Northern Ireland Environmental Statistics Report

May 2019

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Northern Ireland Environmental Statistics

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National Statistics

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

These statistics were first designated as National Statistics, and underwent a full assessment against the Code of Practice, in September 2013 by the UK Statistics Authority https://www.statisticsauthority.gov.uk/publication/statistics-on-the-environment-and-waste-management-in-northern-ireland

No official compliance checks have been completed since, however, we have continued to comply with the Code of Practice since designation and have made the following improvements:

- Added more value by consulting on the report in 2017 [https://www.daera-ni.gov.uk/consultations/consultation-ni-environmental-statistics-report] and attending and presenting at the DAERA statistics user group meeting [DAERAstats-user-group].

- Ongoing quality assurance of the indicators contained within the report by reviewing methods and indicators annually.

- Improved statistical output by creating infographics to accompany the report and tables https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2018.

Reader Information
As this is an environmental publication, no hard copies have been published. This document may be made available in alternative formats, please contact us to discuss your requirements.

Purpose
Report on a range of environmental indicators and provide links to government strategies.

Data Quality
Good or very good depending on dataset. Full details can be found in the user information report available on our website: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Contents

Introduction

Welcome to the eleventh annual Northern Ireland Environmental Statistics Report. This report is intended to be the first reference point for a range of environmental indicators and will provide, where available, annual updates on the indicators contained within it. It is of both public and academic interest and provides a valuable resource across government in providing links to government strategies.

The first annual 'Northern Ireland Environmental Statistics Report[1] was launched on 29 January 2009 as a follow on to the first Northern Ireland Environment Agency (NIEA) State of the Environment Report (March 2008). The 2008 State of the Environment Report[1] prepared by the Environment & Heritage Service (now called the Northern Ireland Environment Agency) within the Department of the Environment (now called Department of Agriculture, Environment and Rural Affairs) was technical in nature and was the first assessment of the state of Northern Ireland's environment. Its aim was to set out baseline data to provide a future measure of the changing state of the environment in Northern Ireland. Northern Ireland Environmental Statistics Reports, however, provide an annual update to the figures and provide commentary around the trends. There has since been a follow up to the first State of the Environment Report, entitled 'From Evidence to Opportunity - A Second Assessment of the State of Northern Ireland's Environment'[1] published in December 2013 by NIEA. This report uses the data in the Northern Ireland Environmental Statistics Report published in January 2012, but adds further background and context to the figures, as well as highlighting the key challenges within each theme.

The indicators that have been chosen for inclusion in this current report, in most instances, complement those that were included in the original State of the Environment Report. Additional indicators have been added, particularly with regard to demographics, environmental pressures and public opinion. Some of the indicators reported in the original State of the Environment Report have not been continued in this report. This is either because there is no further up-to-date data available, or because the indicator is not suitable for annual updates.

We continually review and consult on the content of this report, for example, please see links detailing information from previous user survey, stakeholder workshop and user consultation. Whilst some changes were required in order to include Programme for Government indicators in the report, the recent consultation also provided an opportunity to assess usage of the report and gauge interest in any new indicators that could potentially be included. As a result several new indicators were included in the 2018 report: Carrier bags dispensed; Soluble Reactive phosphorus in Rivers (SRP); Winter Dissolved Inorganic Nitrogen (Winter DiN); Terrestrial Litter; Percentage of terrestrial area under favourable management and percentage of protected marine area under favourable management.

In the 2019 report there are indicators covering eight main topics: Demographics & Public Opinion, Air & Climate, Water, Marine, Land, Biodiversity, Built Heritage and

[1] State of the Environment Reports (December 2013), https://www.daera-ni.gov.uk/publications/state-environment-report-2013

Waste. The indicators presented are based on the most recently available data at the time of publication, and most provide data on trends over time and, where applicable, performance against quantified targets. The indicators that are included were determined in agreement with key data providers, policy colleagues and other interested parties.

This report provides some commentary on each of the indicators and describes any trends that they illustrate. All figures in the report, apart from those with maps only, have corresponding tables which can be found in the associated Excel workbook available online at: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019.

This report is updated annually and each year the indicators will be reviewed for their usefulness and relevance. Additional indicators will also be considered for future years. If you have any comments on the indicators currently published or suggestions for future reports please send the details to the contact listed at the beginning of the report.

Summary of changes to indicators since previous publication

When the report is reviewed each year, some additional indicators may be added and in some instances indicators may need to be removed. Details of such changes this year can be seen in the table below.

Indicators added to / amended in the publication

Indicator		Figure number	Details
Number of days per year with temperature below zero	Added	2.14	New indicator added as a result of the consultation.

1 Demographics & Public Opinion

People and households use up significant levels of resources, such as water, energy and food, and can exert pressure on the environment. Our lifestyle choices also impact upon the state of the environment. This chapter will look at Northern Ireland's changing population and environmental pressures, as well as our changing attitudes towards the environment.

Key points in this chapter:

- In 2017, the Northern Ireland population was estimated to be 6% larger than it had been ten years previously and 21% larger than it was in 1971. The population projections indicate that the population will continue to increase over the next 20-25 years.

- As the population increases, the number of households has also increased. The number of households has, however, increased at a faster rate than the population, as a result of a declining number of people per household.

- Air passenger numbers have increased by 72% in Northern Ireland between 2001 and 2017, with the advent of low-fare airlines a major factor in this. A total of 8.6 million passengers were recorded in 2017, numbers had previously peeked at 8.2 million in 2008, then gradually declined to around 7 million before gently increasing in recent years to give an all-time high of 8.6 million in 2017.

- Car travel continues to dominate the way we do most of our day-to-day travelling, with 70% of our journeys being made by car.

- The level of public concern about environment issues peaked in 2008/09 (at 82%) but has since fallen so that the levels in 2017/18 (71%) are lower than those in 2003/04 (76%).

- Illegal dumping of waste is the biggest environmental concern for households in Northern Ireland.

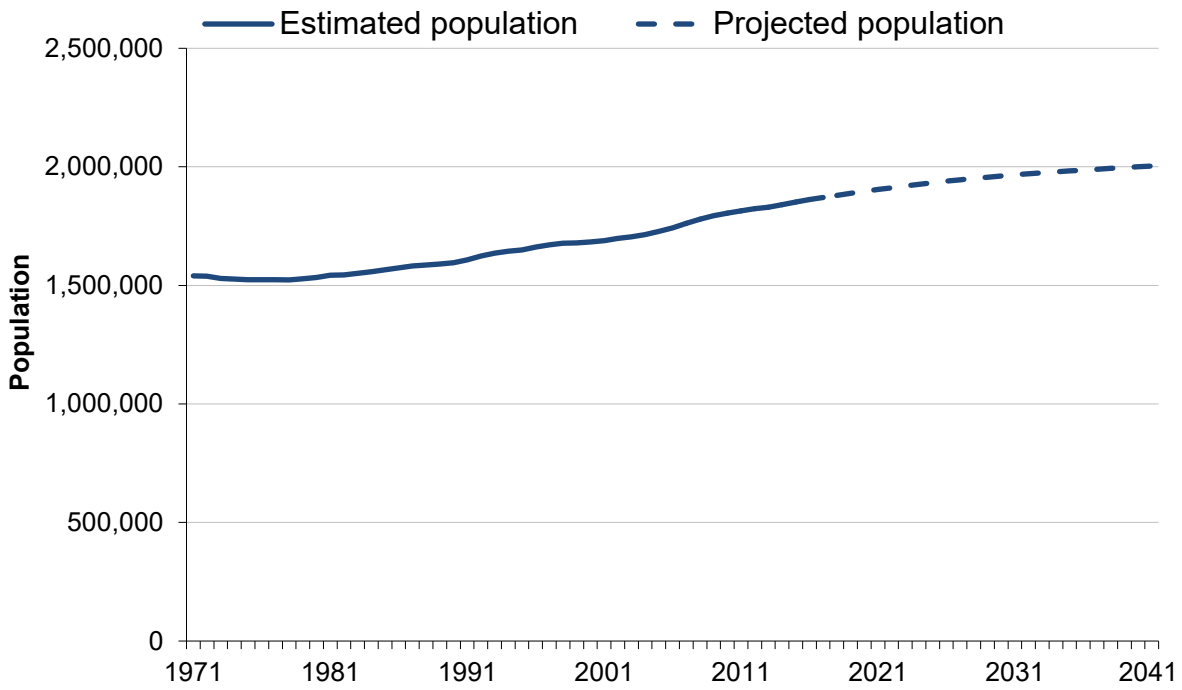
- Similarly, to the previous year, the most common actions taken by households for environmental reasons in 2017/18 were reusing plastic bags or using a reusable bag, using energy saving light bulbs and ensuring clothes / furniture are reused.

- During the fifth year of operation, 98.8 million carrier bags were dispensed by retailers under the carrier bag levy in Northern Ireland. This was 1.1% lower than the previous year, with 1.1 million fewer bags dispensed.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Demographics

Figure 1.1 NI population, estimated (1971-2017) and projected (2018-2041)



Source: NISRA

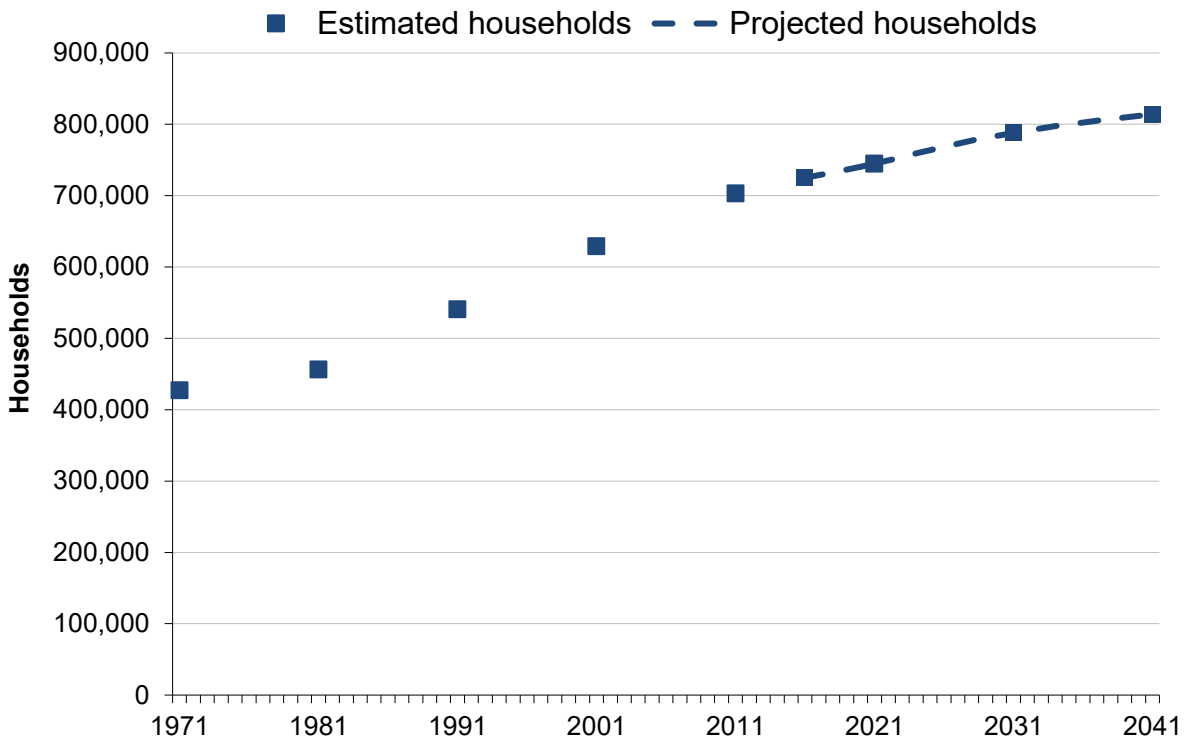
Northern Ireland mid-year population estimates are based on the 2011 Census of population. Each year, the population is 'aged-on' by one year with the number of births in the year added and the number of deaths in the year subtracted. An adjustment is also made for migration. Subsequent mid-year population estimates then use the previous year's figures as the base.

The latest figures from NISRA show that in June 2017, the Northern Ireland population was estimated to be 1.87 million, an increase of 6.2% over the decade from 2007 and an increase of 21.5% since 1971. The population is projected to top 1.90 million by 2021, with further growth to 1.97 million by 2032. The 2 million milestone is anticipated to be reached by 2040.

The chart above displays population estimates and 2017-based population projections. These are the latest projections available at the time of publication.

Demographics

Figure 1.2 NI households, Census figures (1971-2011) and projected (2016-2031)



Source: NISRA

The historic data on the number of households in Northern Ireland are taken from the census of population.

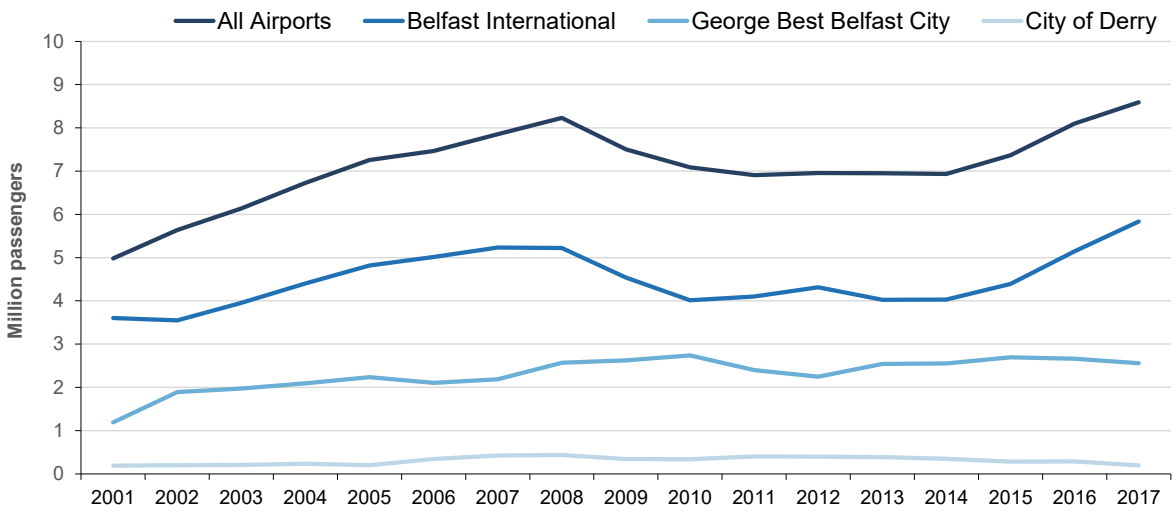
The projected number of households in Northern Ireland, shown in Figure 1.2 above, is derived using a series of assumptions on household formation and the 2016-based population projections https://www.nisra.gov.uk/publications/northern-ireland-household-projections-2016-based.

The number of households in Northern Ireland in 2016 was estimated to be 725,000 an increase of 70% since 1971.

By 2041, the number of households in Northern Ireland is projected to increase by 12% on 2016 figures (to 813,789).

Environmental Pressures

Figure 1.3 Northern Ireland airport passenger numbers, 2001 – 2017



Source: Civil Aviation Authority

Airport passenger numbers increased from 5.0 million in 2001 to a peak of 8.6 million in 2017. Between 2008 and 2014 numbers fell from 8.2 million to 6.9 million before increasing again in 2015 and 2016 to 7.4 and 8.1 million respectively. Total airport passenger numbers increased by 24% between 2014 and 2017.

Passenger numbers at Belfast International increased from 3.6 million in 2001 to 5.2 million in 2007 and 2008. This fell to 4.0 million in 2013 and 2014 before increasing again to a peak of 5.8 million in 2017.

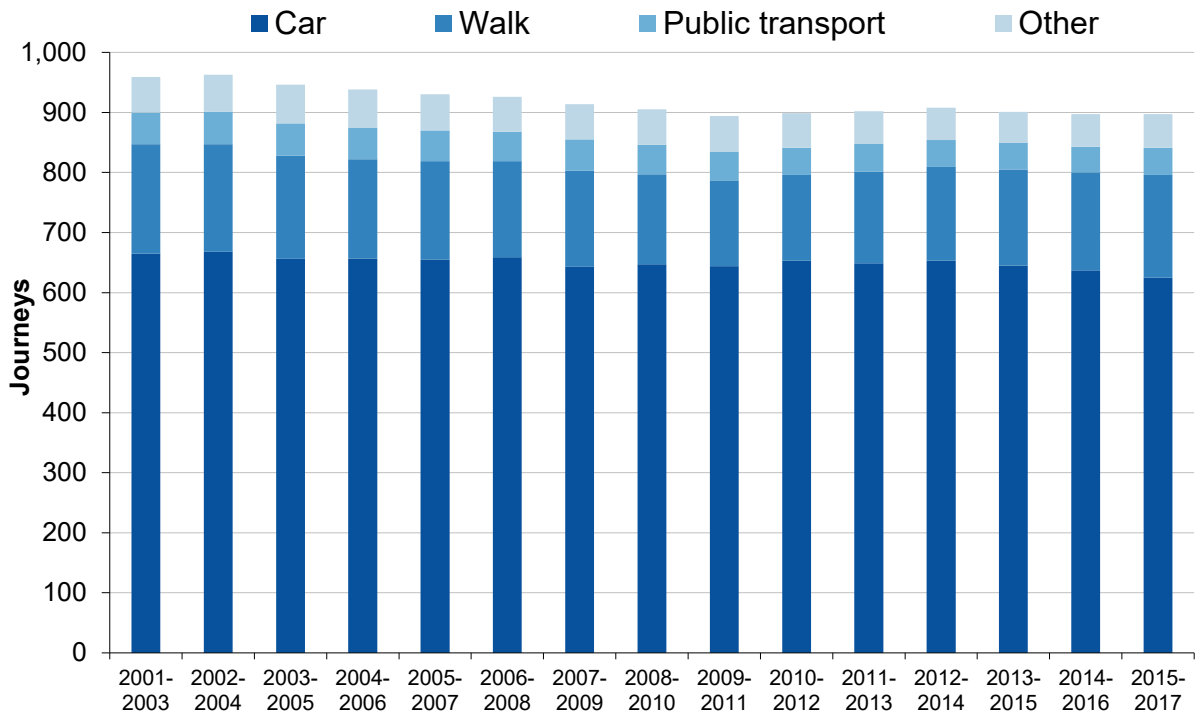
George Best Belfast City increased from 1.2 million passengers in 2001 to 2.7 million in 2010. This fell to 2.2 million in 2012 before reaching 2.7 million in 2015 and 2016 and falling to 2.6 million in 2017.

City of Derry airport passenger numbers increased from 0.2 million in 2001 to 0.4 million in 2007 and 2008. Since then, numbers have fallen to 0.2 million passengers in 2017.

In 2017, Belfast International accounted for 68% of all airport passengers in Northern Ireland, with George Best Belfast City accounting for 30% of all airport passengers. City of Derry accounted for the remaining 2% of all airport passengers in Northern Ireland.

Environmental Pressures

Figure 1.4 Number of journeys per person per year by main mode of transport, 2001-2003 to 2015-2017



Source: Travel Survey for Northern Ireland, DfI

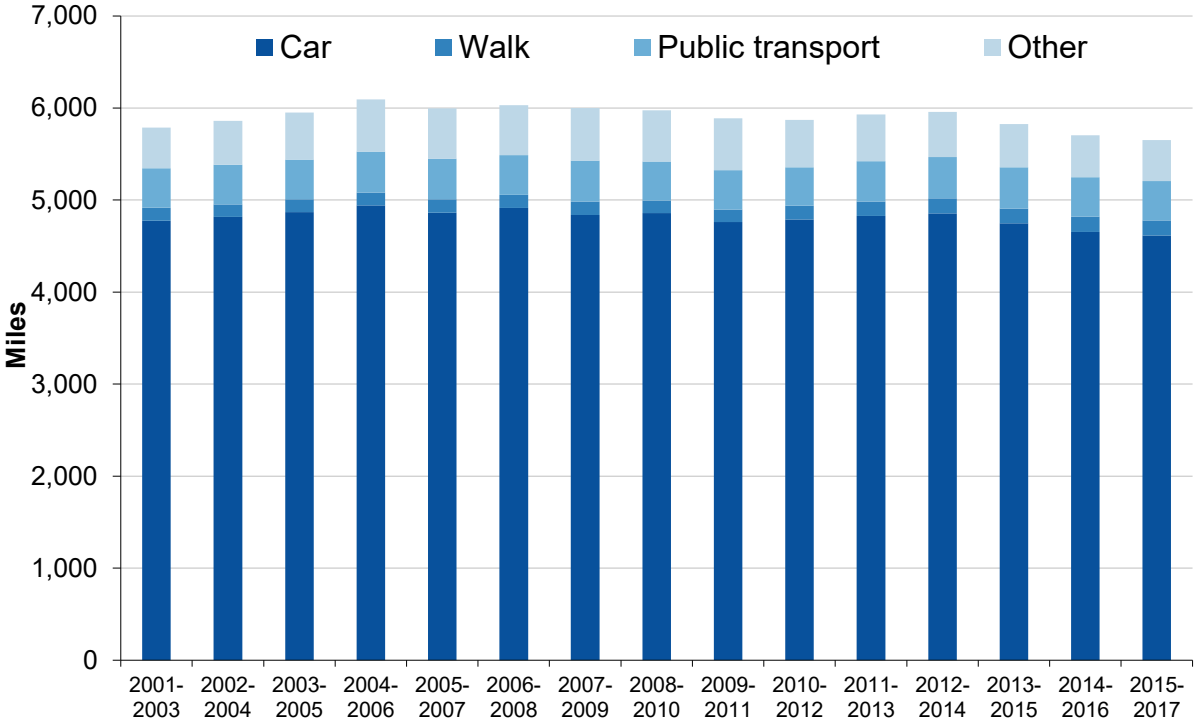
During 2015-2017 each person made an average of 897 journeys per year (over 2 journeys per day). This has decreased by 7% from the 2001-2003 average of 960 journeys per person per year.

On average, in 2015-2017 a total of 70% of all journeys were made by car, either as a driver, or a passenger. During the period 2001-2003 to 2015-2017, car has been the most popular method of transport. The proportion of all journeys made by car accounted for 69% in 2001-2003, increasing to 73% in 2010-2012 and then decreasing to 70% in 2015-2017. Over the same period, the proportion of all journeys made by walking fell from 19% in 2001-2003 to 16% in 2010-2012 and then rose back to 19% in 2015-2017.

Public transport accounted for 5% of all journeys in 2015-2017. Since 2001-2003, the proportion of journeys made by public transport remained stable at between 5% and 6%.

Environmental Pressures

Figure 1.5 Average distance travelled per person per year by mode of transport, 2001-2003 to 2015-2017



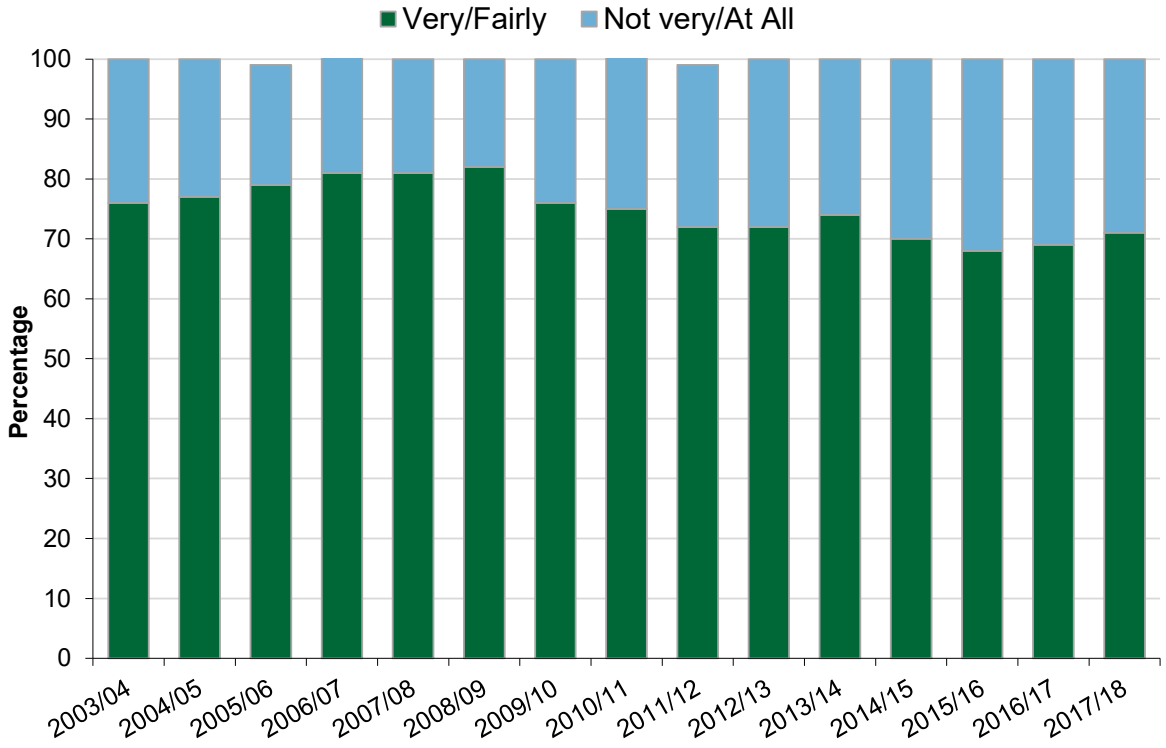
Source: Travel Survey for Northern Ireland, DfI

The total average distance travelled per person per year rose from 5,786 miles in 2001-2003 to 6,094 miles in 2004-2006. It remained relatively consistent until recent years when there was a decrease in total distance travelled per person per year from 5,958 miles in 2012-2014 to 5,653 miles in 2015-2017 (approximately 15 miles travelled per person per day).

Car travel accounted for the majority of the total distance travelled at 82% in 2015-2017 while walking accounted for just 3%. People travelled on average 426 miles per year by public transport, 8% of the total distance travelled.

Public Opinion

Figure 1.6 Level of concern for the environment, 2003/04 – 2017/18



Source: Continuous Household Survey, NISRA

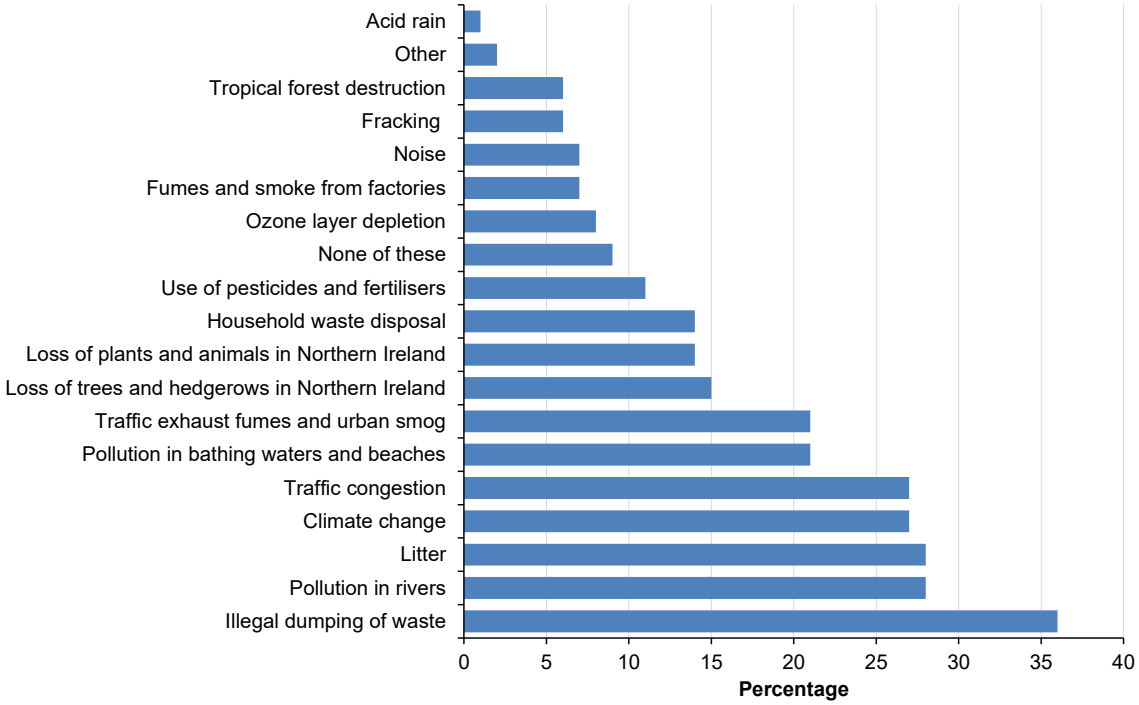
Northern Ireland households were asked to provide their views on environmental issues in NISRA's Continuous Household Survey (CHS)[2].

In 2017/18, the proportion of households very or fairly concerned about the environment was 71%. This was similar to the previous year when 69% of respondents were very or fairly concerned about the environment, furthermore, it is a 3 percentage point increase from the all-time low of 68% recorded in 2015/16. However, it was an 11-percentage point drop from a high of 82% recorded in 2008/09.

[2] https://www.nisra.gov.uk/publications/chs-survey-documents

Public Opinion

Figure 1.7 Environmental problems considered most important, 2017/18



Source: Continuous Household Survey, NISRA

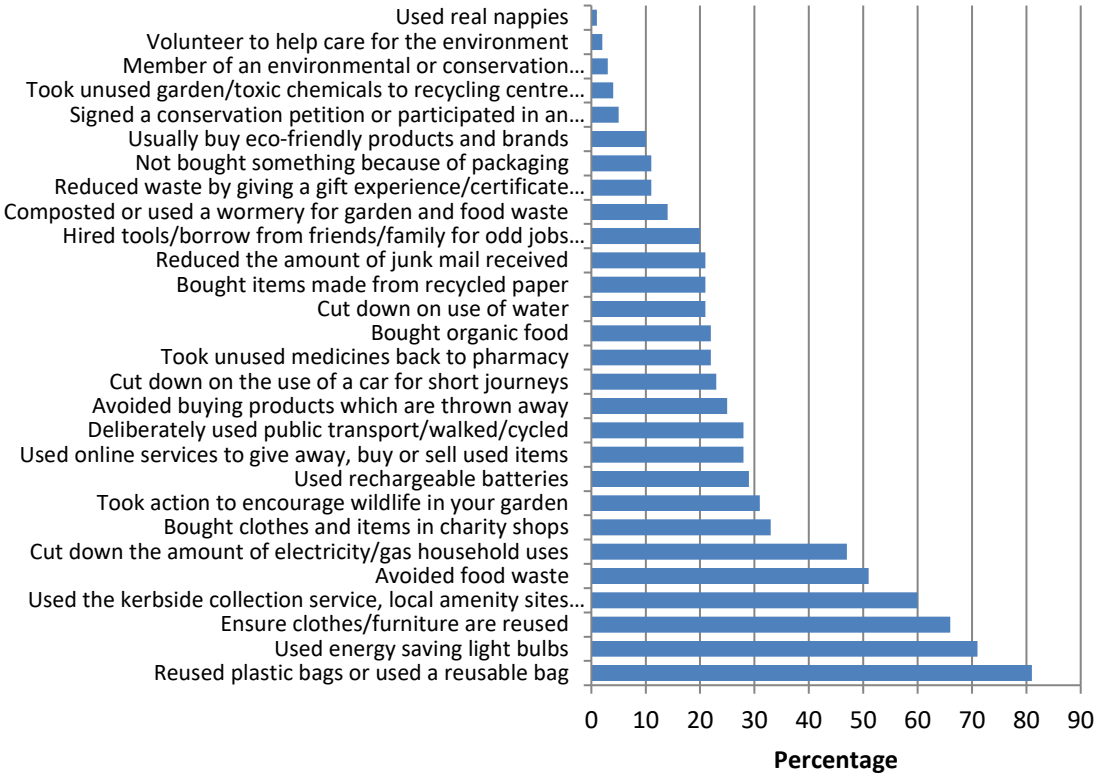
Households were asked to look at the list of environmental problems specified in Figure 1.7 and state which, if any, did they think was the most important to them. Multiple responses per person were permitted. Results show that in 2017/18, the most commonly selected environmental problems were illegal dumping of waste (36%), pollution in rivers (28%), litter (28%), climate change (27%) and traffic congestion (27%). The same options were selected as the most important environmental problems in 2016/17.

Since 2003/04, climate change has been reported as an important environmental problem by an increased proportion of NI households. In 2017/18, 27% of households cited it, compared to 13% in 2003/04. This could be linked to increased media exposure of extreme weather events which have occurred in recent years. However, only 8% considered ozone layer depletion to be a problem in 2017/18 compared with 22% in 2003/04 suggesting that the public do not link climate change with ozone depletion.

In 2017/18 traffic exhaust fumes and urban smog was mentioned by 21% of households as one of their most important environmental problems. However, the proportion of households who consider it a problem has decreased by 14 percentage points from 35% in 2003/04. Similarly, 31% of households considered household waste disposal as one of their most important environmental problems in 2003/04. This dropped by 17 percentage points in 2017/18 to 14%. Although Figure 1.7 only presents data for the most recent year available, the accompanying table online https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019 includes data from previous years.

Sustainability of Lifestyle

Figure 1.8 Actions taken that have a positive impact on the environment, 2017/18



Source: Continuous Household Survey, NISRA

The survey additionally asked households what actions they had taken in the last 12 months that have a positive impact on the environment. Results indicate that in 2017/18, the top three actions taken by households were: reusing plastic bags or using a reusable bag (81%); using energy saving light bulbs (71%) and ensuring clothes/furniture are reused (66%). The same top three actions were observed in 2016/17 with percentages of 83%, 70% and 65% respectively.

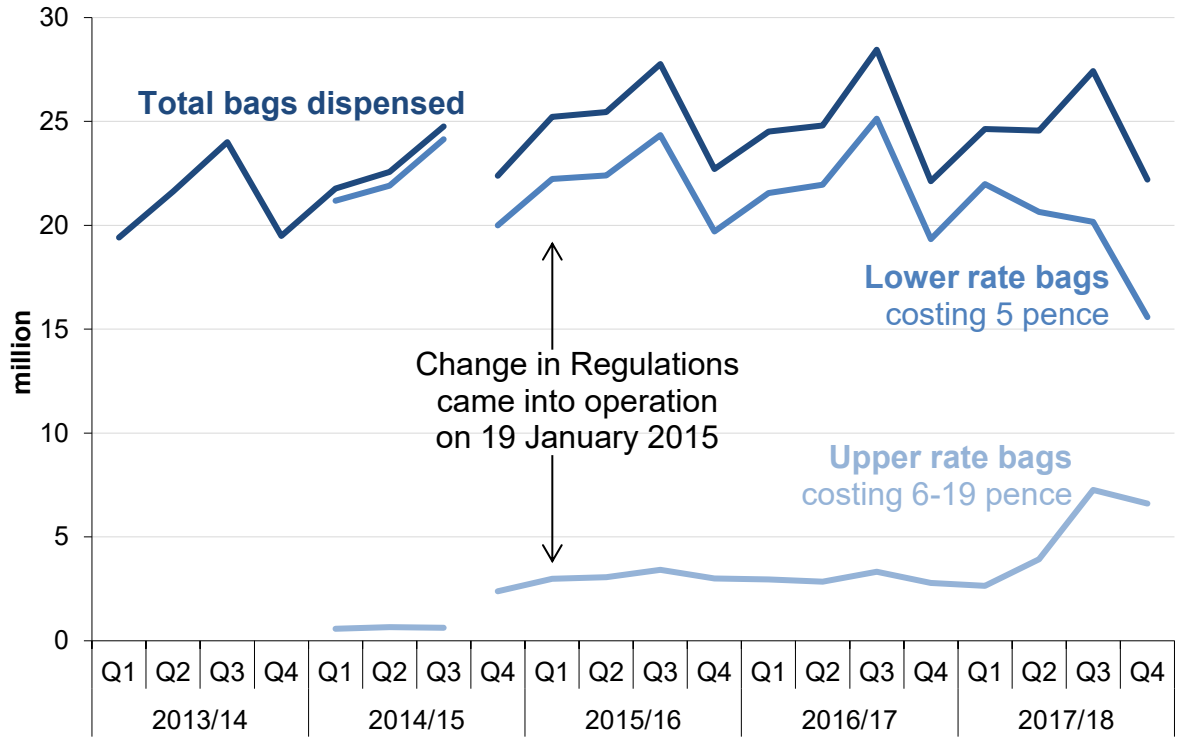
The proportion of households cutting down on the amount of electricity/gas used fell by 2 percentage points to 47% in 2017/18. The proportion of households who bought clothes and items in charity shops fell 3 percentage points to 33% in 2017/18. Similarly, the proportion that reduced waste by giving a gift experience/certificate instead of product also fell by 3 percentage points to 11% in 2017/18.

An increased proportion of households, up 3 percentage points to 21% in 2017/18 reduced the amount of junk mail received.

Although the figure above only presents data for the most recent year available the accompanying table in the excel tables online includes data from previous years (https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019)

Carrier bag usage

Figure 1.9 Carrier bags dispensed 2013/14 to 2017/18



Source: DAERA
Note: The scope of the carrier bay levy was extended during the last quarter of 2014/15. This contributed to the increases shown in reported bag numbers after 2013/14.

The Single Use Carrier Bags Charge Regulations (Northern Ireland) 2013 were made on 15 January 2013 and came into operation on 8 April 2013. Following the introduction of the legislation in 2013, all sellers of goods in Northern Ireland were required to charge their customers at least 5 pence (the levy) for every single use carrier bags supplied new.

Prior to the introduction of the carrier bag levy it was estimated that 300 million carrier bags were dispensed annually in Northern Ireland, however, on the implementation of the carrier bag levy this reduced by 71.8% to 84.5 million bags in 2013/14.

In 2014/15 this increased to 91.5 million bags and 2015/16 saw a further increase to 101.2 million bags[3].

[3] The increase in 2014/15 and 2015/16 can be partially explained by a changes in legalisation which came into operation on Monday 19 January 2015. The Single Use Carrier Bags Charge Regulations (Northern Ireland) 2013 (as amended) required that retailers had to charge the 5 pence levy to all carrier bags with a retail price of less than 20 pence – whether single use or reusable. This extension of the levy increased the overall cost of cheap reusable bags in an attempt to encourage shoppers to actively reuse these carrier bags on a more frequent basis and discourage their premature disposal.

During 2017/18, retailers under the carrier bag levy in Northern Ireland dispensed 98.8 million bags. This was 1.1% lower than 2016/17, with 1 million fewer bags dispensed.

Further information and data relating to the carrier bag levy are available from https://www.daera-ni.gov.uk/articles/northern-ireland-carrier-bag-levy-statistics

2 Air & Climate

The air that we breathe is vital to our health and wellbeing. Good air quality is essential for human health, the climate, habitats and the built environment. Pollutants from human activity are present in our atmosphere which may adversely impact upon our health and natural environment. This chapter will report on the quality of our air, on greenhouse gas emissions, renewable energy, environmental installations and the climate.

There are 18 air quality monitoring stations in Northern Ireland. Levels of carbon monoxide, nitrogen oxides, sulphur dioxide, particles, ozone, benzene and polycyclic aromatic hydrocarbons are monitored at many of these stations and are measured against UK Air Quality Strategy objectives and EU Air Quality Directives.

Weather conditions can be a contributing factor to some periods of poor air quality and subsequent elevated levels of air pollutants. This is true of hot, sunny weather which can lead to higher levels of ozone, and winter weather where temperature inversions can lead to increased levels of pollutants, especially particulate matter, at ground level.

Key points in this chapter:

- In 2017, the mean nitrogen dioxide level for the ten sites used for PfG reporting was 33.4µg/m^3. This was 2.1µg/m^3 less than the level reported in 2014. Therefore, the nitrogen dioxide indicator in 2017 is considered to have shown a positive change compared to the baseline year.

- In 2016, Northern Ireland's greenhouse gas emissions were estimated to be 20.6 MtCO2e, a reduction of 15.9% since 1990. The figure of 20.6 MtCO2e is an increase of 3.4% since the baseline year for PfG reporting (2014) and therefore is considered as a negative change for PfG reporting.

- In 2017, of the ammonia emissions from agriculture, 92% came from livestock and 8% from the application of fertilisers containing nitrogen. Emissions from livestock have increased by 11% between 2001 and 2017 whilst the ammonia emissions from nitrogen fertiliser have declined by 22%.

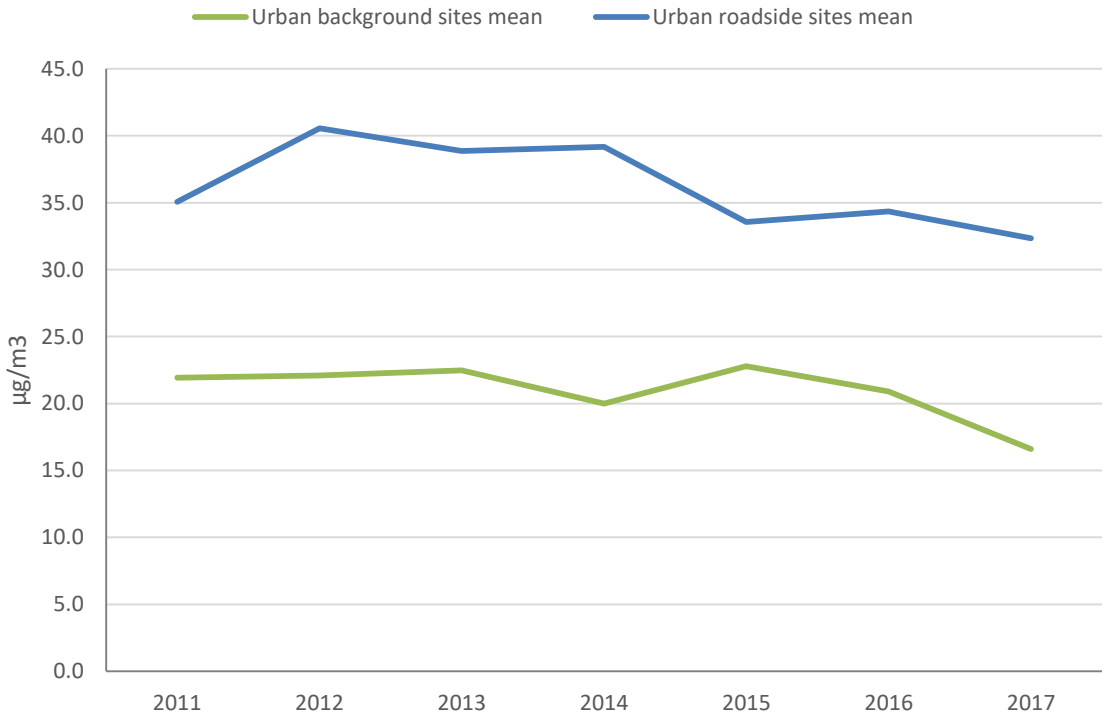
- In 2017/18, 2,876 GWh of electricity in Northern Ireland was generated from indigenous renewable sources. This was equivalent to 36.4% of total electricity consumption in that period, an increase of 9.3 percentage points on the previous 12 month period which has also seen the highest 12 month increase recorded.

- Climate change is of increasing concern to the Northern Ireland public, and some of the climate records do suggest that the average temperature in Northern Ireland has increased since the start of the 20th century.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Nitrogen Dioxide

Figure 2.1a Annual mean concentration of nitrogen dioxide (NO_2), 2011 – 2017



Source: DAERA

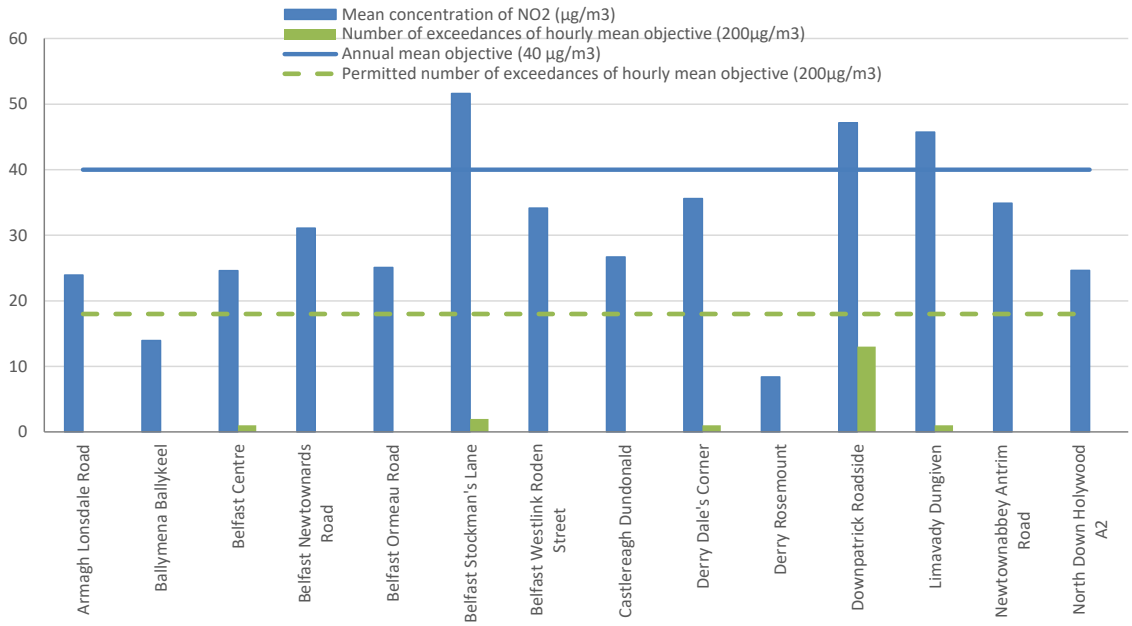
Nitrogen dioxide is part of a group of gaseous air pollutants produced as a result of road traffic and other fossil fuel combustion processes. It can irritate the lungs and lower resistance to respiratory infections such as influenza. Continued or frequent exposure to adverse concentrations may cause increased incidence of acute respiratory illness in children.

In 2017, nitrogen dioxide was monitored using automatic techniques at 16 sites across Northern Ireland. The UK Air Quality Strategy sets objectives for an hourly mean limit of 200µg/m^3 and no more than 18 exceedances of this hourly limit are allowed per year. In addition, there is an annual mean limit of 40µg/m^3. These objectives are the same as those set out in the EU Air Quality Directive 2008/50/EC.

The average annual mean concentration of NO_2 across Northern Ireland's urban background sites remained relatively stable between 2011 and 2016, varying between 20 and 23µg/m^3. In 2017 the average annual mean concentration of NO_2 was 17µg/m^3 across Northern Ireland's urban background sites.

Roadside nitrogen dioxide levels have been more variable, increasing from 35.1µg/m^3 in 2011 to a high of 40.6µg/m^3 in 2012. Since then, nitrogen dioxide levels have fallen to 32.3µg/m^3 in 2017.

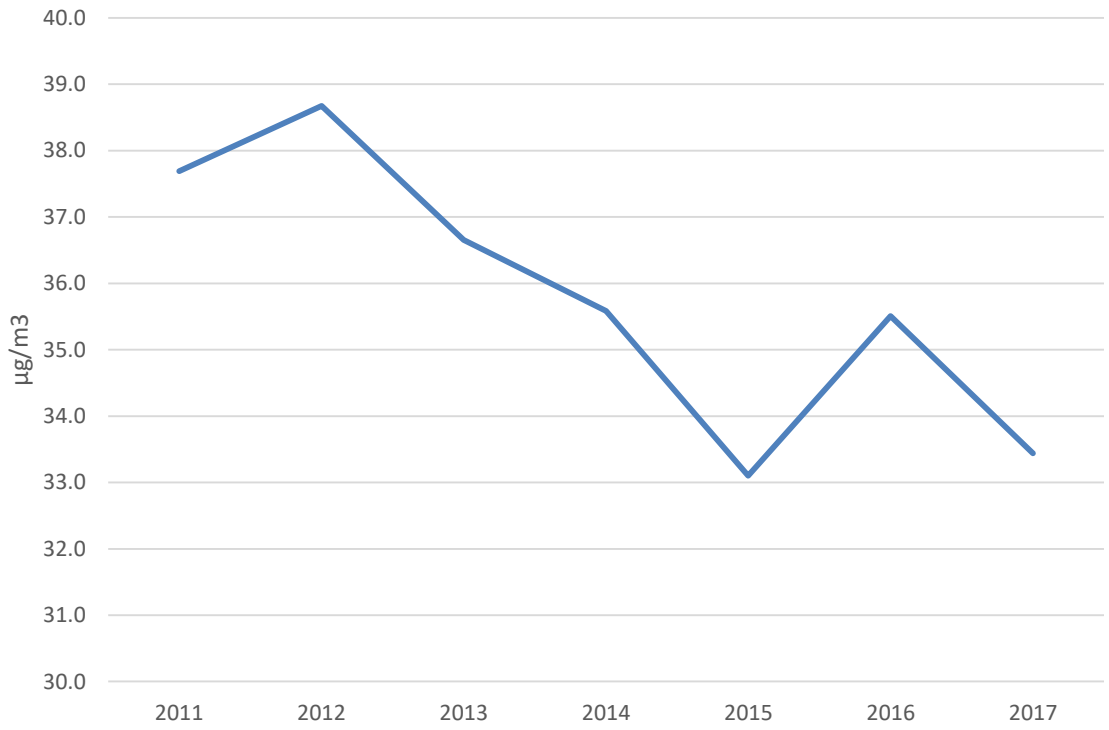
Figure 2.1b Annual mean concentration of nitrogen dioxide (NO_2) by site, 2017



Source: DAERA

In 2017, levels of NO_2 at three roadside sites breached the UK Air Quality Strategy annual mean limit value of 40 µg/m^3. These sites were: Downpatrick Roadside, Belfast Stockman's Lane, as well as Limavady Dungiven. The permitted number of exceedances (18 for an hourly mean limit of 200µg/m^3) was not breached at any sites during 2017.

Figure 2.1c Annual mean concentration of nitrogen dioxide (NO2), 2011 – 2017, 10 sites - Programme for Government indicator



Non Zero Axis

Source: DAERA

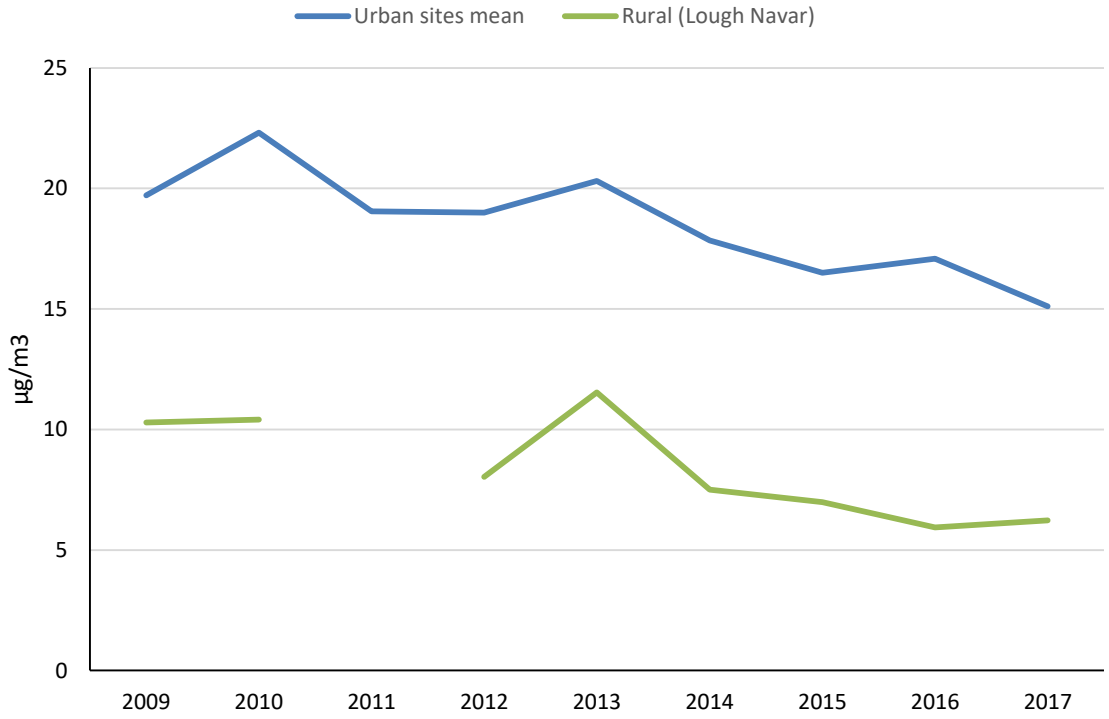
This is an indicator in the draft Programme for Government (PfG) framework. The ten sites included in the average above are:

- Armagh Lonsdale Road,
- Belfast Newtownards Road,
- Belfast Ormeau Road,
- Belfast Stockman's Lane,
- Belfast Westlink Roden Street,
- Castlereagh Dundonald,
- Derry Dale's Corner,
- Downpatrick Roadside,
- Newtownabbey Antrim Road,
- North Down Holywood A2.

The criteria used to report change for this indicator is +/- 1µg/m^3 against the baseline year value in 2014, when the mean nitrogen dioxide level for these ten sites was 35.6µg/m^3. A decrease, compared to the baseline year, of greater than 1µg/m^3 is considered a positive change, or an improvement in air quality, whilst an increase of greater than 1µg/m^3 is considered a negative change, or a deterioration in air quality. A value between 34.6µg/m^3 and 36.6µg/m^3 is considered as no change.
In 2017, the mean nitrogen dioxide level for the ten sites used for PfG reporting was 33.4µg/m^3. This was 2.1µg/m^3 less than the level reported in 2014 – figures are subject to rounding. Therefore, the nitrogen dioxide indicator in 2017 is considered to be a positive change from the baseline year.

Particulate Matter

Figure 2.2 Annual mean concentration of particulate matter (PM_{10}), 2009 – 2017



Source: DAERA
Note: There is no value for Lough Navar for 2011 due to low data capture.

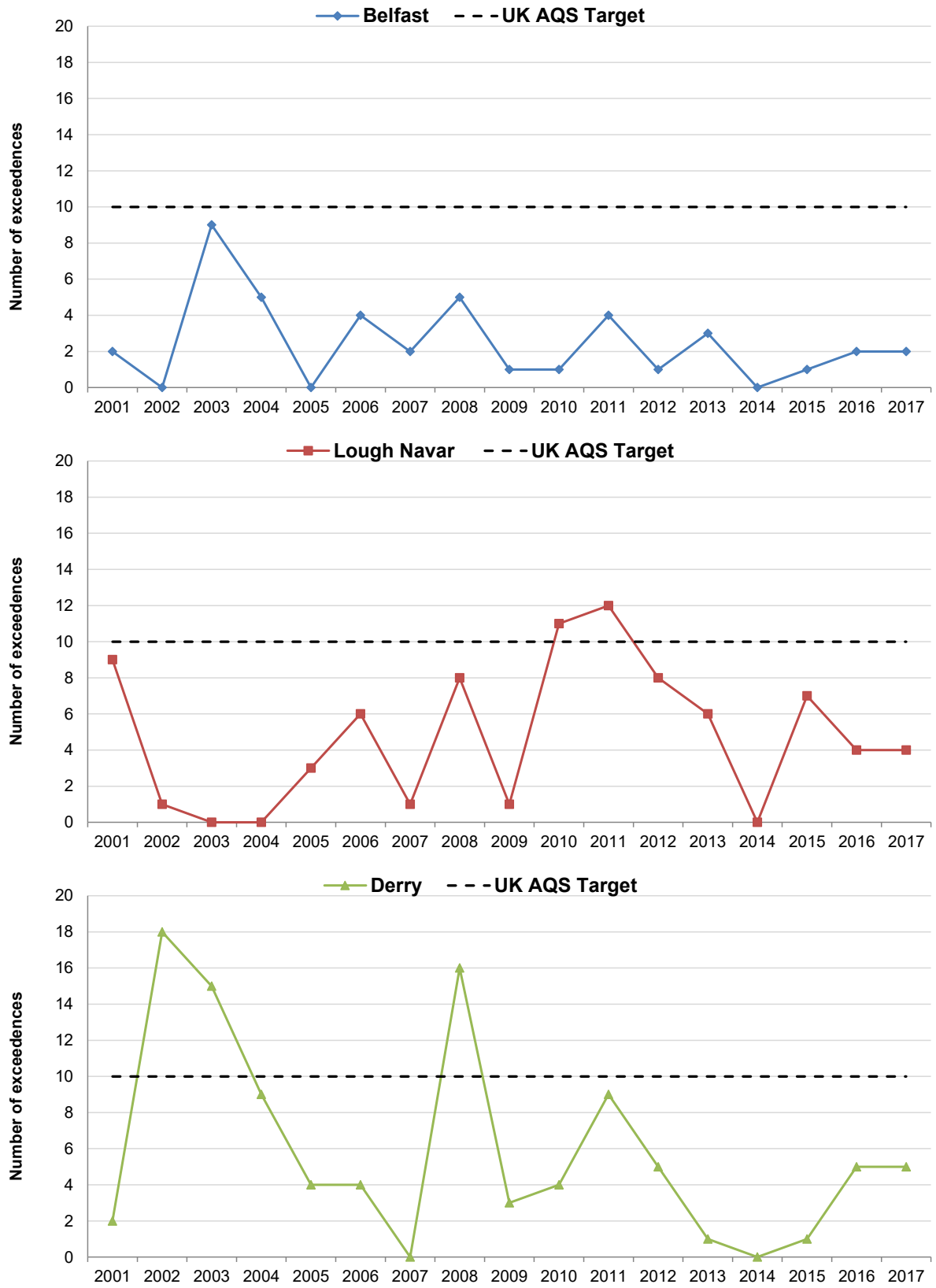
Particulate matter in the atmosphere with a diameter of less than or equal to 10 microns (PM_{10}) arises from both man-made and natural sources. Road transport and fossil fuel combustion produce the majority of airborne particulate matter found in the air in urban locations. Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of symptoms in people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs.

The UK Air Quality Strategy sets objectives for an annual mean limit of 40 µg/m^3 for PM_{10}. It also sets a daily mean limit (24-hour mean) of 50 µg/m^3 which is not to be exceeded more than 35 times a year. These objectives are the same as those set out in the EU Air Quality Directive.

In 2017, at all 10 sites where PM_{10} is monitored, there was no breach of the objective of 40 µg/m^3 for the annual mean concentration of this pollutant. The annual mean concentration of PM_{10} across urban areas in Northern Ireland in 2017 was 15 µg/m^3 and the annual mean for the Lough Navar rural background monitoring site was 6 µg/m^3. In the period since 2009, the annual mean concentration of PM_{10} at the rural Lough Navar site has been no higher than 12 µg/m^3 and the annual mean concentration across Northern Ireland's urban monitoring sites has reached a maximum of 22 µg/m^3 (in 2010) and has remained steady in recent years. The annual mean concentration of PM_{10} by site is included in the excel tables that accompany this report: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Ground Level Ozone

Figure 2.3 Annual exceedances of 8-hour mean objective for ozone, 2001 – 2017



Source: DAERA

Ozone is a gas which naturally occurs high up in the atmosphere where it performs a protective role in reducing the amount of ultra-violet radiation which reaches the earth's surface. However, when ozone occurs near ground-level, in the air we breathe, it is usually as a result of chemical reactions involving other types of air pollution like nitrogen oxides.

Ground-level ozone irritates the eyes and lungs and increases the symptoms of those suffering from asthma and lung diseases. In addition to its serious impacts on human health, ozone is phytotoxic, causing damage to many plants and commercial crops. It can also damage or age some man-made materials such as rubber, as well as bleaching paints and fabrics. Ozone is monitored using automatic sites at Belfast, Lough Navar and Londonderry.

The UK Air Quality Strategy (AQS) sets an objective for the maximum daily eight-hour mean concentration of ozone not to exceed 100 μg/m^3 (microgram per cubic metre of air) on more than ten occasions per year at each particular site. This is more stringent than the Target Value for human health protection as set out in the EU Air Quality Directive. This Target Value says that the maximum daily 8-hour mean concentration of ozone should not exceed 120 μg/m^3 on more than 25 days each year.

Ozone levels remain variable from year to year, depending on weather conditions and transboundary levels of ozone i.e. ozone crossing provincial, territorial or national boundaries. Therefore, ozone exceedances at any site remain a possibility. Levels of ozone, unlike other air pollutants can be more problematic at rural locations, such as Lough Navar, due to atmospheric chemistry.

From 2001 to 2017, the UK AQS objective has been missed three times at Derry (in 2002, 2003 and 2008). Lough Navar has missed the objective twice (in 2010 and 2011). The objective has never been missed at the Belfast site during the entire monitoring period. In 2017, no sites exceeded the UK AQS objective or the EU Target Value for human health of 120 μg/m^3 (for the maximum daily 8-hour mean) on more than the permitted 25 days in specific years.

Polycyclic Aromatic Hydrocarbons

Figure 2.4 Annual mean concentrations of Benzo(a)pyrene, 2001 – 2017

Source: DAERA

Polycyclic aromatic hydrocarbons (PAHs) are a group of more than 100 different chemicals that can occur naturally – for example in fossil fuel deposits – as well as being released from burning coal, oil, gasoline, waste, tobacco, wood, or other organic substances. They are of particular concern to human health because they can potentially cause cancer. Benzo[a]pyrene (B[a]P) is one of seventeen PAHs that are monitored in ambient air across the UK, and is chosen as being representative of levels of PAHs arising from combustion sources.

The UK Air Quality Strategy (AQS) sets an objective for B[a]P (microgram per cubic metre of air), where the annual average concentration should not exceed 0.25 ng/m^3. In addition, the EU sets a less stringent annual mean Target Value of 1ng/m^3.

B[a]P has been measured at five different sites in Northern Ireland since 2001.[4]
The longest monitoring sequence (at Lisburn Dunmurry High School and replaced by Lisburn Kilmakee Leisure Centre in 2012) has shown annual mean concentrations fluctuating between 0.33 and 1.44 ng/m^3 since 2001. In 2017, and as was the case in previous years, all operational sites (in Derry, Ballymena and Lisburn) breached the UK AQS objective. From 2011 to 2017, all sites showed compliance with the EU Target Value (no more than 1 ng/m^3 for annual mean B[a]P) with the exception of Ballymena Ballykeel in 2010 and 2011, and Derry Brandywell in 2016.

Air pollution levels in different years can be affected by a number of factors, with weather conditions being one of these. 2010 had an unusually cold winter, and as a result, levels of B[a]P – produced mainly as a result of residential combustion of solid fuel - were particularly high. In addition to increased fuel-burning activity, cold, calm, weather conditions can trap pollutants near ground level, and this is another reason why levels are higher in colder years like 2010. In 2010, all three monitoring sites showed breaches of the EU Target Value for B[a]P.

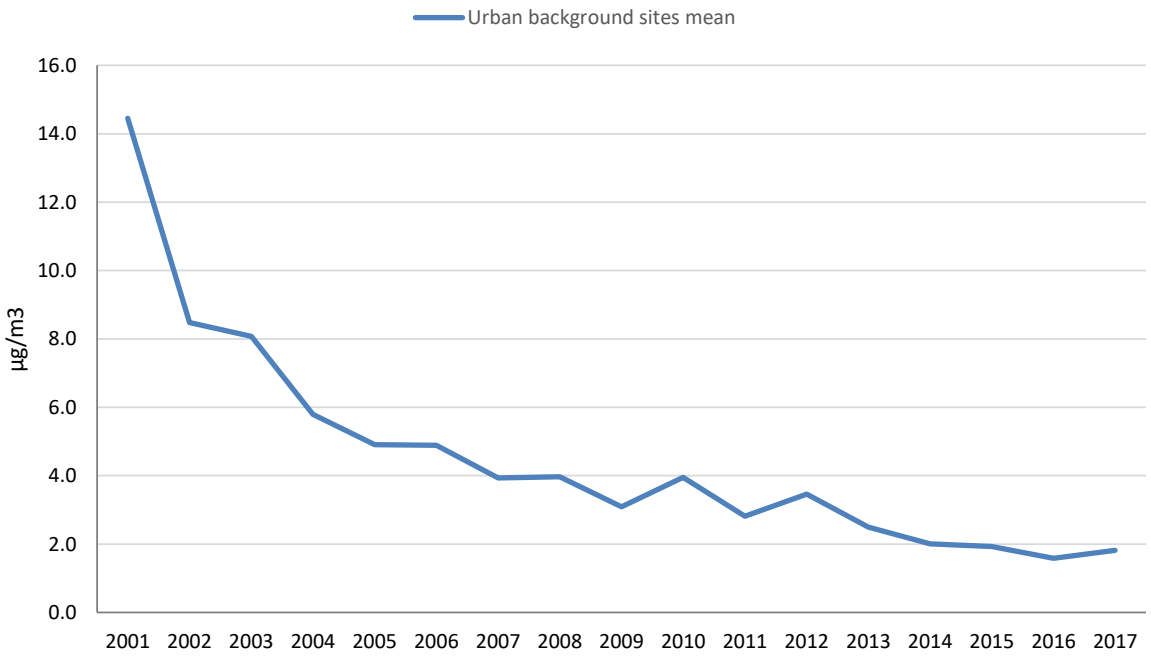
The current Northern Ireland sites, although situated in predominantly residential areas, show annual mean B[a]P concentrations similar to those seen in industrial areas in GB such as Scunthorpe, Middlesbrough and Port Talbot.

Research commissioned by DOE (now DAERA) in 2012 showed that high PAH concentrations recorded at these locations are likely due to widespread residential combustion of smoky (bituminous) coal. This is demonstrated by the lower PAH levels recorded at Belfast Clara Street from 2001 to 2006. The levels monitored at this site in Belfast were comparable to levels recorded in other large UK cities, where air pollution from households is limited by councils having Smoke Control Areas in place. In Smoke Control Areas the burning of unauthorised fuels, such as smoky coal, is banned; the majority of the Greater Belfast area is covered by Smoke Control provisions.

[4] In 2012, the monitoring site at Lisburn Dunmurry High School was decommissioned, and replaced by a monitoring site at Kilmakee, Dunmurry. However, readings/data capture was not sufficient in either site in 2012.

Sulphur Dioxide

Figure 2.5 Annual mean concentration of sulphur dioxide (SO2), 2001 – 2017



Source: DAERA

Sulphur dioxide (SO_2) is formed from the combustion of fuels containing sulphur (such as some coals and oils). The sharp, eye-watering smell of coal smoke is partly due to SO_2. High concentrations of this pollutant, for even short periods, can cause coughing, mucus secretion, and a worsening of symptoms for people with existing breathing problems such as asthma.

The marked reduction in this pollutant over recent years (87% less in 2017 compared with 2001) is linked to the expansion of the mains natural gas network in Northern Ireland, with an increasing amount of uptake of natural gas as a heating fuel. Uptake of this fuel has reduced the use of oil and solid fuel (coal) (which produce higher amounts of SO_2) in the domestic and industrial sectors.

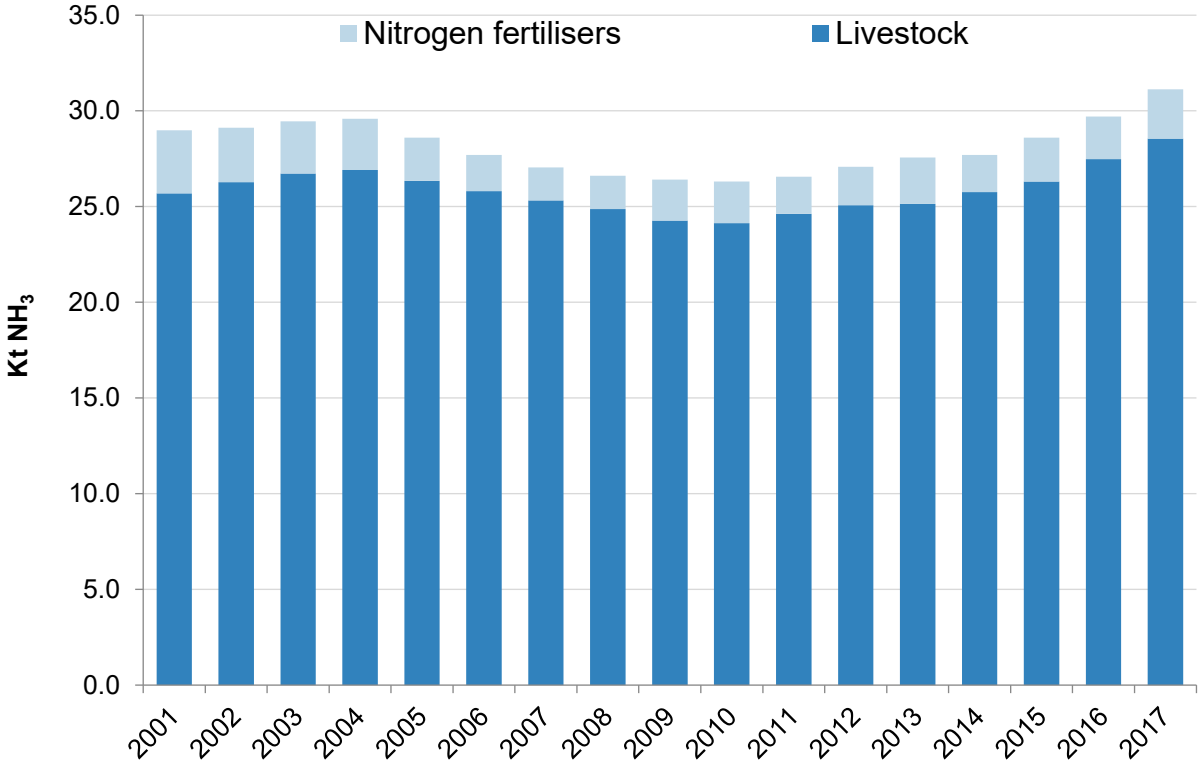
The EU Air Quality Directive and the UK Air Quality Strategy set objectives for a 1-hour mean limit of 350 µg/m^3 which is not to be exceeded more than 24 times a year and a 24-hour mean limit of 125 µg/m^3 which is not to be exceeded more than 3 times a year. These standards were to be achieved by December 2004 and maintained thereafter. A further objective for a 15-minute mean of 266 µg/m^3 which is not to be exceeded more than 35 times a year was to be achieved by December 2005.

Sulphur dioxide was measured at five automatic monitoring sites in Northern Ireland in 2017. Levels at all sites in 2017 met the requirements of the Air Quality Strategy for 1-hour and 24-hour mean levels of sulphur dioxide, as well as the 15-minute mean objective. A significant downward trend in annual mean sulphur dioxide concentrations has been identified at monitoring locations.

In 2017, the average annual mean concentration of SO_2 in urban areas was 1.8 µg/m^3. This is 0.2 µg/m^3 higher than the previous year, but has fallen from a high of 14.5 µg/m^3 in 2001.

Ammonia

Figure 2.6 Annual ammonia emissions from agriculture, 2001 – 2017



Source: Rothamsted Research, North Wyke

Ammonia is an air pollutant which arises mainly from agricultural practices. The agriculture sector accounted for the majority of ammonia emissions in Northern Ireland in 2017. Other sources include transport, commercial and domestic combustion and industrial processes.

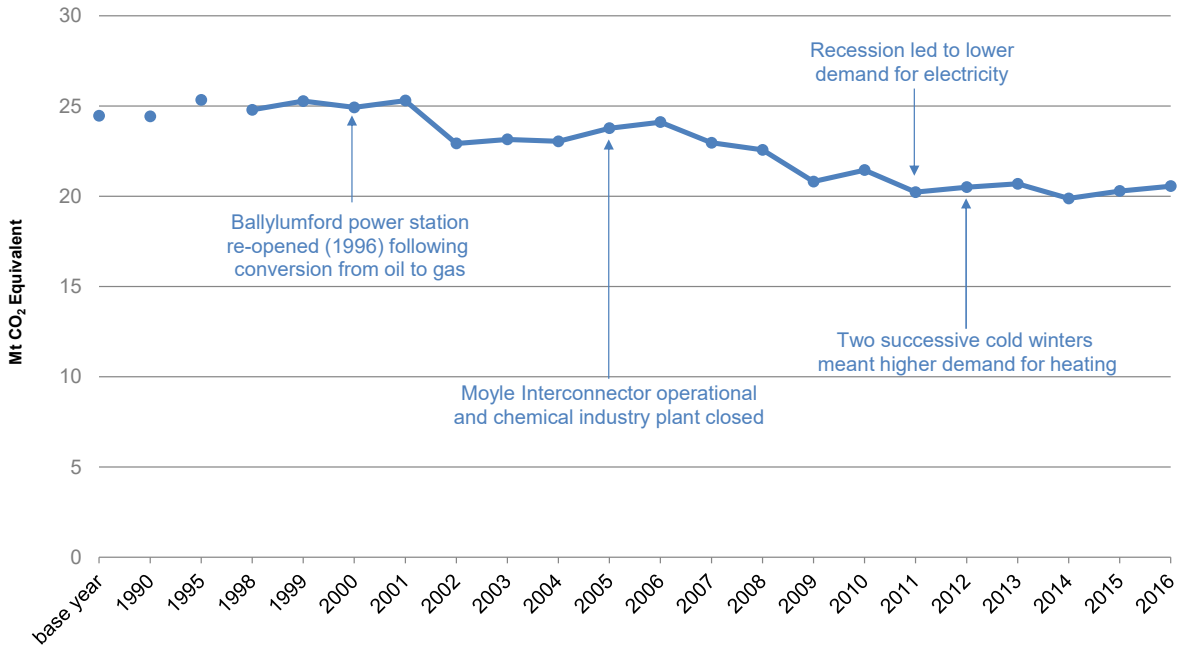
In 2017, of the ammonia emissions from agriculture, 92% came from livestock, and only 8% from the application of fertilisers containing nitrogen. Estimates of total ammonia emissions from agriculture are based on numbers of cattle, sheep, pigs, poultry, horses, goats and deer together with associated information on livestock and manure management practices and the use of nitrogen-containing fertilisers.

Emissions from livestock have increased by 7.4% since 2001 (from 25.8kt to 28.6kt in 2017). This compares with a 2.9% decrease for the UK as a whole over the same period. Cattle numbers have declined to a lesser extent in NI compared with the UK as a whole (dairy cow numbers have increased) and pig and poultry numbers have increased over this period in NI in contrast to decreasing populations for the UK as a whole.

The ammonia emissions from nitrogen fertilisers have declined by 0.7 kilotonnes (from 3.3kt in 2001 to 2.6kt in 2017), a 22.0% decrease. This is directly associated with a significant reduction in fertiliser use, particularly on grassland. Overall, ammonia emissions have increased, by 7.4%, from 29.1kt in 2001 to 31.1kt in 2017.

Greenhouse Gas Emissions

Figure 2.7 Total greenhouse gas emissions in Northern Ireland, 1990 – 2016



Note: The base year for UK greenhouse gas emissions is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for fluorinated gases.

Source: Aether and Ricardo Energy & Environment

Greenhouse gas emissions for England, Scotland, Wales and Northern Ireland are published annually, detailing estimates of greenhouse gas emissions since 1990. The estimates are consistent with the United Nations Framework Convention on Climate Change reporting guidelines.

The UK Climate Change Act commits the UK to reducing emissions by at least 80% by 2050 from 1990 baseline levels. In 2016, Northern Ireland's total greenhouse gas emissions accounted for 4.4% of the UK total, higher than its population share of 2.9%. Since the base year (1990), Northern Ireland's total greenhouse gas emissions have decreased by 16% from 24.5 to 20.6 million tonnes of carbon dioxide equivalent ($MtCO_2e$). This is less than the reduction seen for the UK as a whole, which saw a decrease of 41% compared to the base year.

Emissions in a particular year can be influenced by the weather. For example the two successive cold winters in early and late 2010 resulted in high demand for heating and subsequently an increase in emissions. In 2012 there was an increase in emissions from widespread forest wildfires which occurred during a spell of particularly dry, windy weather. Global fuel prices have caused a shift in recent years from burning natural gas to coal in the energy supply sector which has increased emissions from the energy supply sector since 2011.

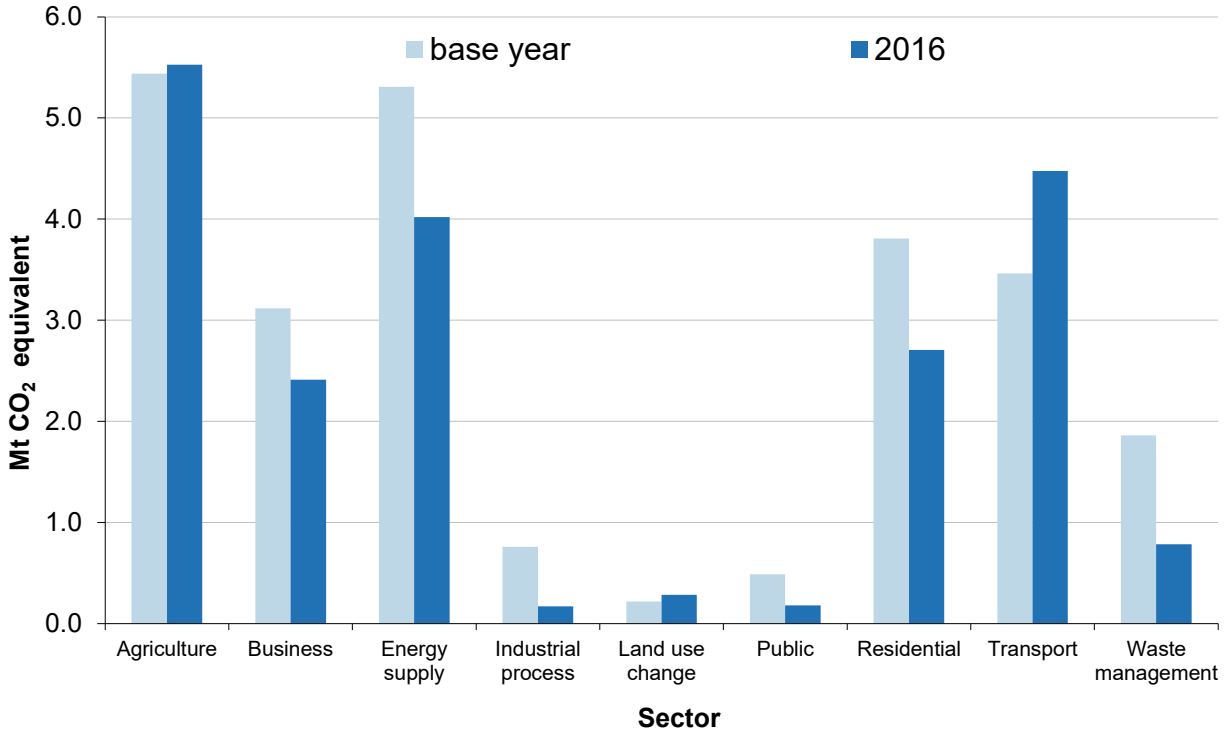
This is an indicator in the draft Programme for Government (PfG) framework. The criteria used to report change for this indicator is +/- 1.0 percentage points cumulatively on an annual basis against the baseline year value in 2014, when

Northern Ireland's greenhouse gas emissions were estimated to be 19.9 $MtCO_2e$, an 18.7% reduction from 1990, when greenhouse gas emissions were estimated to be 24.5 $MtCO_2e$. A decrease in estimated emissions, compared to the PfG baseline year (2014), of greater than 1 percentage point (cumulatively) is considered a positive change whilst an increase in estimated emissions of greater than 1 percentage point (cumulatively) is considered a negative change. A change of less than 1 percentage point (cumulatively) is considered as no change.

In 2016, Northern Ireland's greenhouse gas emissions were estimated to be 20.6 $MtCO_2e$, a reduction of 15.9% since 1990. This is an increase of 3.4% since the baseline year for PfG reporting (2014) and therefore is considered as a negative change for PfG reporting.

Greenhouse Gas Emissions

Figure 2.8 Greenhouse gas emissions in Northern Ireland by sector, base year & 2016



Note: The base year for UK greenhouse gas emissions is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for fluorinated gases.

Source: Aether and Ricardo Energy & Environment

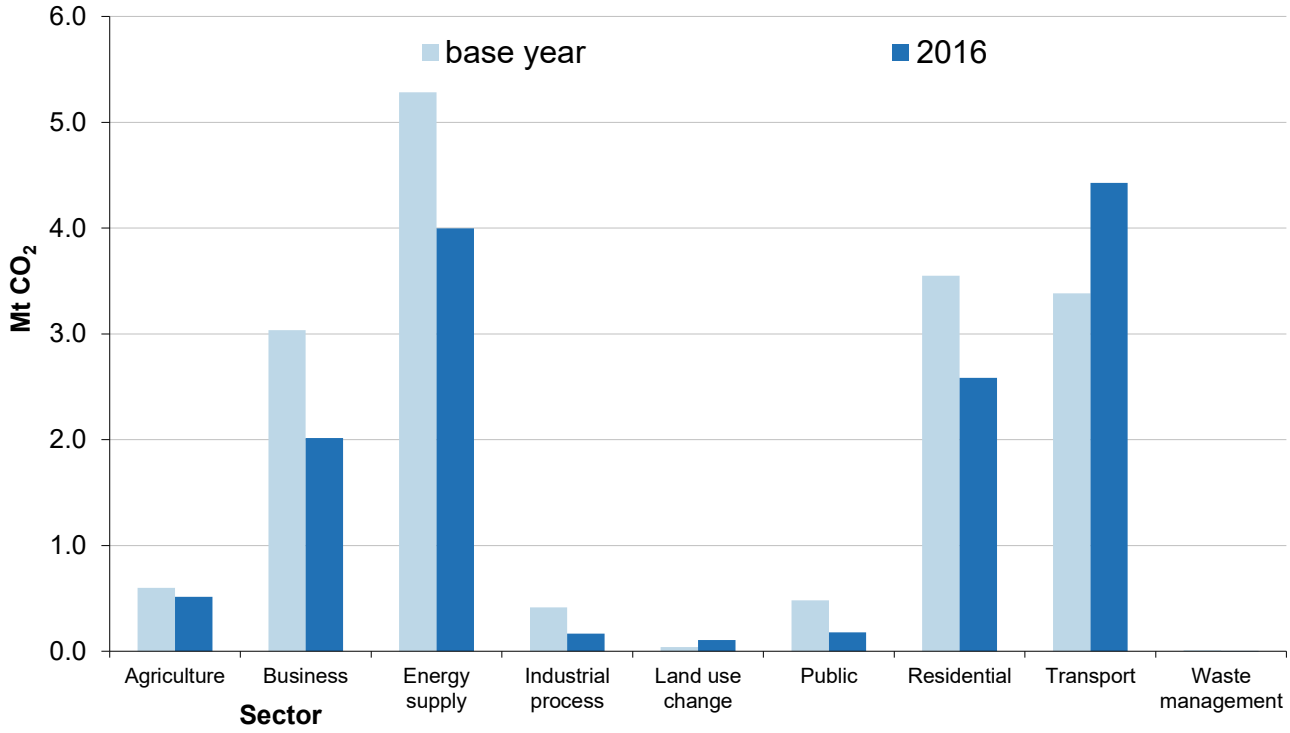
The largest sources of emissions in 2016 were agriculture (27%), transport (22%) and energy supply (20%).

Most sectors showed a decreasing trend since the base year, the largest decreases were in the energy supply, residential and waste sectors. They were driven by improvements in energy efficiency, fuel switching from coal to natural gas, which became available in the late 1990s, and the introduction of methane capture and oxidation systems in landfill management.

In 2016, emissions from the transport, agriculture and energy supply sectors accounted for the majority of greenhouse gas emissions (68%).
The business and industrial processes sectors showed the largest decreases in emissions between 2015 and 2016. This was related to a reduction in the use of coal in industrial combustion.

Greenhouse Gas Emissions

Figure 2.9 Carbon dioxide (CO_2) emissions in Northern Ireland by sector, base year & 2016



Note: The base year for UK greenhouse gas emissions is 1990 for carbon dioxide.

Source: Aether and Ricardo Energy & Environment

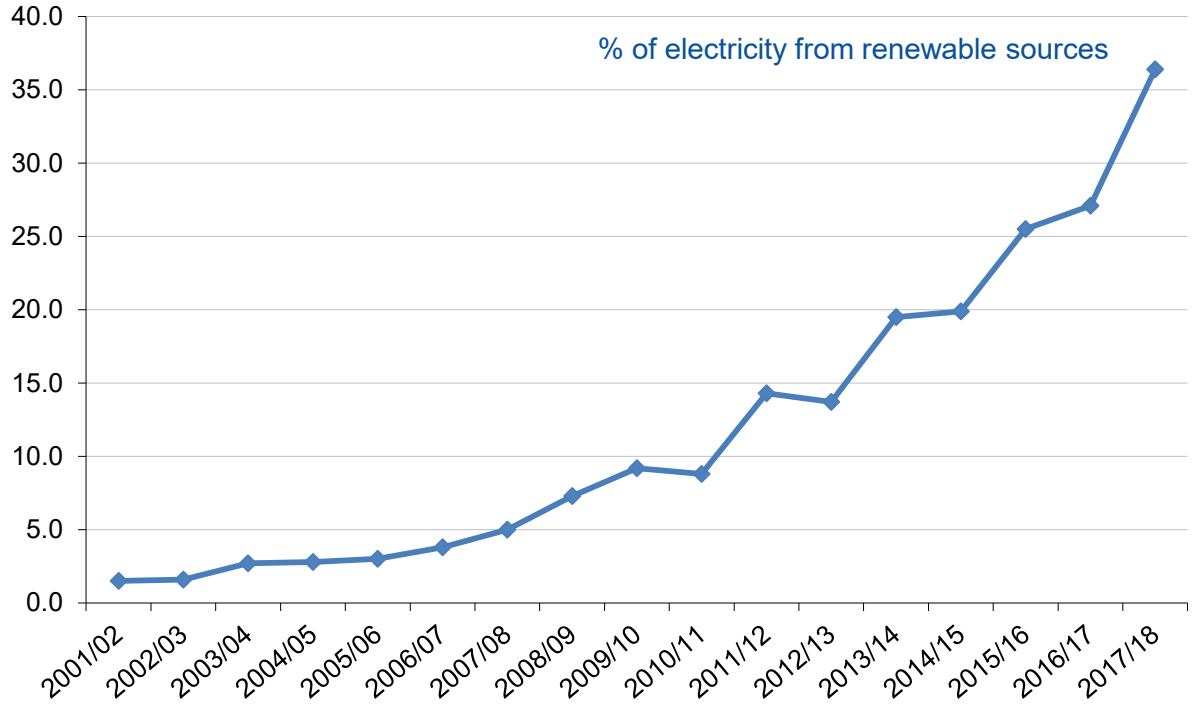
In 2016, Northern Ireland emissions of carbon dioxide (CO_2) amounted to 14.0 million tonnes of carbon dioxide equivalent ($MtCO_2e$), a decrease of 16.7% on emissions of CO_2 in the base year.

Transport, energy supply and residential were the most significant contributors to CO_2 emissions, being responsible for 79% of all the CO_2 produced in Northern Ireland in 2016. Emissions from waste management are mainly dominated by methane from landfill. Agriculture is the most significant source sector for methane and nitrous oxide, accounting for 82% and 78% of total Northern Ireland emissions of these two gases, respectively. Northern Ireland CO_2 emissions in 2016 represented 3.7% of UK CO_2 emissions, an increase of 1% on the base year.

The majority of the CO_2 emission source sectors have seen a decreasing trend since the base year with business, residential and energy supply sectors reductions in CO_2 emissions of 34%, 27% and 24% respectively. Natural gas has been available to the energy supply sector since 1996 and to industrial, commercial and domestic users since 1999. The emission of CO_2 per unit energy produced is lower for natural gas than other fossil fuels such as coal and oil. NI has also seen an increase in electricity generated from renewable sources in recent years.

Renewable Energy

Figure 2.10 Percentage of total electricity consumption generated from indigenous renewable sources, 2001/02 – 2017/18



Source: DfE

The Northern Ireland Executive's Strategic Energy Framework has set a target of 40% electricity consumption from renewable sources by 2020.

In 2017/18, some 2,876 GWh of electricity in Northern Ireland was generated from renewable sources. This was equivalent to 36.4% of total electricity consumption in that period, an increase of 9.3 percentage points on the previous twelve month period and was the highest rolling 12 month proportion on record at the time.

There has been a sizeable increase in the amount of electricity generated from indigenous renewable sources since 2001/02, when only 128GWh (1.5% of total electricity consumed) was from renewable sources.

Of all renewable electricity generated within Northern Ireland during the 2018 calendar year, 83.1% was generated from wind. This compares to 84.3% for the previous 12 month period (January 2017 to December 2017). These changes are heavily influenced by increases/decreases in stock (i.e. more or fewer wind turbines in operation) or weather (i.e. a particularly windy or non-windy year) or both.

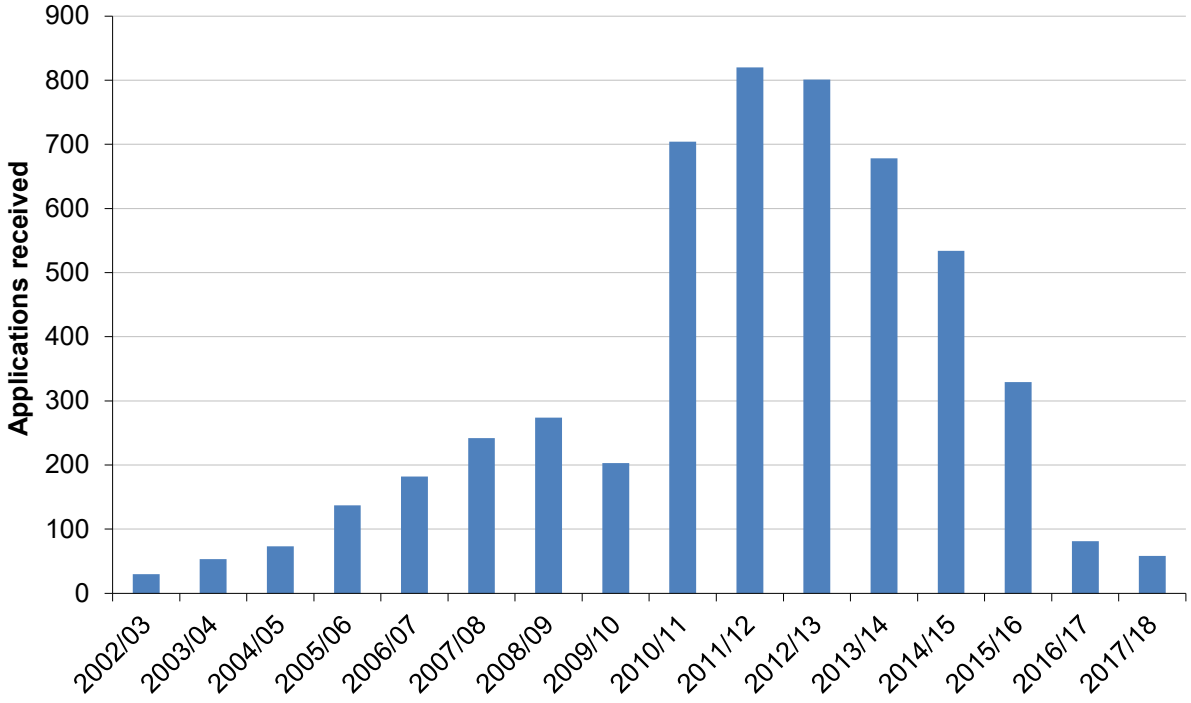
A number of new wind turbines/wind farms have come into operation over recent years – a list of these by county is available at http://www.iwea.com/windfarmsinireland. The introduction of new wind farms can have the 'step change' effect that can be observed in recent years. In addition, more recently there has been increased generation from some other renewable sources (e.g. biomass and biogas).

Renewable electricity generation has linkages with other Government policies such as climate change, energy efficiency etc. These other policies can have a direct influence on future deployment of renewables and the generation and consumption of electricity.

The long term trend that can be observed from the figures is a general increase in the generation and consumption of renewable electricity in NI since 2001. A large part of this increase can be attributed to the introduction of the Northern Ireland Renewables Obligation (NIRO) in 2005 which provides a revenue stream for renewable electricity generation in the form of Renewable Obligation Certificates (ROCs). The NIRO closed to new large scale onshore wind projects on 31 March 2016, new small scale onshore wind on 30 June 2016 and all non-wind technologies on 31 March 2017. Projects seeking to accredit after the closure dates must meet the eligibility criteria for grace periods as set out in the associated legislation.

Environmental Installations

Figure 2.11 Planning applications for environmental installations, 2002/03 – 2017/18

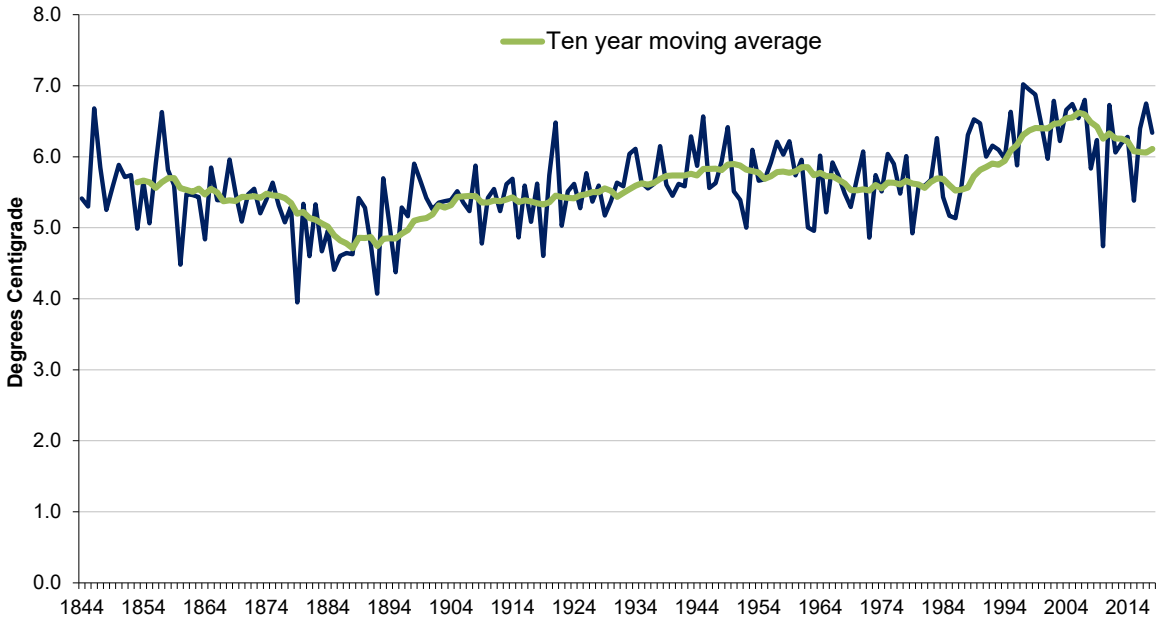


Source: DfI, Planning activity statistics, https://www.infrastructure-ni.gov.uk/articles/planning-activity-statistics

Department for Infrastructure (DfI) Planning NI monitor the number of renewable energy applications. These include single wind turbines, wind farms, solar panels, biomass energy, heat pumps, anaerobic digestion and hydroelectric schemes. Single wind turbines made up the majority of renewable energy applications received in 2017/18 (51.7%), but at a much reduced proportion compared with previous years. Planning permission is required for all environmental installations.

The overall number of renewable energy applications received in 2017/18 was 58, the lowest annual figure in the series since 2003/04. This represented a 28.4% decrease in received applications from the same period a year earlier. The number of applications received annually peaked in 2011/12, with 820 applications received in that year. It is likely that the high levels at this time were driven by the NI Executive's targets for electricity consumption from renewable sources, with a target of 20% to be achieved by 2015, and 40% by 2020. The continuing sharp decline in recent years (a 92.9% decrease from peak of 820 to 58 applications in 2017/18) may be partly due to a reduction in government funding available, as well as a lack of capacity on the power grid to allow for new connections.

Figure 2.12 Mean annual minimum temperature, 1844 – 2018



Source: Armagh Observatory

The mean annual minimum temperature for Northern Ireland has been calculated from the Armagh Observatory temperature records.

The ten year moving average trend line shows that the annual minimum temperature reached a low towards the end of the 19th century, and has been steadily increasing since.

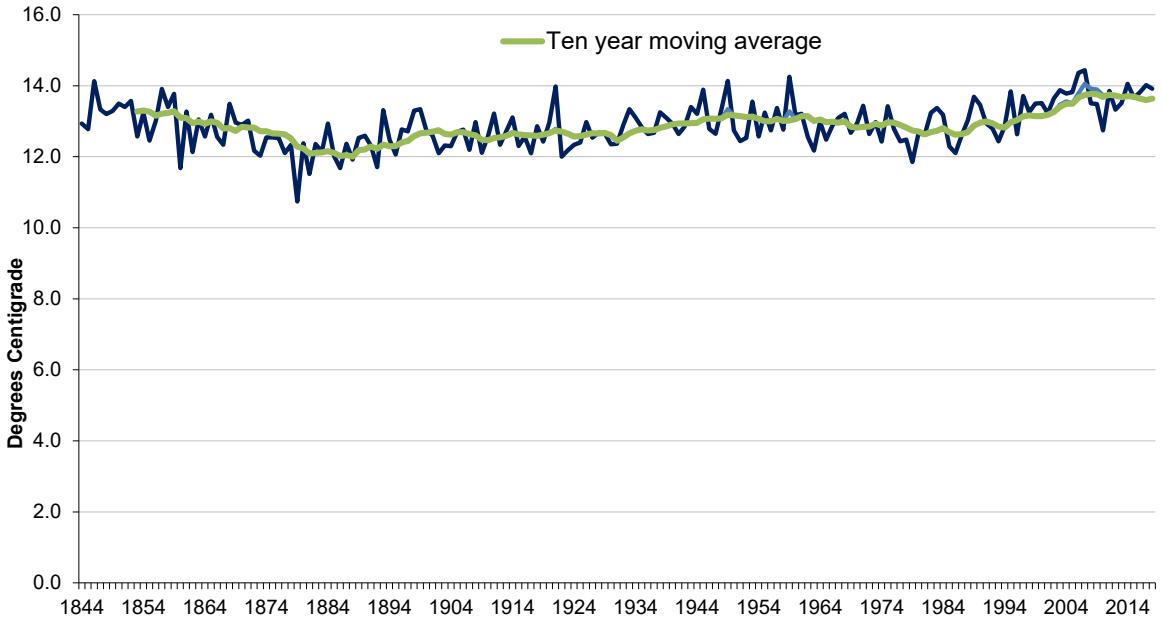
At the end of the 20th century, the ten-year moving average mean annual minimum temperature had risen to its highest levels since the temperature records began.

The lowest mean annual minimum temperature (3.95°C) was recorded in 1879.

The highest mean annual minimum temperature (7.02°C) was recorded in 1997.

The 2018 mean annual minimum temperature (6.34°C) was 0.41°C lower than the 6.75°C seen in 2017.

Figure 2.13 Mean annual maximum temperature, 1844 – 2018



Source: Armagh Observatory

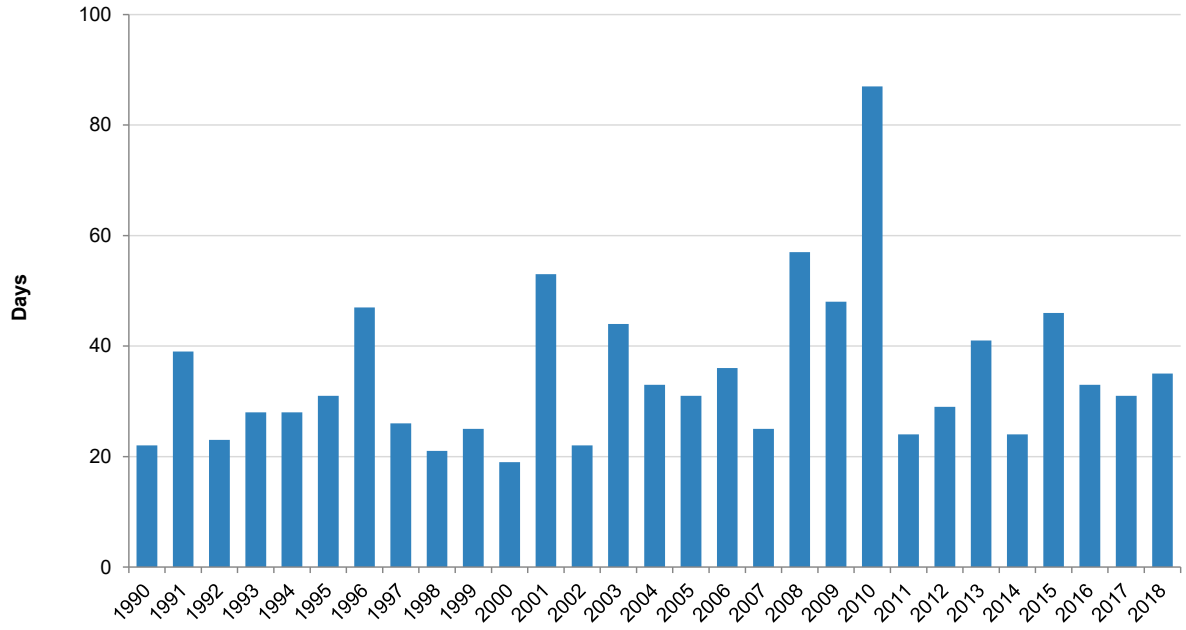
The mean annual maximum temperature for Northern Ireland has been calculated from the Armagh Observatory temperature records.

Similar to the mean annual minimum temperature, the lowest mean annual maximum temperature of 10.74°C was recorded in 1879.

The highest mean annual maximum temperature (14.44°C) was recorded in 2007.

The mean annual maximum temperature has varied over the years, between 12 and 14°C. In the most recent years, the ten-year moving average for maximum temperature has been between 13.6°C and 13.9°C.

Figure 2.14 Number of days per year with temperature below zero, 1990 – 2018



Source: Armagh Observatory

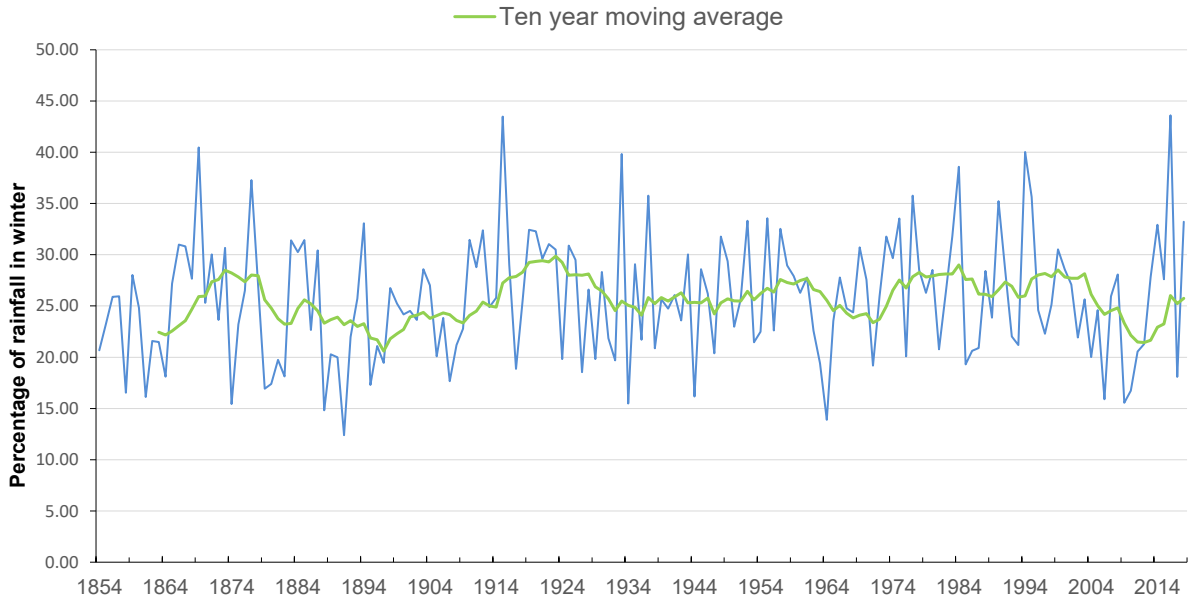
The number of days per year where a sub-zero temperature was recorded has been calculated from the Armagh Observatory temperature records.

Between 1990 and 2018 there were on average 35 days per year when a temperature below zero was recorded.

The year with the highest number of days with a temperature below zero recorded was 2010 with 87 days.

The year with the lowest number of days with a temperature below zero recorded was 2000 with 19 days.

Figure 2.15 Percentage of annual rainfall falling in winter (Dec – Feb), 1854 – 2018



Source: Armagh Observatory

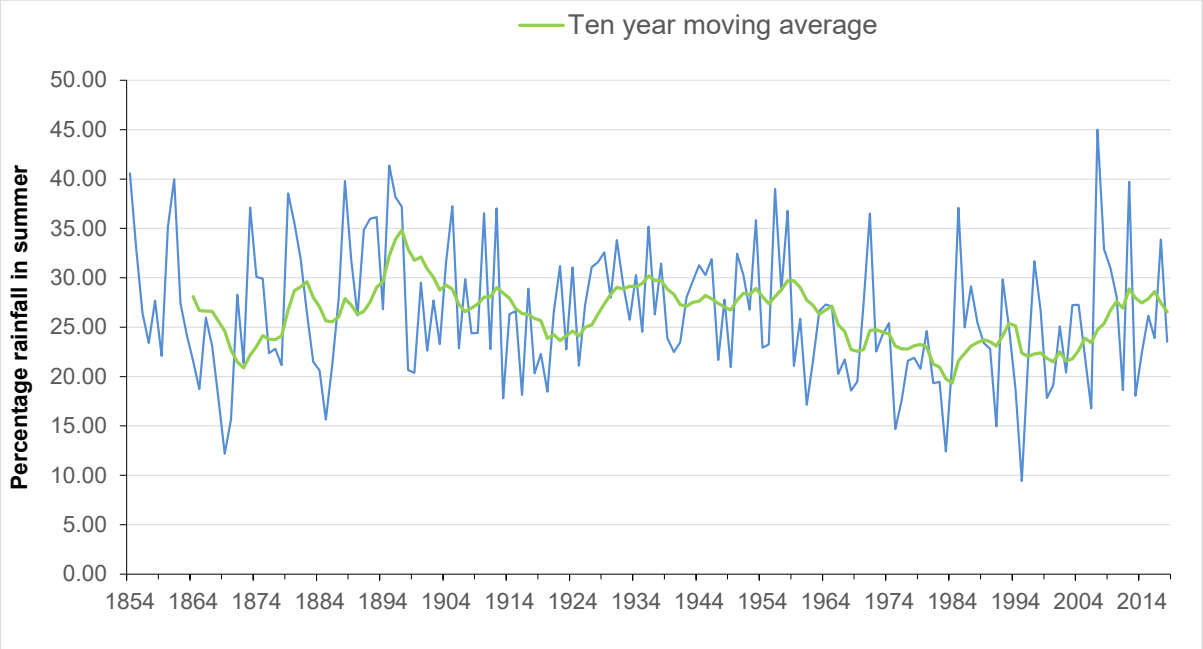
Rainfall records are also kept at Armagh Observatory. The amount of rainfall observed in winter (December to February) is calculated as a percentage of annual rainfall (December to November).

The greatest percentage of annual rainfall falling in winter occurred in 1915, when 43% of the year's rainfall fell in the three winter months.

In 1891 just 12% of the annual rainfall fell in winter. This is the smallest percentage of annual rainfall in winter recorded in Northern Ireland.

In 2018, 33.2% of the annual rainfall fell in winter, this is the second highest proportion recorded over the past two decades.

Figure 2.16 Percentage of annual rainfall falling in summer (Jun – Aug), 1854 – 2018



Source: Armagh Observatory

The amount of rainfall observed in summer (June to August) is calculated as a percentage of annual rainfall (December to November).

Over time the ten year moving average has decreased from a high of 35% in 1897 to a low of 19% in 1984, however, there has been an increase in the ten year moving average in recent years (to around 25-28%).

2012 saw the second highest level (40%) of summer rainfall since 1895. The highest level recorded was in 2007, when 45% of the year's rainfall fell in the three summer months.

In 1995, less than 10% of the annual rainfall fell between June and August, the lowest percentage recorded in Northern Ireland. In 2018, 24% of annual rainfall fell between June and August.

3 Water

Water is an essential natural resource and plays a vital role in maintaining biodiversity, our health and social welfare and our economic development. Our rivers, lakes, estuaries, seas and groundwater provide water to sustain many of our core social and economic activities, and also provide drinking water for our population. This chapter will report on the condition of Northern Ireland's inland waters, and on the levels of compliance with waste water standards and drinking water standards. Indicators on the state of the marine environment are covered in Chapter 4.

Key points in this chapter:

- In 2018 soluble reactive phosphorus (SRP) was measured at 93 surveillance rivers across Northern Ireland giving an average concentration of 0.068 mg/l of phosphorus per litre of water. This was 0.009 mg/l more than the level reported in 2015. Therefore, SRP in river water is considered unchanged since the baseline year for PfG reporting.

- River monitoring is carried out against national standards for the Water Framework Directive (WFD), 31.3% of monitored river waterbodies were classified as 'high' or 'good' quality in 2018.

- Lakes are a significant source of drinking water supplies. Lough Neagh and Upper and Lower Lough Erne make up over 90% of the total area of lakes greater than 50 hectares in Northern Ireland. There are 21 lakes currently monitored in Northern Ireland, of which 5 achieved a 'good' standard when classified in 2018.

- Compliance of Waste Water Treatment Works against the numeric conditions of their Water Order (WO) consent is a key performance indicator (KPI) for the water utility sector and has continued to improve since 2007, reaching 95% in 2018.

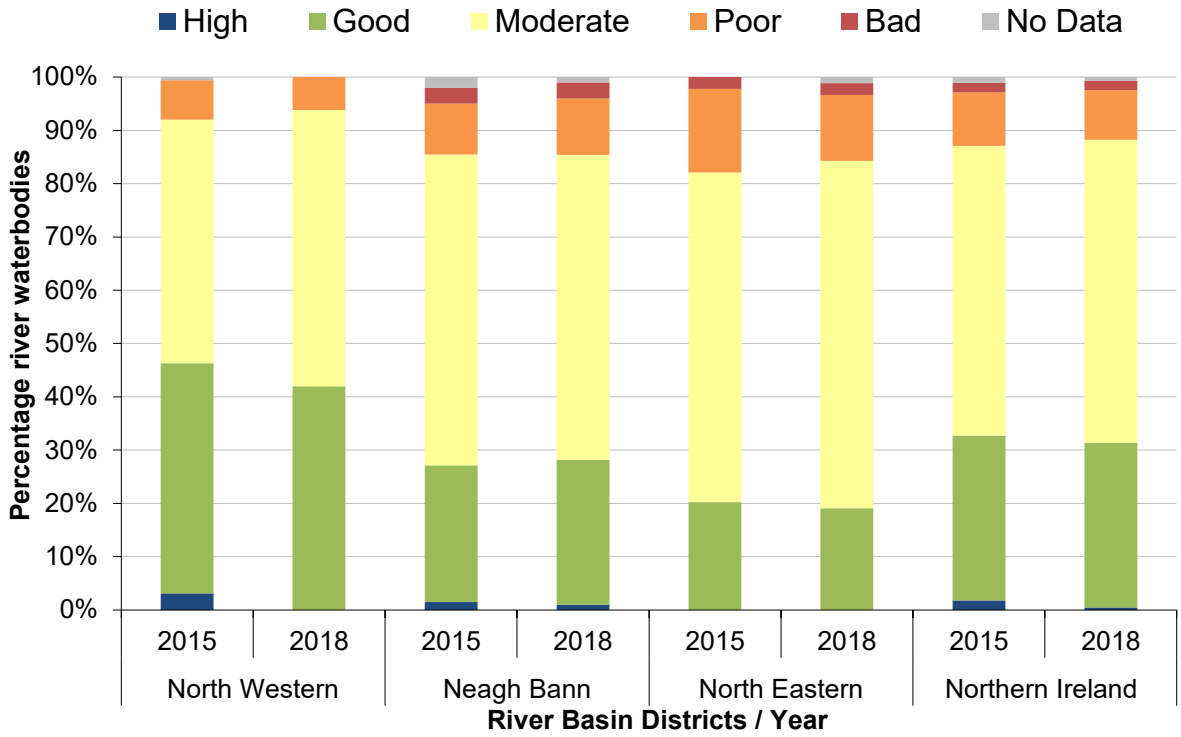
- Drinking water quality compliance remains at over 99%.

- Water pollution incidents are investigated by NIEA. In 2017 there were 1,902 incidents reported to NIEA or discovered by NIEA during inspections, of which 1,028 (54%) were substantiated (confirmed) as having an impact on the water quality of the receiving waterway. Of these, 13% were considered to be of High or Medium Severity.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

River Quality

Figure 3.1 Water Framework Directive (WFD) overall classification (% river waterbodies), 2015 and 2018 (second cycle water body set and environmental standards)



Source: NIEA

The river water body classification has been produced using the results from the Water Framework Directive quality elements. Overall classification utilises a combination of biological, chemical and hydromorphological quality elements including macroinvertebrates, pH (measure of acidity or alkalinity of a solution) and ammonia to assign status of river quality in one of five classes from 'high' through to 'bad'.

The Water Framework Directive requires NIEA to protect the status of water bodies from deterioration and, where necessary and practicable, to restore water bodies to good status.

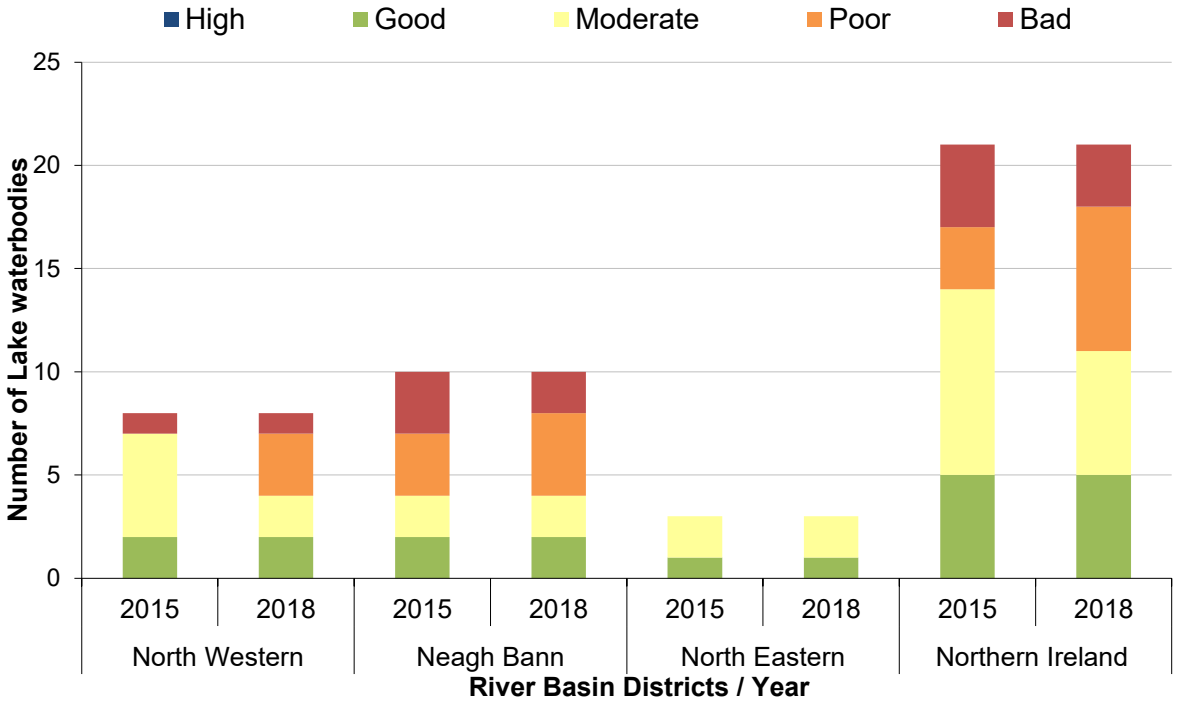
The environmental objectives established in the river basin plan set the water status to be achieved for surface water bodies for each six year planning cycle starting from 2015. These data refer to 450 river water bodies.

In 2018, 31.3% of NI river water bodies were classified as 'high' or 'good' quality compared to 32.7% in 2015.

The WFD Classifications are required to report to Europe on a 6-yearly basis. The next update required is 2021, an interim update has been carried out and included in this report (including updates to end of 2018).

Lake Quality

Figure 3.2 Lake Water Framework Directive status, 2015 and 2018 (interim second cycle water body set and environmental standards)



Source: NIEA

The Water Framework Directive requires NIEA to classify the 'surface water status' of Northern Ireland's lake water bodies. There are 21 lake water bodies in Northern Ireland i.e. lakes with an area of greater than 50 hectares.

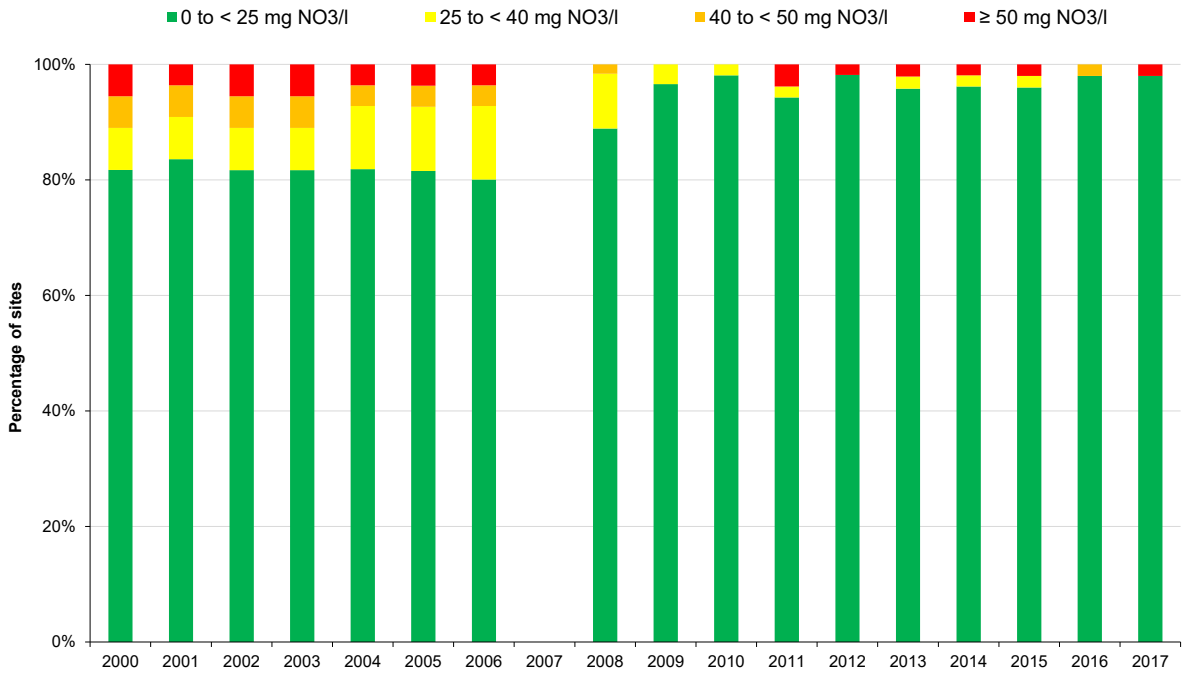
Lake water body status has been produced using a combination of biological, chemical and hydromorphological quality elements including macrophytes, phytoplankton, phytobenthos, total phosphorus and dissolved oxygen. Overall status of a water body is then determined by assigning the lower of a water body's 'Ecological Status' and its 'Chemical Status' using one of five classes i.e. High, Good, Moderate, Poor, Bad.

An interim classification was published in 2018 which indicated that five of the 21 lake water bodies in Northern Ireland i.e. 24% classified as being 'Good' surface water status; the remaining 16 lake water bodies (76%) were classified as having a less than 'Good' status. The number classified as 'good' was the same as 2015, however, there were more lakes classified as 'poor' in 2018, 7 compared to 3 in 2015.

The WFD Classifications are required to report to Europe on a 6-yearly basis with the next update due in 2021.

Groundwater Quality

Figure 3.3 Annual mean nitrate concentrations (in groundwater), 2000 – 2017



Source: NIEA

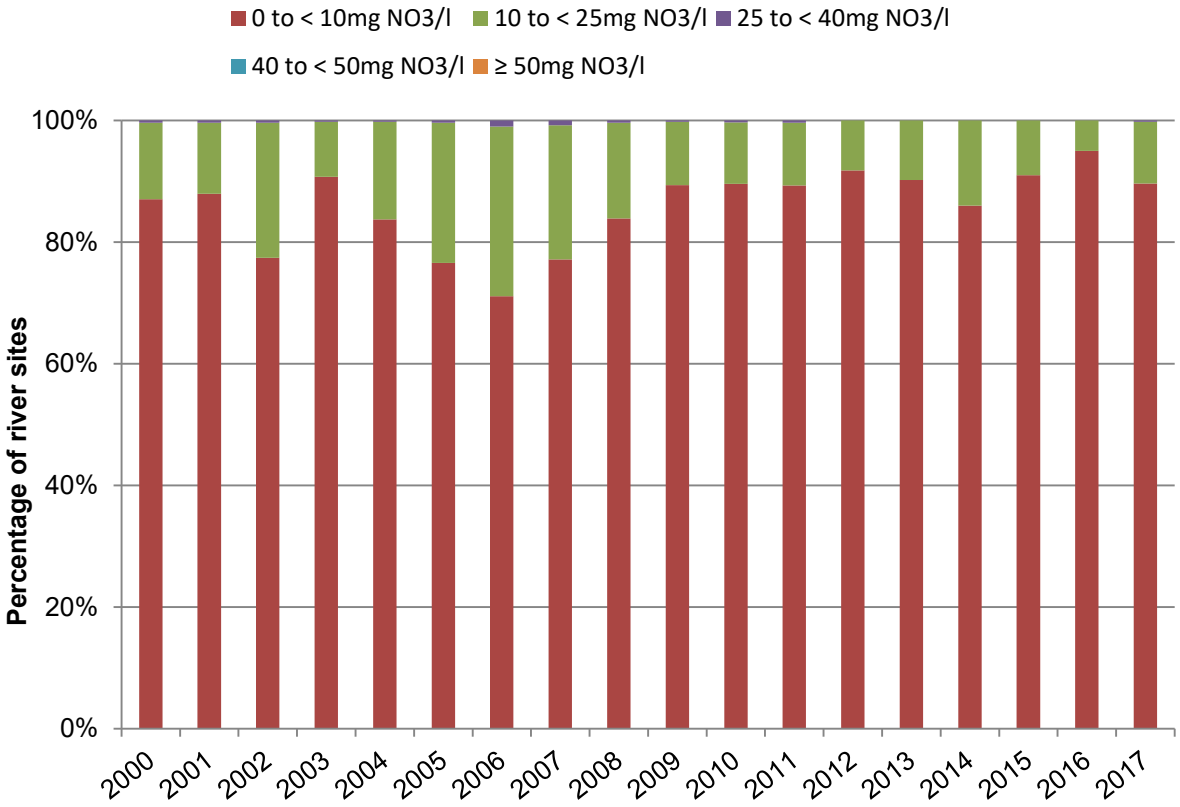
Regional monitoring of nitrate concentrations in groundwater across Northern Ireland began in 2000. The Groundwater Daughter Directive (2006/118/EC) sets the groundwater quality standard at 50 mg NO_3/l. In the period 2000 to 2006, approximately 91% of sites had an annual mean concentration of less than 40 mg NO_3/l and approximately 82% were less than 25 mg NO_3/l.

Regional monitoring re-commenced in 2008, after a major review of the network was undertaken. The figures both pre and post review are broadly comparable.

In 2017, nitrate concentrations were monitored at 50 groundwater sites across Northern Ireland giving an average concentration of 4.5 mg NO_3/l. Groundwater nitrate concentrations across Northern Ireland are generally low with 49 of the 50 (98%) stations below 25 mg NO_3/l in 2017. Note that one station equates to 2% of the total.

River Quality - nitrate

Figure 3.4 Annual mean nitrate concentrations (in rivers), 2000 – 2017



Source: NIEA

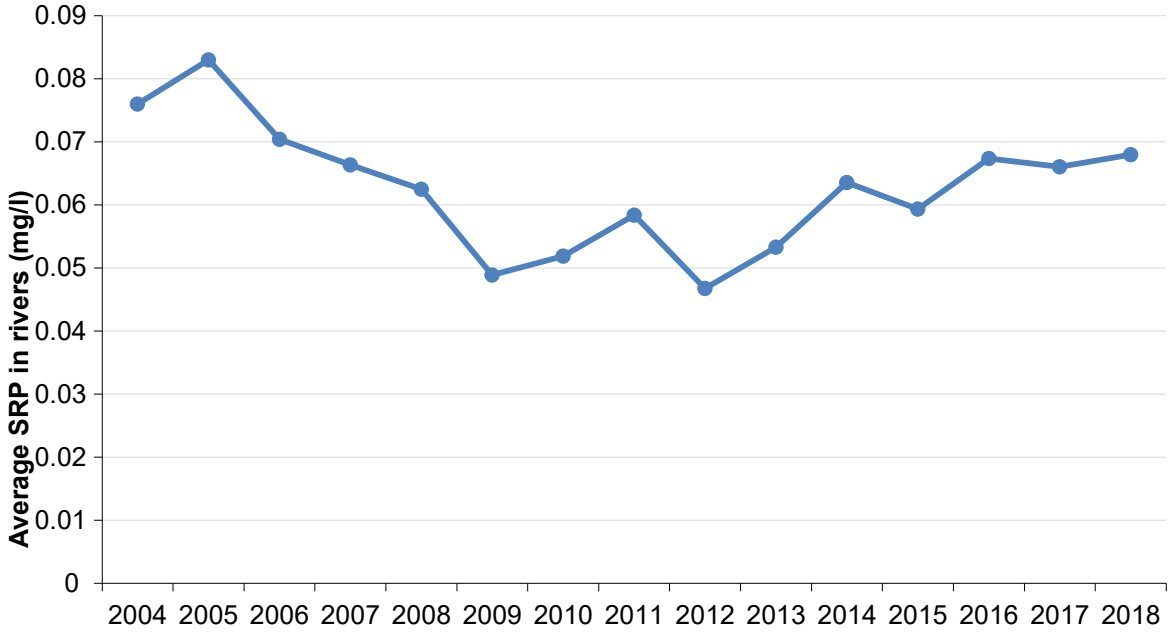
Under the Nitrates Directive, Northern Ireland must monitor surface waters for nitrate pollution against a mandatory standard of 50 mg NO_3/l. In addition a guide standard for surface waters is operational where 90% of samples should be less than 25 mg NO_3/l.

In the period 2000 to 2011, over 99% of sites had an annual mean concentration of less than 25 mg NO_3/l. In the period 2012 to 2016, all rivers that were monitored for nitrate had an annual mean concentration of less than 25 mg NO_3/l. In 2017, 99.8% of sites had an annual mean concentration of less than 25 mg NO_3/l.

Long-term seasonal trend analysis shows that the monthly trends in average nitrate concentrations in rivers in Northern Ireland are predominantly decreasing or stable over the 25-year period, 1992-2016, which may be attributed to the measures implemented through the Nitrates Action Programme.

River Quality – Soluble Reactive Phosphorus

Figure 3.5 soluble reactive phosphorus (SRP) in rivers, 2004 – 2018



Source: DAERA

Soluble reactive phosphorus (SRP) is a plant nutrient, which, when present in rivers in elevated concentrations, can lead to accelerated growth of algae and other plants. The impact on the composition and abundance of plant species can have adverse implications for other aspects of water quality, such as oxygen levels, and for the characteristics of river habitats. These various changes can cause undesirable disturbances to populations of water animals, such as invertebrates and fish.

This is an indicator in the draft Programme for Government (PfG) framework. The criteria used to report change for this indicator is +/- 0.01 mg/l against the baseline year value in 2015, when the SRP concentration was 0.059 mg/l. A decrease, compared to the baseline year, of greater than 0.01 mg/l in concentration is considered a positive change whilst an increase in concentration of greater than 0.01 mg/l is considered a negative change. A value between 0.049 mg/l and 0.069 mg/l is considered as no change.

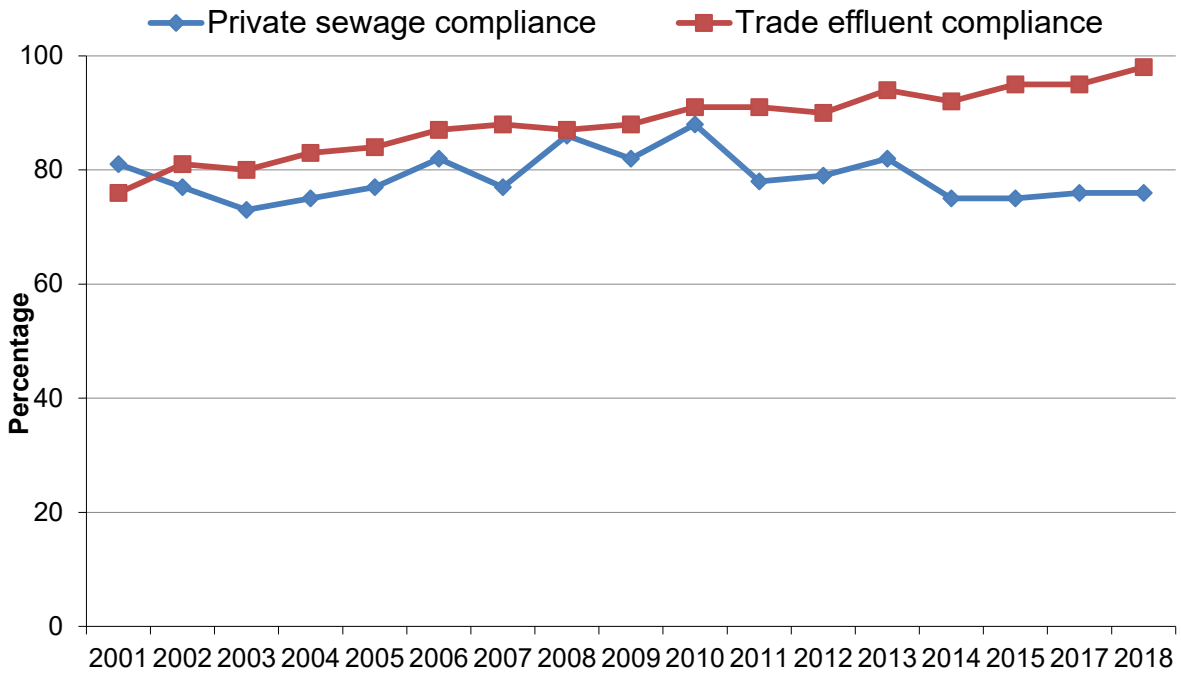
In 2018 soluble reactive phosphorus was measured at 93 surveillance rivers across Northern Ireland giving an average concentration of 0.068 mg/l of phosphorus in river water. This was 0.009 mg/l more than the level reported in 2015. Therefore, SRP in river water is considered unchanged since the baseline year for PfG reporting using the criteria above.

The introduction of The Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 has contributed to a reduction in phosphorus from agricultural activities, in conjunction with ongoing improvements in domestic wastewater treatment through

investment by Northern Ireland Water. In recent years, levels of soluble reactive phosphorus in the 93 surveillance rivers have increased marginally and it is a cause for concern that there are signs of a sustained upward trend, since the low of 0.047 mg/l reported in 2012.

Industrial Discharge Quality

Figure 3.6 Trends in annual private and trade discharge consent compliance (EA 95-percentile), 2001 – 2018



Source: NIEA

The monitoring of effluent discharges gives an indication of levels of pollution to the water environment and improvements in controls.

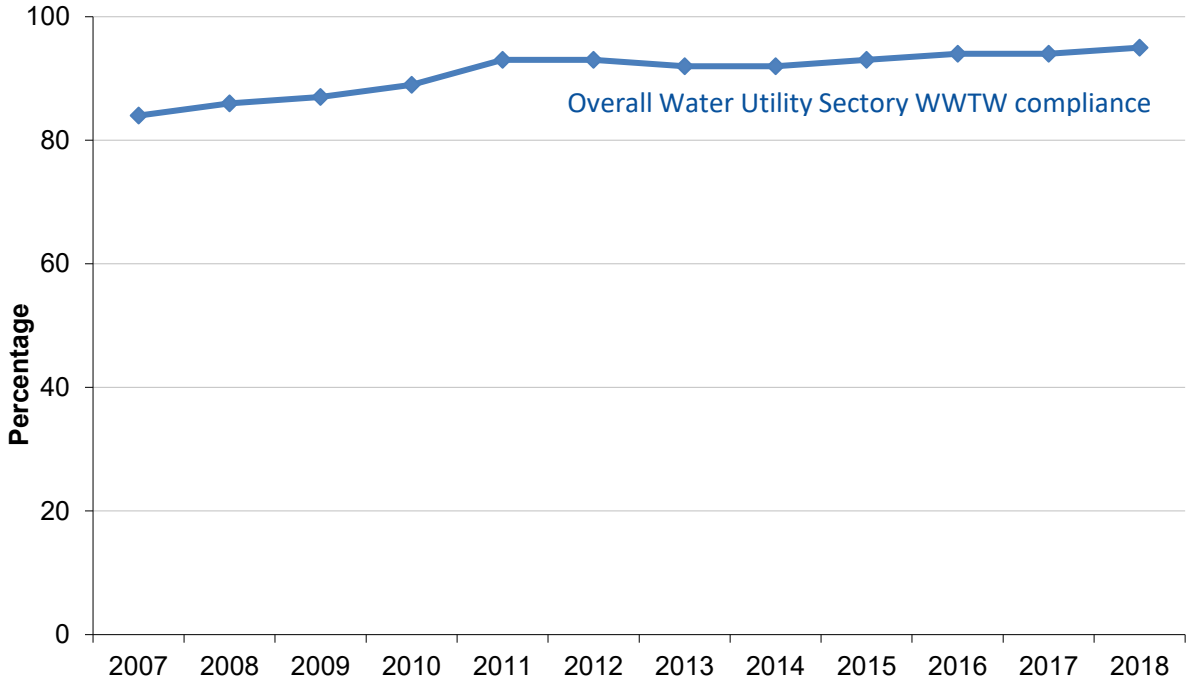
Numerical limits on Water Order consents for private sewage and trade discharges are set as absolute standards. However, compliance is assessed on a 95-percentile basis, i.e. a discharge must be within its consent conditions 95% of the time to comply.

Compliance for private sewage was 76% in 2018 which is below the high of 88% recorded in 2010 but higher than the minimum value of 73% in 2003. For trade effluent compliance there has been an increase from 76% in 2001 to 98% in 2018, which is the highest value yet determined.

There has been an improved provision of support to and more consistent enforcement action against consent holders.

Water Utility Discharge Quality

Figure 3.7 Summary of compliance of Water Utility Sector Waste Water Treatment Works (WWTW), 2007 – 2018



Source: NIEA

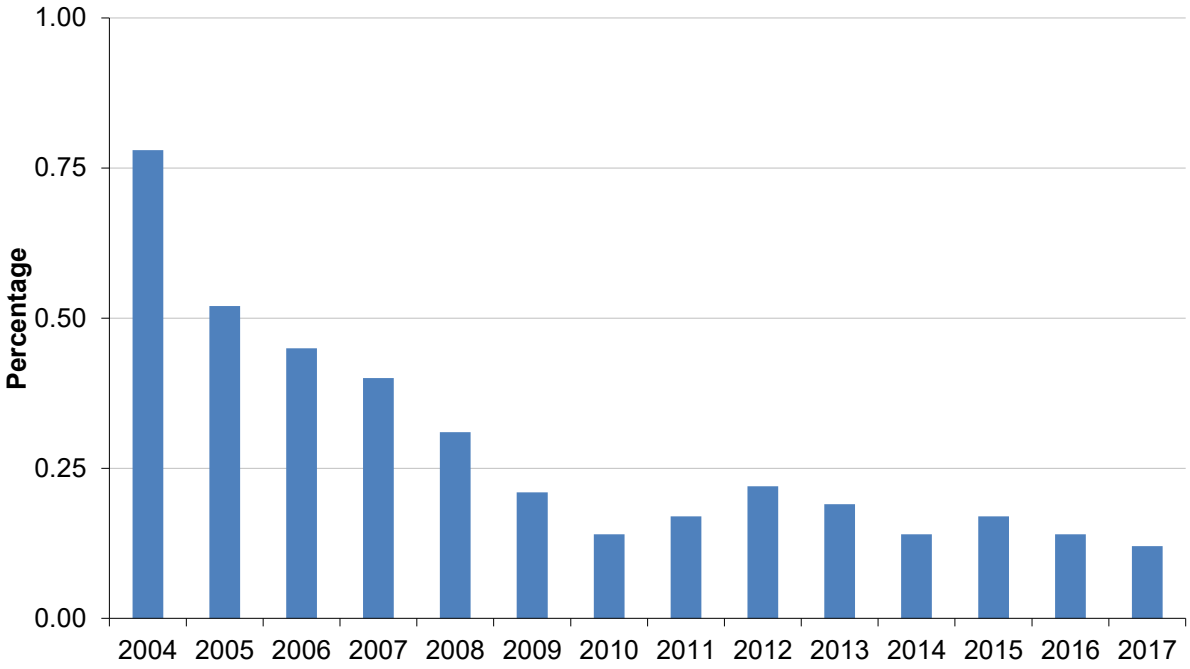
Compliance of waste water treatment works (WWTW) with numeric conditions of Water Order consents was introduced in 2007. It is a key performance indicator for the water utility sector and has continued to improve since 2007 with compliance now at 95%.

Northern Ireland Water (NIW) compliance is assessed against numeric standards set for discharges serving a population equivalent greater than 249. The number of WWTW has dropped from 244 in 2007, to 232 in 2018. Numeric compliance is also assessed for six waste water treatment works operated under Public Private Partnership (PPP) contracts. Of the 232 WWTW assessed, 217 complied with the numeric conditions of their Water Order Consents.

There has been sustained investment by Northern Ireland Water (NIW) in the upgrade of WWTW and sewage networks since 2007. The PPP contractors that operate NIW WWTW under contract consistently achieve full compliance.

Drinking Water Quality

Figure 3.8 Percentage of tests failing to meet the standards with the Northern Ireland drinking water quality regulations, 2004 – 2017



Source: NIEA

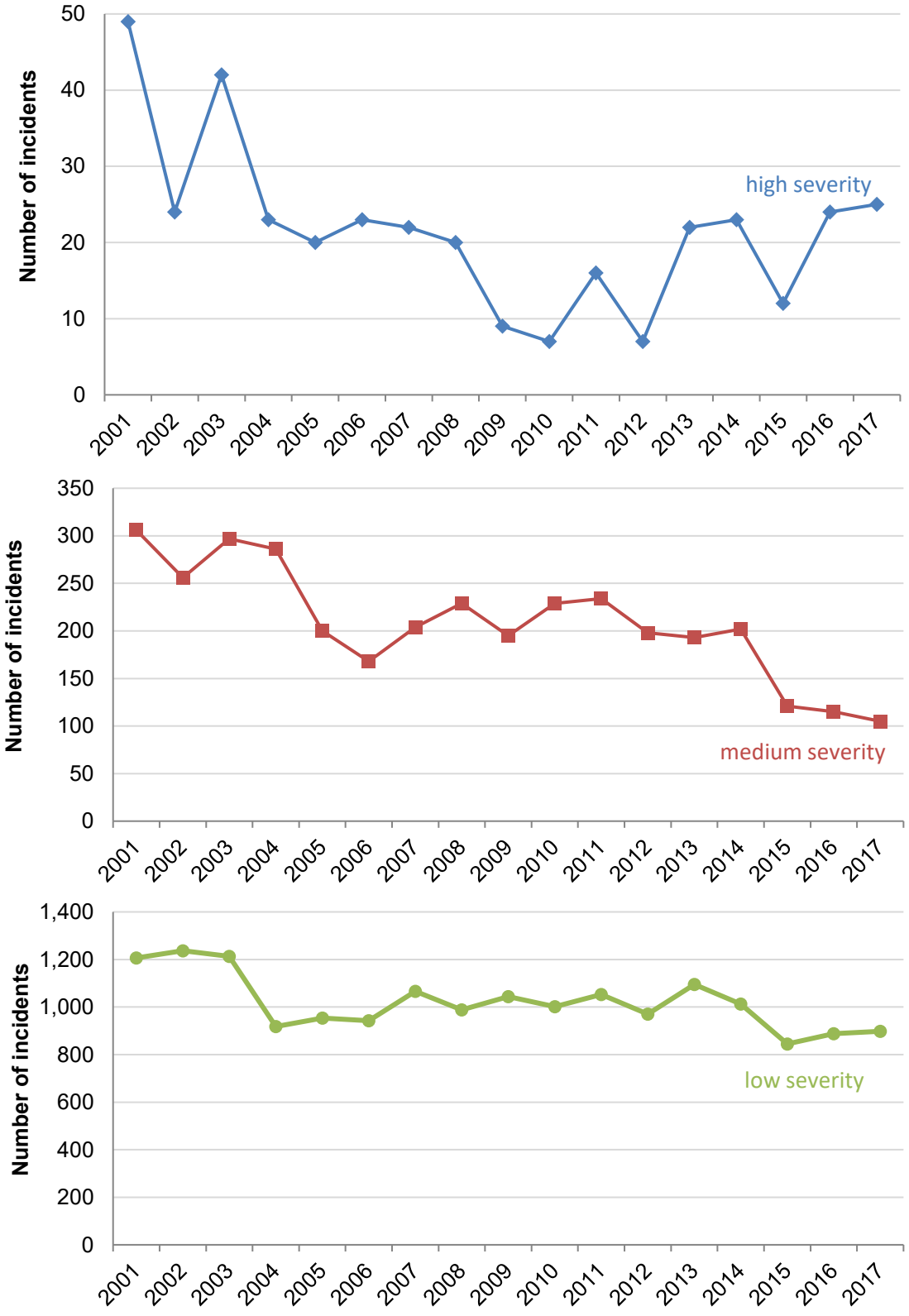
Drinking Water Quality of public drinking water supplied by NI Water is assessed using the regulatory parameters monitored at water treatment works, service reservoirs and consumers' taps.

The results are based on upwards of 98,000 samples taken throughout the water supply chain across Northern Ireland each year. Overall compliance remains high at 99.88% in 2017. Please note that Figure 3.8 presents the overall percentage of all regulatory compliance tests failing to meet drinking water standards.

Looking at private water supplies (not supplied by NI Water) in 2017, 157 supplies were included in the regulatory sampling programme. Of the 10,205 samples taken at private water supplies, 98.74% complied with the regulatory standards.

Water Pollution Incidents

Figure 3.9 Severity of substantiated water pollution incidents, 2001 – 2017



Source: NIEA

In 2017, there were 1,902 incidents either reported to NIEA or discovered by NIEA staff during inspections, of which 1,028 (54%) were substantiated (confirmed) as having an impact on the water quality of the receiving waterway. The total number of reported incidents increased by 4% compared with last reported year (1,836) and the number of substantiated incidents in 2017 (1,028) was similar to 2016 (1,027). The total number of substantiated incidents in 2017 is 33% lower than the average annual level recorded in the period 2001 – 2003 (1,543).

Substantiated pollution incidents are classified according to their environmental impact severity. A total of 130 (13%) high and medium severity incidents were investigated during 2017. This was a decrease of 6% compared with 2016 figures (139).

In 2017, Farming (30%), accounted for the largest proportion of substantiated incidents investigated by NIEA , followed by Industry (19%), Domestic (19%), Other (17%), Northern Ireland Water Ltd (13%) and Transport (2%).

4 Marine

The majority of Northern Ireland's 650 km of coastline is protected for its special interest and a number of our coastal species and habitats are recognised as internationally important. The marine life in the seas surrounding Northern Ireland is rich and varied and includes marine mammals such as harbour seals, whales, dolphins, seabirds, waterfowl and other species that migrate here. Our coastline also includes productive and biologically diverse ecosystems, with features which serve as critical natural defences against storms, floods and erosion. This chapter looks at the quality of Northern Ireland's bathing water, coastal water and shellfish water, and Irish Sea temperatures.

Key points in this chapter:

- In Northern Ireland levels of winter DIN have been monitored consistently at 24 marine waterbodies since 2012. The levels of winter DIN remained relatively stable between 2012 and 2018. In 2018, winter DIN was recorded at 25.96 µM. This was 0.49 µM less than 2015 levels and therefore is considered as no change on the baseline year for PfG reporting.

- Based on data from 2015 to 2018, 15 of the 26 beaches (58%) monitored in Northern Ireland met the 'excellent' standard while seven beaches (27%) met the 'good' standard. A further four beaches (15%) were classified as 'sufficient' and no beaches were classified as poor.

- Nine beaches and two marinas were awarded Blue Flag status, meeting a number of criteria such as water quality, safety, facilities and information.

- Ten of the 25 marine water bodies (40%) around Northern Ireland's shores are classified as 'high' or 'good', with the remaining water body areas being classified as 'moderate' (56%) or 'poor' (4%).

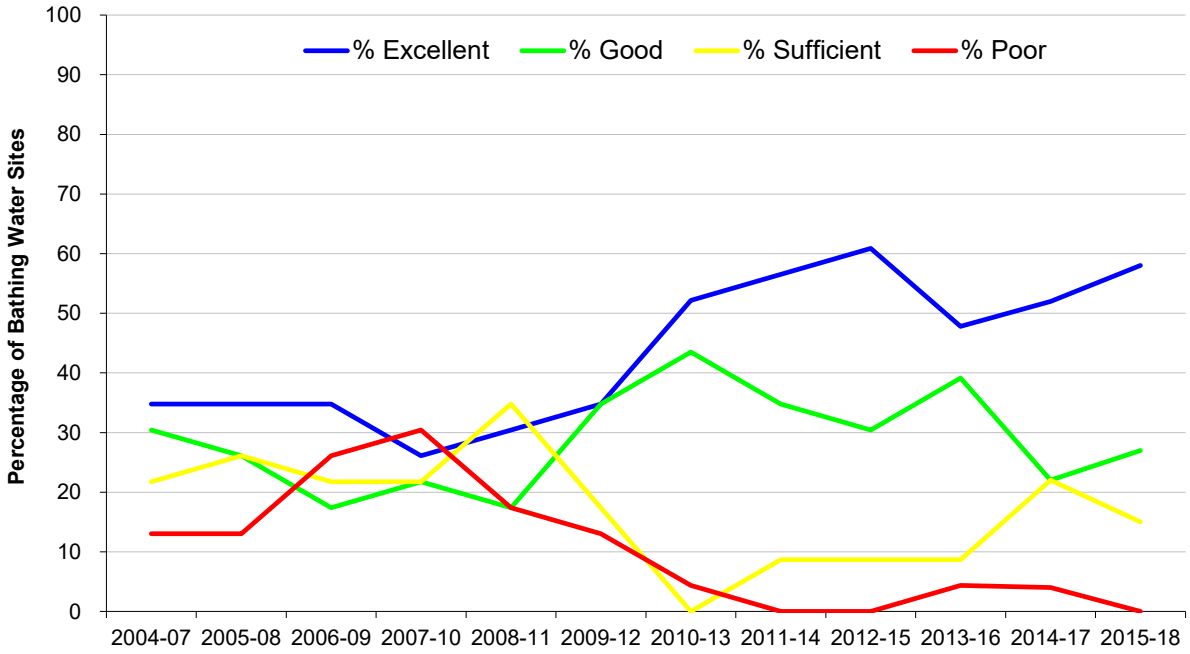
- Two out of nine designated shellfish water protected areas (SWPAs) complying with the Water Framework Directive guideline E. Coli standard in Shellfish Flesh in 2018.

- In 2017/18 an average of 6,250 items of litter was observed per kilometre (items/km). This is higher than the 4,370 items/km observed in 2016/17.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Bathing Water Quality

Figure 4.1 Bathing water compliance for microbial standards of EC Bathing Water Directive, 2004-07 to 2015-18



Source: DAERA Marine and Fisheries Division

DAERA works closely with other Departments and Agencies to drive improvements to water quality. Measures include maintenance and capital investments in new sewage treatment facilities and sewerage infrastructure, regulation of agricultural, domestic and industrial discharges and investigative monitoring of water catchments.

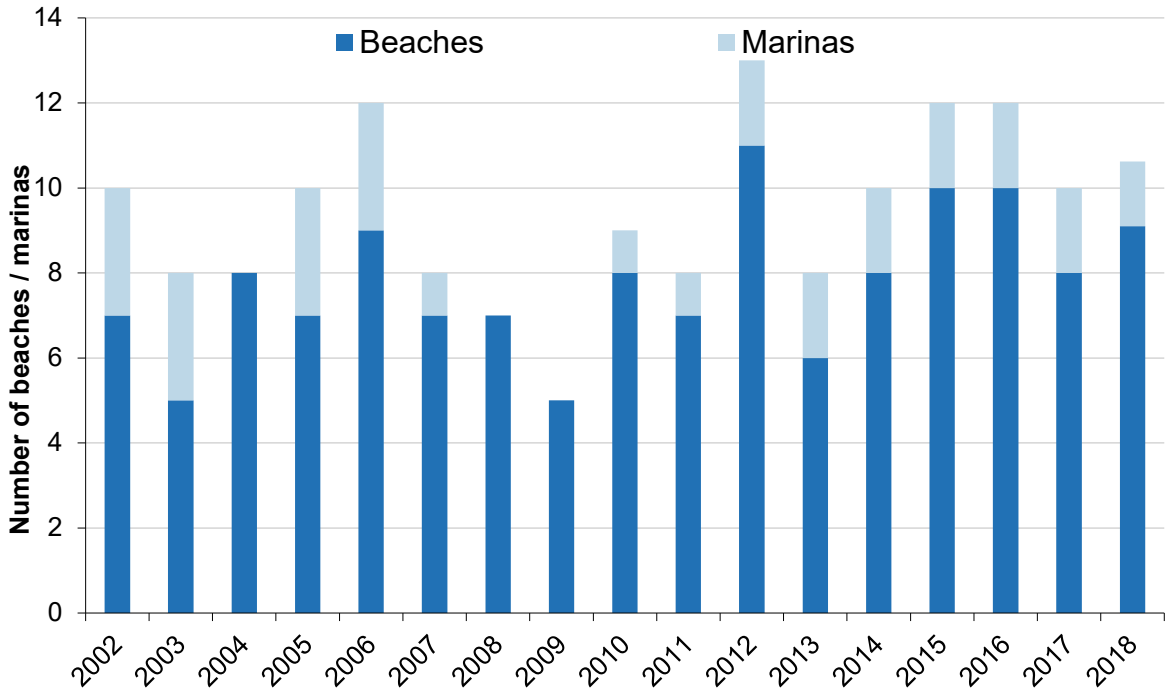
A full list of bathing waters and the standards reached each year from 2004 to 2018 is included in the excel tables that accompany this report: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019.

After a revision of the EC Bathing Water Directive (2006/7/EC) in 2015, bathing water quality assessments are carried using data gathered on a rolling 4-year period with classification standards also becoming more stringent.

Between 2014-17 and 2015-18, six bathing waters changed their status and three were newly identified. In 2015-18 the overall number of bathing waters classified as 'excellent' increased by three compared to 2014-17 with Ballycastle, and Millisle moving from 'good' to 'excellent' status and two of the three newly designated sites (Kilclief and Ballyhornan) achieving 'excellent'. The other newly identified bathing water (Cloughey) achieved 'good'. Portrush (Curran) East changed from 'sufficient' to 'good'. Ballyholme changed from 'poor' to 'sufficient' and Castlerock changed from 'excellent' to 'good'. This brings the total number of bathing waters classified as 'good' up to 7 in 2015-18, from 5 in 2014-17 and decreases the number of bathing waters at 'sufficient' standard by 1 to a total of 4 in 2015-18. There are no bathing waters classified as 'poor' in 2015-18.

Blue Flag Beaches

Figure 4.2 Number of Blue Flag Awards – Beaches & Marinas, 2002 – 2018



Source: Keep Northern Ireland Beautiful

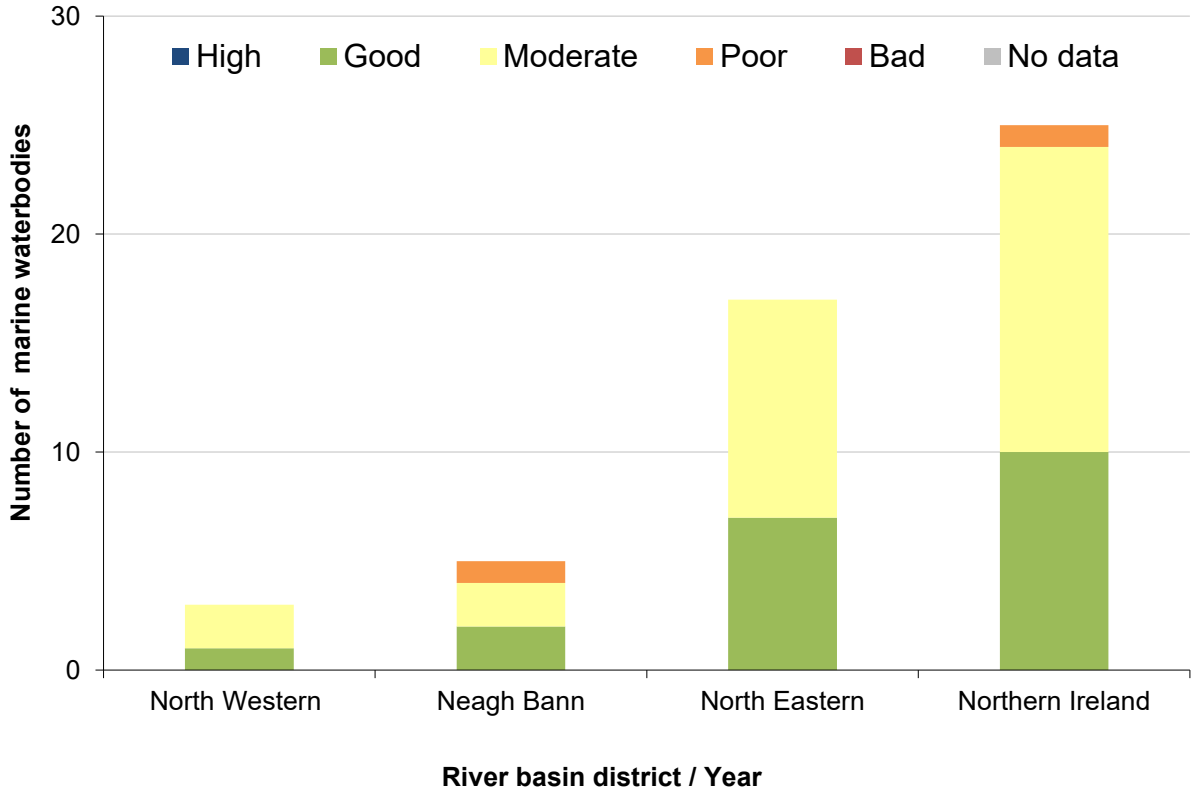
The Blue Flag Award is a voluntary eco-label for well managed beaches and marinas. The international Blue Flag Programme uses a number of criteria which beaches and marinas have to meet to gain the award such as water quality, safety, facilities and information.

In 2018, 9 beaches and 2 marinas were awarded with Blue Flag status. Beaches are assessed against 30 criteria, including safety, accessibility, facilities including toilets and provision of environmental education activities. Furthermore, Blue Flag beaches must have 'Excellent' water quality under the revised EU Bathing Water Directive. Although the bathing water quality criteria uses the EU Bathing Water Directive 'Excellent' standard, the decision that the UK should leave the EU will have no effect on the Blue Flag programme.

The recipients were Benone, Downhill, Portstewart Strand, Portrush East Strand, Portrush West and Whiterocks on the north coast; and Murlough beach, Tyrella and Cranfield West on the east coast. The awarded marinas were Ballyronan on Lough Neagh and Ballycastle on the north coast. In Northern Ireland Keep Northern Ireland Beautiful administers the programme, more information concerning these awards is available at www.keepnorthernirelandbeautiful.org.

Marine Water Quality

Figure 4.3 Water Framework Directive overall status in transitional and coastal waters (number of marine water bodies), 2018 (second cycle transitional and coastal water body set and standards)



Source: DAERA Marine and Fisheries Division

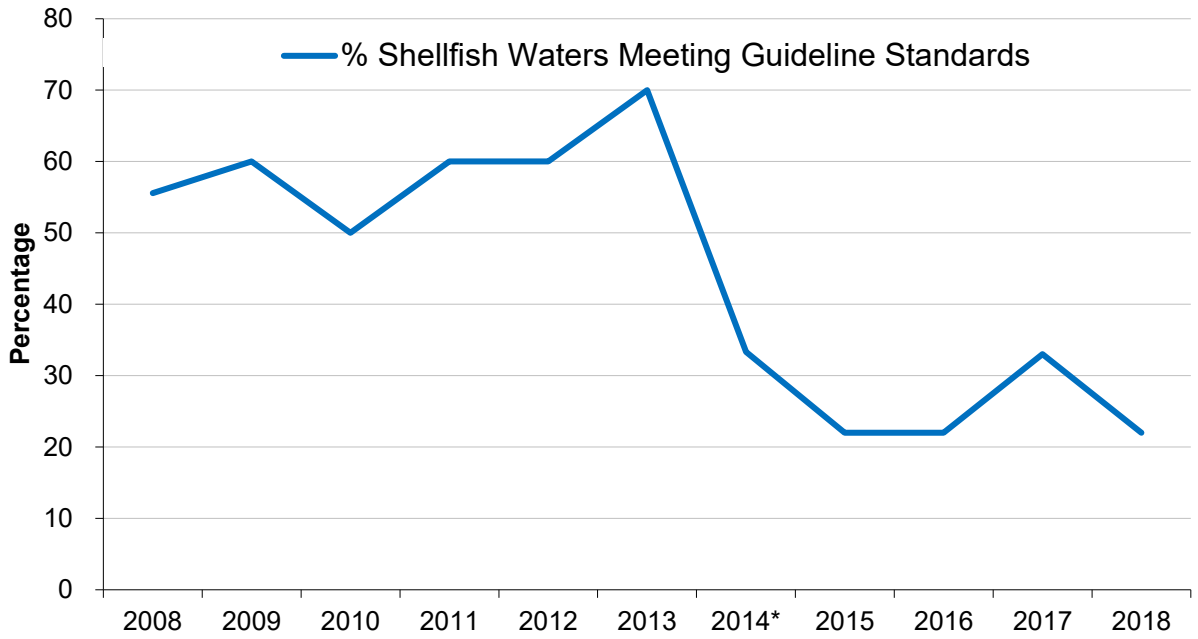
The Water Framework Directive requires NIEA to protect the status of waterbodies from deterioration and, where necessary and practicable, to restore waterbodies to good status. The environmental objectives established in the river basin plan set the water status to be achieved for surface waterbodies for each six year planning cycle starting from 2015.

There are 25 marine water bodies in the water body data set. In 2018, 10 (40%) marine water bodies were classified as ‘good’ status, the remaining 15 (60%) were at ‘moderate’ or ‘poor’ status.

The main factors driving classification in Northern Ireland coastal waters are dissolved inorganic nitrogen (DIN), specific pollutants (Annex VIII) and priority hazardous substances (Annex X) as outlined in the Water Framework Directive. In transitional waters the most important elements in determining status were DIN and specific pollutants, in certain cases, plants and fish fauna were also found to impact upon ecological quality.

Shellfish Water Protected Areas

Figure 4.4 Shellfish waters directive compliance, 2008 - 2018



*Note: From 2008-2013, compliance was measured against guideline E. Coli standard in flesh as set out in the Shellfish Waters Directive. **In January 2014, the Shellfish Waters Directive was subsumed into the Water Framework Directive (WFD). The WFD Guideline standard is slightly tighter than the existing standard in the Shellfish Waters Directive.*

Source: DAERA Environment Marine and Fisheries Division

Designated Shellfish Water Protected Areas are areas designated for the protection of shellfish growth and production. Good water quality is important for the production of high quality shellfish. In Northern Ireland there are currently ten Shellfish Water Protected Areas which were designated under the Shellfish Waters Directive and subsequently managed under the Water Framework Directive. These are located within Lough Foyle (Longfield Bank and Balls Point), Larne Lough, Belfast Lough, Strangford Lough (Skate Rock, Reagh Bay/ Paddy's Point and Marlfield Bay), Killough Harbour, Dundrum Bay and Carlingford Lough. Further information regarding areas sampled can be found at https://www.daera-ni.gov.uk/publications/pollution-reduction-programmes-2015.

In January 2014, the Shellfish Waters Directive was subsumed into the Water Framework Directive, resulting in more stringent *E. coli* standards and a noticeable "drop" in the percentage of designated shellfish waters. A total of two out of nine designated shellfish waters (22%) complied with the WFD guideline *E. coli* standard in 2018. No data was available for Marlfield in Strangford Lough which has not seen any shellfish harvesting for a number of years. The Department will consider the de-designation of this site if harvesting is not recommenced. In 2018, two out of nine designated shellfish waters (22%) complied with the guideline *E. coli* standards.

Comprehensive monitoring programmes are in place to assess the status of Shellfish Water Protected Areas under the WFD and classification under the EU Hygiene Regulations (854/2004). A suite of determinants are assessed to determine ecological

status and the overall objective under WFD. (Table 4.4iii included in the excel tables – available at: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019)

DAERA Environment Marine and Fisheries Division continue to manage Shellfish Water Protected Areas to ensure that there is no deterioration in water quality; also that steady progress is made towards compliance with guideline standards. Compliance with guideline standards are determined by measuring *E.coli* and other prescribed contaminants in shellfish flesh. Relevant shellfish waters contaminants are monitored under Water Framework Directive Annex VIII and Annex X specific pollutants and priority hazardous substances.

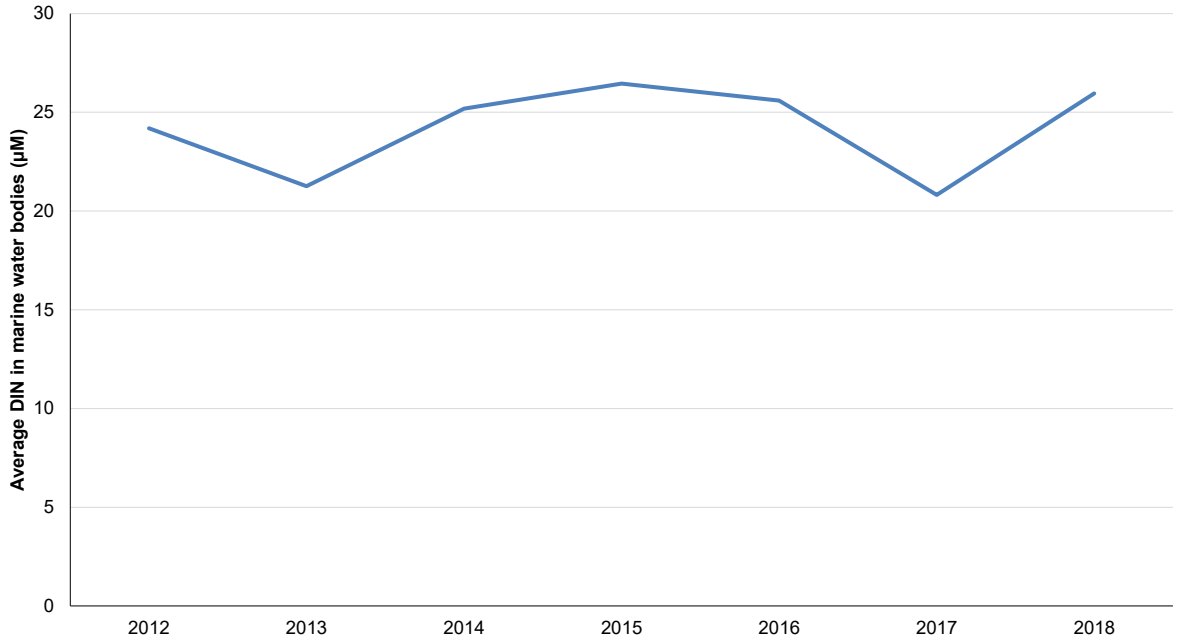
Shellfish beds are classified by the Food Standards Agency in Northern Ireland (FSA in NI) to determine the levels of post-harvest treatment that is required before shellfish can be placed on the market for consumption. Monthly monitoring of shellfish flesh is conducted to ensure that the classification that has been awarded by the FSA in NI remains appropriate. Thus ensuring that levels of marine biotoxins and chemical contaminants within the shellfish flesh do not exceed regulatory limits or cause a risk to public health.

DAERA Environment Marine and Fisheries Division work closely with the FSA in NI in managing shellfisheries from both an environmental and public health perspective.

A full list of shellfish waters and the compliance standard met for each year from 2008 to 2018 is included in the excel tables that accompany this report.

Winter Dissolved Inorganic Nitrogen

Figure 4.5 Winter Dissolved Inorganic Nitrogen (Winter DIN), 2012 - 2018



Source: DAERA Marine and Fisheries Division

Marine nutrients are one of the key environmental variables controlling the growth of phytoplankton in coastal waters. In temperate regions, coastal waters nutrient concentrations are highest in winter, when agricultural run-off is highest due to increased rainfall, and algal growth is lowest due to lack of light and lower temperatures.

Monitoring studies performed in the UK, indicate that concentrations of nutrients tend to peak in coastal waters during the winter months (November to February). Dissolved inorganic nitrogen (DIN), which consists of nitrate, nitrite and ammonia is an important indicator of marine nutrient status, as nitrogen is the most important nutrient in limiting marine algal growth.

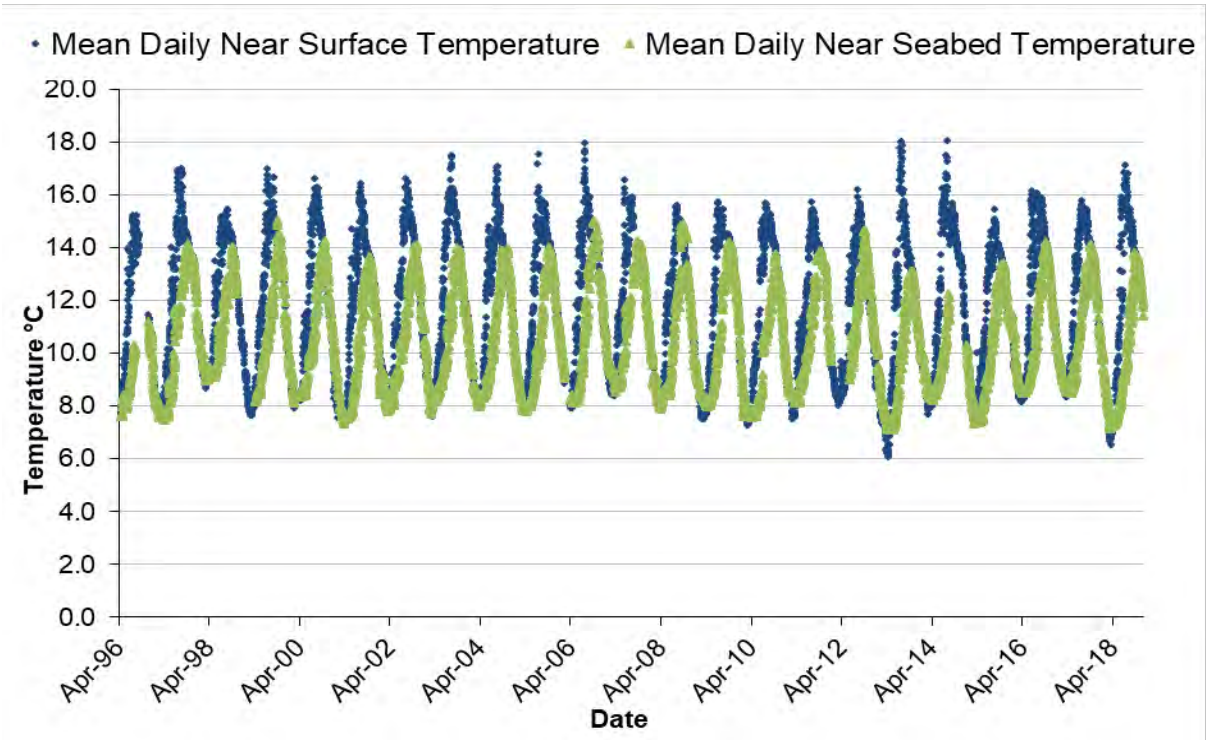
Excessive levels of marine nutrients can lead to local imbalances of marine phytoplankton (planktonic blooms) and macroalgae (seaweeds) a process known as *eutrophication*. Local effects can include impacts on the dissolved oxygen concentrations of the water column which can lead to fish kills and the localised smothering of other marine macroalgae and animals, particularly in intertidal areas.

This is an indicator in the draft Programme for Government (PfG) framework. The criteria used to report change for this indicator is +/- 3 µM against the baseline year value in 2015, when the level of winter DIN was 26.45 µM. A decrease, compared to the baseline year, of greater than 3 µM is considered a positive change whilst an increase in concentration of greater than 3 µM is considered a negative change. A value between 23.45 µM and 29.45 µM is considered as no change.

In Northern Ireland levels of winter DIN have been monitored consistently at 24 marine waterbodies since 2012. The levels of winter DIN remained relatively stable between 2012 and 2018. In 2018, winter DIN was recorded at 25.96 µM. This was a 0.49 µM less than 2015 levels and therefore is considered as no change on the baseline year for PfG reporting.

Sea Temperature

Figure 4.6 Daily sea temperature, Irish Sea, April 1996 - December 2018



Source: AFBI

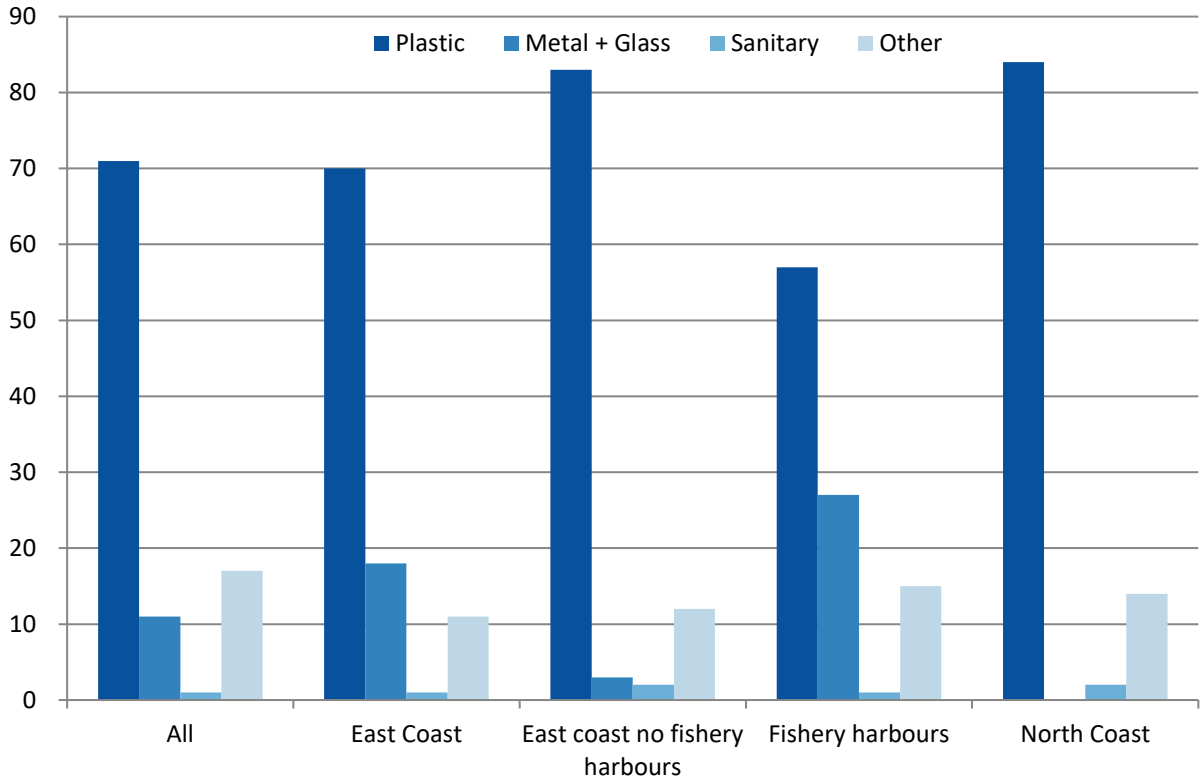
As part of a long-term research programme investigating the influence of the physical environment on the marine ecosystem in the Irish Sea, the Agri-Food and Biosciences Institute maintains an instrumented mooring in the western Irish Sea.

The temperature of the sea is recorded at different depths every three hours and from these measurements daily mean values can be calculated. The temperature is recorded by two moored thermistors. One is located close to an anchor on the seabed at a depth of ~90m, while the other is attached to the underside of a moored buoy at ~2m. These moorings are permanent and share the same grid reference point.

The lowest water temperature is usually recorded in February and the warmest in August. During the autumn and winter months there is generally little difference in the temperature of water close to the surface and near the seabed. However, warming of the surface layers during spring and summer causes the water column to stratify. This tends to isolate the bottom water and as a consequence it does not warm up as much. During the summer the temperature difference between the near surface and bottom water can be as much as 7 - 8 °C. Data are collected as part of a long-term research programme investigating the influence of the physical environment on the marine ecosystem in the Irish Sea. The time-series now consists of some 23 years of data and it will now be possible for marine scientists to undertake a detailed analysis of the data to investigate inter-annual variability in the seasonal development of water column stratification and to determine whether there are any trends in the data.

Beach Litter

Figure 4.7 Litter at beaches by material type, 2017/18



Source: DAERA/KNIB

The Marine Strategy Framework Directive (MSFD) is designed to more effectively protect the marine environment across Europe. The Directive aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect a resource upon which many economic and social activities depend. For marine litter, GES is defined as "properties and quantities of marine litter that do not cause harm to the coastal and marine environment".

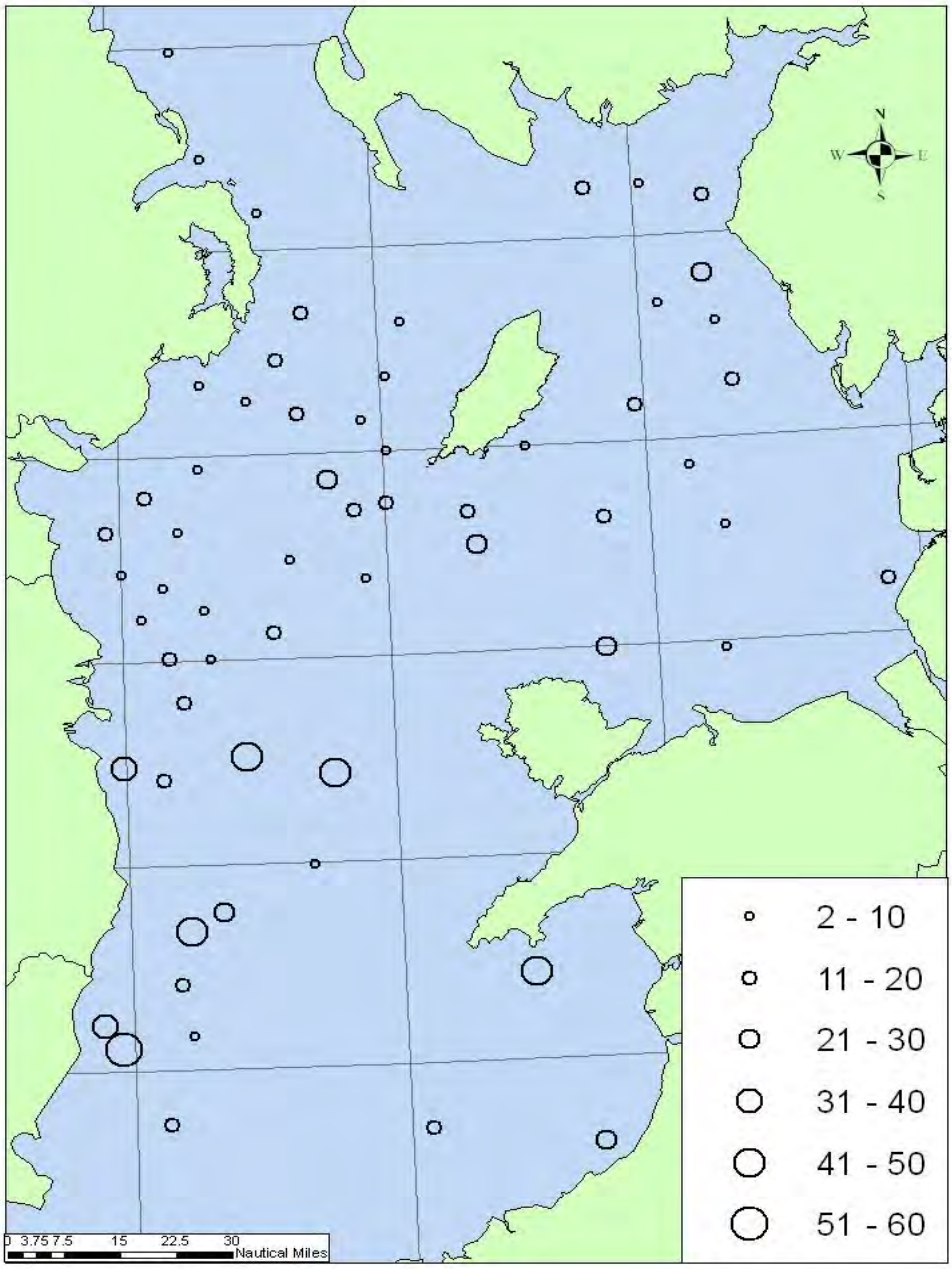
Coastline surveys are a primary tool for monitoring litter in the marine environment. They can be used to measure the effectiveness of management or mitigation measures and identify the sources and activities leading to litter pollution. Keep Northern Ireland Beautiful (KNIB) began surveying beach litter quarterly on behalf of DOE (now DAERA) in September 2012. Litter surveys are carried out by trained volunteer group surveyors using the internationally recognised OSPAR methodology. Ten Northern Ireland beaches covering a range of areas of the coastline are monitored annually for litter – Runkerry, White Park Bay, Rathlin, Ballywalter, Portavogie, Ballyhornan, Ardglass, Tyrella, Kilkeel North and Rostrevor. Hazelbank in Belfast Lough will be added in 2019.

In 2017/18, an average of 6,250 items of litter was observed per kilometre (items/km). This is more than the 4,370 items/km in 2016/17, with the lowest number of items for annual surveys undertaken to date 3,498 items/km in 2013. Fluctuations from year to year can be due to the proximity of surveys to recent storm weather, and data collected over a longer time period will allow a meaningful assessment of trend.

The majority of litter items observed were made of plastic (71%), with another 11% made of metal and glass along with 1% sanitary waste such as cotton buds and wipes. The most common types of litter items in 2018 were small pieces of plastic and plastic string and cord < 1cm and plastic drinks containers and lids over 2.5cm (approx. 1 inch) in length.

Among the abundant items observed were plastic drinks bottles, bottle tops and sweet wrappers, tin cans and fast food containers. These items are frequently bought together, and are among the most common items in terrestrial litter in Northern Ireland.

Figure 4.8 Offshore Litter Items per trawl station, 2017/18



Source: DAERA Marine and Fisheries Division

Custom fit for purpose monitoring programmes have been developed by DAERA Marine Conservation and Reporting to address Descriptor 10 of the Marine Strategy Framework Directive. The offshore programme is based on AFBI bottom trawl fisheries stock assessment surveys of 65+ stations in spring and autumn annually. Numbers of items per offshore trawl have been very consistent from survey to survey over recent years. An assessment of all of the data since 2010 is due next year and will comment on trend, sources and litter types.

5 Land

Land and landscape management have the greatest visual impact on our environment and our appreciation of it. Whether the land is used for agriculture, housing or forestry its value is immense and perhaps most importantly, it is a limited resource. This chapter examines soil quality, forest and woodland plantings, the role of agri-environment schemes on our land and housing completions and designations of townscape and villagescape.

Key points in this chapter:

- From a random selection of 500 fields from intensive cattle farms across Northern Ireland, less soils were deficient or low in phosphorus in 2016/17 compared to 2011/12, and slightly more had excessive phosphorus concentrations. It is expected that soil phosphorus concentrations will decline in the long-term as a result of the Nitrates Action Programme (NAP) and Phosphorus (P) Regulations (first published in 2007 with subsequent updates).

- Agri-environment schemes encourage farmers and landowners to manage their land to benefit the environment. At the end of 2018, 66,000 hectares of land in Northern Ireland were under agri-environment scheme agreement, an increase from the previous year as the new environmental farming scheme is implemented.

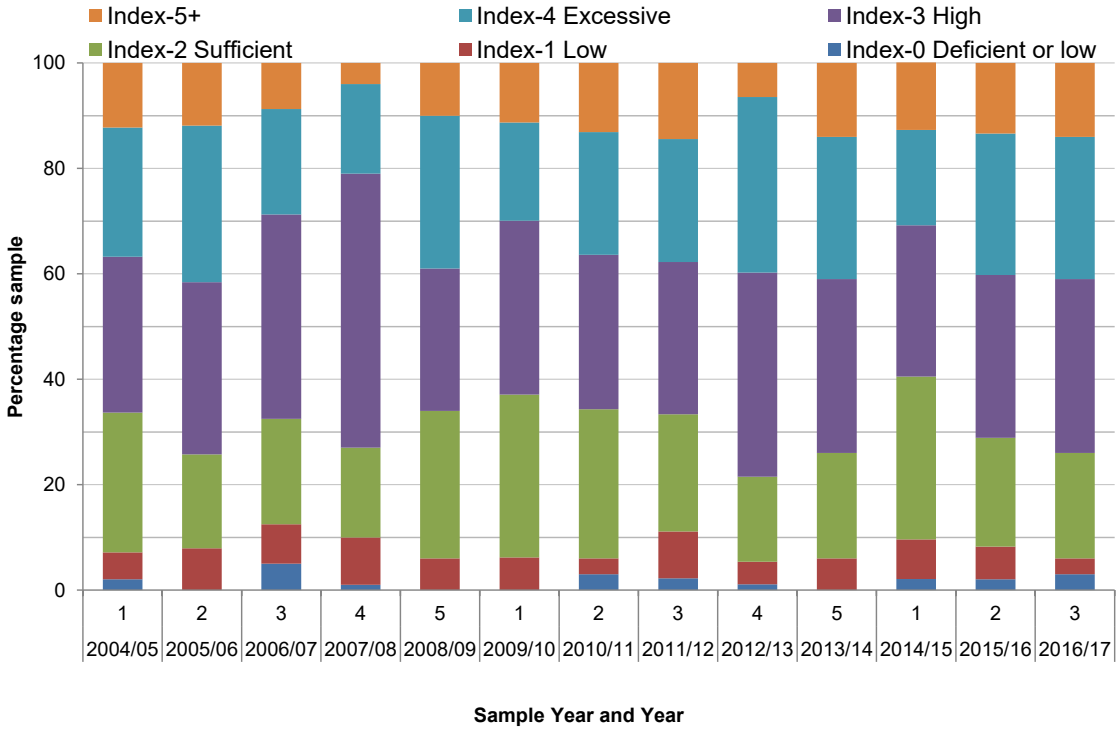
- Forests and woodlands provide important habitats, natural resources and diversity to landscapes. In 2018/19, 238 hectares of new woodland was created by private landowners supported under the Rural Development Programme. This is up from 210 hectares in 2017/18.

- Terrestrial litter impacts upon the quality of the local environment. In Northern Ireland, 20% of transects surveyed failed to reach an acceptable standard of cleanliness in 2017/18, this is an increase on the 15% failing to meet the acceptable standard in 2016/17.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Soil Quality

Figure 5.1 Soil phosphorus (as Olsen-P) by P-index for managed grassland soils, 2004/05 – 2016/17



Source: AFBI

The Agri-Food and Biosciences Institute (AFBI) Representative Soil Sampling Scheme (RSSS) began in 2004/05. Five hundred fields were randomly selected from intensive cattle farms across Northern Ireland and each winter one hundred of these fields are sampled.

The quantity of 'plant-available' phosphorus (P) in soil (measured by the Olsen method) is expressed as an index from 0 (deficient in P) to 9 (excessive in P for all crops).

For grassland, Olsen P-indices normally range from 0 to 5. Furthermore:

- A P-index of 0 means deficient in soil-P and a soil-P concentration of 0-9 mgP/l.

- A P-Index of 5 means excessive soil-P and a soil-P concentration greater than 70 mgP/l.

For managed grassland soils, an Olsen P-Index greater than 3, indicating a soil-P concentration greater than 45 mgP/l, is considered to be excessive.

The completion of analysis for soils sampled in 2016/17 allows a direct comparison of changes in soil fertility with the results of soil samples taken from those same fields five years earlier (2011/12). A comparison of the annual summary soil datasets for 2011/12 and 2016/17 shows that there were small decreases in the proportion of samples at P-index 1 (-5.9 percentage points), P-Index 2 (-2.2 percentage points) and

soils at P-Index 5+ (-0.4 percentage points), and increases in samples at P-Index 0 (+0.8 percentage points), P-Index 3 (+4.1 percentage points) and P-Index 4 (+3.7 percentage points).

Therefore, in 2016/17, less soils were deficient or low in P compared to 2011/12, i.e. 6.0% in 2016/17 and 11.1% in 2011/12, and slightly more soils had excessive P concentrations, i.e. 41.0% in 2016/17 and 37.7% in 2011/12.

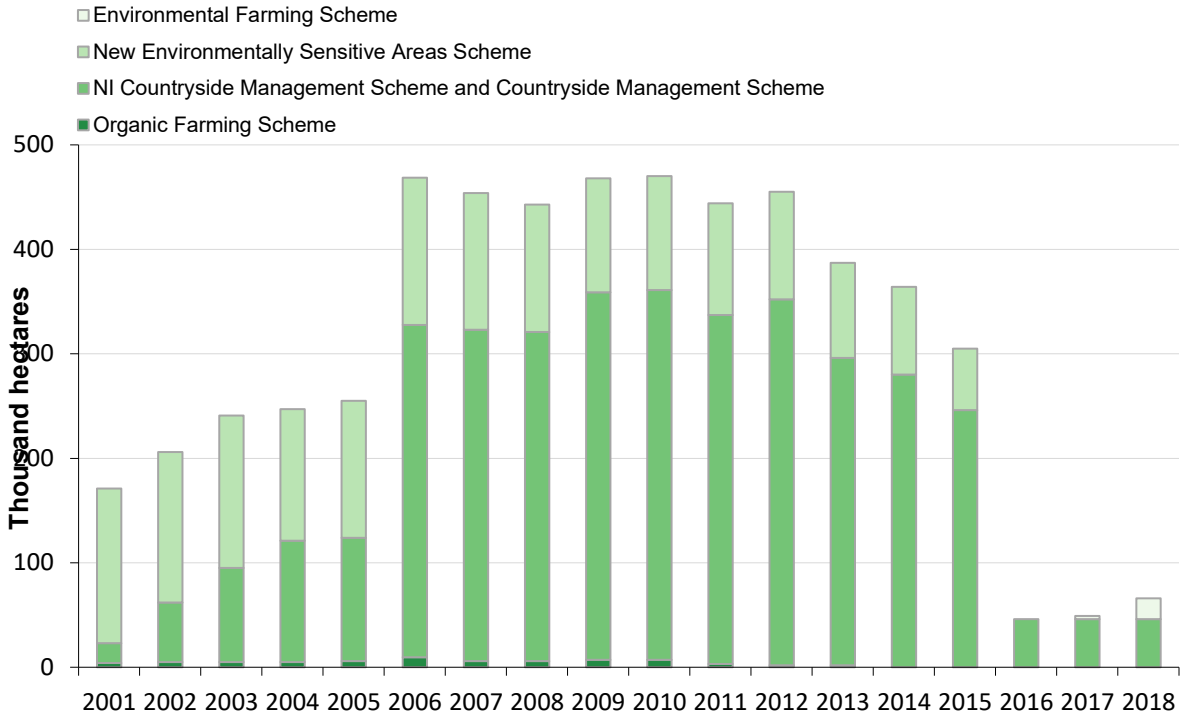
There is likely to be a linkage between chemical water quality and the soil-P data, with water quality improving as soil-P declines i.e. lakes, rivers and estuarine waters becoming less eutrophic.

In the long term, it is expected that soil-P will decline as a result of the Nitrates Action Programme (NAP) and Phosphorus (P) Regulations (first published in 2007 with subsequent updates). Thus, the first cycle of soil-P data represent the period before the NAP & P Regulations were in force while the second and subsequent cycles represent the period when the NAP & P Regulations were in force.

Sampling for this indicator did not take place in the year 2017/18 as the RSSS work is suspended pending review.

Sustainable Land Management

Figure 5.2 Northern Ireland agri-environment schemes, area under agreements, 2001 – 2018



Source: DAERA

Agri-environment schemes delivered by The Department of Agriculture, Environment & Rural Affairs (DAERA) are voluntary and support farmers and landowners to manage their land to benefit the environment. In 2010, at its peak, 45% of NI farmland was being managed under agri-environment scheme agreements. These schemes included the Northern Ireland Countryside Management Scheme (NICMS) https://www.daera-ni.gov.uk/publications/countryside-management-scheme-2007-2013-information-booklet , the Countryside Management Scheme (CMS), the Environmentally Sensitive Areas Scheme (ESAS) and the Organic Farming Scheme (OFS). During 2016, the area of agricultural land managed through these schemes fell by 85% to 46,000 hectares (4.4% of NI farmland). This was due to the expiration in 2016 of those remaining 10 year agreements from the older agri-environment schemes (CMS and ESAS).

Within the NICMS scheme (first launched in 2009), a significant proportion of the total number of agreements also came to the end of their 7 year term in late 2015. There are now only approximately 585 agreements still active within the NICMS scheme. The land area managed through the NICMS scheme remains at 46,000 hectares in 2018. The aim of the NICMS is to enhance biodiversity, improve water quality, enhance the landscape and heritage features, and help reduce the impact of climate change by integrating sustainable environmental management into the everyday workings of the farm. In return for this, farmers and landowners receive a payment, based on the area of habitat and archaeological features present on the farm, and the area/length of

habitat enhancement options carried out. All remaining NICMS agreements are scheduled to have ended by 31st December 2019.

In 2017 DAERA launched its new agri-environment scheme - the Environmental Farming Scheme (EFS) (https://www.daera-ni.gov.uk/topics/rural-development/environmental-farming-scheme-efs). This is a voluntary scheme under the NI Rural Development Programme 2014-2020, which is part financed by the EU. It offers participants a 5-year agreement to deliver a range of environmental measures. The EFS has been designed to address specific environmental needs, primarily related to biodiversity, climate change and water quality. It is targeted and prioritised to deliver maximum environmental benefit and value for money.

The EFS has three levels:-

- A Higher Level, primarily for environmentally designated sites - Special Area of Conservation [SAC], Special Protection Area [SPA], RAMSAR, biological Areas of Special Scientific Interest [ASSI] and for priority habitats and species;
- A Wider Level to deliver benefits across the countryside, outside of environmentally designated areas; and
- A Group Level to facilitate co-operative action by farmers in specific areas such as environmentally designated areas, priority habitats, or river catchments.

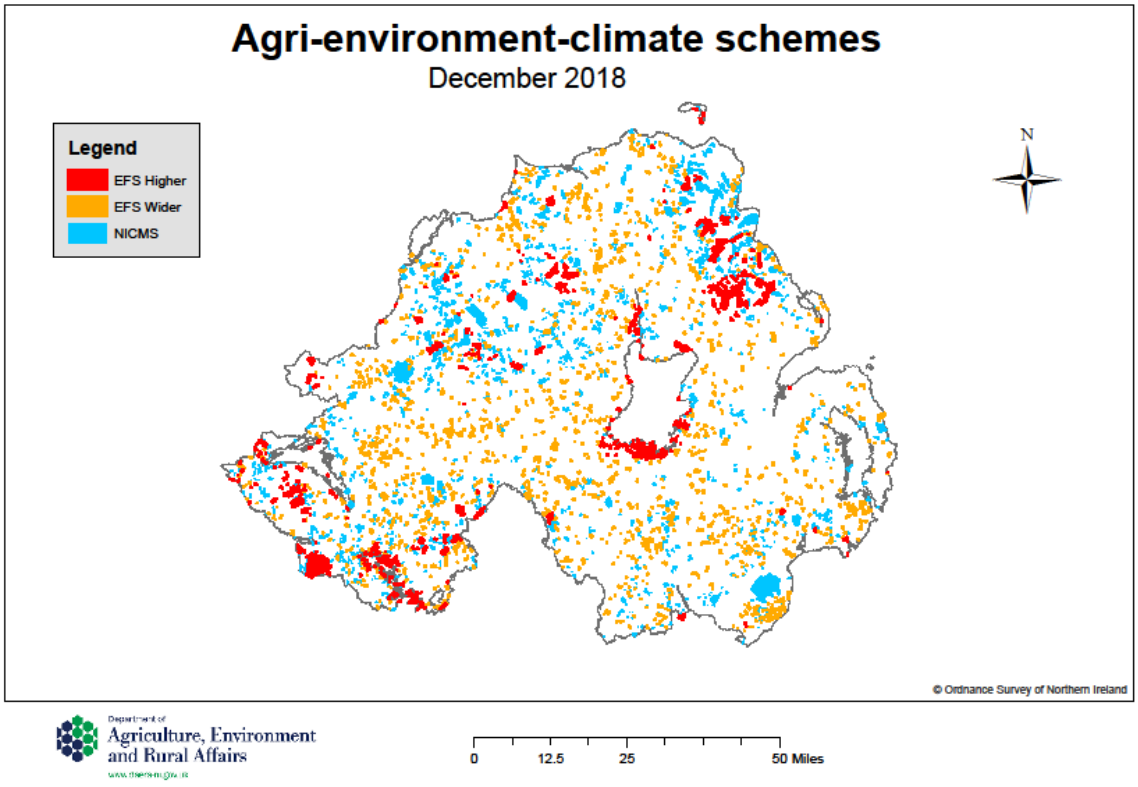
Businesses can undertake to setup and manage a range of environmental measures in their EFS agreement. The first 1,065 Wider Level agreements commenced on 1 July 2017, and these are attached to 3,295 hectares of NI farmland. From 1st January 2018 a total of 231 EFS Higher Level agreements commenced, and this equates to 16,407 hectares under agreement. The EFS Group Facilitation measure has been introduced initially through pilot projects. During 2018 two Group projects commenced and three were being progressed.

EFS Higher level agreements contain a site specific remedial management plan, with the aim of maintaining and enhancing the biodiversity value of the habitat. For example 1340 hectares of breeding wader bird sites and 7911 hectares of Moorland habitat (which includes blanket bog) are under appropriate management regimes through this first tranche.

Under the EFS in 2018 support was agreed for the completion of 528km of water quality measures (e.g. creation of riparian buffers, watercourse bank stabilisation, and provision of alternative drinking sources for livestock). Agreements were in place for scheme options which cover Biodiversity actions to be carried out across 815 hectares of farmland (e.g. provision of winter feeding sites for wild birds) and 161km of linear type work (e.g. hedge laying and traditional stone walls). Under the category of Climate change actions EFS agreements are supporting organic conversion of 388 hectares of land, leading to a total of 2,351 hectares being under organic management during the EFS agreement period. There is support being provided for climate change actions through agreements on Agro-forestry, tree corridor planting, and for 147km of new native hedgerow planting in 2018. The EFS also offers financial support to establish native woodland of up to 5 hectares in area, and farm businesses have agreements to establish 116 hectares of new native woodland in this first tranche. For establishment of woodland greater than 5 hectares, the NI Forest Service administers a separate

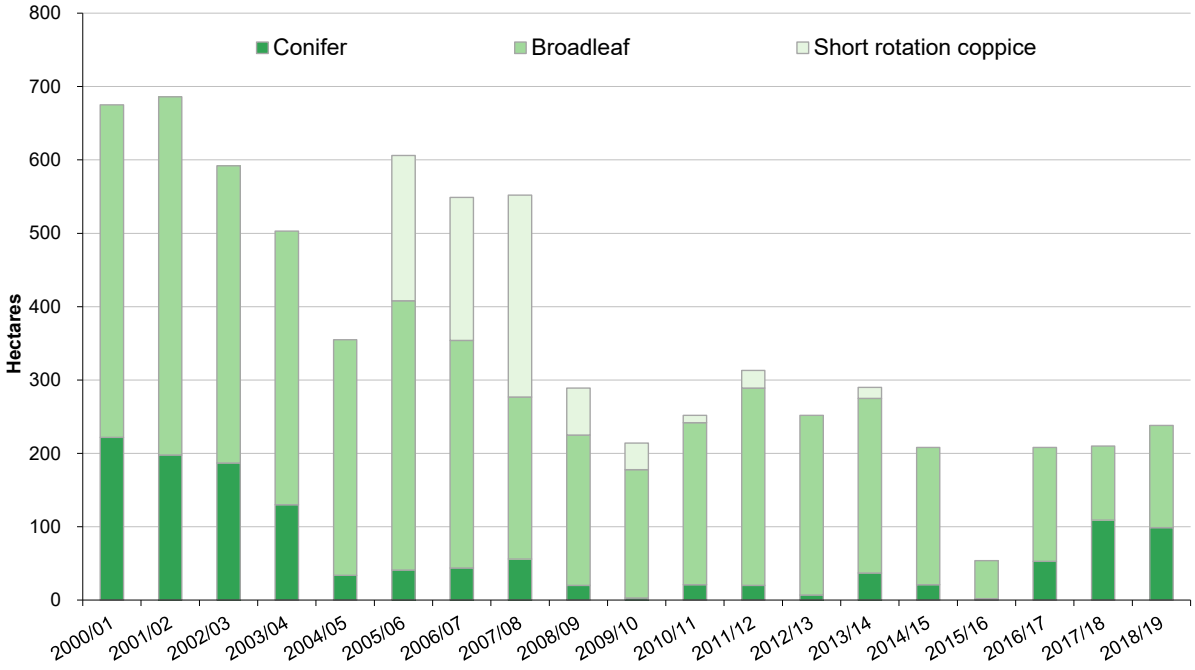
scheme (see 5.3 Area of Woodland). Additionally, 52 farm businesses in this first tranche are undertaking to preserve the native Irish Moiled Cattle breed.

The current target is to have up to 6,200 EFS agreements in place by 2020. Tranche 2 agreements for Wider Level and Higher level will commence on 1st January 2019, and further application windows to the EFS are being made available.



Area of Woodland

Figure 5.3 Area of new forest and woodland plantings, 2000/01 – 2018/19



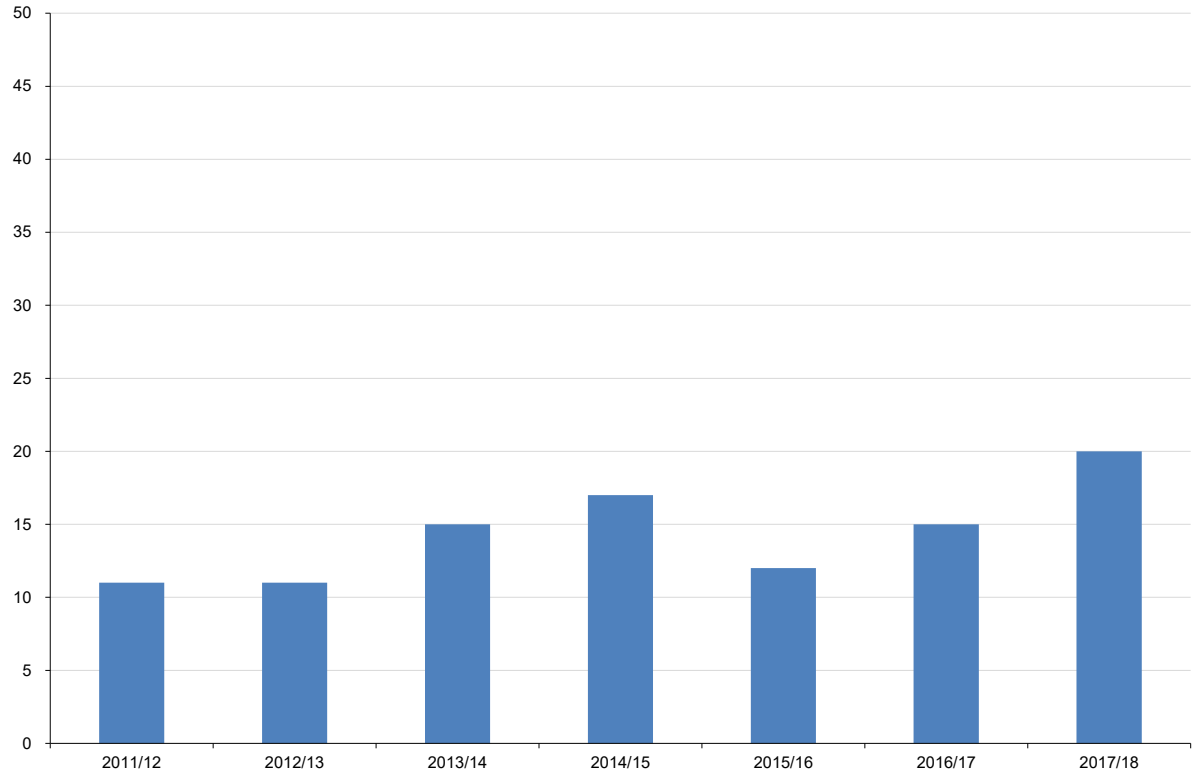
Source: Northern Ireland Forest Service

In Northern Ireland, over 55% of forests and woodlands are state-owned or managed.

Grant support to encourage afforestation and sustainable management of privately owned woodlands is provided by forestry measures in the Rural Development Programme. In 2018/19, 238 hectares of new woodland (99 ha conifer and 139 Broadleaf) was planted and part funded by the European Commission under the 2014 - 2020 Rural Development Programme. This is an increase on the 210 hectares supported in 2017/18 and the 208 hectares supported in 2016/17.

Terrestrial Litter

Figure 5.4 Percentage of transects at unacceptable standard, 2011/12 – 2017/18



Source: Keep Northern Ireland Beautiful

Note: Figures prior to 2015/16 are weighted to account for the change in council areas and land use from April 2015 on.

Litter is defined as anything that is dropped, discarded or thrown down by anyone, e.g. cigarettes, crisp bags, bottles and cans, receipts, dog fouling. The litter survey is undertaken annually using transects to analyse the extent of litter across all councils in Northern Ireland. One hundred transects are surveyed per council area across all land use types (retail, rural, main road, residential, recreational and industrial). Transects are selected at random using maps. If the selected transect is deemed unsuitable an alternative transect, close to the original site is chosen. Each transect is graded depending on the extent of litter in it. Grade A, B+ or B is deemed to have reached acceptable standards of litter, whilst, any transect that falls below a grade B has failed to reach an acceptable standard.

In 2017/18, 1,100 transects were surveyed and 7% of those were grade A and completely free of litter, 73% were grade B, predominantly free of litter or refuse, apart from some small items. As shown in the chart above, the proportion of transects failing to meet the acceptable standards in 2017/18 was 20%. The majority of this was transects with widespread distribution of litter or refuse, with minor accumulations (19%), the remaining proportion of transects were grade D, i.e. heavily littered with significant accumulations. This was a deterioration of 5 percentage points on the 15% of transects failing to meet the standards in 2016/17. In Northern Ireland the programme is administered by Keep Northern Ireland Beautiful, with more information

about terrestrial litter available at http://www.keepnorthernirelandbeautiful.org/cgi-bin/generic?instanceID=48 .

6 Biodiversity

Biodiversity describes the vast range of living organisms on earth. Biological diversity has been defined as:

"The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Convention on Biological Diversity, 1992

The state of our biodiversity reflects the state of our air, water and land environments. This chapter reports on the extent of nature conservation designations in Northern Ireland, the condition of some of these designations, bird populations, sites of local nature conservation importance and the condition of priority habitats and species.

Habitats and species in Northern Ireland are protected by a series of statutory designations. These include Areas of Special Scientific Interest (ASSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites (areas of wetland and waterfowl conservation), National Nature Reserves, Marine Nature Reserves and Local Nature Reserves. Protection is also afforded by non-statutory Sites of Local Nature Conservation Importance (SLNCI).

Key points in this chapter:

- In 2017/18 the proportion of land area under favourable management was 0.2%, similar to the proportion reported in 2016/17. The proportion of marine area under favourable management in 2017/18 was 4.5%, the same as the proportion reported in 2016/17.

- Bird populations are considered to be a good indicator of the broad state of the wildlife and the countryside. Between 1994 and 2017, the wild bird population has increased by 49%, however it should be noted that the underlying bird populations are not all increasing.

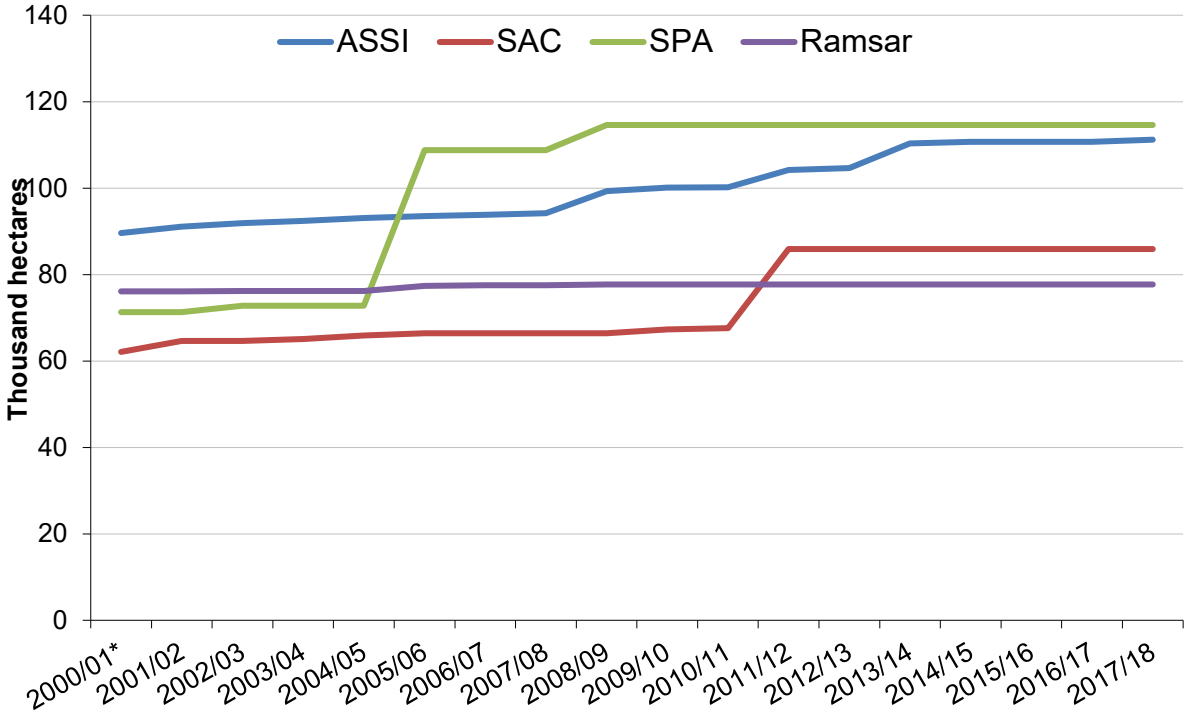
- Between 1994/95 and 2016/17 the total wetland bird population is estimated to have decreased by 12%.

- The Green Flag Award is a national bench marking standard for parks and green spaces. In 2018/19, 71 parks and green spaces achieved Green Flag Award status, compared with 60 in 2017/18.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Nature Conservation Designations

Figure 6.1(a) Area of nature conservation designations, 2000/01 – 2017/18



Source: NIEA

** These figures include all conservation designations up to and including 2000/01.*

Identifying and protecting areas of special nature conservation interest, and the flora and fauna they support, has been a cornerstone of nature conservation action in the UK during the last 50 years. Some areas are deemed to be of such importance that they have been formally designated in accordance with a number of pieces of national and international legislation.

Many places throughout Northern Ireland have been designated and protected by these laws to ensure their nature conservation value is retained, and indeed enhanced. Such protection has been afforded to areas on land, to rivers and lakes, to parts of our coastline, and to areas of the surrounding sea.

At 31 March 2018, a total of 111,159 hectares across 394 sites had been declared as Areas of Special Scientific Interest (ASSI), 85,900 hectares across 57 sites as Special Areas of Conservation (SACs), 114,600 hectares across 17 sites as Special Protection Areas (SPAs) and 77,700 hectares across 21 sites as Ramsar sites (areas of wetland and waterfowl conservation). Both SACs and SPAs are designated in accordance with European Directives, and Ramsar sites under an international convention.

There is some overlap between these different types of designation and, therefore, these cannot be totalled to give an absolute figure on the extent of designations. Figures 6.1 (b) and 6.1(c) show the spatial extent and distribution of these areas.

Figure 6.1(b) Areas of Special Scientific Interest (ASSI), designated between 1976 and 2018

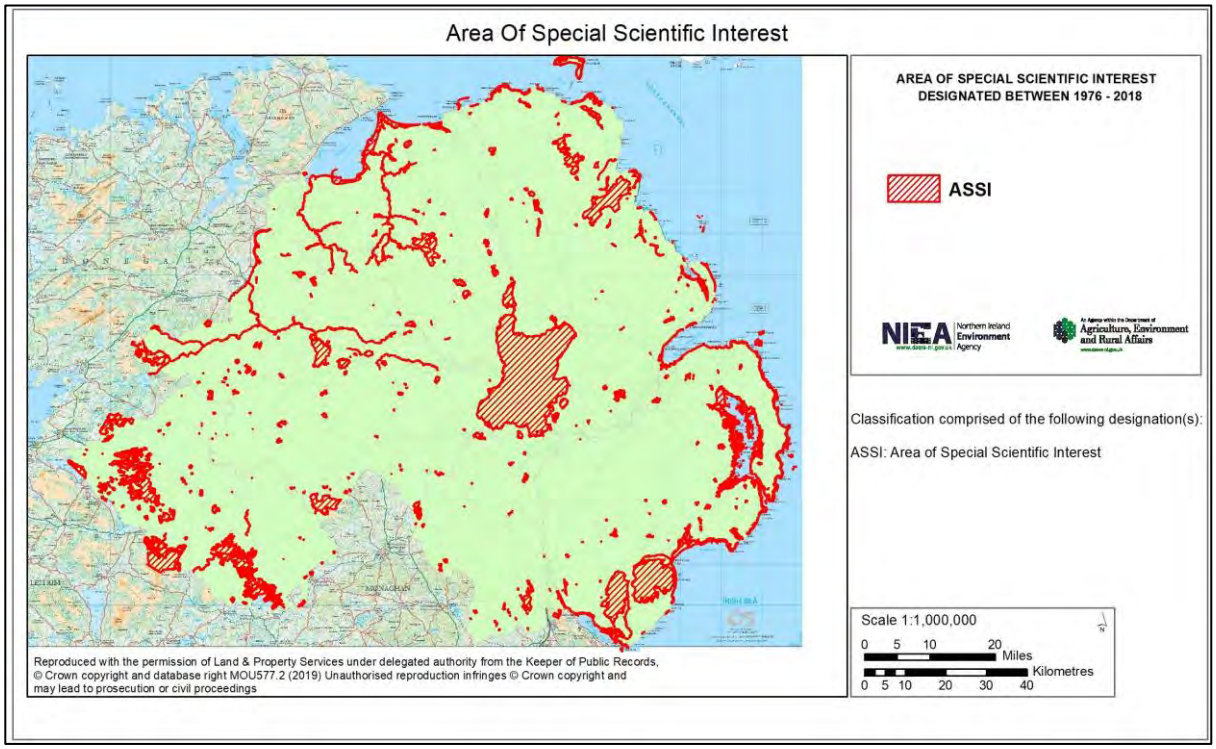
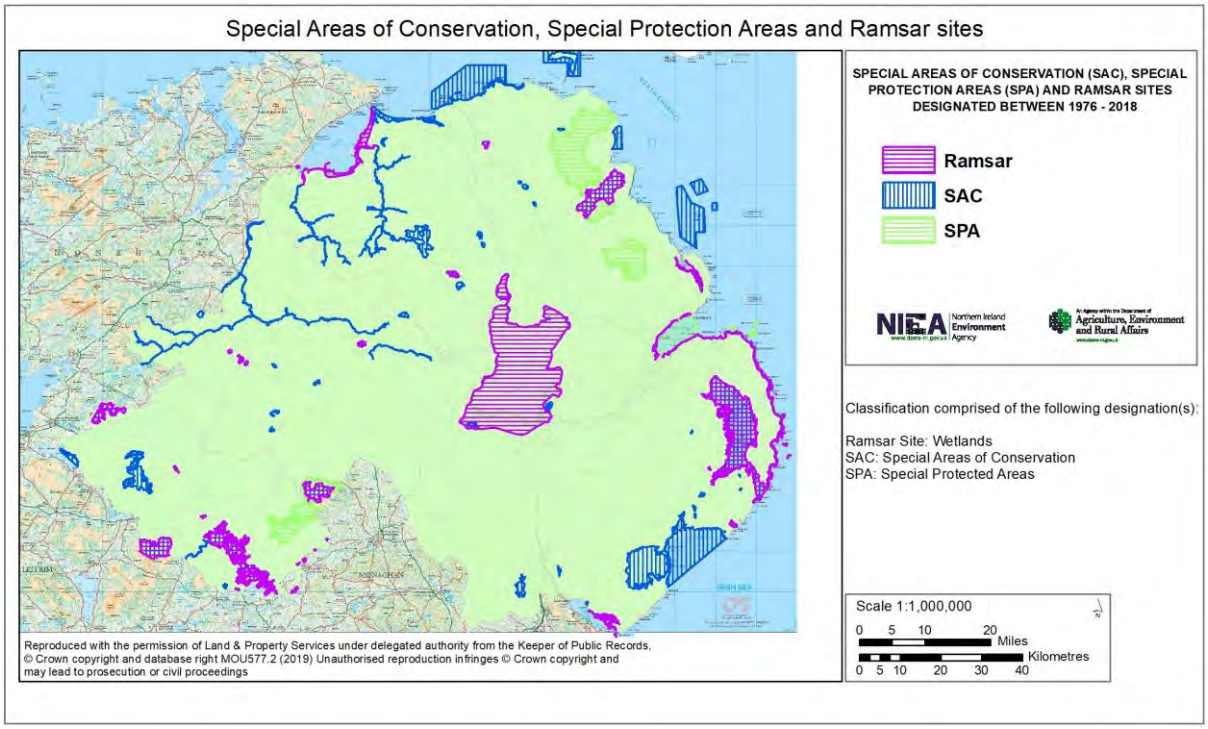
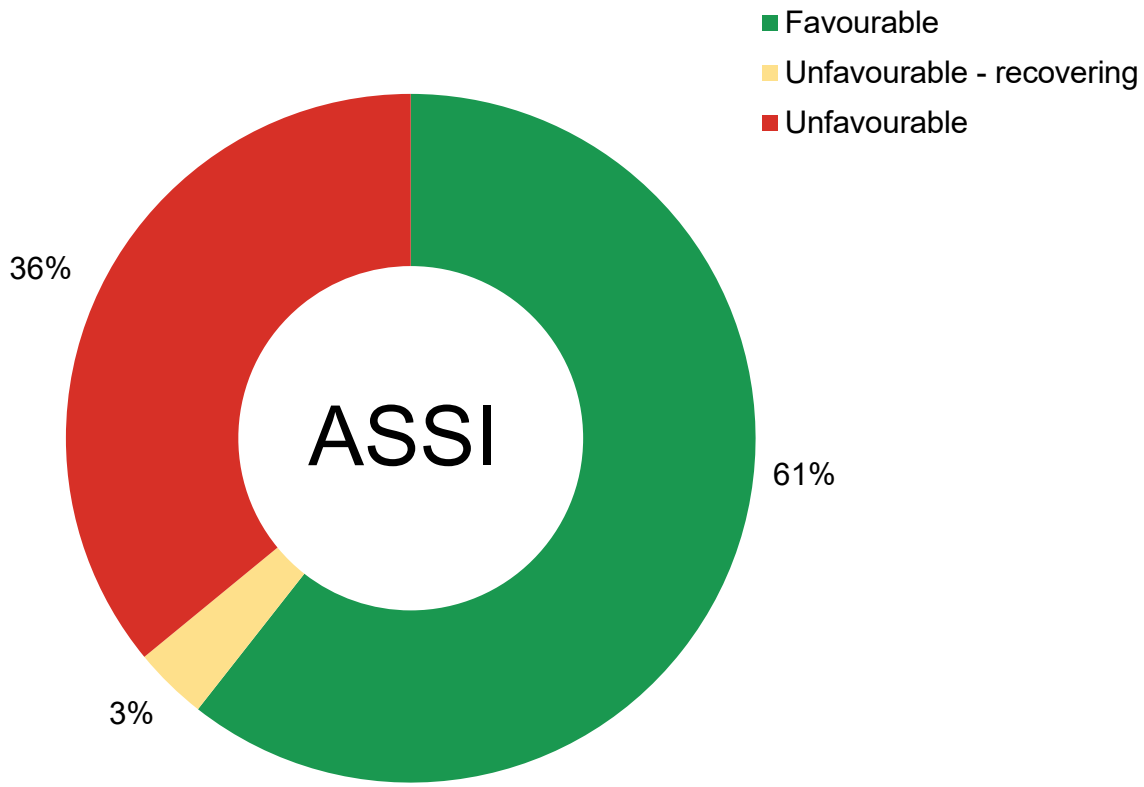


Figure 6.1(c) Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites, designated between 1976 and 2018



Nature Conservation Designations

Figure 6.2 Condition of features within Areas of Special Scientific Interest (ASSI), for the six year rolling period ending March 2018



Source: NIEA

Note: Due to rounding, percentages may not add to 100%

Areas of Special Scientific Interest (ASSIs) are designated sites which are protected under Northern Ireland law for their nature and earth science value. They are selected based on specific qualifying features which include earth science features, habitats and species. The condition of these features is assessed over a six year monitoring programme.

The first full cycle of monitoring was completed in March 2008, during which 916 features from 195 ASSIs were assessed. These data have been updated with the results from subsequent monitoring over the past 10 years. Over 1,000 features have now been assessed, including features re-assessed as part of the second and third six-year cycles, in addition to a number of new features on recently declared ASSIs.

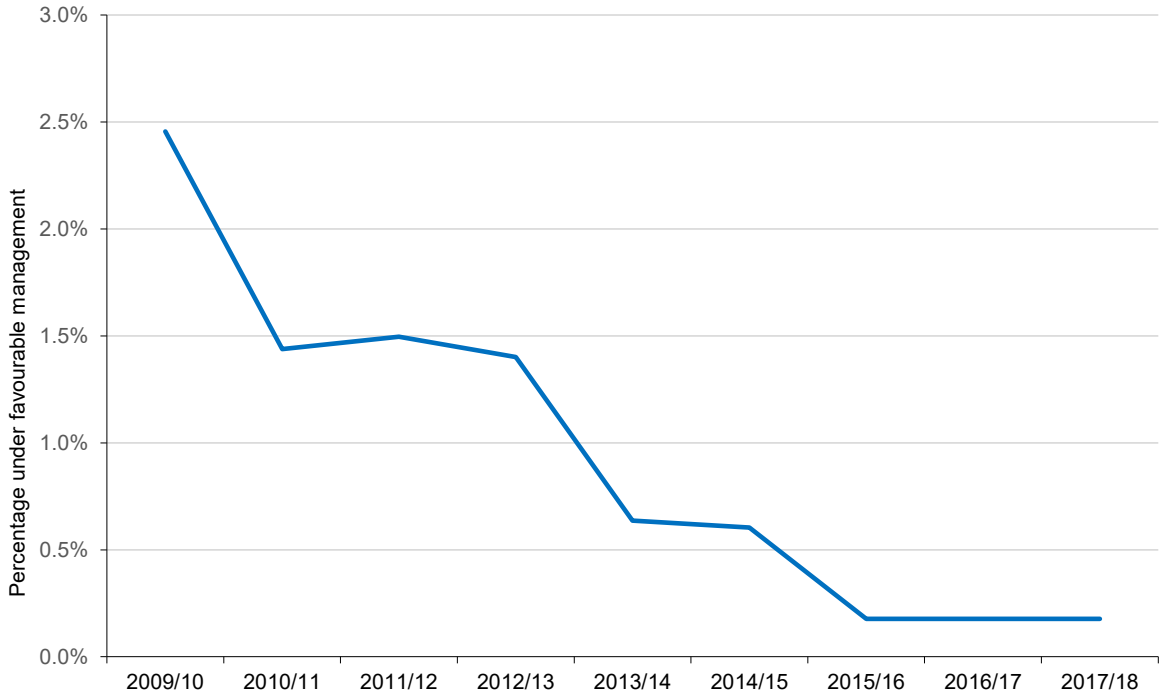
The results are very similar to the results that were published in the 2018 report, with 61% of the features in favourable condition and 36% in unfavourable condition.

NIEA is aiming to achieve favourable condition for a much higher proportion of the ASSI network, but acknowledges that restoring features that are currently unfavourable to favourable condition will take time. The Agency is continuing to work with landowners and other stakeholders to ensure that sympathetic management of ASSIs is in place. A

range of delivery mechanisms have been identified to help achieve this objective, including agri-environment schemes, EU Interreg Va Programme, the management of the DAERA estate (Forest Service lands, NIEA country parks and nature reserves) and grant-aid support from DAERA, in addition to direct funding by NIEA through the Management of Sensitive Sites scheme (MOSS).

Land under favourable management

Figure 6.3 Percentage of protected terrestrial area under favourable management 2009-10 to 2017-18



Source: DAERA

Our protected areas represent the very best of our natural landscapes, biodiversity and geodiversity, forming the cornerstone of nature conservation by supporting plants, animals and habitats that are rare or unique. The on-going protection and management of this coherent network of sites ensures that these important natural and cultural assets can be enjoyed by this and future generations.

We have a range of protected area designations, representing features of national and international importance. With the designation of protected sites largely complete, the focus is now on improving the sites overall condition towards “favourable conservation status” (FCS). FCS is being achieved through favourable management interventions which are deemed necessary to support the recovery of the site’s special features, based on a detailed assessment of ecological requirements of a particular site.

A number of initiatives and plans are being put in place to identify what actions are required to achieve FCS and to identify any potential funding mechanisms to assist undertake these actions. Measures to increase the percentage of protected areas under favourable management include:

- Developing or updating conservation management plans for Special Areas of Conservation (SACs) designated under the Habitats Directive and subsequently, Special Protection Areas (SPAs) under the Birds Directives through a number of delivery mechanisms.
- Development of conservation measures for Marine Conservation Zones.

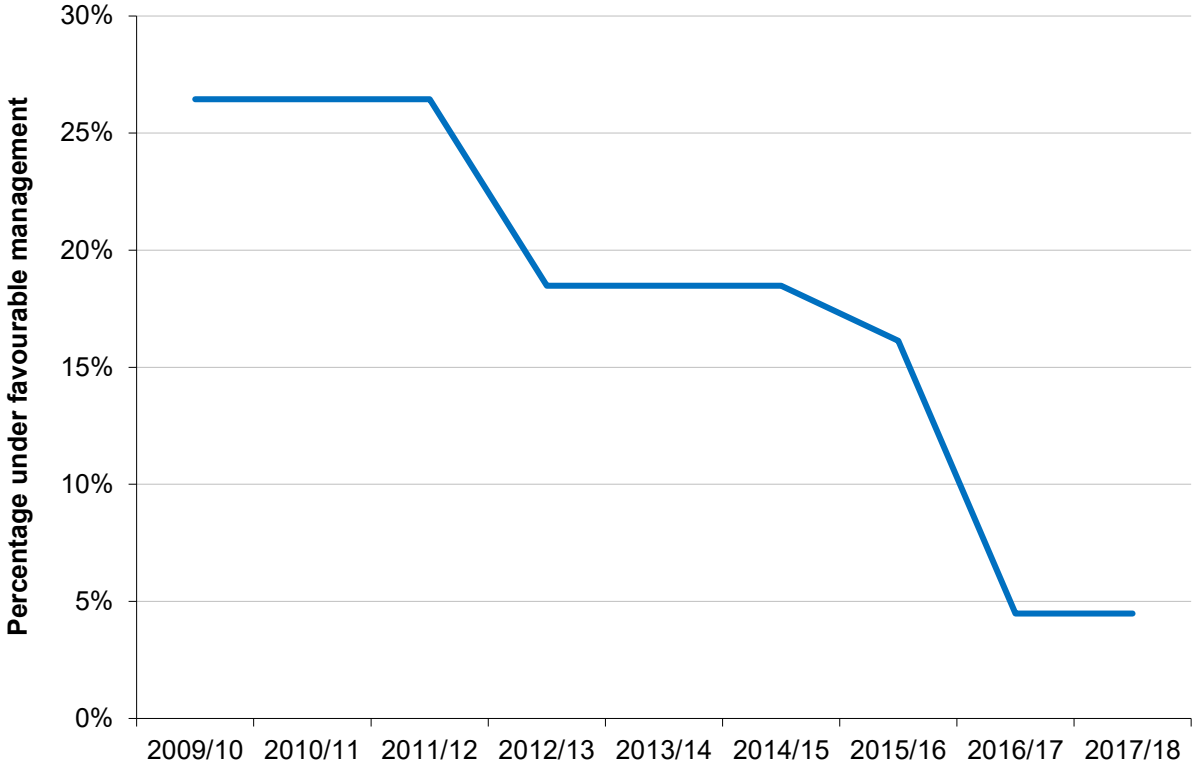
- Enhanced roll-out of Management of Sensitive Sites (MOSS) scheme to support favourable management in designated sites.
- Continue to manage Environment Fund clients delivering current priorities which contribute to the objective.
- Continue to manage 2 INTERREG Va Habitats projects delivering a series of conservation management plans and conservation actions.
- Working with local authorities to protect priority habitats and species advising on development control and new area plans.
- Developing working examples on the most effective way of measuring natural capital to ensure that the full benefits of natural assets are realised which will ultimately inform elements of CMPs.
- Working with DAERA's grant-aid budget and external EU and Heritage Lottery Fund (HLF) funding to manage designated sites and priority habitats and species.
- Roll out of the Environmental Farming Scheme Higher Level agreements which commenced in early 2018.

The proportion of terrestrial areas under favourable management has shown a decreasing trend since 2009/10. During this period, the Department has been working towards the creation of an ecologically coherent network of terrestrial and marine protected areas and efforts were focused on completing a programme of designations. The total terrestrial protected area increased from 1,384km^2 in 2009/10, of which 2.46% was under favourable management, to 1,489km^2 in 2017/18, of which 0.18% was under favourable management.

The Department has now entered a phase where the necessary management measures will be identified and introduced for both terrestrial and marine protected areas, and the focus between 2018 and 2022 will be on bringing the protected area network into favourable management. The trend should be improving from 2018 onwards.

Marine area under favourable management

Figure 6.4 Percentage of protected marine area under favourable management 2009-10 to 2017-18



Source: DAERA

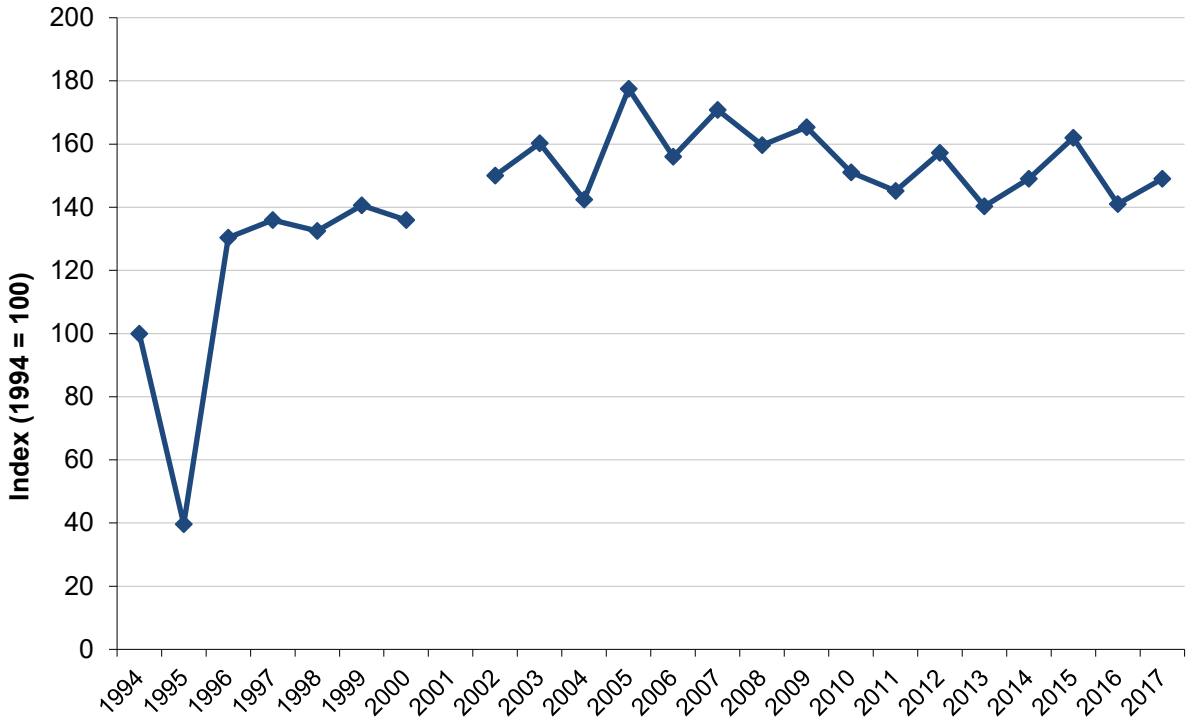
Our protected areas represent the very best of our natural landscapes, biodiversity and geodiversity, forming the cornerstone of nature conservation by supporting plants, animals and habitats that are rare or unique. The on-going protection and management of this coherent network of sites will ensure that these important natural and cultural assets can be enjoyed by this and future generations.

We have a range of protected area designations, representing features of national and international importance.

The proportion of marine areas under favourable management has shown a decreasing trend since 2009/10. During this period, the Department has been working towards the creation of an ecologically coherent network of terrestrial and marine protected areas and efforts were focused on completing a programme of designations. The total marine protected area increased from 269km2 in 2009/10 to 2,566km2 in 2017/18. The Department has now entered a phase where the necessary management measures will be identified and introduced for both terrestrial and marine protected areas, and the focus between 2018 and 2022 will be on bringing the protected area network into favourable management. The trend should be improving from 2018 onwards. In 2017/18 the proportion of marine area under favourable management was 4.48%.

Wild Birds

Figure 6.5 Change to wild bird populations in Northern Ireland, 1994 - 2017



Data Source: British Trust for Ornithology

Northern Ireland's wild bird population is monitored as part of the UK BTO/JNCC/RSPB (British Trust for Ornithology/Joint Nature Conservation Committee/The Royal Society for the Protection of Birds) Breeding Bird Survey, which is undertaken annually at over 3,000 sites across the UK (128 in Northern Ireland during 2017).

Due to the nature of the data analysis, the number of species for which trends are available can vary year-on-year. In 2017 information on trends was available for 37 of the most common species.

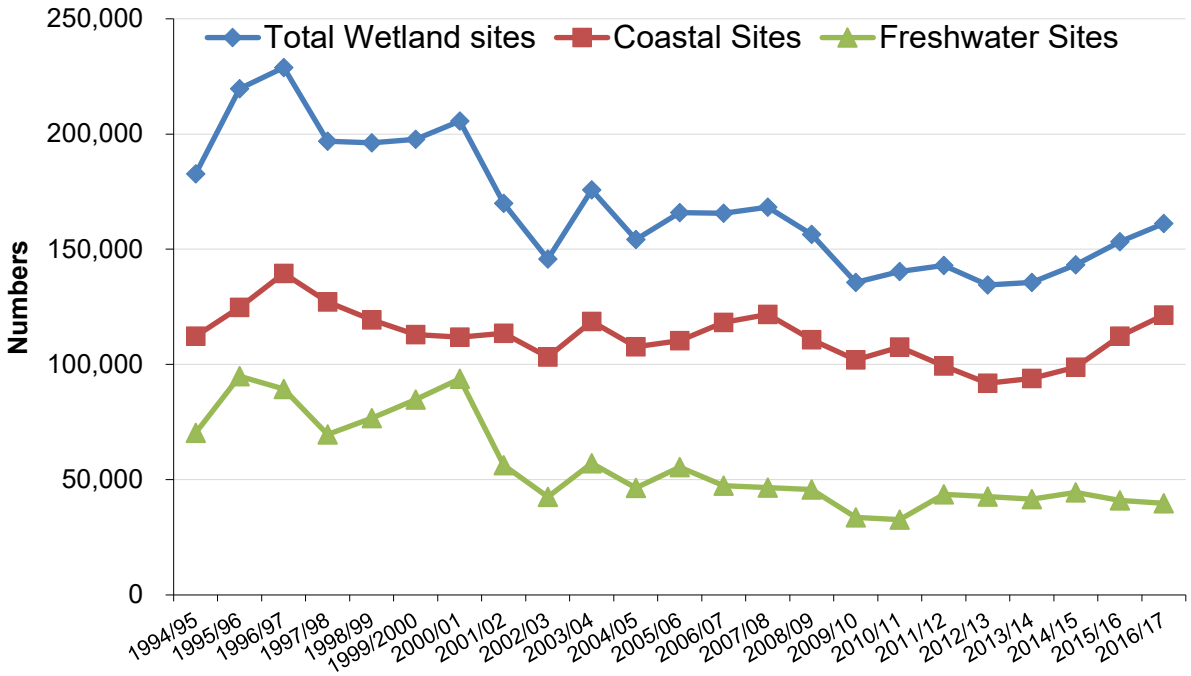
There is no figure for 2001, due to the impact that the foot and mouth outbreak had on the collection of data, i.e. observers not being able to access many rural areas.

Between 1994 and 2017, the wild bird population has increased by 49%, although it has been relatively stable since 2002. It should also be noted that the underlying species populations are not all increasing. For example, while Backcap numbers have more than doubled and House Martins and Chiffchaffs have increased by around 40% during the last ten years, the Mistle Thrush has declined by a quarter and Greenfinch by 80% over the same period. In common with elsewhere in the UK, the long-term decline of the Greenfinch appears to be largely due to the effects of Trichomonosis, a disease carried by a protozoan parasite. Collared dove is among the species which has also been susceptible to this disease in Great Britain, but in Northern Ireland its numbers have increased by 95% since 1995.

In the short term, a number of species, including Blue Tit and Linnet, showed apparent declines between 2016 and 2017, though only that for Greenfinch was statistically significant. Significant increases from 2016 were recorded in Pheasant, Blackcap, Goldcrest, Wren, Blackbird and Bullfinch.

Wetland Birds

Figure 6.6 Wetland bird populations in Northern Ireland, 1994/95 – 2016/17



Source: British Trust for Ornithology/NIEA

Between 1994/95 and 2016/17, the total wetland bird population of Northern Ireland is estimated to have decreased by 12%. Over that time, coastal populations increased by 8% while freshwater populations declined by 43%. The large decline recorded at freshwater sites is strongly influenced by the notable fall in wintering diving duck numbers at Lough Neagh. The scale of this decline also reflected in the decline in total waterbird numbers.

The trend since last year's assessment has shown an increase of 8% overall, with waterbird populations at coastal sites increasing by 11% but the freshwater figures showing a 3% decline. The increase at coastal sites was attributable to generally improved numbers across a range of waterfowl and wader species, rather than to any notable large-scale changes in particular species across Northern Ireland.

Amongst coastal sites, Lough Foyle, Carlingford Lough and Dundrum Inner Bay recorded notable increases of 53%, 33% and 20% respectively from the previous season. At Lough Foyle there was a general increase in numbers across a range of waterbird species, notably in Whooper Swan, Teal and Lapwing, peaking in January 2017. Trends at Carlingford Lough are likely to reflect improved monitoring at the site. At Outer Ards the major influx of gulls recorded in early 2016 was not repeated and this was reflected in a reduction in peak waterbird numbers by 31%. The above figures highlight both the variability in usage by migratory waterbirds between years of many of these wetland sites and their continued importance.

Amongst our freshwater sites, Loughs Neagh and Beg reported a minor increase of 1% in peak waterbird numbers during 2016/17 and there is some indication that numbers may be stabilising after the steep decline seen since 2002/03. Upper Lough Erne's numbers decreased by 11%. Despite the overall declines at Lough Neagh in the past 15 years, this is still the most important site in UK for Pochard, Tufted Duck, Scaup and Goldeneye (based on current 5 year averages).

Notable increases were recorded in a number of duck species. Wigeon, Teal and Pintail numbers rose by 49%, 43% and 68% respectively, while amongst the other dabbling duck Mallard (-11%) and Gadwall (-22%) declined. Shelduck numbers continued their recent recovery and were up by 88% overall. There were contrasting fortunes among the diving duck species, particularly at Lough Neagh. Pochard and Scaup, showed a welcome increase of 43% and 68% respectively, while Tufted Duck and Goldeneye remained relatively stable.

Continuing the trend from the previous winter, Whooper Swan numbers showed a small increase (15%) overall. This was reflected at all major sites for this species. Canadian Light-bellied Brent Geese (for which the island of Ireland is the most important wintering location in the world) was, however, present in smaller numbers, decreasing by 21% from 2015/16. This is likely to be a consequence of variable reproductive success, which is typical of Arctic-breeding species.

The 2016/17 winter brought signs of recovery for a number of wader species which had previously shown declines. Knot showed the largest increase from the previous season (266%). Sanderling numbers also showed a strong recovery, with numbers increasing by 128%. Other waders also showing a substantial increase were Oystercatcher, Ringed Plover, Purple Sandpiper, Bar-tailed Godwit and Redshank. Declines however continue to affect a number of our shorebirds. Black-tailed Godwit numbers, which showed a notable recovery in the previous season, reversed that trend with a reduction of 28%. This trend is probably a consequence of reduced productivity on the species Icelandic breeding grounds. Declines were also evident in Curlew, Greenshank and Turnstone. The decrease in wintering Curlew numbers reflects the poor conservation status of this globally "near-threatened" across much of its breeding range.

As mentioned above, the large influx of gulls recorded early in 2016 was not repeated during the 2016/17 season. This was reflected by declines of varying degrees in four out of the five widespread wintering gull species. In comparison with 2015/16 peak Black-headed Gull numbers decreased by 6%, Lesser Black-backed Gulls by 5%, Herring Gulls by 13% and Great Black-backed Gulls by 1%. In contrast, however, Common Gull increased by 39%.

Many of these site-based species increases and declines reflect changes at UK level suggesting these changes are driven by regional scale or international factors and may not be due to site related issues.

It is thought that milder winters throughout north-western Europe may be a factor behind some of these species declines here, resulting in their wintering closer to their breeding sites. While such migratory "short-stopping" by more easterly breeding species may be contributing to the fact that 32% of European waterbird populations are declining (Waterbird Population Estimates, Wetlands International, 5th edition), it is

likely that other factors such as loss of breeding habitat and poor breeding success are also involved

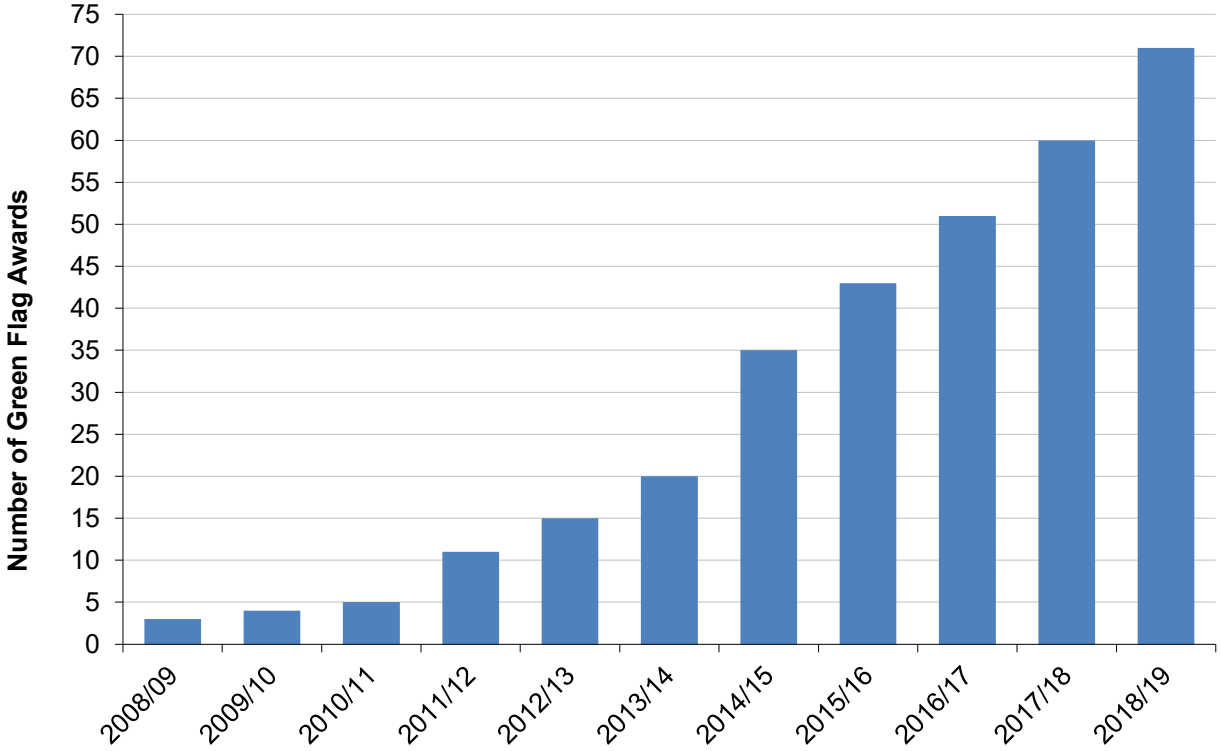
A recent UK report (CHAINSPAN) considered the effect of climatic changes to our most important ornithological sites. While ongoing declines of some species are anticipated e.g. as a result of changing migration patterns, populations of other species are expected to increase and overall, sites that have been and currently are important for our bird populations, will continue to be so. This underlines the need to continue to protect, maintain and enhance these sites through best management practices.

Northern Ireland's wetland bird populations are monitored as part of the UK Wetland Bird Survey (WeBS). This survey monitors non-breeding waterbirds across the UK, collectively identifying population sizes at local and regional scales, determining trends in numbers and identifying important sites for waterbirds. A similar scheme in the Republic of Ireland (I-WeBS) allows population monitoring at an all-Ireland level.

The data above are based on the nine main sites for non-breeding waterbirds in Northern Ireland. There are seven coastal sites namely: Belfast Lough, Carlingford Lough, Dundrum Bay (Inner), Larne Lough, Lough Foyle, Outer Ards shoreline, Strangford Lough and two freshwater sites namely Upper Lough Erne and Loughs Neagh and Beg. The figures used are the maximum monthly counts for each site over the winter survey period.

Green Flag Awards

Figure 6.7 Number of Green Flag Awards – Parks and Green Spaces, 2008/09 – 2017/18



Source: Keep Northern Ireland Beautiful

The Green Flag Award is a national bench marking standard for parks and green spaces. The Green Flag Award aims to encourage the provision of good quality public parks and green spaces that are managed in environmentally sustainable ways. In Northern Ireland the programme is administered by Keep Northern Ireland Beautiful.

In 2018/19, 71 parks and green spaces were achieved Green Flag status, compared with 60 in 2017/18. The continued growth since the scheme began can, in part, be attributed to there being more applicants and better awareness of the scheme. Also, more local authorities have invested in their green spaces and are entering them for the award. It should be noted that awards are given on an annual basis and winners must apply each year to renew their Green Flag status.

A link to the full list of recipients can be found in in the user information report that accompanies this publication. Available on our website: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2018

7 Built Heritage

Northern Ireland has a rich heritage of archaeological sites, monuments and buildings representing the aspirations and achievements of past societies, providing evidence of settlement, agricultural, industrial and ritual activity from 9,000 years ago to the present day. This chapter looks at the numbers of scheduled monuments and listed buildings in Northern Ireland, including those which are at risk.

Key points in this chapter:

- In 2017/18, there were a total of 1,994 scheduled historic monuments protected under Article 3 of the Historic Monuments and Archaeological Objects (NI) Order 1995. Overall there has been a 32% increase in the number of scheduled monuments rising from 1,513 in 2001/02 to 1,994 in 2017/18.

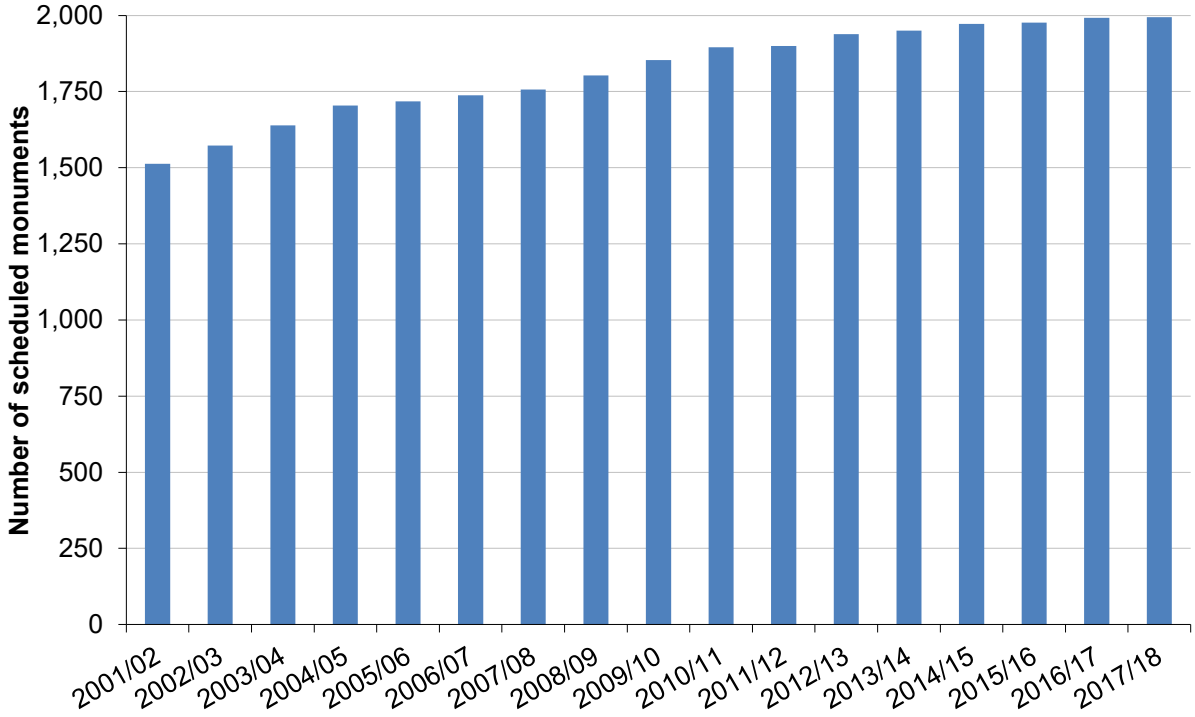
- Listed buildings are those of special architectural or historic interest, and provide an indication of the extent of this historical architectural resource. There has been a modest increase in the number of buildings listed in recent years with a total of 8,916 statutory listings in 2017/18, compared with 8,191 in 2003/04.

- Buildings that are classified as ‘at risk’ in Northern Ireland are recorded on the online Built Heritage at Risk in Northern Ireland (BHARNI) database. In 2017/18, there were 512 listed buildings and structures on this database, and 19 buildings had been removed in the last year. During 2016/17, £262,680 in funding was spent on 19 grants.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Monuments

Figure 7.1a Total number of scheduled historic monuments, 2001/02 – 2017/18



Source: DfC Historic Environment Division

Note: One monument was descheduled in 2007/08

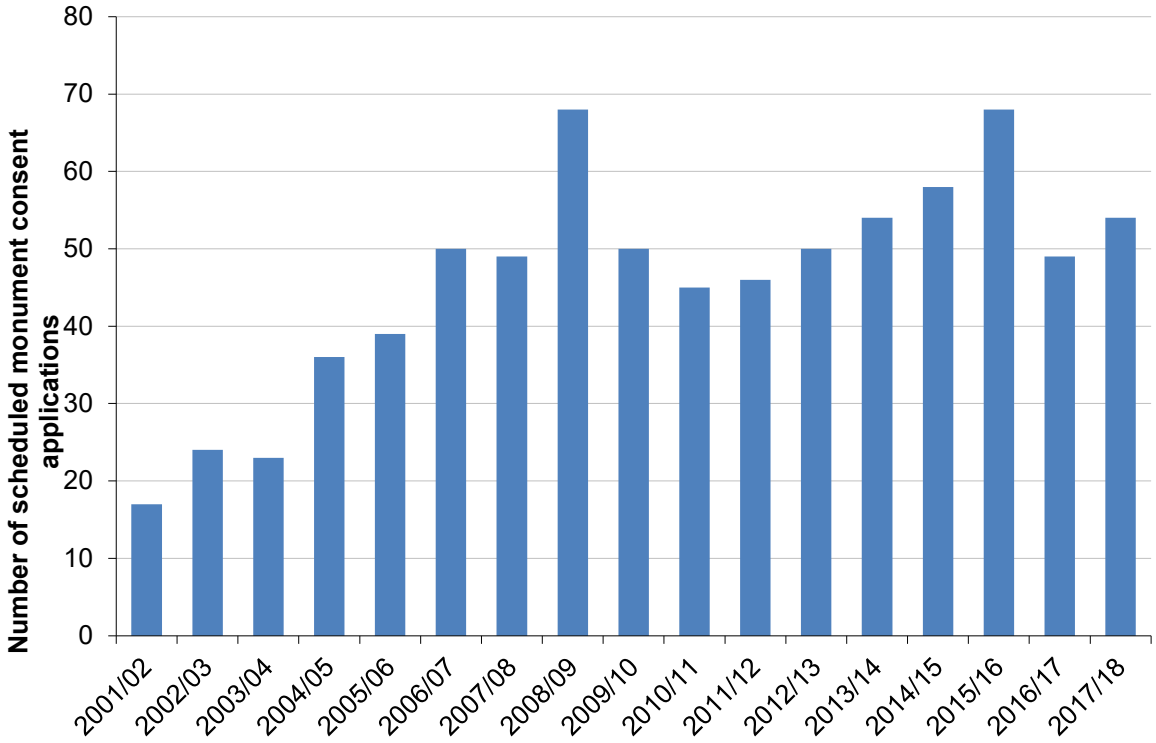
Scheduled historic monuments comprise a selection of the most important or most rare and vulnerable of our archaeological sites. They include a range of site types, such as megalithic tombs, prehistoric and early Christian ritual and settlement earthworks, church and castle ruins and features of industrial, defence or maritime heritage importance. These sites are generally in private ownership and the purpose of scheduling is to provide statutory protection to them and to improve or stabilise their condition through advice and guidance. Monuments are monitored for condition and risk by field monument wardens. From April 2015 a risk based inspection regime has been employed ensuring that the most vulnerable monuments receive increased inspections aimed toward improving their condition

There were 2 monuments newly scheduled during 2017-2018, a decrease from 15 in 2016/17. The recorded numbers of scheduled monuments have increased since 2001/02 reflecting ongoing survey, designation and assessment. The figures provide an indication of this aspect of the rich cultural and built heritage of Northern Ireland, an increasingly important source of “soft power” and an important contributor to the Northern Ireland economy, through attracting tourism and filming. Overall there has been a 32% increase in the number of scheduled monuments rising from 1,513 in 2001/02 to 1,994 in 2017/18.

The trend is a general increase as new sites are selected for scheduling each year, in line with the criteria for scheduling presently outlined in Planning Policy Statement 6,

and to better reflect and protect the array of cultural heritage across Northern Ireland. Amendments to existing entries in the schedule are also occasionally made on the basis of new evidence. Scheduled monuments are managed by their owners under Historic Environment Division guidance.

Figure 7.1b Number of scheduled monument consent applications received, 2001/02 – 2017/18



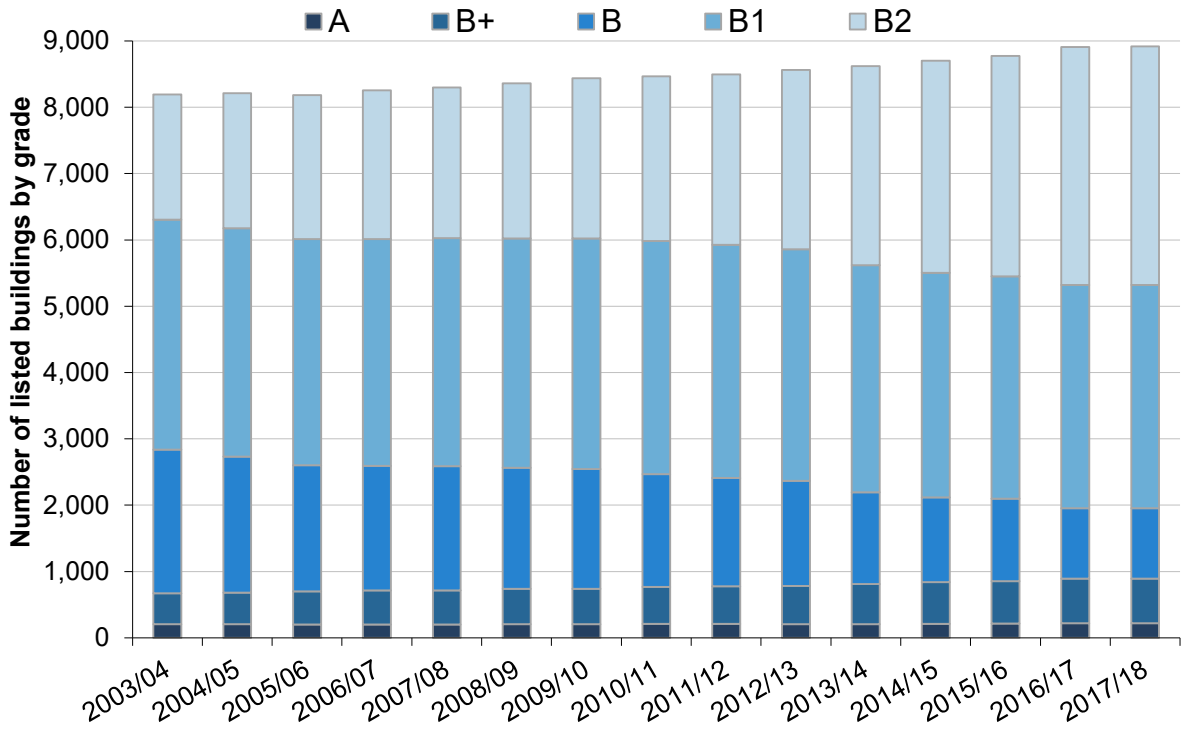
Source: DfC Historic Environment Division

Note: One monument was descheduled in 2007/08

Scheduled Monument Consent must be sought for proposed works which may alter or disturb the fabric of a scheduled historic monument, or its ground surface. Scheduled historic monuments are predominantly located in rural areas and most owners tend to come from within the agricultural sector. Prior to 2004/05, applications for consent ran at numbers below 30 per year. Following a peak of 68 in 2008/09, application numbers now average around 50 per year, apart from another peak of 68 in 2015/16.

Listed Buildings

Figure 7.2 Number of listed buildings by grade, 2003/04 – 2017/18



Source: DfC Historic Environment Division

Listed buildings are those of special architectural or historic interest, and provide an indication of the extent of this historical architectural resource. They therefore, represent our most important historic buildings.

All of Northern Ireland was surveyed between 1970 and 1995 and suitable buildings were protected by listing. Such structures can range from large stately homes to small gate screens but all must meet the test of Section 80 of the Planning Act (Northern Ireland) 2011 that they must be of 'special architectural or historic interest'.

There has been a modest increase in the number of buildings listed in recent years with a total of 8,916 statutory listings in 2017/18 , compared with 8,191 in 2003/04. Some listings include multiple buildings, therefore, the total number of buildings protected in this way is slightly higher.

A second, area based survey of all historic buildings (The Second Survey) has been underway since 1997 and is largely responsible for the increase. However it should be noted that a significant number of buildings have also been found to no longer meet the legislative test as part of this process and have therefore, been removed.

There is expected to be changes to the number of listed buildings as a result of the on-going Second Survey. This will identify buildings which may be added to or removed from the ‘List’, as well as clarifying the Department for Communities understanding of the special Architectural and Historic interest of buildings remaining on the ‘List’. The number of grade B buildings is expected to continue to reduce over time. Most of these buildings are churches which were ineligible for grant aid in 1986 when the B category was split into grade B1 and

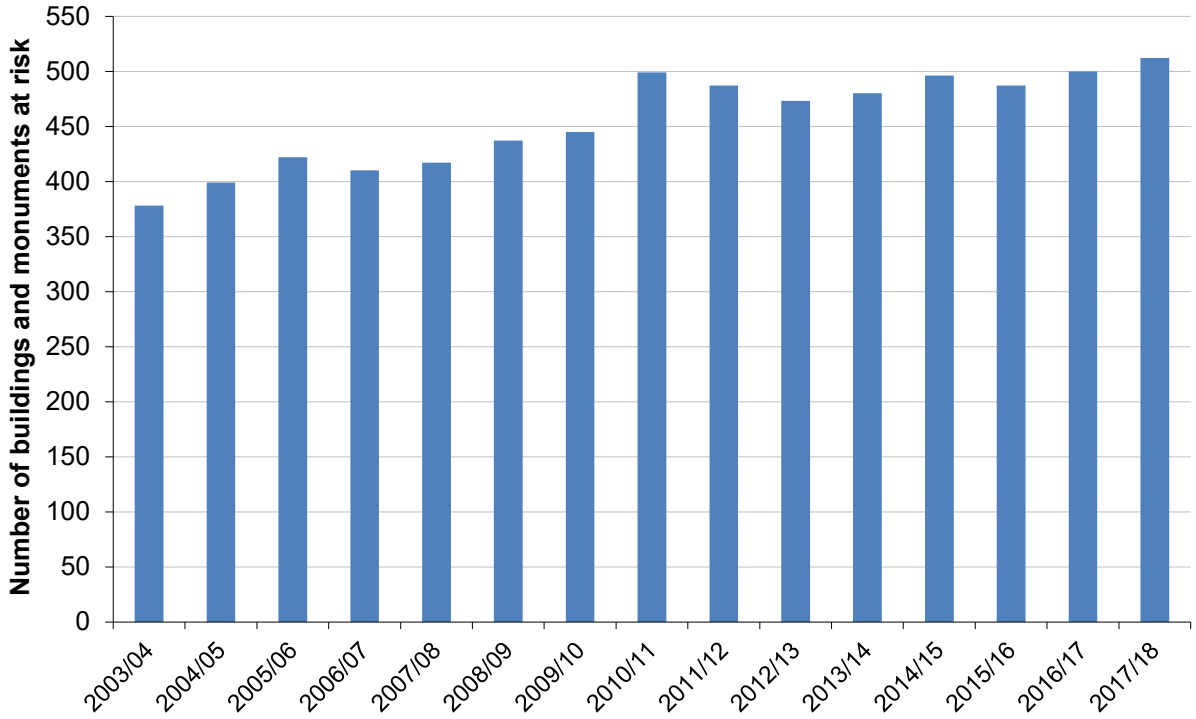
B2 for grant purposes. Grade B buildings are being allocated to either the B1 or B2 category as part of the Second Survey.

More detail on the grading of listing buildings can be found on page 10 of Annex C of Planning Policy Statement 6 (March 2011)
http://www.planningni.gov.uk/index/policy/planning_statements/pps6_-_revised_annex_c__criteria_for_listing.pdf

Records of all listed buildings are published on the Northern Ireland Buildings Database at: www.communities-ni.gov.uk/services/buildings-database

Buildings and Monuments at Risk

Figure 7.3 Number of buildings and monuments at risk, 2003/04 – 2017/18



Source: DfC Historic Environment Division

A listed building or structure is at risk when its condition and management is deemed to be poor and unsustainable, placing the building or structure under threat of deterioration and/or demolition.

Such listed buildings, structures and some scheduled monuments are recorded on an on-line database: the Built Heritage at Risk in Northern Ireland (BHARNI) register.

The BHARNI register provides an indicator of changes in the number of buildings judged to be at risk. In 2017/18, there were 512 buildings and structures on the BHARNI database, an increase of 12 on the register in 2016/17.

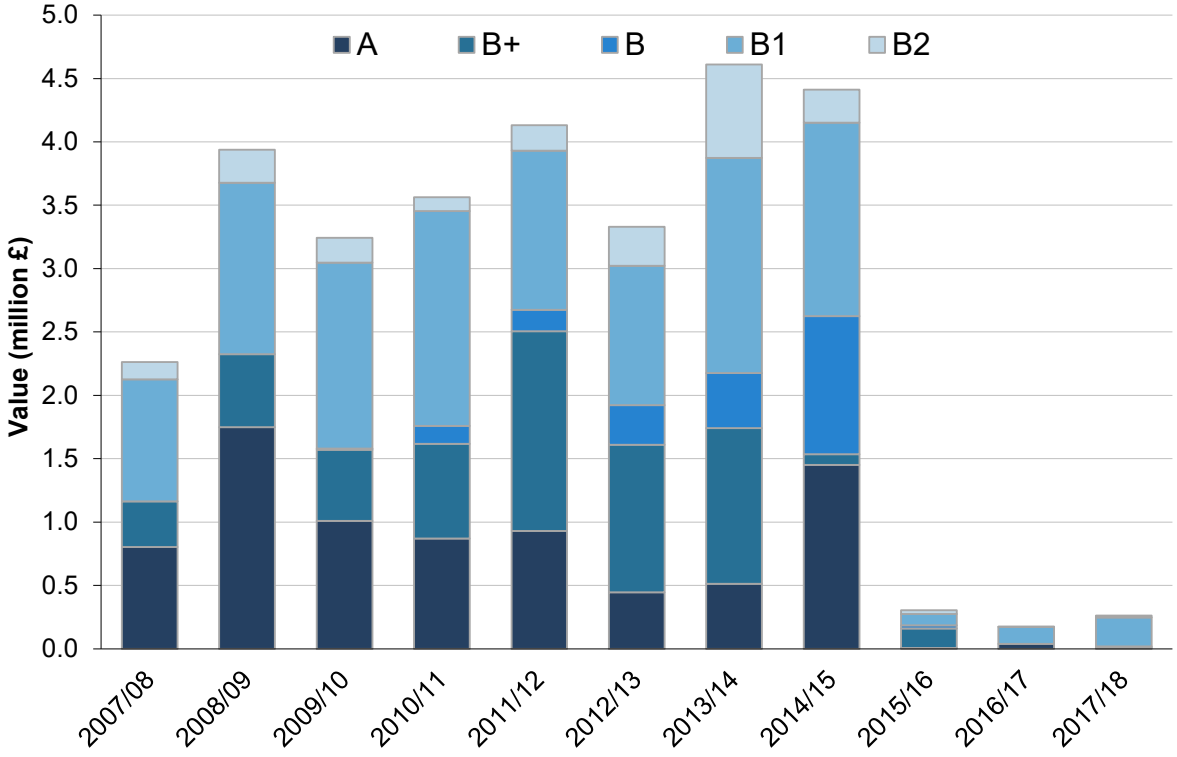
The number of buildings on the register can be expected to rise as more detailed information is made available through surveys.

The NI Sustainable Development Strategy set a target of removing 200 buildings from the BHARNI register (based on the 2006 figure) by 2016. Between 2006 and 2016, 192 buildings were removed, thereby almost meeting the target.

Eight buildings were conserved and removed from the list in 2016/17 and a further 19 in 2017/18.

Listed Buildings Grant Funding

Figure 7.4 Value of grant paid and the number of buildings in receipt of grant in each listed building grade, 2007/08 – 2017/18



Source: DfC Historic Environment Division

There is no statutory requirement for owners of listed buildings to maintain their properties in a good condition. While owners can be prosecuted for deliberately damaging or destroying listed buildings, they cannot be prosecuted for allowing them to fall into disrepair. In order to encourage building conservation activities, DfC offers assistance for the repair of listed buildings. Until 2014/15 this was offered as part of the listed building grant scheme. Since 2016/17 this has been incorporated into the Repair Stream of the Division's annual Historic Environment Fund.

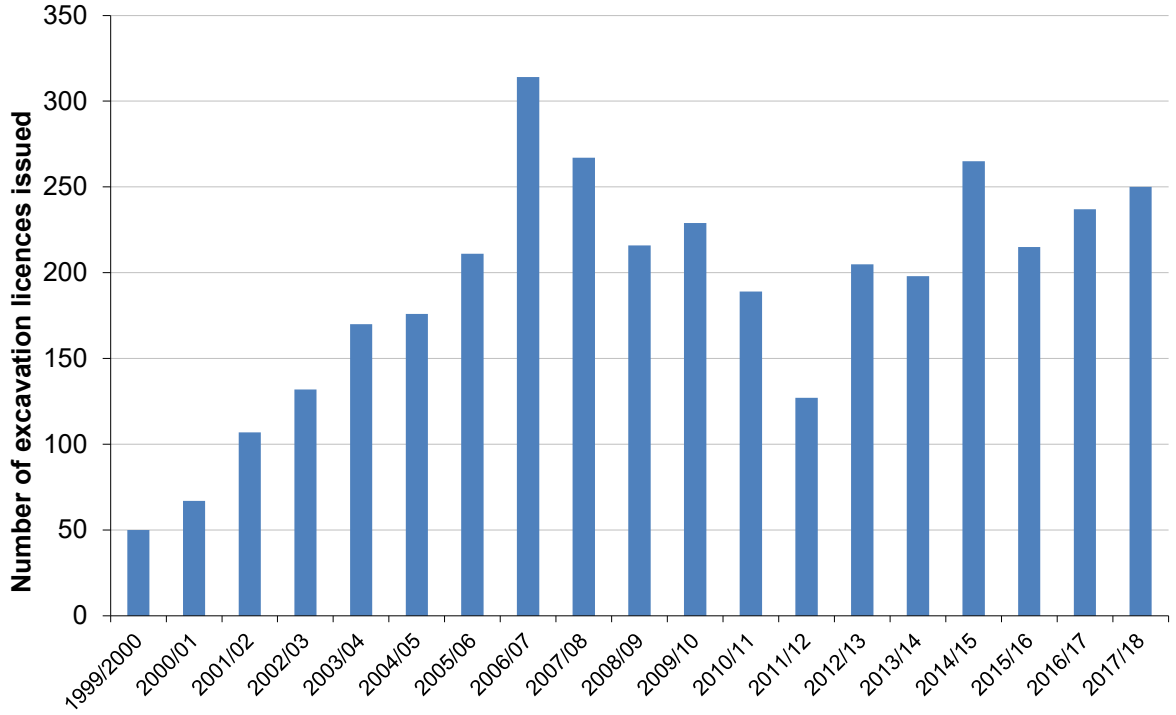
The Repair Stream is open to scheduled historic monuments as well as listed buildings, but the data provided here relates to listed buildings only.

The rate of support currently payable is 20% of repair costs for most types of building with increased support for the repair of thatched roofs or owners on certain qualifying benefits. All support is capped at £50k.

During 2017/18, the number of buildings which benefitted from the receipt of support (22) was higher than in the previous year (13), as was the total value of support awarded, £262,680 in 2017/18 compared to £172,725 in 2016/17. This was still much less than the 136 buildings supported in 2014/15

Excavation licences

Figure 7.5 Number of excavation licences issued, 1999/00 – 2017/18



Source: DfC Historic Environment Division

Archaeological excavations are carried out for a variety of reasons, including research, community engagement and in association with the conservation of a monument. Since the advent of Developer Funding in the late 1990s, however, the vast majority have been carried out as part of a planning approval as a condition of development. The number of excavations since then therefore, reflects the number of planning cases with an associated archaeological requirement and more generally is a crude index of planned development.

The rise in archaeological excavation licenses to a peak of 314 in 2006-07 corresponds with increasing development projects during the economic ‘boom’. The fall to 127 licences in 2011-12 reflects the decline in development during the succeeding ‘bust’. In recent years the number of licences was around 200 with the exception of 2014/15 when 265 licences were issued. The most recent figures show an increase to 237 in 2016/17 and a further slight increase to 250 in 2017/18 although at this stage it appears that these figures reflect a more controlled increase in activity than that which occurred in the early 2000s.

8 Waste

Waste and, especially, how we deal with it, is becoming an increasingly important issue. Waste is produced by households, by industrial processes, by the construction and demolition industry, through commercial activities and agricultural practices and by public services and utilities. Waste can affect the environment through its visual impact or by emissions to the air, groundwater and surface water as well as the contamination of land.

This chapter reports on the amount of local authority collected (LAC) municipal waste produced, the amount of LAC municipal waste sent for preparing for reuse, recycling, composting, energy recovery and sent to landfill, the amount of LAC waste produced per household and per capita, and the amount of LAC household waste produced and recovered. LAC municipal waste is defined as waste which is collected under arrangements made by a district council.

Key points in this chapter:

- In 2017/18, Northern Ireland's household recycling rate was 48.1%. This was a 6.0 percentage point increase on the 2014/15 level. Therefore, household waste recycling is considered to have made a positive change since the baseline year for PfG reporting.

- There were 874,257 tonnes of household waste collected in Northern Ireland in 2017/18, a small decrease on the amount collected in 2016/17 (875,956 tonnes). Since 2006/07, total household waste arisings in Northern Ireland have fallen by 6.9%.

- In 2017/18, 1.177 tonnes of household waste were collected per household, a 13.2% decrease on the 2007/08 figure of 1.356 tonnes.

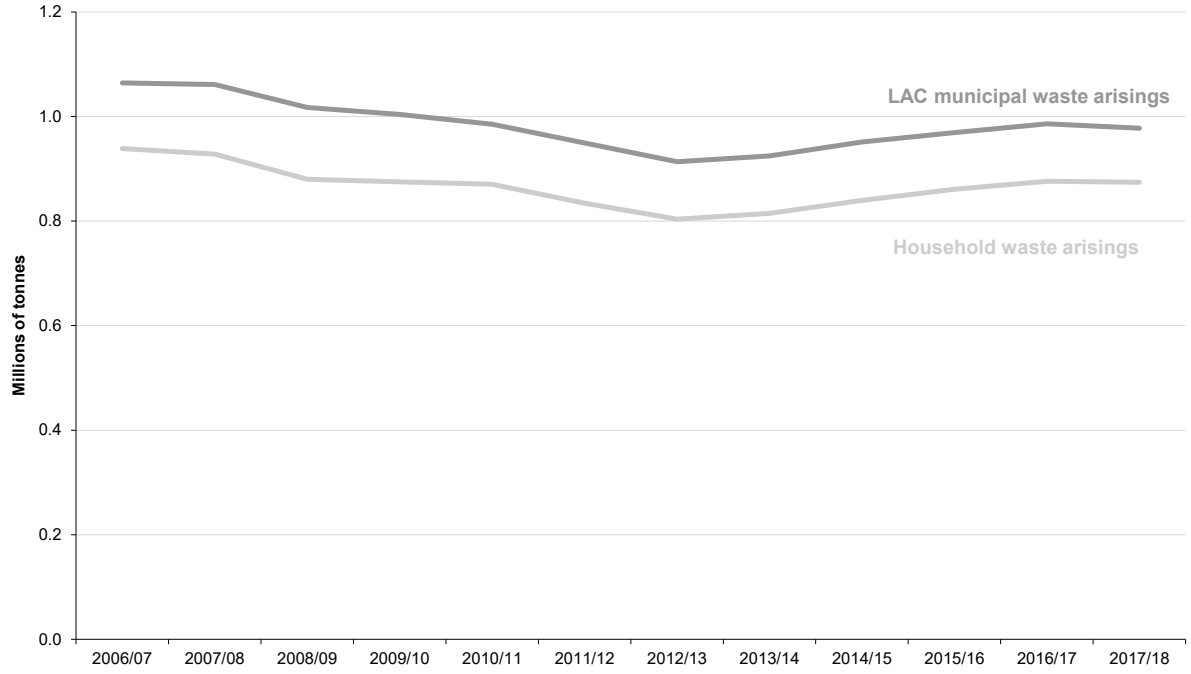
- 179,899 tonnes of LAC municipal waste arisings was sent for energy recovery in 2017/18. This gave a LAC municipal waste energy recovery rate of 18.4%.

- The quantity of LAC municipal waste sent to landfill in 2017/18 was 319,212 tonnes, a landfill rate of 33%. The landfill rate for household waste was 32%. Both landfill rates are the lowest ever recorded for Northern Ireland.

Data tables and more information for this chapter can be found in the excel tables and user information report provided online: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019

Waste Arisings

Figure 8.1 Waste arisings, 2006/07 – 2017/18



Source: DAERA

Local Authority Collected (LAC) municipal waste in Northern Ireland is defined as waste which is collected under arrangements made by a district council. It is predominantly made up of kerbside household collected waste, but also includes waste collected from civic amenity sites and some commercial waste.

LAC municipal waste data for Northern Ireland are collected via quarterly data returns submitted by all district councils through the WasteDataFlow system.

In 2017/18, Northern Ireland's councils collected 977,817 tonnes of LAC municipal waste. This was a 0.8% decrease on the 985,994 tonnes collected in 2016/17.

Since 2006/07 household waste has accounted for 86-89% of total LAC municipal waste. In 2017/18 household waste accounted for 89.4%. Household waste includes materials collected directly from households via kerbside collections, material taken to bring sites and civic amenity sites as well as several other smaller sources. The remaining 10.6% was non-household waste.

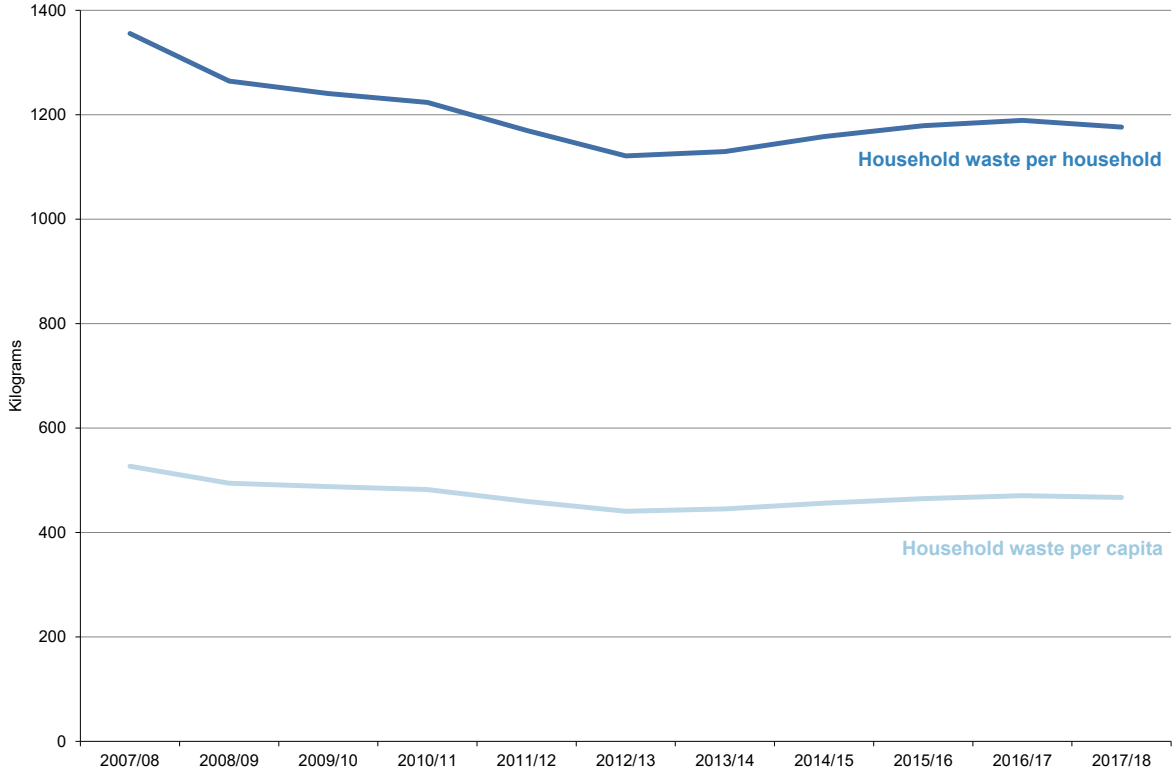
There were 874,257 tonnes of household waste collected in Northern Ireland in 2017/18, an decrease of 0.2% on the amount collected in 2016/17 (875,965 tonnes). Since 2006/07, total household waste arisings in Northern Ireland have fallen by 6.9%.

The longer term trend has been a reduction in LAC municipal waste arisings from 1,064,090 tonnes in 2006/07 to a low of 913,546 in 2012/13, a 14.1% decrease. Since then arisings have increased by 7.0% over the last five years.

Factors affecting LAC municipal waste, the majority of which is household waste, range from demographic pressures, individual household behaviours, the advice and collection services provided by local authorities and to some extent the state of the economy.

Waste Arisings

Figure 8.2 Household waste arisings per capita and per household per year, 2007/08 – 2017/18



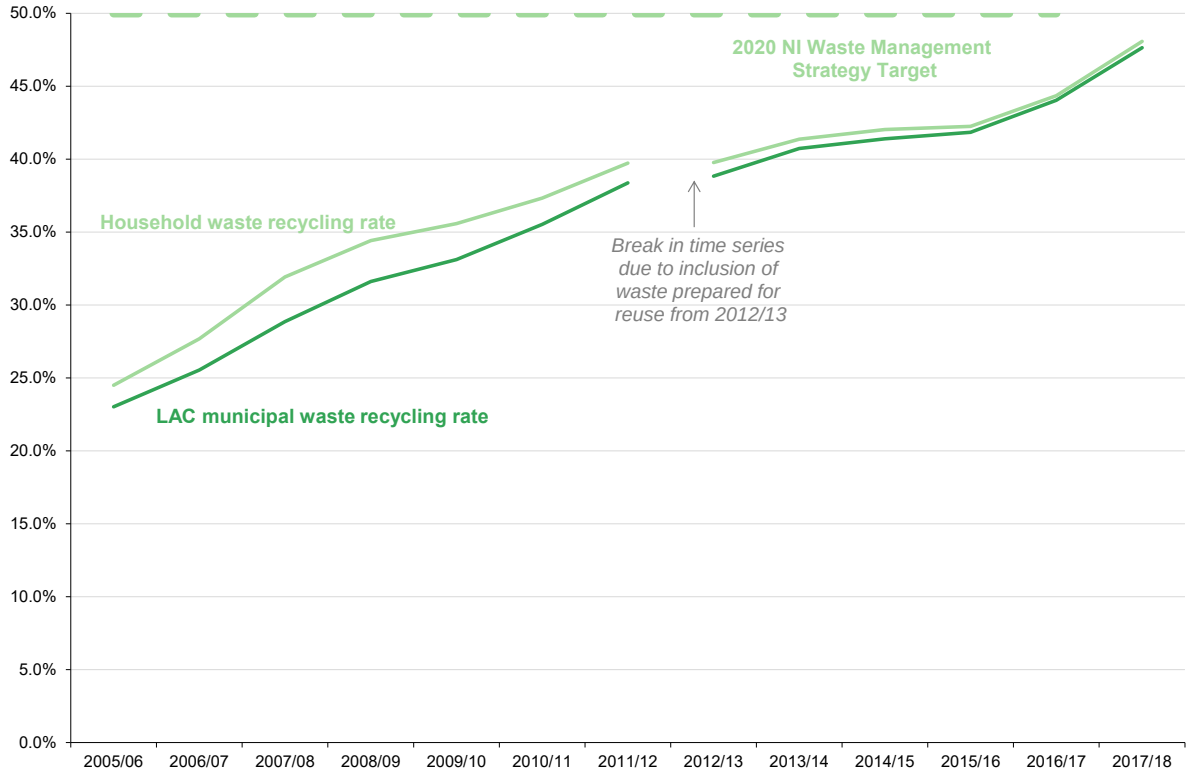
Source: DAERA

Household waste is one element of LAC municipal waste collected, and is recorded using the WasteDataFlow system as the amount of waste collected by the district council's regular household, kerbside, civic amenity and bring site collections.

In 2017/18, 1,177 kilograms of household waste were collected per household, a 13.2% decrease on the 2007/08 figure of 1,356 kilograms. Household waste per capita has fallen 11.3% since 2007/08, with 467 kilograms collected in 2017/18.

Recycling (preparing for reuse, dry recycling and composting)

Figure 8.3 Waste sent for preparing for reuse, dry recycling and composting, 2006/07 – 2017/18



Source: DAERA
Note: reuse was included with recycling and composting from 2012/13 onwards. The impact was small, adding less than 0.1 percentage points to the NI rate.

Reuse, dry recycling and composting (referred to as 'recycling' for the rest of this section) is based on materials collected for recycling at the kerbside, civic amenity sites, bring sites and those collected by a third party, such as charities/voluntary groups. Recycling of waste is becoming much more common in Northern Ireland. The revised Northern Ireland Waste Management Strategy (Delivering Resource Efficiency, 2013) proposed to achieve a 50% recycling rate by 2020 for local authority collected municipal waste.

In 2017/18, the tonnage of LAC municipal waste sent for preparing for reuse, dry recycling and composting (referred to as 'recycling' for the rest of this section) reached a record high at 465,777 tonnes. The LAC municipal waste recycling rate was 47.6%. This was an increase on the 44.0% recycling rate recorded in 2016/17. The tonnage sent for recycling in 2017/18 increased by 7.3% from 434,209 tonnes in 2016/17.

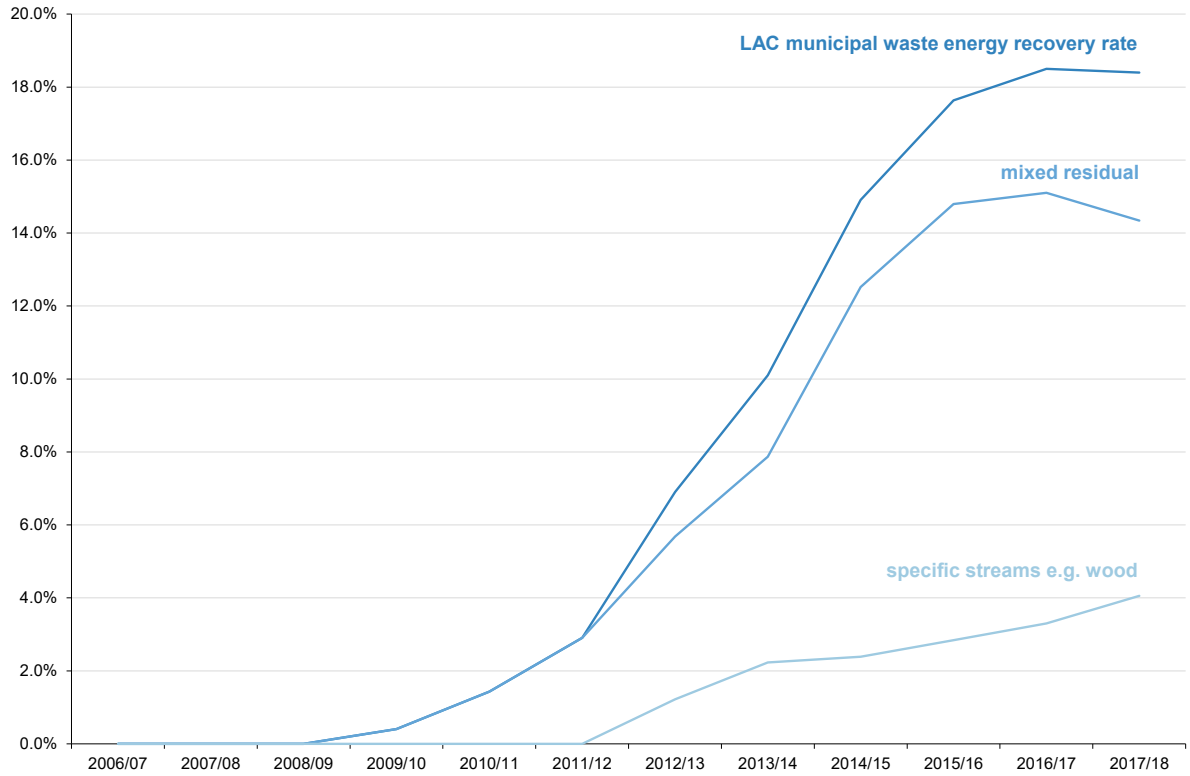
The household waste recycling rate was 48.1% in 2017/18. Again, this was an increase on the 2016/17 recycling rate of 44.3% whilst the tonnage sent for recycling recorded a new high of 420,265 tonnes. The proportion of household waste sent for preparing for reuse was 0.2%, dry recycling made up 23.3% and composting was 24.6%. During 2016/17, the equivalent rates for preparing for reuse, dry recycling and composting were similar at 0.2%, 22.8% and 21.4%.

The household waste recycling rate is an indicator in the draft Programme for Government (PfG) framework. The criteria used to report change for this indicator is +/- 0.5 percentage points cumulatively on an annual basis against the baseline year value in 2014/15, when the household waste recycling rate was 42.0%. A decrease, compared to the baseline year, of greater than 0.5 percentage points (cumulatively each year) in the rate is considered a negative change whilst an increase in the rate of greater than 0.5 percentage points (cumulatively each year) is considered a positive change. A change of less than 0.5 percentage points on a cumulative basis is considered as no change.

In 2017/18, Northern Ireland's household recycling rate was 48.1%. This was a 6.0 percentage point increase on the 2014/15 level. Therefore, household waste recycling is considered to have a positive change since the baseline year for PfG reporting.

Energy Recovery

Figure 8.4 LAC municipal waste sent for energy recovery, 2006/07 – 2017/18



Source: DAERA

Energy recovery is the term used when value is gained from waste products by converting them into energy. The major method used is incineration with energy recovery, although other technologies exist.

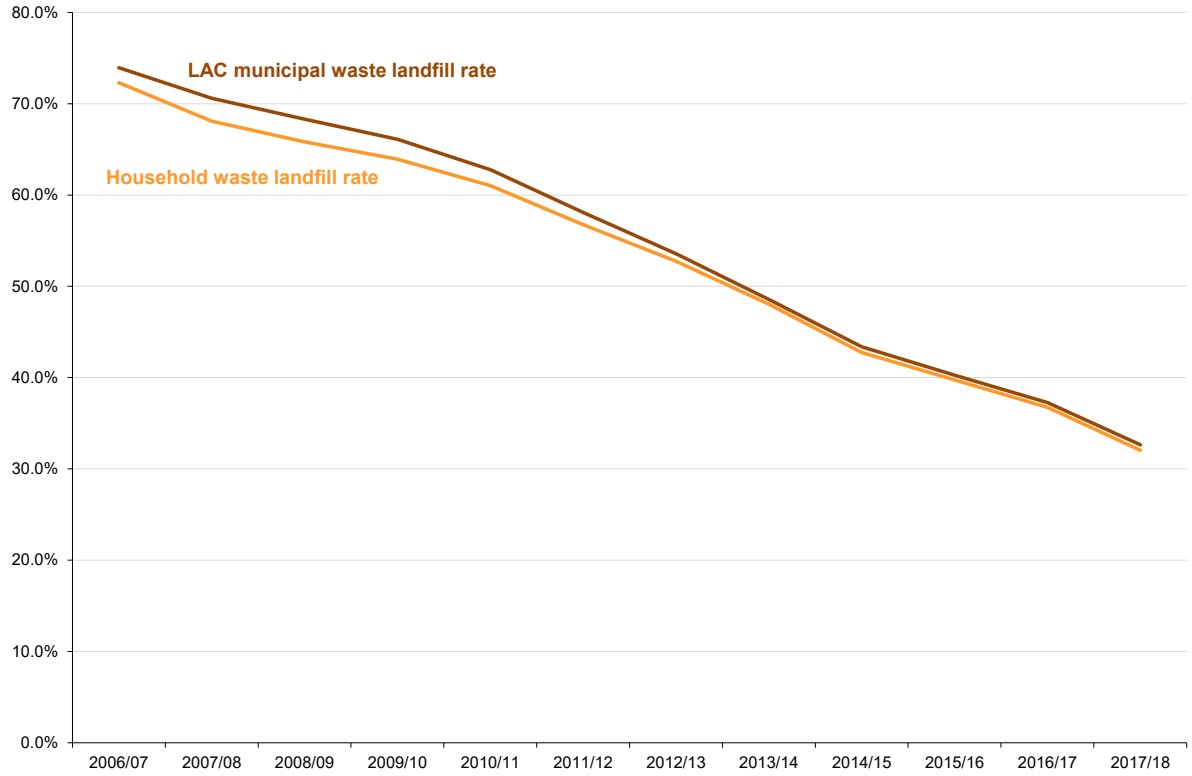
In 2017/18, 179,899 tonnes of LAC municipal waste was sent for energy recovery. This gave a LAC municipal waste energy recovery rate of 18.4%, similar to the 18.5% recorded in 2016/17. In each year, the majority was mixed residual LAC municipal waste with a smaller proportion from specific streams, e.g. wood.

There was zero, or very small quantities, of LAC municipal waste sent for energy recovery before 2009/10. Strong growth followed from 2010/11 to 2017/18 with the energy recovery rate increasing from 0.4% in 2009/10 to 18.4% in 2017/18. Most of the growth has been driven by mixed residual LAC municipal waste sent for energy recovery, with the specific streams proportion reaching 2-3% in 2013/14 and remaining around that level since.

Mixed residual LAC municipal waste sent for energy recovery is combustible residual waste collected from the kerbside and from civic amenity sites and processed into refuse derived fuel at material recovery facilities. The specific streams element of energy recovery is mostly wood but also includes furniture, carpets and mattresses, mostly collected from civic amenity sites.

Landfill

Figure 8.5 Waste sent to landfill, 2006/07– 2017/18



Source: DAERA

The quantity of LAC municipal waste sent to landfill decreased by 13.1% from 367,484 tonnes to 319,212 tonnes between 2016/17 and 2017/18. This gave a landfill rate of 32.6% for 2017/18, 4.6 percentage points lower than the 37.3% recorded in 2016/17 and the lowest ever recorded. Similarly, the landfill rate for household waste has recorded a new low of 32.0% in 2017/18, a drop of 4.7 percentage points on the 2016/17 rate of 36.7% and a fall from a high of 72.3% in 2006/07.

A large drop in landfill could be due to a change in the way in which a council(s) chooses to handle the residual waste that is collected. Instead of sending this straight to landfill, dirty MRFs (material recovery facilities) are becoming more popular as a way of capturing more recyclable material from residual waste. This material can also be sent for energy recovery in the form of refuse derived fuel (RDF) which also diverts it from landfill. In addition, the ongoing Rethink Waste campaign is encouraging the NI population to Reduce, Reuse and Recycle their waste. Generating energy from waste by incineration is preferable to landfill, although preparing for reuse and recycling are preferable to both.

Landfill Tax for household waste (the majority of LAC municipal waste) continues to be the main driver for local authorities to reduce landfill. Other considerations include a limit on the amount of biodegradable LAC municipal waste. Landfilled biodegradable waste emits methane and carbon dioxide into the atmosphere as it decomposes and leachate is produced when water becomes contaminated as it filters down through a landfill.

Appendix

Appendix 1: User Guidance

This section contains some general information about the quality of the data used in the Northern Ireland Environmental Statistics Report including guidance to assist with interpretation. A more in-depth description of the data and assessment of data quality can be found in in the user information report that accompanies this publication. Available on our website: https://www.daera-ni.gov.uk/publications/northern-ireland-environmental-statistics-report-2019.

Data collection and timeliness

To inform this publication, data are supplied from a variety of sources. As most of this information is readily available it is not thought to create an unreasonable burden on the data suppliers. Due to the nature of compendium publications, some data are available earlier than others but we cannot publish until the final piece of data is provided. It should also be noted that the timing and availability of data varies across datasets and data suppliers. Therefore, more up-to-date data may become available directly from the individual data suppliers at differing points in time.

Main Uses of Data

This publication provides annual updates of key environmental indicators, ensuring that the most up to date information is readily available for policy makers, environmental interest groups, academics and the public.

Policy Development and Briefing

The information in the publication is used for input into and monitoring of a number of strategies and policies. For example, the indicator data have been used for the Second Report of the Northern Ireland Biodiversity Group 2005-2009 on Delivery of the Northern Ireland Biodiversity Strategy. In addition, the data were used to inform the major review of the Regional Development Strategy 2035. The data included in previous NI Environmental Statistics Reports have been included in the NI chapter of the UK National Ecosystem Assessment, the NI summary of which was officially launched in October 2011.[5] The data included in NI Environmental Statistics Report were used heavily in the development of the 2013 Northern Ireland State of the Environment Report: From Evidence to Opportunity. The data have also been used for associated European updates (via input to UK reporting) including the 2015 European State Outlook Report. The new councils in Northern Ireland will use the report to assist with the collation of environmental assets for the new development plans. The indicators within this report were used during the drafting of the Programme for Government (PfG) framework 2016-2021. This resulted in some additional indicators and commentary so this report can provide updates for PfG reporting.

General Information and Research

[2] Full chapter: http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx
NI summary: http://www.nienvironmentlink.org/cmsfiles/files/Publications/NEA-Summary-for-web.pdf

The publication is generally used for reference and is a good starting point when looking for information on key environmental indicators specific to Northern Ireland. It is circulated to a number of external users including Sustainable Northern Ireland; Northern Ireland Environment Link; Northern Ireland Local Government Association and UK Climate Impacts Programme. In addition for future reporting some of the indicators will be used for comparative statistics of key environmental indicators reported under EU Directives.

Rounding, Summing and Differences

There may be slight discrepancies between totals and the sum of the constituent items due to rounding.

Any statements made in this report regarding differences between groups, have been tested and are statistically significant at the 5% significance level. This significance level is the criteria for judging whether differences between groups might have arisen by chance. The standard criteria is to use the 5% level, i.e. the probability being one in twenty that an observed difference might have arisen by chance factors alone.

Data revisions/corrections

Balancing the aims of accuracy and timeliness of publication means that revisions of data are an expected part of the production of statistics as more information becomes available. Where significant revisions are made to final data, users will be provided with clear information indicating that this is the case. Despite best efforts, there may be occasions whereby publications need to be amended for errors.

If an error is deemed to be material, the electronic publication of the data will be amended as soon as possible and alerts placed on the website notifying the change.

If an error is deemed to be minor, a correction will be made within the next release for publication.

In all cases, the nature and extent of the revisions will be explained clearly for users.

Environmental Information Elsewhere in the United Kingdom, Ireland and Europe

While it is our intention to direct users to environmental information elsewhere in the UK and Europe, users should be aware that environmental indicators are not always measured in a comparable manner to those in Northern Ireland. Details of environmental data published elsewhere in the UK and Europe can be found at the following links.

England
https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/statistics

Scotland
http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment

Wales
https://gov.wales/statistics-and-research?field_policy_areas%5B103%5D=103

Ireland
https://www.cso.ie/en/interactivezone/statisticsexplained/environment/

European Union Member States
http://ec.europa.eu/eurostat/web/environment/statistics-illustrated

Appendix 2: List of indicators, source, release and status

The table below shows the source, whether or not the indicator is first released within this publication and the 'status' of each indicator. Status definitions are as follows:

- National Statistics – Independently assessed as conforming to the Code of Practice for Official Statistics. (http://www.statisticsauthority.gov.uk/assessment/code-of-practice/)
- Official Statistics – Conform to the Code of Practice for Official Statistics but have not been independently assessed.
- Non-Official Statistics – Sourced from outside Government and not from a specified producer (http://www.statisticsauthority.gov.uk/national-statistician/producers-of-official-statistics/index.html) of Official Statistics e.g. Civil Aviation Authority.

Figure	Source	First released in this publication	Status
1.1 Population	NISRA		National Statistics
1.2 Households	NISRA		National Statistics
1.3 Airport passenger numbers	Civil Aviation Authority		Non-Official Statistics
1.4 Journeys per person	DfI		National Statistics
1.5 Average distance travelled	DfI		National Statistics
1.6 Concern for the environment	NISRA		National Statistics
1.7 Environmental problems	NISRA	✓	National Statistics
1.8 Actions taken for the environment	NISRA	✓	National Statistics
1.9 Carrier bags dispensed	DAERA		Official Statistics
2.1 Concentration of nitrogen dioxide	DAERA	✓	Official Statistics
2.2 Concentration of particulate matter	DAERA		Official Statistics
2.3 Ground level ozone	DAERA		Official Statistics
2.4 Concentration of Benzo(a)pyrene	DAERA		Official Statistics
2.5 Concentration of Sulphur dioxide	DAERA		Official Statistics

2.6 Ammonia emissions from agriculture	Rothamsted Research	✓	Official Statistics
2.7 Total Greenhouse gas emissions	Ricardo-AEA		Official Statistics
2.8 Greenhouse gas emissions by sector	Ricardo-AEA		Official Statistics
2.9 Carbon dioxide emissions	Ricardo-AEA		Official Statistics
2.10 Renewable energy	DfE (provided by NIE)		Official Statistics
2.11 Environmental Installations	DfI		Official Statistics
2.12 Mean annual minimum temperature	Armagh Observatory		Non-Official Statistics
2.13 Mean annual maximum temperature	Armagh Observatory		Non-Official Statistics
2.14 Number of days per year with temperature below zero	Armagh Observatory		Non-Official Statistics
2.15 Rainfall falling in winter	Armagh Observatory		Non-Official Statistics
2.16 Rainfall falling in summer	Armagh Observatory		Non-Official Statistics
3.1 Overall river quality	NIEA		Official Statistics
3.2 Overall lake quality	NIEA		Official Statistics
3.3 Groundwater nitrate concentration	NIEA	✓	Official Statistics
3.4 River nitrate concentration	NIEA	✓	Official Statistics
3.5 Soluble reactive phosphorus in rivers (SRP)	NIEA	✓	Official Statistics
3.6 Industrial discharge quality	NIEA	✓	Official Statistics
3.7 Water utility discharge quality	NIEA	✓	Official Statistics
3.8 Drinking water quality	NIEA		Official Statistics
3.9 Water pollution incidents	NIEA	✓	Official Statistics
4.1 Bathing Water Quality	NIEA		Official Statistics
4.2 Blue flag beaches	Keep NI Beautiful (previously Tidy NI)		Non-Official Statistics
4.3 Marine water quality	DAERA		Official Statistics

4.4 Shellfish waters	NIEA	✓	Official Statistics
4.5 Winter dissolved inorganic nitrogen (Winter DIN)	NIEA	✓	Official Statistics
4.6 Sea temperature	AFBI	✓	Official Statistics
4.7 Beach litter	DAERA Marine Division		Official Statistics
4.8 Marine litter	DAERA Marine Division	✓	Official Statistics
5.1 Soil Quality	AFBI		Official Statistics
5.2 Sustainable land management	DAERA		Official Statistics
5.3 Area of woodland	Forest Service		Official Statistics
5.4 Terrestrial litter	Keep NI Beautiful (previously Tidy NI)		Non-Official Statistics
6.1 Area of nature conservation designations	NIEA		Official Statistics
6.2 Condition of features within ASSIs	NIEA	✓	Official Statistics
6.3 Land under favourable management	DAERA	✓	Official Statistics
6.4 Marine under favourable management	DAERA	✓	Official Statistics
6.5 Wild birds	JNCC/BTO		Official Statistics
6.6 Wetland birds	JNCC/BTO		Official Statistics
6.7 Green Flag Awards	Keep NI Beautiful (previously Tidy NI)		Non-Official Statistics
7.1a Scheduled monuments	DfC		Official Statistics
7.1b Scheduled monuments consent applications	DfC		Official Statistics
7.2 Number of listed buildings	DfC		Official Statistics
7.3 Buildings and monuments at risk	DfC	✓	Official Statistics
7.4 Listed buildings grant funding	DfC	✓	Official Statistics
7.5 Excavation licences	DfC	✓	Official Statistics

8.1 Waste arisings	DAERA		National Statistics
8.2 Waste arisings per capita and per household	DAERA		National Statistics
8.3 Waste sent for preparing for reuse, dry recycling and composting	DAERA		National Statistics
8.4 LAC municipal waste sent for energy recovery	DAERA		National Statistics
8.5 Waste sent to landfill	DAERA		National Statistics

Appendix 3: Glossary of terms

Arboriculturist	Arboriculturists cultivate and manage trees, hedgerows and shrubs. The work is undertaken in both rural and urban settings and includes all aspects of felling, preserving, planting and protecting trees, sometimes using heavy equipment. They also provide information and advice on specific tree-related issues.
Acidification	The process of a substance becoming more acidic or decreasing in pH, generally in reference to surface waters and soils.
Agri-food	Agricultural production and food and drink processing.
Ammonia (NH_3)	A colourless, corrosive, pungent-smelling, gaseous pollutant, formed mainly by the decomposition of organic material.
Annual Mean	The average over the year.
Anthropogenic	Caused or produced by humans
Areas of Special Scientific Interest (ASSI)	Protected areas that represent the best of our wildlife and geological sites that make a considerable contribution to the conservation of our most valuable natural places.
Biodegradable	Capable of being decomposed by bacteria or other living organisms and thereby avoiding pollution.
Biodiversity	The variability among living organisms and the ecological complexes of which they are part.
Carbon Dioxide (CO_2)	A naturally occurring gas found in the atmosphere which is the most important greenhouse gas produced by human activities, primarily through the combustion of fossil fuels.
Catchment	Term used to describe an area which is drained by a river.
Chlorophyll	A green pigment, present in all green plants and in cyanobacteria, which is responsible for the absorption of light to provide energy for photosynthesis.
Climate Change	A change in global climate which is attributed directly or indirectly to human activity and which is in addition to natural climate variability observed over comparable time periods.
Clostridium Perfringens	Specie of clostridium bacteria whose spores produce a toxin that causes blood poisoning, gas gangrene, infection of wounds, and a type of food poisoning that may be mild for healthy adults but can be serious for elderly, infirm, or the very young. Also called Welch's Bacillus. Written also as C. perfringens or Clos. Perfringen.
Coliforms	A broad class of bacteria found in our environment, including the faeces of man and other warm-blooded animals.
Colony Forming Units	A measure of viable (living) bacterial numbers
Compliance	Adhering to laws, regulations and policies.

Controlled Waste	Household, industrial and commercial waste or any such wastes that require a waste management licence for treatment, transfer or disposal.
Designation	The process of identifying an area and affording it a special status.
Discharge Consent	Authorisation from an environmental regulator required prior to the discharge of anything other than uncontaminated water to surface waters or ground waters
Dissolved Oxygen	The amount of oxygen dissolved in a body of water as an indication of the degree of health of the water and its ability to support a balanced aquatic ecosystem.
Ecosystem	A natural unit consisting of all plants, animals and micro-organisms in an area which function together with the non living environmental factors.
Effluent	A discharge of pollutants into the environment, partially or completely treated or in its natural state; generally used in regard to discharges into waters.
Emission	The direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources into air, water or onto land.
European Union (EU)	A super national and intergovernmental body comprising twenty-seven European countries.
Eutrophication	The enrichment by nutrients, especially compounds of nitrogen and/or phosphorous, causing an increase in the growth of algae and plants that produces an undesirable disturbance to the natural balance of an ecosystem.
Faecal Coliforms	A subgroup of bacteria of the coliform type that live mainly in the gut of warm-blooded animals.
Fluorinated gases ('F-gases')	A family of man-made gases used in a range of industrial applications. Because they do not damage the atmospheric ozone layer, they are often used as substitutes for ozone-depleting substances. However, F-gases are powerful greenhouse gases, with a global warming effect up to 23,000 times greater than carbon dioxide (CO_2), and their emissions are rising strongly.
Good Environmental Status	The overall state of the environment that provides ecologically diverse and dynamic ecosystems which are healthy and productive.
GPS	Global Positioning System, a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.
Greenfield	Undeveloped land in a city or rural area either used for agriculture, landscape design, or left to naturally evolve.
Greenhouse Gases	Components of the atmosphere which contribute to the greenhouse effect by absorbing and radiating solar heat.

Groundwater	All water which is below the surface of the ground in the saturated zone and which is in direct contact with the ground or subsoil.
Habitat	Place where an organism (e.g. human, animal, plant, micro-organism) or population lives, characterised by its surroundings, both living and non-living.
Habitats Directive	EC Directive aiming to achieve the conservation of natural habitats and species, as well as the protection and where possible improvement of biodiversity. The main aim is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements, and create a network of protected areas across the European Union known as "Natura 2000".
Heritage Assets	Buildings, landscapes, buried remains and historic areas of architectural or historic interest. Some have statutory protection as listed buildings or scheduled monuments. Others are included in designated conservation areas, historic parks and gardens, World Heritage Sites, and Areas of Outstanding Natural Beauty.
Household waste	Waste collected by Local Authorities from households.
Hydrogen Ion	An ionized hydrogen atom, occurring in plasmas and in aqueous solutions of acids, in which it is solvated by one or more water molecules.
Hydromorphological	Hydromorphology is a term used in river basin management to describe the combination of hydrological and geomorphological (structural) processes and attributes of rivers, lakes, estuaries and coastal waters.
Indicator	An observed value representative of a phenomenon to study. In general, indicators quantify information by aggregating different and multiple data.
Indigenous	Originating and living, or occurring naturally in an area or environment.
Inorganic	Not composed of organic matter.
kt NH_3	Kilotonnes of Ammonia.
Lake	An area of variable size filled with water, localized in a basin, that is surrounded by land, apart from any river or other outlet that serves to feed or drain the lake.
Landfill	Area of land in or on which waste is deposited.
Land Use	The human employment of the land; a change in land use at any location may involve a shift to a different type of use (e.g. from farming to residential) or a change in the intensity of use.
Leachate	Liquid that leaks from waste disposal sites.
Listed building	A building officially designated as being of architectural or historic importance and having protection from demolition or major alterations.

Macroinvertebrates	Organisms without backbones, which are visible to the eye without the aid of a microscope.
Macrophytes	An aquatic plant large enough to be seen by the naked eye.
Mandatory	Obligatory.
Methane (CH_4)	A colourless, non-poisonous, flammable gas with a high global warming potential. It is the principal component of natural gas and is produced by the anaerobic decomposition of organic matter. Important sources include marshes and landfill sites.
Municipal Waste	Household waste and any other waste under the control of (i.e. collected by) Councils or agents acting on their behalf
Nitrous Oxide (N_2O)	A colourless, non-flammable gas which contributes to the greenhouse effect. It is used in medicine as an anaesthetic and is commonly known as “laughing gas”.
Nitrogen dioxide (NO_2)	Some nitrogen dioxide is formed naturally in the atmosphere by lightning and some is produced by plants, soil and water. However, only about 1% of the total amount of nitrogen dioxide found in our cities' air is formed this way. It is an important air pollutant because it contributes to the formation of photochemical smog, which can have significant impacts on human health.
Nutrient	Element or chemical essential for growth.
Organic	Containing carbon compounds.
OSPAR	An international convention for the protection of the marine environment of the north east Atlantic, to which both the UK and Ireland are signatories. The name ‘OSPAR’ is derived from the earlier Oslo and Paris Conventions, which were combined in 1998.
Ozone	A pungent, colourless, naturally occurring but toxic gas. Close to the earth's surface ground-level ozone is produced photochemically from hydrocarbons, NOx and sunlight, and is a major component of smog. In the stratosphere, it protects the earth from harmful ultraviolet radiation.
Particulate	Fine particle of solid or liquid suspended in gas.
pH	A unit for measuring hydrogen ion concentrations. A pH of 7 indicates a "neutral" water or solution. At pH lower than 7, a solution is acidic. At pH higher than 7, a solution is alkaline.
PM_{10}	Particulate Matter less than 10 microns in diameter, such as solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles allows them to easily enter the air sacs in the lungs where they may be deposited, resulting in adverse health effects. PM10 also reduces visibility.
Pollutants	Substances which, when present in the environment under certain conditions, may become injurious to human, animal,

	plant or microbial life, or to property, or which may interfere with the use and enjoyment of life or property.
Pollution	The introduction of pollutants into the environment.
Polycyclic aromatic hydrocarbons (PAHs)	A group of more than 100 different chemicals that are released from burning coal, oil, gasoline, trash, tobacco, wood, or other organic substances such as charcoal-broiled meat. They are also called polynuclear aromatic hydrocarbons
Priority habitats and species	Habitats and species that are conservation priorities which are under threat because of their rarity and rate of decline.
Phytobenthos	Benthic organisms that are plants or algae.
Photoplankton	Plankton consisting of microscopic plant.
Ramsar sites	Covers all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.
Recycling	Using waste materials in manufacturing other products of an identical or similar nature.
Renewable Energy	Energy derived from a resource that can be exploited without depletion because it is constantly replenished, e.g. solar radiation and wind.
Scheduling	Including on a list for legal preservation or protection.
Special Areas of Conservation (SACs)	Given greater protection under the European legislation of The Habitat's Directive. They have been designated because of a possible threat to the special habitats or species which they contain and to provide increased protection to a variety of animals, plants and habitats of importance to biodiversity both on a national and international scale.
Special Protection Areas (SPAs)	Designated under the European Commission Directive on the Conservation of Wild Birds. All European Community member States are required to identify internationally important areas for breeding, over-wintering and migrating birds and designate them as Special Protection Areas (SPAs).
Sulphur Dioxide (SO_2)	A pungent, colourless, gas. Released naturally by volcanic activity, large amounts are also produced by the combustion of fossil fuels, especially coal and oil.
Surface water	Water on the surface of the planet such as in a stream, river, lake, wetland, or ocean.
Sustainable Development	The ability to meet our needs and enjoy a better quality of life without jeopardising the quality of life of future generations.
Total Phosphorus	Total phosphorus (TP) is a measure of all the forms of phosphorus, dissolved or particulate, that are found in a sample.

Transect	A transect on a street is normally 50m long, extended 2m from the backline to the gully on one side of the street. It includes footpaths, kerbs and gullies and may also include landscaped areas such as verges, grassed areas,
Turbidity	Muddiness created by stirring up sediment or having foreign particles suspended.
Waste	Any substance or object which the holder discards or intends or is required to discard.
Waste Arisings	A measure of the amount of waste generated by a specified sector or activity.
Water body	Any significant accumulation of water.
Water Framework Directive	EU Directive aiming to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. Its main aims are to: protect and enhance aquatic ecosystems and prevent their deterioration; promote sustainable water use; reduce discharges, emissions and losses of priority substances; and contribute to reducing the effects of floods and droughts.

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