

Air Quality in Ireland Report 2021



Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2021

WHO Air Quality
Guidelines for health

Problem
Pollutants

What's Needed?

New
Developments

Data and Other
Information

Acknowledgements
and Disclaimer



Key Messages

Air Quality in Ireland

- Air quality in Ireland is generally good, however, there are concerning localised issues that are impacting negatively on the air we breathe.
- Air quality monitoring results in 2021 showed that fine particulate matter ($PM_{2.5}$) mainly from burning solid fuel in our homes, and nitrogen dioxide (NO_2) mainly from road transport, remain the main threats to good air quality.
- EPA monitoring shows that $PM_{2.5}$ and NO_2 levels are within the current EU legal limits, however these pollutants exceed the World Health Organisation (WHO) Air Quality guidelines (AQGs) for health.



Clean Air and Health

- Air pollution is a major environmental risk to our health. According to the WHO, air pollution can increase the risk of stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma.
- It is estimated that there are approximately 1,300* premature deaths annually in Ireland due to poor air quality from fine particulate matter ($PM_{2.5}$).
- Meeting the new WHO guidelines will be a major challenge. The majority of Ireland's stations did not meet the new WHO Air Quality guidelines (AQGs) in 2021.
- Ireland and Europe should move towards achieving the health based WHO Air Quality guidelines.

[*European Environment Agency \(EEA\) 2021.](#)



What can we do?

We can all help improve the quality of the air we breathe by:

- Using less solid fuel and cleaner fuels to heat our homes.
- Reducing our use of cars to go to school, work and play.

Air Quality Monitoring

What and how we monitor air quality in Ireland

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer

The EPA in partnership with Local Authorities, public/semi-state bodies and universities has established a world class air quality monitoring network. The network will be completed in 2022 with 116 stations (97 operational at the end of 2021).



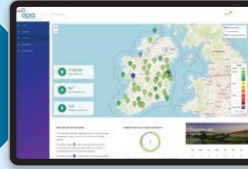
See how the Ambient Air Monitoring Programme has expanded over the years >

WATCH ON EPA YouTube Channel

The monitoring network provides real-time air quality results and generates public health advice.

You can view the results and advice for your local area on the Air Quality Index for Health (AQIH).

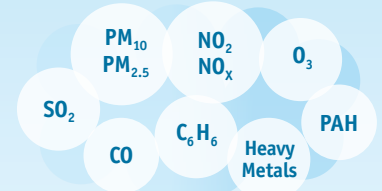
FIND OUT
what air quality is like near you



In 2023 we will be able to provide a 3-day air quality forecast. We are currently developing air quality models and forecasting to provide additional information to the public.

MORE at LIFE Emerald

WHAT DID WE MONITOR in Ireland's air in 2021?



MORE ABOUT each pollutant

We monitor dioxin levels in the environment by analysing cow's milk. The main source of dioxins is illegal burning of waste. Dioxin concentrations, as in recent years, were well below European limit values.

[Find out more about dioxins on our FAQs.](#)

The EPA is currently developing the National Ecosystem Monitoring Network, a requirement under the [NECD](#). The Network's goal is to monitor certain air pollutants (such as ammonia) and their impacts on sensitive ecosystems.



WATCH ON EPA YouTube Channel

Air Quality in Ireland 2021

Cleaner Air For Europe Directive (CAFE Directive) (2008/50/EC)¹

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information


Acknowledgements and Disclaimer



Ireland met all of its EU legal requirements in 2021 but it failed to meet WHO guideline levels for health in 2021.



The [CAFE Directive](#) establishes objectives on how to assess ambient air quality in order to reduce, prevent and avoid harmful effects on our health and on the environment. This table shows Ireland's level of compliance with the CAFE legal limits for selected pollutants in 2021.

 More detail is available in the 2021 supplementary data tables for Ireland's air quality.

The four designated zones for the purposes of monitoring air quality in Ireland can be seen [HERE](#)

The long-term trends in ambient PM_{2.5} concentrations using selected stations from across the designated zones, with national emissions figures can be compared [ON THE FOLLOWING PAGE](#)

Selected pollutants measured in 2021 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations, parameter monitored in 2021	EU legal limit values
PM ₁₀	87	No exceedances
PM _{2.5}	81	No exceedances
NO ₂	30	No exceedances
Ozone (O ₃)	21	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
PAHs	5	No exceedances
Heavy metals	5	No exceedances
CO	6	No exceedances
Benzene	2	No exceedances

Europe as part of the **Green Deal** and the **EU's zero pollution visions for 2050** is revising its **air quality standards** to align them more closely with the lower WHO recommendations.



[CLICK ON EACH BUTTON](#) for more detail

¹The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

Air Quality in Ireland 2021

Cleaner Air For Europe Directive (CAFE Directive) (2008/50/EC)¹

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

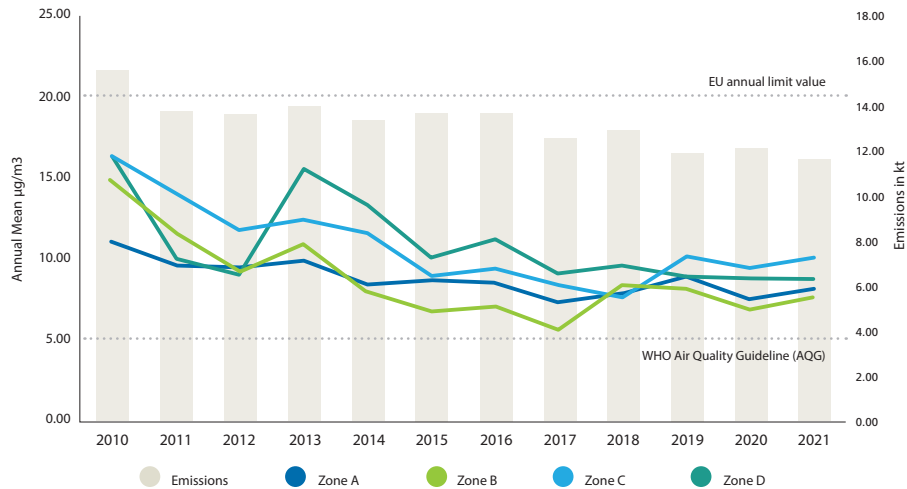
What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer

Long-term trends in ambient PM_{2.5} concentrations in Ireland with national emissions figures



NOTE: Emissions figures for 2010-2020 are published inventory emissions data and for *2021 is published emissions projected data



WHO Air Quality Guidelines for Health

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



The World Health Organisation (WHO) published new Air Quality Guidelines (AQGs) in 2021 based on the impact of pollutants on our health. There are 4 Interim Targets (IT) identified (IT1, IT2, IT3, IT4) towards achieving the final AQG levels.

Achieving the WHO Air Quality Guidelines in the future will be a major challenge for Ireland and all of Europe.

Ireland did not meet the new WHO Air Quality guidelines for health in 2021.*

Selected pollutants measured in 2021 failing the WHO AQG levels

Pollutant	Number of stations monitored	WHO Air Quality Guideline (AQG)
PM ₁₀	87	Above annual WHO AQG value at 8 stations. Above daily WHO AQG value at 21 stations
PM _{2.5}	81	Above annual WHO AQG value at 65 stations. Above daily WHO AQG value at 61 stations
NO ₂	30	Above WHO annual or 24 hour AQG level at 23 stations
Ozone (O ₃)	21	Above WHO AQG level at 19 stations
Sulphur dioxide (SO ₂)	15	Above WHO 24 hour AQG level at 1 station
PAHs	5	Above EEA reference level at 3 stations

New WHO AQGs & Interim Targets
SEE TABLE 1 ON FOLLOWING PAGES

COMPARE with adherence to EU legal limits values (CAFE Directive)
SEE TABLE 2 ON FOLLOWING PAGES



How air quality looks across Europe and how does Ireland compare?

See the challenge for Ireland to meet the WHO air quality guidelines. **SEE TABLE 3 ON THE FOLLOWING PAGES**

*Ireland met all of its EU CAFE legal requirements in 2021 but would not have met the new WHO air quality guidelines levels for health in 2021. The WHO AQGs are not legally binding, however, Ireland and Europe should move towards achieving these guidelines.

WHO Air Quality Guidelines for Health

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer

Table 1

Summary of recommended AQG levels and interim targets						
Pollutant	Averaging Time	IT1	IT2	IT3	IT4	AQG Level
PM _{2.5} µg/m ³	Annual	35	25	15	10	5
PM _{2.5} µg/m ³	24 hour ^a	75	50	37.5	25	15
PM ₁₀ µg/m ³	Annual	70	50	30	20	15
PM ₁₀ µg/m ³	24 hour ^a	150	100	75	50	45
O ₃ µg/m ³	Peak Season ^b	100	70	—	—	60
O ₃ µg/m ³	8 hour ^a	160	120	—	—	100
NO ₂ µg/m ³	Annual	40	30	20	—	10
NO ₂ µg/m ³	24 hour ^a	120	50	—	—	25
SO ₂ µg/m ³	24 hour ^a	125	50	—	—	40
CO mg/m ³	24 hour ^a	7	—	—	—	4



WHO Air Quality Guidelines for Health

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



Table 2

Selected pollutants measured in 2021 failing the WHO AQG levels

Pollutant	Number of stations, parameter monitored 2021	WHO Air Quality Guideline (AQG)
PM ₁₀	87	Above annual WHO AQG value at 8 stations. Above daily WHO AQG value at 21 stations
PM _{2.5}	81	Above annual WHO AQG value at 65 stations. Above daily WHO AQG value at 61 stations
NO ₂	30	Above WHO annual or 24 hour AQG level at 23 stations
Ozone (O ₃)	21	Above WHO AQG level at 19 stations
Sulphur dioxide (SO ₂)	15	Above WHO 24 hour AQG level at 1 station
PAHs	5	Above EEA reference level at 3 stations

Selected pollutants measured in 2021 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations, parameter monitored 2021	EU legal limit values
PM ₁₀	87	No exceedances
PM _{2.5}	81	No exceedances
NO ₂	30	No exceedances
Ozone (O ₃)	21	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
PAHs	5	No exceedances
Heavy metals	5	No exceedances
CO	6	No exceedances
Benzene	2	No exceedances

WHO Air Quality Guidelines for Health

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer

Table 3

Annual PM_{2.5} concentrations in Ireland in 2021 failed the new WHO AQG annual levels

WHO Interim Target (IT) and AQGs level	Number of stations over annual mean WHO level	% of total stations
35 µg/m ³	0	—
25 µg/m ³	0	—
15 µg/m ³	1	1%
10 µg/m ³	6	7%
5 µg/m ³	65	80%



Problem Pollutants

The two most significant pollutants in Ireland are Particulate matter and Nitrogen dioxide.

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



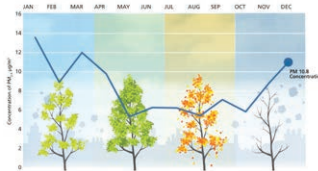
1. Particulate matter (PM)

What is Particulate matter? Particulate matter (PM) are very small particles which can be solid or liquid. The EPA monitors PM₁₀ and PM_{2.5}.

Where does it come from? Fine particulate matter (PM_{2.5}) in Ireland mainly comes from the burning of solid fuel, such as coal, peat, and wood to heat our homes.

How will it impact my health? PM_{2.5} is the more important pollutant as it causes most health issues. These small particles can penetrate the lungs and cause damage. Chronic exposure can also contribute to stroke and heart disease.

When is it at its worst? PM levels, in our towns and villages, are at their worst during the winter because of emissions from fires and stoves, with increased burning of solid fuels.



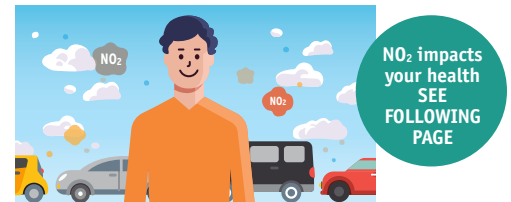
2. Nitrogen dioxide (NO₂)

What is Nitrogen dioxide? Nitrogen dioxide (NO₂) is an air pollutant gas.

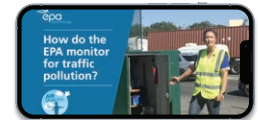
Where does it come from? The main source of NO₂ in our towns and cities is from traffic (petrol and diesel engines).

How will it impact my health? NO₂ can affect our lungs and breathing.

When is it at its worst? The highest concentration of NO₂ occurs in our cities, where traffic is heaviest.



NO₂ can affect our lungs and make pre-existing conditions like asthma worse.



Problem Pollutants

The two most significant pollutants in Ireland are Particulate matter and Nitrogen dioxide.

Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2021

WHO Air Quality
Guidelines for health

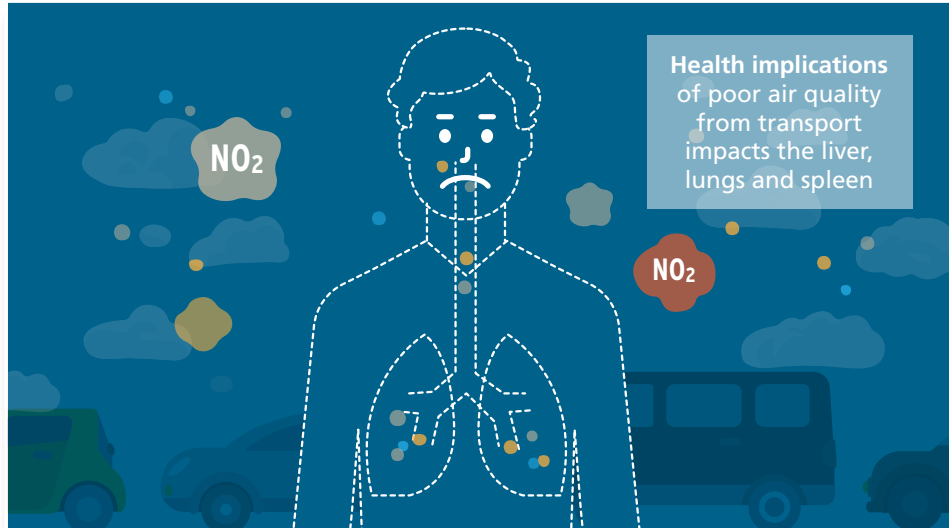
**Problem
pollutants**

What's Needed?

New
Developments

Data and Other
Information

Acknowledgements
and Disclaimer



What's needed?

We can all help improve the quality of the air we breathe

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



Reduce home heating pollution (PM)

- Change how you heat your home by moving away from smoky fuels and instead use cleaner choices, where possible.
- Avoid using solid fuels if you have an alternative cleaner heating system.
- Make your home more comfortable and energy efficient. Supports are available through The National Retrofitting Scheme.



Reduce car pollution (NO₂)

- Walk, cycle or take public transport, even for the last kilometre (if you can).
- Leave the car at home (if you can) for one day a week or more.
- Carpool where possible.
- Work from home (if you can) for part of your working week.
- Go electric on your next car, if you can afford it.



What does the EPA want?

- Ireland and Europe should move towards achieving the WHO Air Quality guidelines.
- Measures to address fuel poverty, should also improve air quality.
- Local Authorities must provide more resources to increase air enforcement activities.
- The planned [National Clean Air Strategy for Ireland](#) needs to be published and fully implemented.
- National investment in clean public transport is needed across the country.



What's needed?

We can all help improve the quality of the air we breathe

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

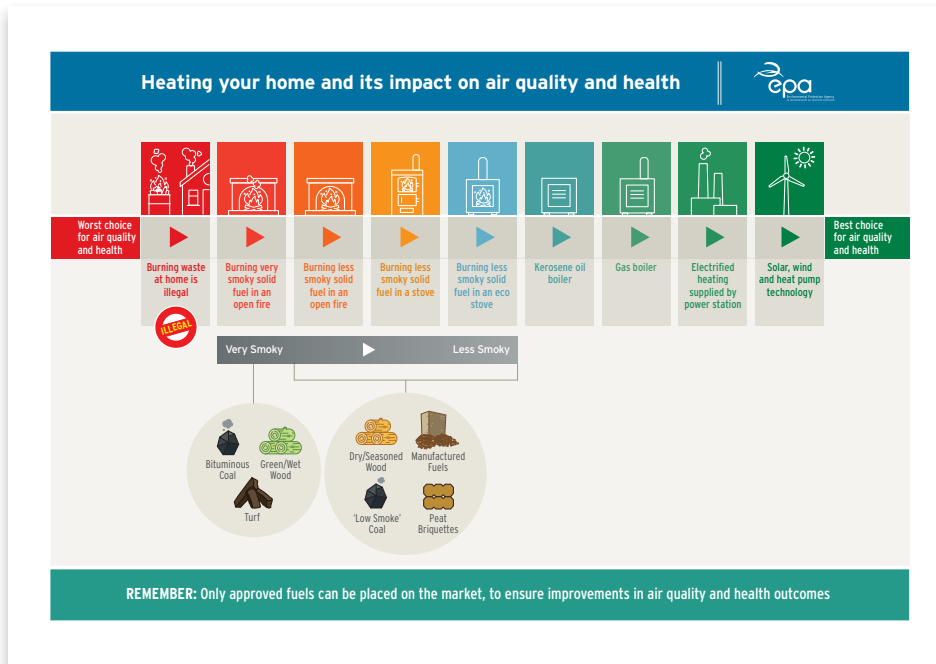
Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



New Developments

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer



LIFE Emerald is a four-year EU – Irish government funded forecasting and modelling project which started in 2021. It will allow the public to make more informed health related decisions on a daily basis with the help of a 3-day air quality forecast, and near-realtime and historical air quality maps for the entire country.

 **VISIT**
 The LIFE Emerald website



 **WATCH ON**
 EPA YouTube Channel



The (GLOBE) Programme is an international science and education programme that provides school students with the opportunity to participate in citizen science.

The GLOBE Ireland Air Quality Campaign is a citizen science campaign to assess traffic-related air pollution at schools, involving over 600 teachers/students throughout Ireland.

Campaigns & Participation
SEE NEXT PAGE



 **VISIT**
 the GLOBE website



Clean Air Together (CAT) is a citizen science project where people voluntarily measure levels of Nitrogen Dioxide (NO₂) in their local area. This is done to create a better understanding of NO₂ air pollution. The first measurement campaign took place in 2021 with 1,000 citizens across Dublin participating.

Clean Air Together has moved to Cork in 2022.

 **CAT Project**
comes to Cork



 **WATCH ON**
 EPA YouTube Channel

New Developments

Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2021

WHO Air Quality
Guidelines for health

Problem
Pollutants

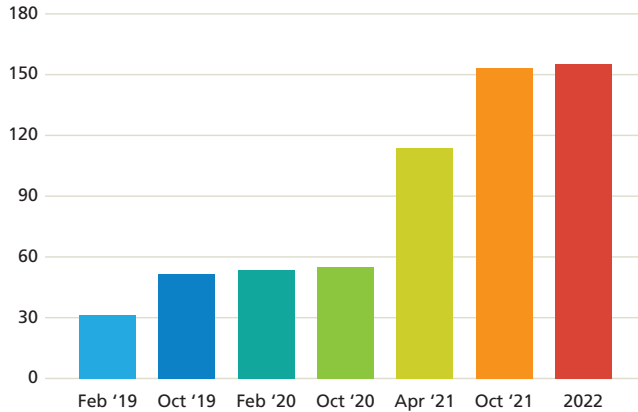
What's Needed?

**New
Developments**

Data and Other
Information

Acknowledgements
and Disclaimer

GLOBE Air Quality Campaign School Participation



Data and Other Information

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2021

WHO Air Quality Guidelines for health

Problem Pollutants

What's Needed?

New Developments

Data and Other Information

Acknowledgements and Disclaimer













If you want more information

Go to the EPA Air Quality Frequently Asked Questions

 **GO TO**
the website

MORE USEFUL LINKS

- | | | | | |
|--|---|--|---|--|
|  Supplementary information for the 2021 Air Quality Report in Ireland |  EPA's Air Quality Index for Health (AQIH) |  Real Time Air quality data for Ireland |  A synopsis of air quality issues in Ireland and how to solve them |  Public awareness campaign to reduce air pollution from domestic solid fuel |
|  Dublin's Air Quality Plan 2021 |  Urban Environmental Indicators |  The National Investment Framework for Transport in Ireland |  Ireland's Climate Action Plan 2021 |  Government agrees new regulations on solid fuels |

EU and WHO

- | | | | | |
|---|--|--|--|--|
|  The Cleaner Air For Europe Directive (CAFE) |  EEA Report: Air Quality in Europe 2021 |  WHO Air Quality Guidelines Global Update |  WHO 10 ways to fight air pollution |  WHO: How air pollution impacts your body |
|---|--|--|--|--|

RESEARCH

- | | |
|--|---|
|  Eco-driving: Trends and Potential Impacts |  Residential Transition Away from Solid Fuels |
|--|---|

EPA funded research in Air Quality

 **CLICK HERE**
For more details

Acknowledgements and Disclaimer

Acknowledgments: The principal authors, Lisa Sheils and Sarah Boylan, wish to acknowledge the contributions of their colleagues: Patrick Kenny, Lin Delaney, Emilia Hanley, Ken Murphy, Kevin Delaney, Patrick Malone, Dermot Burke, Cathal Ruane, Micheál O'Dwyer, Stephen Sommerville (retired), Patrick Byrne and Director Micheál Lehane, in the National Ambient Air Quality Programme. EPA contractors, Hugh Baxter, Dylan Halpin, Peter Mooney and Colm Flynn (intern). Fiona O'Rourke EPA Evidence Programme, Emily Williamson and Eileen Butler, Communications Team and Leo McKittrick EPA Clean Air Together. Additional support in monitoring, analysis and input was provided by EPA staff in Dublin, Kilkenny, Wexford, Castlebar, Monaghan, Cork and Limerick with support in data collection and reporting from colleagues in the EPA Research, Emissions, Air Cross Office, Ecosystem Services, Enforcement, Catchments, IT and Geographic Information System teams. The authors also acknowledge the input of personnel from local authorities, DECC, the Health Service Executive, Met Éireann, UCC, MTU, TCD, MU, UoG amongst others, who provided data for this report. FUSE Graphic Design.

Cover and back cover photographs courtesy of Stephen Treacy and Lisa Sheils, EPA respectively.

Although we in the Environmental Protection Agency have tried our best to make sure this publication is accurate, we cannot guarantee complete accuracy. Neither we nor the authors are in any way responsible for any loss or damage caused by, or claimed to have been caused by, anyone doing anything or failing to do anything based on information in this publication. You may reproduce all or part of this publication without further permission, provided you acknowledge the source.

Published by the Environmental Protection Agency, Ireland September 2022

ISBN: 978-1-80009-070-5

