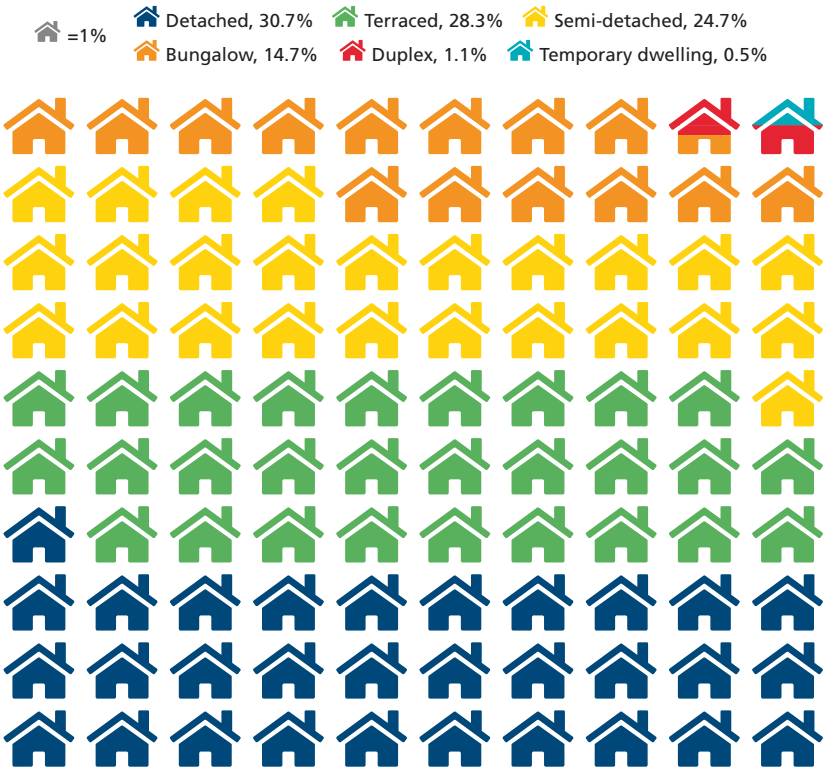
As shown in Table 5.3, explicit conservation targets exist for built land (via the no net land take target under the EU Soil Strategy, see Chapter 6) and for peatlands and permanent grasslands (under the CAP Strategic Plan 2023–2027). In summary, these targets set out that the extent of artificial surfaces (3.8% according to the National Land Cover Map) should not increase, the peatland area (6.5%) should not decline further and the ratio of permanent grassland to the total agricultural area should not decrease by more than 5%.

Current policies and strategies (Table 5.3) include explicit expansion targets for ecosystems, forestry and agriculture and for more built land to provide housing and to service mobility (mostly for the provision of active travel, greenways and increased rail connections). The expansion targets protecting space for nature do not prescribe how land should be used, and this is where land management comes in. The correct land management policy and approach can make it possible for healthy ecosystems to successfully co-exist with land uses such as forestry and agriculture.

Meeting land use targets

Meeting Ireland's housing targets while adhering to the no net land take target in the EU Soil Strategy (see Chapter 6) will require using vacant or derelict properties (for which there are some explicit targets), increasing the density of development and implementing land recycling (reuse of abandoned, vacant or underused land for redevelopment). Census 2022 found that the increase in housing stock from 2016 to 2022 was equivalent to an average 1% rise per year, while the population rose by 1.2% per year during the same period. As illustrated in Figure 5.8, GeoDirectory, the national address database jointly managed by An Post and Tailte Éireann, identifies over 2.1 million residential dwellings in Ireland.[3] The national residential vacancy rate in June 2023 stood at a record low of 3.9% (81,712 units), and 21,134 address points were classified as derelict.

Figure 5.8 Residential dwellings stock



Source: GeoDirectory, 2023

3 assets.ey.com/content/dam/ey-sites/ey-com/en_ie/topics/economics/ey-geodirectory-residential-report-q4-2023.pdf (accessed 25 July 2024).

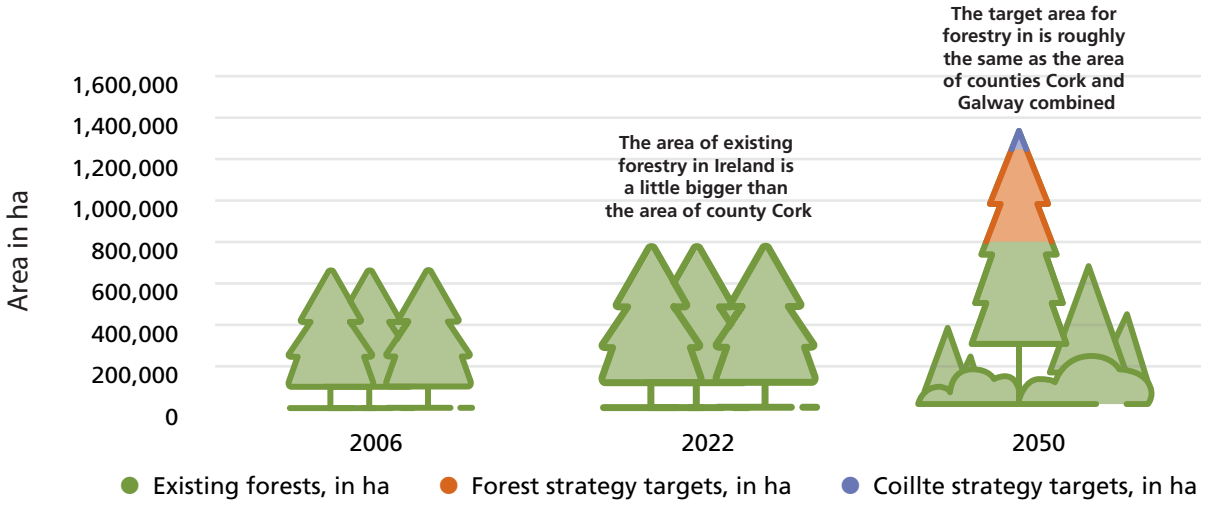
Achieving a no net land take target has implications for how other national policies might be delivered. For example, under a no net land take target, the 33,000 homes sought under the Housing for All policy (Table 5.3) would be supplied each year without a consequent net increase in artificial surface area (according to the National Land Cover Map, artificial surface areas are currently 3.8% of Ireland's land area). The GeoDirectory Residential Buildings Report 2023 identified 22,842 buildings under construction with 17.2% of the new construction activity occurring in Dublin (GeoDirectory, 2023).

Based on the assessment of policies and strategies undertaken (Table 5.3), the most frequently occurring explicit expansion target is to increase the area under forestry. Of the policies assessed, six have targets for forestry expansion. These policies and associated targets have different purposes, such as increasing carbon sequestration, providing raw material for biomass or building and promoting ecosystem connectivity. Given that forestry is currently a pressure on protected habitats and on water quality, any expansion of forestry to meet climate action and sustainable development objectives must be done in a way that has a positive impact on biodiversity and water quality.

The National Forest Inventory for 2022[4] identified that 808,850 ha (11.6%) of Ireland's land area was forest (DAFM, 2023). Forest cover increased from 10% (697,842 ha) in 2006 to 11.6% in 2022.

The Forest Strategy target of 18% by 2050 would mean that 1,256,116 ha of Ireland's land area would be forest (on both public and private land), an increase of 447,266 ha. The Coillte target aims to supply 100,000 ha of new forest by 2050, which is just under one-quarter of the Forest Strategy target. The Food Vision 2030 and Ag Climatise targets of 8000 ha per year would take 43 years to achieve the Forest Strategy target (assuming that the Coillte target is achieved and counted as part of the overall Forest Strategy target). Ireland's Climate Change Assessment (Thorne *et al.*, 2023) noted that for forests to contribute to net zero emissions would require between 25,000 and 30,000 ha of planting per year which is significantly higher than the 8000 ha outlined in the Forest Strategy. Figure 5.9 gives an indication of the forestry targets.

Figure 5.9 Forestry levels in Ireland (2006 and 2022) and 2050 target levels



Source: DAFM, 2023

4 The National Forest Inventory uses a specific method to measure forestry, so its estimate of Ireland's national forest cover is different from that of the National Land Cover Map. The figure provided by the Forest Inventory is considered the official statistic for forest cover in this chapter.

The EU Biodiversity Strategy, the Common Agricultural Policy Strategic Plan (including the €1.5 billion ACRES agri-environment scheme) and Food Vision 2030 all set targets for space for nature within agricultural land. Food Vision 2030 recognises the significant pressure on water quality and biodiversity exerted by agriculture (as the predominant land use). Food Vision 2030 outlines a sustainable food systems approach that recognises how fundamental a healthy environment is to food production. Such an approach requires food producers to also be engaged in sustainability measures (e.g. cutting GHG emissions, managing water resources, storing carbon, protecting soil health and supporting biodiversity). Food Vision 2030 calls for more to be done at EU and national levels to incentivise the delivery of ecosystem services by food producers. Initiatives such as the Farming for Nature programme provide tangible examples of farms that are productive and have a positive impact on biodiversity.

While some policies have a very clear land use implication – they will either conserve or expand particular land uses – other potential consequences are not clear, as they depend on how policies are implemented. For example, whether the Fifth Nitrates Action Plan, and any changes to Ireland's Nitrates Derogation, have an impact on land use demands depends on the response to reduced stocking rates and whether they are achieved by expanding the area of land farmed or by managing the number of livestock.

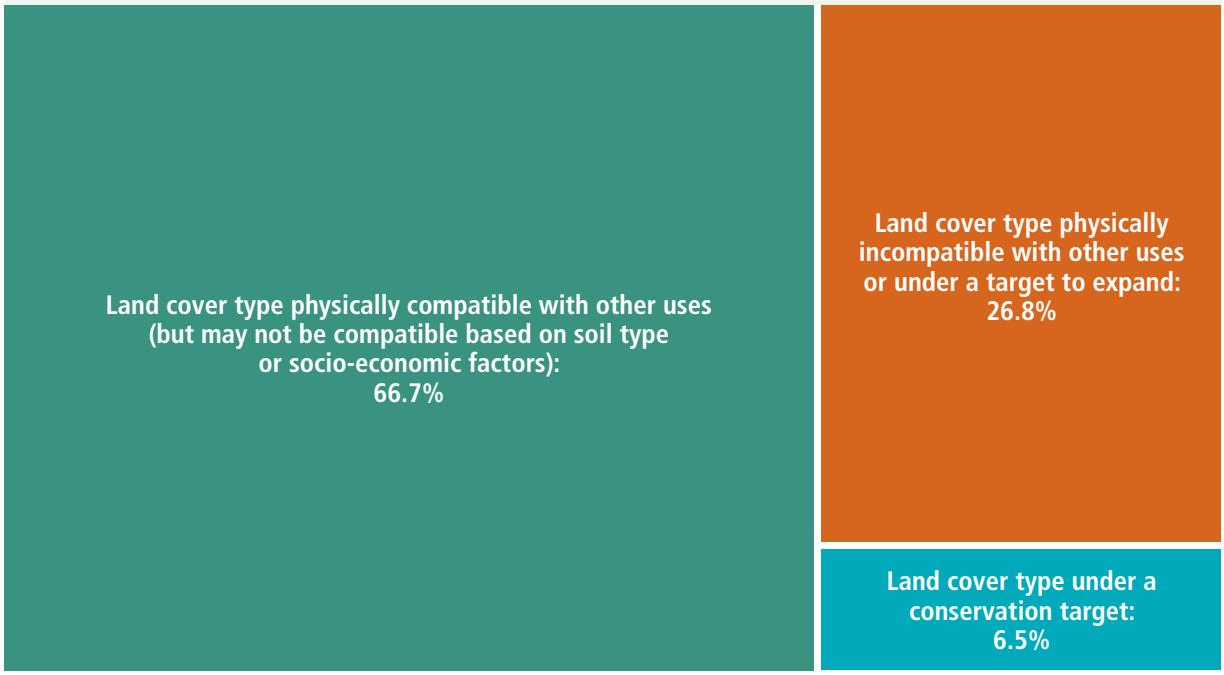
Similarly, renewable energy targets incur demands for onshore wind and solar installations. The impact of this demand on land use depends on the type of land the energy installations occupy and the potential for energy generation to co-exist with other land uses. Solar and wind energy infrastructure can co-exist with other land uses (e.g. agrivoltaics is the dual use of land for agriculture and solar power generation). The revised Renewable Energy Directive ((EU) 2023/2413) entered into force in October 2023. It requires the existing share of renewable energy in the EU to double. In identifying where renewable generation can be accelerated, Member States must map the domestic potential for renewable energy generation and the associated infrastructure required by May 2025. The revised Renewable Energy Directive proposes that the permit-granting procedures may need to be further streamlined to enable the acceleration of renewable energy delivery. Renewable energy generation can be achieved through wind energy, solar energy and bioenergy (Figure 5.10). The specific effects of the acceleration of energy generation on Ireland's land use depends on how these energy sources are implemented.

Figure 5.10 Solar array, Hilltown Solar Farm, Co. Meath

Credit: David Dodd, DECC

National policies and strategies, along with our existing land use practices, are placing demands on Ireland's land. Not all locations and existing land uses can support changes in land use or the addition of different land uses. For example, artificial surfaces are generally not compatible with forestry or agricultural expansion targets, as this would require the removal of built surfaces first. Figure 5.11 shows a limited, high-level assessment of existing land cover types that are potentially physically compatible with a future change in land use. It indicates that up to 66.7% of Ireland's land is potentially physically compatible with a change in land use. However, this assessment does not consider other important contexts, such as soil type or the social or economic aspects of a change in land use. Accordingly, the actual amount of land that is truly compatible with a change in land use – when soil type, social, economic and other factors are considered – is likely to be considerably less. The assessment doesn't account for multiple land uses at the same location which will be an important approach for the future. A much deeper assessment of which land uses are suitable for different locations is required to create a clear picture of land demand in Ireland and to identify whether Ireland can accommodate all current land use demands.

Figure 5.11 Area of land in Ireland that is physically compatible with a change in land use to meet policy targets



Other land use constraints

As well as social and economic factors, other constraints can influence the suitability of land for particular uses. Climate change brings increased climatic hazards. The Climate Ireland portal[5] identifies coastal erosion, inland flooding, coastal flooding and water scarcity as Ireland's key climatic hazards of concern.

Coastal erosion will influence future land use in coastal zones, depending on the strategic approaches adopted locally to respond to coastal erosion (Figure 5.12). Strategies to conserve existing developments or land uses in coastal zones can manage the impact but may require significant investment in hard infrastructure. Retreat allows for coastal erosion but may result in land uses or development projects having to be abandoned or for 'no development' policies to be implemented in coastal zones.

5 www.climateireland.ie (accessed 2 July 2024).

Figure 5.12 Coastal erosion near Kilmore, Co. Wexford

Credit: David Dodd, DECC

Nationally, Ireland has high levels of water availability, but there are constraints on the water supply in more densely populated areas, particularly along the east coast, which might affect residential and commercial development. Uisce Éireann's water supply capacity register[6] shows that, while there is capacity for new connections in the Dublin area, there are limits on the level of service available and that water conservation orders are likely until the development of new supplies. Examination of the 2018 drought identified that, while the drought occurred on a national scale, its impacts varied: eastern regions reported a reduction in harvested biomass, while western uplands and bogs in the midlands produced more biomass (Falzoi *et al.*, 2019). Ireland's Climate Change Assessment (Thorne *et al.*, 2023) projects increases in the frequency and severity of droughts which may impact regional agricultural and forestry land use and ecosystems.

The Office of Public Works has modelled the risk for coastal and river flooding. An analysis of the coastal flood risk overlain on the National Land Cover Map shows that the types of land cover most likely to be impacted by coastal flooding include the typical land cover classes that occur in coastal areas (sand dunes, saltmarshes, etc). Table 5.4 shows the areas of land cover types that are at risk from coastal flooding and river flooding under modelled high-probability scenarios.

For coastal flooding, typical coastal land cover types such as saltmarshes and sand dunes are at risk. This assessment provides a high-level summary of the types of land cover that are at risk of flooding, indicating the types of land use constraints that we will have to contend with as Ireland's climate changes. Considering their relative extent in the National Land Cover Map, artificial areas are relatively more at risk from coastal and river flooding than other land cover types. Ireland's Climate Change Assessment (Thorne *et al.*, 2023) noted the importance of developing plans – particularly for the built environment and coastal environments – to develop a climate-resilient Ireland.

6 www.water.ie/connections/developer-services/capacity-registers/water-supply-capacity-register/dublin/ (accessed 2 July 2024).

Table 5.4 Areas of land cover types at risk of coastal or river flooding (in hectares) according to the Office of Public Works' high-probability flood scenarios

Land cover type	Area (ha) at risk under high-probability flooding scenario	
	Coastal flooding	River flooding
Artificial surfaces	2,529	3,269
Exposed surfaces	4,961	2,767
Cultivated land	3,075	4,616
Forest, woodland and scrub	6,404	12,370
Grassland	29,130	50,256
Saltmarsh and swamp	4,419	1,190
Peatland	809	5,963
Heath and bracken	645	232

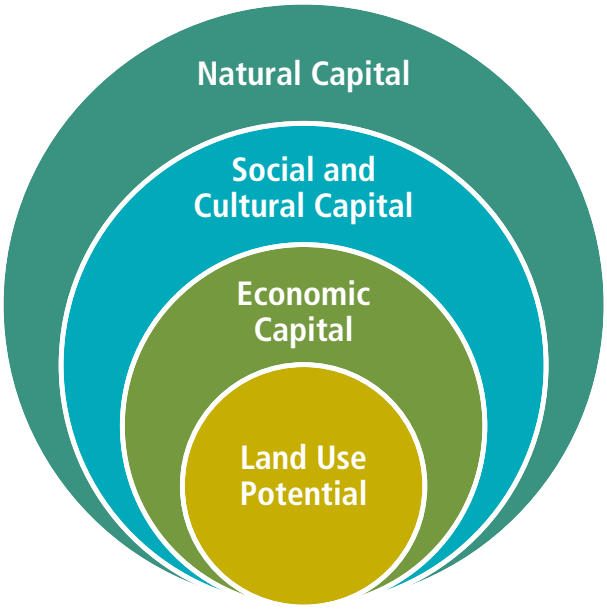
5. Responses to land use pressures and land demands

A range of approaches are being taken to address land use pressures and goals in various countries, including Ireland. A capitals framework concept (DAFM and DECC, 2023d) identifies land as a critical resource underpinning economic, social/cultural and natural capital (Figure 5.13). These three types of capital are interrelated; activities in one can result in positive or negative outcomes in another. Natural capital refers to the direct and indirect value that nature provides to society (Dwyer and Wentworth, 2020). Natural capital includes freshwater, minerals, soil for growing food, and natural services such as pollination. An important conclusion of the capitals framework is that safeguarding natural capital requires a shift from policies that focus on different aspects of land use towards a more integrated approach (Dwyer and Wentworth, 2020). A Royal Society paper (RS, 2023) recommends that land use decision-making should be based on a multifunctional approach that considers natural aspects when making decisions about economic or social uses of land.

Examples of national land use plans

The importance of prioritising land use decisions as the basis for meeting socio-economic, climate change and biodiversity goals is supported by an assessment completed by the Danish Council on Climate Change (DCCC, 2024). The assessment considered how Denmark's land use in 2050 would be able to meet three goals (limiting GHG emissions, achieving good ecological status in water bodies and making room for biodiversity). The assessment identified a synergistic effect: some land uses contribute to several objectives simultaneously if applied in the right locations. The synergistic effect could help to limit the costs of achieving the three objectives. Given that 72% of Denmark's land is agricultural, the regulatory framework proposed in the assessment could be of significant interest to Ireland.

Figure 5.13 A capitals approach to land use



Source: DAFM and DECC, 2023d

The concept of multiple benefits is not new: Scotland implemented a multiple benefits approach in its first land use strategy in 2011 (Scottish Government, 2011).

Scotland has released two further land use strategies since 2011, both of which build on the initial strategy. Like Ireland, Scotland's land is mostly in private ownership. The 2017 Scottish statement of land rights and responsibilities recognised the close relationship between land and people and that 'land use and ownership contribute to the fulfilment of many human rights' (Scottish Government, 2017). Managing land use to meet multiple needs requires a truly collaborative approach to understanding (sometimes competing) stakeholder requirements across different sectors at scales that can be implemented at a local level (Hölting *et al.*, 2020). Meaningful stakeholder engagement from the start is essential for the implementation of land use that provides multiple benefits (Dwyer and Wentworth, 2020). This is especially important in Ireland, given Ireland's land ownership profile and the importance of community buy-in for land use decisions.

Scotland's current (and third) land use strategy recognises that demands on its land are growing and that addressing climate and nature emergencies requires changes in how land is used (Scottish Government, 2021). Scotland's land use strategies illustrates the potential to move away from a siloed view of land use towards a recognition of land use as a system.

Topic Box 5.2 Scotland's land use strategies

Scotland's first land use strategy (Scottish Government, 2011) stated that, while Scotland's land area is fixed, the benefits that land can deliver are not. The strategy noted that not all land benefits (or services) are visible to landowners and, with the right knowledge and support, land capacity could be better exploited in sustainable ways. Land use that delivers multiple benefits describes a land use approach that delivers various positive outcomes, often for more than one stakeholder. One example presented in Scotland's land use strategy is an agroforestry land use approach whereby natural woodland on a farm provides shelter for livestock along with carbon retention and ecosystem benefits.

Scotland second strategy (2016–2021) retained the vision and objectives of the first and sought to clarify how a land use strategy would support cross-sectoral, rather than sector-by-sector, approaches to land use (Scottish Government, 2016). The second strategy was followed by a statement of land rights and responsibilities (Scottish Government, 2017).

Scotland's third land use strategy presents an overarching vision of what sustainable land use in Scotland could look like, moving away from a sector-by-sector approach. The strategy presents seven representative landscapes with a vision for how each landscape would change if competing land uses were sustainably managed.

Phase 1 of Ireland's Land Use Review includes a review of 21 national land use plans (NLUPs) and strategies from other countries to assess their approaches to land use planning. The plans all took different approaches, but the concept of the interconnectedness of land use decisions and environmental (or natural) capacity was a common theme in many. Ecosystem services approaches were taken by Costa Rica, Iceland, Portugal and Switzerland. Portugal's NLUP perceived ecosystem services as a way of differentiating regions and redistributing wealth, noting the importance of integrating ecosystem services into economic value chains. Costa Rica was an early adopter of payments for ecosystem services. To address low forest cover, a 1996 law paid landowners to convert agricultural land and livestock farming into agroforestry and silvopasture (combining trees and livestock).

Payment was provided for mitigating GHG emissions and protecting biodiversity, water and/or scenic beauty. Costa Rica significantly increased its forest cover, and land has become a carbon sink (DAFM and DECC, 2023e).

Another common theme across many of the NLUPs was the use of spatial data and models to help design and track land use decisions and interventions. Access to data through programmes such as the European Copernicus Land Monitoring Service offer great potential to track changes in land use, as they make it feasible to quickly assess the impacts of land use decisions.

Ireland's Land Use Review

The 19 recommendations from phase 1 of Ireland's Land Use Review address the data and evidence that should be developed to support land use plans in Ireland. Phase 1 recommended developing the ability to track and model Ireland's land use as the integrated and interconnected system that it is. Phase 1 delivered a point-in-time assessment of Ireland's land use: bringing together a complete set of integrated indicators would enable a constant or rolling review.

While phase 1 of the Land Use Review gathered evidence, phase 2 is assessing land use policies and measures. As outlined above, land use is driving pressures on the environment, but adopting a more integrated approach with multiple benefits, similar to approaches being taken by other countries, could provide a way forward. The challenge for phase 2 of the review is to identify the measures that are needed to ensure that Ireland's natural capital remains able to sustain social and economic land use needs. The engagement of all stakeholders is key (Dwyer and Wentworth, 2020), and the NLUP approaches of other countries show potential pathways for incentivising the protection of natural capital.

6. Conclusions

Ireland's land cover data tell us that the main land cover is grassland. Since 1990 there have been long-term trends of increasing areas of artificial surfaces, of wetland loss and of growing areas of forestry. Ireland's land cover changes have been driven by different factors, including national policy and economic activity. The new National Land Cover Map provides higher resolution information about domestic land cover than Ireland has ever previously accessed. Phase 1 of the Land Use Review made 19 recommendations about how Ireland's land evidence can be further extended and improved to support land use decisions.

The aim of the ongoing Land Use Review is to identify appropriate policies, measures and actions in the context of the government's wider economic, social and climate objectives. Environmental evidence shows that land is a net source of GHG emissions, and land use is driving pressures on water quality and biodiversity.

There are many demands on Ireland's land. Along with a growing population, there are a range of national policies and strategies that have targets that depend on land. Ireland's land is mostly privately owned, so the active engagement and participation of all land stakeholders is vital to ensure that policies and targets are successfully implemented.

While land-related policies and targets are often set at the national level, their implementation depends on the local scale: different locations are suited to different land use options. While it is challenging to consider local implementation when forming national policy, Ireland's relatively small geographical size makes this more feasible. The new National Land Cover Map, and advances in land mapping data and technology, present opportunities to support local-level decision-making. Considering Ireland's geographical extent and the range of demands on its land, a multiple benefits approach – properly applied – offers a path to meet environmental, social and economic demands. Land use decisions can be complex, but maintaining a rolling review of land use based on the best available data would support land use decision-making.

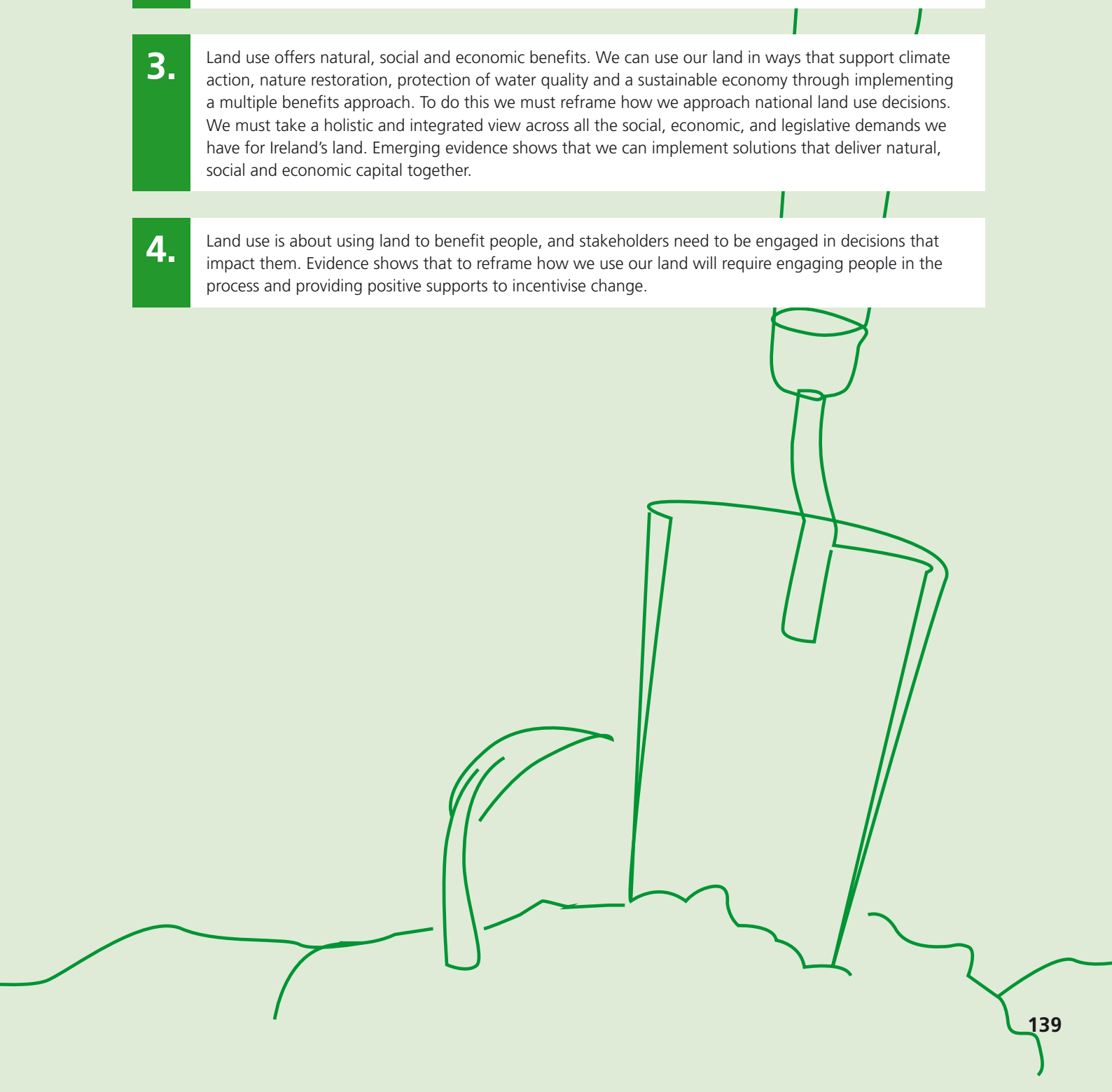
Key chapter messages

1. Ireland's land is in demand. Our current land use is a source of greenhouse gas emissions. Some of our current land use practices are exerting pressures on water quality and nature that show no immediate signs of abating.

2. We cannot make more land, so must use our land wisely. Part of this challenge is to understand how best to use our land for social and economic benefits in a way that supports, rather than damages, the environment. The national land use review has a vital role to play in identifying land use opportunities and constraints.

3. Land use offers natural, social and economic benefits. We can use our land in ways that support climate action, nature restoration, protection of water quality and a sustainable economy through implementing a multiple benefits approach. To do this we must reframe how we approach national land use decisions. We must take a holistic and integrated view across all the social, economic, and legislative demands we have for Ireland's land. Emerging evidence shows that we can implement solutions that deliver natural, social and economic capital together.

4. Land use is about using land to benefit people, and stakeholders need to be engaged in decisions that impact them. Evidence shows that to reframe how we use our land will require engaging people in the process and providing positive supports to incentivise change.



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