



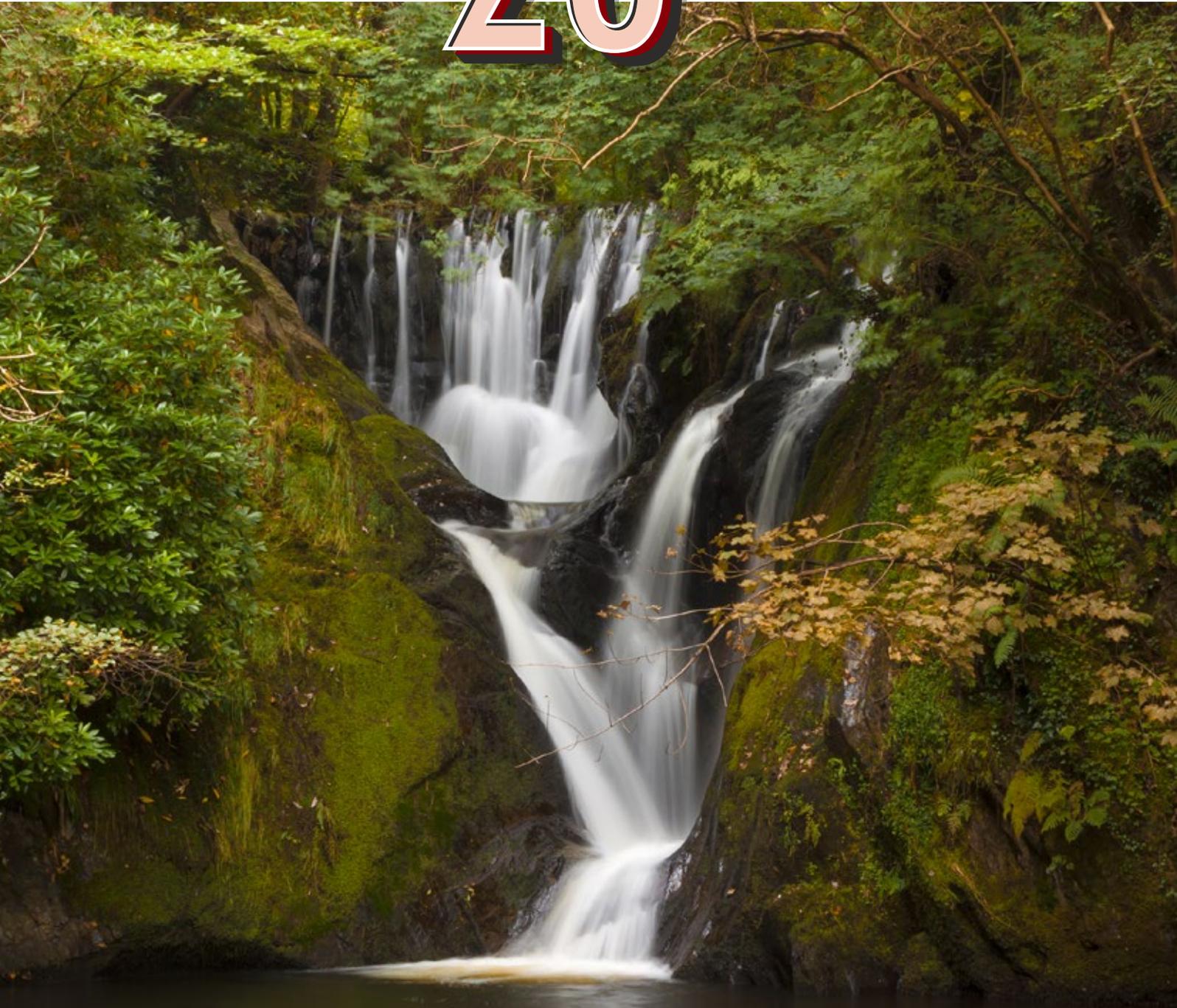
Llywodraeth Cymru  
Welsh Government

# Air Pollution in Wales 2014

CELEBRATING

20  
YEARS

OF THE WELSH  
AIR QUALITY FORUM



Welsh Air Quality Forum  
Fforwm Ansawdd Awyr Cymru



Ricardo  
Energy & Environment

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This report has been produced by Ricardo Energy & Environment  
on behalf of the Welsh Government and Welsh Air Quality Forum

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# Foreword



by Ronnie Alexander

When I first began working for Welsh Government (then the Welsh Office) in 1990, there were 37 Local Authorities in Wales and two Port Health Authorities – at Pembrokeshire and Swansea Bay. I was convinced that much could be done to standardise (at least to some extent) the sampling activities of Local Authorities on food and air quality.

With the assistance of David Worthington, who was subsequently appointed to the post of Deputy Chief Environmental Health Adviser, we formed the idea of creating the Welsh Food Microbiological Forum and the Welsh Air Quality Forum. For the Welsh Air Quality Forum, I was successful in attracting funding from the Chief Medical Officer Research budget and individual subscriptions from each of the Local Authorities.

Cardiff Metropolitan University provided the office accommodation and IT support and, on the basis of all the elements of this partnership funding, we were then in a position to advertise for the position of project officer to commence the coordination of the work of the Forum 20 years ago. The work was initially overseen by a Steering Group, which I was privileged to chair.

Since then, the work of the Welsh Air Quality Forum has grown and expanded, and the funding now takes place directly from the Welsh Government. Nonetheless, the fact that the Welsh Air Quality Forum is still in existence is testament, not only to the original idea, but also, and much more importantly, to the valuable contribution of all the Local Authorities that continue to work to achieve the demonstrable value which the Welsh Air Quality Forum achieves for public health improvement in Wales.

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# Introduction

This is the 12th annual report on air quality in Wales to be produced by Ricardo Energy & Environment under the auspices of the Welsh Air Quality Forum (WAQF) for the Welsh Government and marks WAQF's 20th anniversary. It aims to provide Welsh citizens and the air quality community with a user-friendly summary of information on local air quality monitoring, pollution levels and their impacts throughout Wales during 2014. It also details the WAQF's activities alongside major policy, technical and scientific developments.

More detailed information, analysis and data covering air quality in Wales can be found on the WAQF's website ([www.welshairquality.co.uk](http://www.welshairquality.co.uk)). All data used in this report are freely available through the website, which has been improved and developed over recent years. The website is used by 22 Local Authorities to submit monitoring data and by thousands more individuals to download data and learn about monitoring sites and measurements that take place. It contains comprehensive data, graphs and information on health effects from a continually increasing number of monitoring stations, together with local forecasts of air quality over the next 5

days. Providing the population of Wales access to reliable and accurate information on the quality of the air we breathe. OpenAir data analysis tools provide a free and open-source tool to analyse, interpret and understand air pollution data. The user-friendly interactive Google Map™ interface allows users to access and analyse data at a glance.

Chapter 2 presents the WAQF's activity in 2014. Chapter 3 summarises successes of policy over the last 25 years. Chapter 4 presents key air quality statistics from all networks and summarises the air quality monitoring networks in Wales. These include air quality monitoring stations run by the Welsh Local Authorities themselves and the national monitoring networks run by the Department for Environment, Food and Rural Affairs (Defra) and Devolved Administrations. Chapters 5 and 6 discuss long-term trends and the spatial distribution of air pollutants across the country. Chapter 7 reports on topics of special interest – this year it looks at advances in the capability of the WAQF in the last 20 years. Finally, for readers wanting to find out more, additional web-based and published sources of information are summarised in Chapter 8.

# The WAQF and its Activities in 2014

The Welsh Air Quality Forum (WAQF) represents the 22 Unitary Councils of Wales and is made up of representatives from Local Authorities, the Welsh Government, Public Health Wales, Natural Resources Wales and several academic institutions. The WAQF members are responsible for the collection, dissemination and coordination of air quality monitoring information in Wales. This includes the operation of the Welsh Air Quality Database, the quality assurance and quality control of all data, and the provision of support and training to Local Authorities. The WAQF provides expertise and guidance to ensure that Local Air Quality Management (LAQM) statutory requirements are met and air quality in Wales is reported in an accurate, transparent and timely manner.

## WAQF Highlights from 2014

- The automatic monitoring network was expanded to 46 sites by the end of 2014.
- A report, 'Comparison of the Modelled National Air Quality Maps with 2012 Welsh AQ monitoring data', was issued at the end of the year as part of the WAQF's Science and Innovation work. This adds confidence to the use of the data available from various sources.
- The Welsh Government grant scheme for its Tranquil Greener Spaces project was made available again in 2014. Authorities were able to bid for funding in respect of local initiatives, with air quality improvement playing a key factor.
- The Air Quality Wales website continues to provide near-real-time updates of the latest air quality information. Website usage remained good at over 1,500 unique visitors per month.
- Improved functionality of the website, through the addition of yet more tools, assists Local Authorities to meet their LAQM duties and provides a very impressive enhancement to members of the public who have air quality queries. Increasing numbers of consultants are also making use of the website, particularly in respect of planning applications.
- Expert speakers invited to WAQF meetings have continued to provide additional training for officers and contributed towards consistent delivery of the air quality functions across Wales. The WAQF also provides a means for dialogue between officers on specific and general topics where consensus of opinion can be attained, thereby delivering a more consistent approach to implementing the LAQM requirements in Wales.

- Use of the website Discussion Forum continues to enable debate and promote best practice.

## WAQF Events

The first WAQF meeting took place on the 3<sup>rd</sup> April at City Hall, Cardiff. It was reported that, in March, the UK had experienced two extensive episodes involving particulate matter up to 10 µm in size (PM<sub>10</sub>) and smaller than 2.5 µm (PM<sub>2.5</sub>). These were related to a period of calm weather resulting in poor local dispersion of pollutants, and the long-range transport of pollution from Europe. Another incident related to a Saharan dust cloud that covered much of the UK. The WAQF was informed that Natural Resources Wales would continue to provide a response for emergency incidents and that monitoring facilities would be made available from the Llanelli Laboratories. The use of low-cost air quality sensors was discussed including their benefits and disadvantages.

The second meeting took place on the 3<sup>rd</sup> July at Brunel House in Cardiff. Discussion topics included the expansion of the automatic monitoring network, and analysis of the moderate ozone air pollution that was evident at the end of June and early July 2014.

The last meeting of the year took place on the 27<sup>th</sup> November at the Welsh Government Offices in Cathay's Park, Cardiff. This included a discussion of the annual mapping report.

### Annual Seminar

The Annual Welsh Air Quality Forum Seminar took place on 25<sup>th</sup> September at the Media Resources Centre in Llandrindod Wells. Over 60 WAQF members and delegates attended the event. Presentations included:

- Air Quality Policy 2014.
- Managing the Public Health Risks from Environmental Incidents: Guidance for Wales.
- Emergency Incident Management Framework.
- Low Cost Sensor Networks for Air Quality Monitoring.
- Air Quality and Health Impacts of Waste to Energy and Biomass Combustion.
- Air Quality Impacts of Domestic Wood Burning.
- Source Apportionment of Particulate Matter (PM<sub>2.5</sub>) in the UK (including cooking emissions).
- Air Quality Impact of Fracking Activities.

# Policy Successes of the last 25 years

Advances in scientific understanding and improved technologies have greatly enhanced our knowledge of the major sources and impacts of air pollution. However, the introduction of environmental legislation at local, national and international levels has provided a strong impetus to reduce the levels of harmful pollutants in the UK. Consequently, current concentrations of many recognised pollutants are now at the lowest they have been since measurements began.

Over the last 25 years, our understanding of the air pollution climate in the UK and Wales and our approach to its management has improved dramatically. To coincide with the 20th anniversary of the Welsh Air Quality Forum (WAQF), this chapter highlights some of the pivotal pieces of legislation implemented over the last 25 years that continue to provide relevance and purpose to the group.

## European laws

Many policies have been introduced at the European level to combat air pollution. These include:

- National Emission Ceilings Directive 2001/81/EC, which sets limits on the total emissions that each Member State can make of sulphur dioxide, nitric oxide, nitrogen dioxide, volatile organic compounds and ammonia from any source. It is for Member States to decide how to control emissions so as to meet these overall limits.
- Directive 2004/107/EC, which sets ambient air quality standards and requires European Member States to monitor concentrations of arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons (PAH).
- Integrated Pollution Prevention and Control Directive (IPPC) 2006/12/EC, which sets out an integrated environmental approach to the regulation of certain activities. Emissions to air, water (including discharges to sewer) and land must be considered together. Regulators must set permit conditions to achieve a high level of protection for the environment as a whole.
- The Air Quality Framework Directive 2008/50/EC, which streamlines European air quality law. It sets ambient air quality standards and requires Member States to monitor concentrations of substances including sulphur dioxide, nitrogen dioxide, particulate matter and lead.

- The Industrial Emissions Directive 2010/75/EU, which regulates air pollution emissions at source and other kinds of industrial emissions.

## UK National Laws

Policies have also been implemented at the UK level. These, alongside specific regulations for Wales, will have an impact on air pollution and air quality in Wales.



Included in these is the 1990 Environmental Protection Act. Under this Act, some 2,000 of the most polluting processes have been made subject to Integrated Pollution Control, while a further 13,000 processes have been made subject to Local Air Pollution Control. Also in the 1990s, the Clean Air Act 1993 was introduced. This gave Local Authorities smoke control powers including the power to ban chimney smoke and the use of unauthorised fuels in designated areas.

The current system for local air quality management in the UK was legislated through the Environment Act 1995. This required the publication of the first National Air Quality Strategy (last reviewed and updated in 2007). The strategy sets out the UK's air quality objectives and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem.

As part of this approach, the strategy introduced statutory requirements for Local Authorities in relation to the assessment and control of air quality. Local Authorities are required to periodically review air quality in their area for specific pollutants, and to assess current and projected future levels of air quality.

The latter part of the 1990s also saw the introduction of the Pollution Prevention and Control (PPC) Act 1999, which enabled regulations to be made to implement the Integrated Pollution Prevention and Control Directive (IPPC) Directive.

The year 2000 saw the introduction of five new policies. These were:

- Pollution Prevention and Control (England and Wales) Regulations 2000, which apply an integrated approach to certain industrial activities. Emissions to air, water (including discharges to sewer) and land must be considered together. Regulators must set permit conditions to achieve a high level of protection for the environment as a whole.
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000, which was published as a result of a review of the 1997 strategy. The objectives are generally more stringent than those in the original 1997 strategy. The framework has been set to achieve cleaner air that will bring health and social benefits to all individuals, though the effort of everyone is required to help deliver cleaner air.
- Transport Act 2000, which requires local transport authorities to produce Local Transport Plans (LTPs) that tackle traffic issues including deterioration in air quality.
- Finance Act 2000, which created the Climate Change Levy that seeks to minimise greenhouse gas emissions.

Other policies introduced during the 2000s include the National Emissions Ceilings Regulations 2002, which set limits for total emissions of certain pollutants; the Pollution Prevention and Control (England and Wales) Amendment (No 2) Regulations 2003; and the European Pollutant Release and Transfer Register Regulations 2006 (E-PRTR), which aims to enhance public access to environmental information through the establishment of a coherent and integrated electronic database. Further policies are The Large Combustion Plants (National Emission Reduction Plan) Regulations 2007, which implements the requirement under the European Large Combustion Plants Directive for governments to publish a National Emissions Reduction Plan (NERP); The Environmental Permitting (England and Wales) Regulations 2010, which introduces a streamlined regime for regulating polluting activities, principally through environmental permits; and The Air Quality Standards (Wales) Regulations 2010, which sets ambient air quality standards in Wales. These regulations give effect to two European Directives – the Air Quality Framework Directive 2008/50/EC and Directive 2004/107/EC (covering to arsenic, cadmium, mercury, nickel and PAHs).

Environmental legislation introduced over the past 25 years has led to the continued reduction in levels of harmful pollutants in Wales and more widely. However, air pollution still remains a problem and we must continue to work towards further improvements.

The Welsh Government and Local Authorities are committed to improving air quality and are continually looking for ways to progress and streamline the way air pollution is managed – not only to meet legislative requirements, but also to enhance the health of people and the environment in which we live.

# Monitoring Networks and Data Highlights

The Welsh Government and the Welsh Air Quality Forum (WAQF) work closely with air quality experts and the Department for Environment, Food and Rural Affairs (Defra) to monitor and reduce air pollution in Wales. Figure 4.1 illustrates the long-term trends for nitrogen dioxide, particulate matter up to 10  $\mu\text{m}$  in size ( $\text{PM}_{10}$ ) and ozone concentrations in Wales. Apart from ozone this shows a steady improvement in pollutant concentrations since the 1990s. As ozone is a regional pollutant that is transboundary in nature, it is outside the direct control of the Welsh Government and Local Authorities.

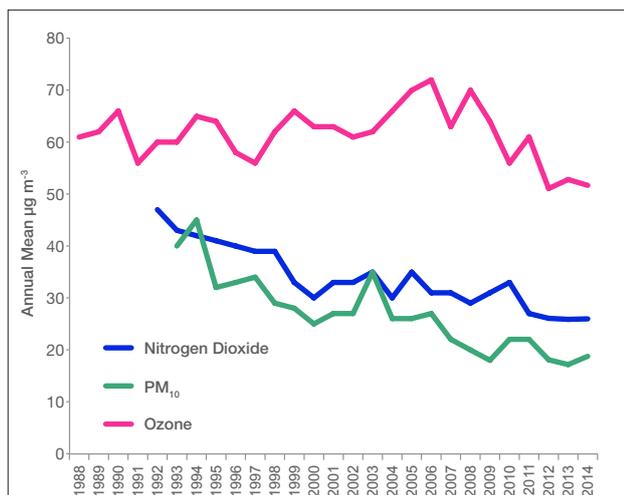


Figure 4.1

Ambient pollutant trends in Wales 1990-2014

## Local Authority Monitoring

Air quality monitoring in Wales is undertaken by Local Authorities and through national networks managed by the Welsh Government. There are two main types of air pollution monitoring – automatic monitoring and passive sampling. Automatic monitoring uses continuous analysis techniques to measure and record ambient concentrations of a range of air pollutants. Passive samplers (such as diffusion tubes) contain a chemical reagent that adsorbs the pollutant from the air. Samplers are exposed for a period of time and analysed in a laboratory. In 2014, there were a total of 42 automatic monitoring sites distributed across the country that were operated by Local Authorities. These sites contain equipment that automatically measures

carbon monoxide, nitrogen oxides, sulphur dioxide, ozone,  $\text{PM}_{10}$  and particulate matter up to 2.5  $\mu\text{m}$  in size ( $\text{PM}_{2.5}$ ). In addition to these, there were several hundred diffusion tubes measuring monthly mean nitrogen dioxide levels. Overall, data capture for the automatic instruments operated by Local Authorities during the year was 87%.

Ambient concentrations of  $\text{PM}_{10}$  were “Moderate” on 62 days, “High” on 13 days and “Very High” on 4 days (as defined by the Daily Air Quality Index bandings) during the year. For nitrogen dioxide, there were 58 days with “Moderate” concentrations, but there were no days with “High” levels recorded in 2014. There were no “Moderate” or “High” levels recorded for sulphur dioxide. There were 45 days with “Moderate” ozone and no days with “High” ozone, as measured by the monitoring sites operated by Local Authorities. Overall, pollution levels in Wales were low for 217 days, moderate for 130 days, high for 14 days and very high for 4 days. So, for 60% of the time, pollution levels were low across the whole of the Wales. Details of the Daily Air Quality Index banding system used to describe pollution levels for the public during 2014 can be found at <http://uk-air.defra.gov.uk/air-pollution/daqj>

## Summary of Exceedances

Exceedance statistics generated from the ‘Air Quality in Wales’ website show that no monitoring sites in Wales exceeded any Air Quality Strategy (AQS) Objectives (or corresponding EU limit values) for carbon monoxide, sulphur dioxide, benzene or lead during 2014.

Four Welsh monitoring sites (Neath Cimla Road, Caerphilly Hafodyrynys, Newport M4 Junction 25 and Swansea Hafod) exceeded the annual mean objective of 40  $\mu\text{g m}^{-3}$  for nitrogen dioxide. Caerphilly Hafodyrynys and Caerphilly White Street also exceeded the AQS Objective for hourly mean nitrogen dioxide concentration on more than the permitted 18 occasions in 2014.

Three sites in Wales exceeded the AQS Objective for ozone (100  $\mu\text{g m}^{-3}$  as a maximum daily 8-hour mean) on more than the permitted 10 occasions. These were Marchlyn Mawr, Swansea Hafod Differential Optical Absorption Spectroscopy (DOAS) and Pembroke Power Station.

## The National Air Quality Monitoring Networks Operating in Wales

There are several national air quality monitoring networks operating across Wales. These report air pollution levels in Wales that can be assessed against regulatory requirements and to provide information for air quality researchers, the medical community and members of the public.

### Automatic Urban and Rural Network

There are 11 air quality monitoring sites in the UK Automatic Urban and Rural Network (AURN) operating across Wales. The techniques used for monitoring the gaseous pollutants in the AURN are the reference methods of measurement defined in the relevant EU Directives. For particulate matter, the AURN uses methods that have demonstrated equivalence to the reference method, but which (unlike the reference method) allow continuous monitoring and provision of this information in 'real time'.

### Urban and Industrial Metals Network

There are seven UK Urban and Industrial Metals Network monitoring sites located in Wales.

### PAH Monitoring Network

Wales has four polycyclic aromatic hydrocarbon (PAH) network sites. These monitor compliance with the 4<sup>th</sup> Daughter Directive, which includes a target value of 1 ng m<sup>-3</sup> for the annual mean concentration of benzo[a]pyrene as a representative PAH, not to be exceeded after 31<sup>st</sup> December 2012. This network uses the PM<sub>10</sub> "Digitel™" sampler. Ambient air is sampled through glass fibre filters and polyurethane foam pads, which capture the PAH compounds for later analysis in a laboratory.

### Black Carbon Network

Black carbon is fine, dark carbonaceous particulate matter produced from the incomplete combustion of materials containing carbon (for example coal, oil and biomass (such as wood)). It is of concern due to possible health impacts and as a suspected contributor to climate change. There is one monitoring site in Wales that measures this parameter. The site, in Cardiff, is part of the Black Carbon Network. This uses an

automatic instrument called an aethalometer that measures black carbon directly using a real-time optical transmission technique.



### Rural Metals Network

There is one monitoring site in Wales, which belongs to the national Rural Metals Network. This rural network complements the statutory UK Metals Network, which predominantly monitors at industrial and urban locations. Airborne particulate matter is sampled and analysed for metals concentrations in PM<sub>10</sub>. The metal concentration data are then combined with the local meteorological data (rainfall, etc) to calculate values for wet deposition (from rain, snow, etc), dry deposition (from dust settling, etc) and cloud deposition (condensation of cloud droplets).

### UK Eutrophying and Acidifying Pollutants Network

The UK Eutrophying and Acidifying Atmospheric Pollutants (UKEAP) network provides information on deposition of eutrophying and acidifying compounds in the UK and assessment of their potential impacts on ecosystems. Other measurements – including sulphur dioxide, nitrogen dioxide and particulate sulphate – have also been made within the programme, to provide a more complete understanding of precipitation chemistry in the UK.

# Air Quality Trends

The number of automatic monitoring sites in Wales has increased greatly in recent years. While this helps to improve our understanding of air quality across the country, it potentially complicates the investigation of how air quality has changed over time. If such investigations are based on all available data, discontinuities and false trends may be introduced because of changes in the composition of the network. Therefore, in this report, investigation of changes has been based on subsets of long-running sites rather than on every site in the network. This should lead to a more robust assessment.

## Nitrogen Dioxide

In Wales (and the rest of the UK), the most widely exceeded limit value is the annual mean nitrogen dioxide concentration ( $40 \mu\text{g m}^{-3}$ ). Figure 5.1 shows how annual mean nitrogen dioxide concentrations have varied with time.

Urban background sites are represented by the longest running site of this type (Cardiff Centre) from 1992, and a subset of four long-running sites which have all been in operation since 2003, with annual data capture of at least 50% – Cardiff Centre, Cwmbran, Newport Malpas Depot and Port Talbot (replaced by the nearby Port Talbot Margam site in 2007 – the two Port Talbot sites are treated as one for the purpose of the graph). Cardiff Centre shows a clear decrease from 1992 to around 2000, after which the downward trend appears to have levelled off. The mean for the long-running sites shows a slight decrease through the 2000s, although 2010 was a higher year.

Urban traffic sites (those within 10 m of a major road) are represented by the longest-running roadside site (Swansea Morrision) from 2001, and a subset of two long-running sites that have been in operation since 2002 – Swansea Morrision and Wrexham. Neither Swansea Morrision nor the mean of the two long-running sites shows any clear pattern of increase or decrease in nitrogen dioxide concentration in recent years.

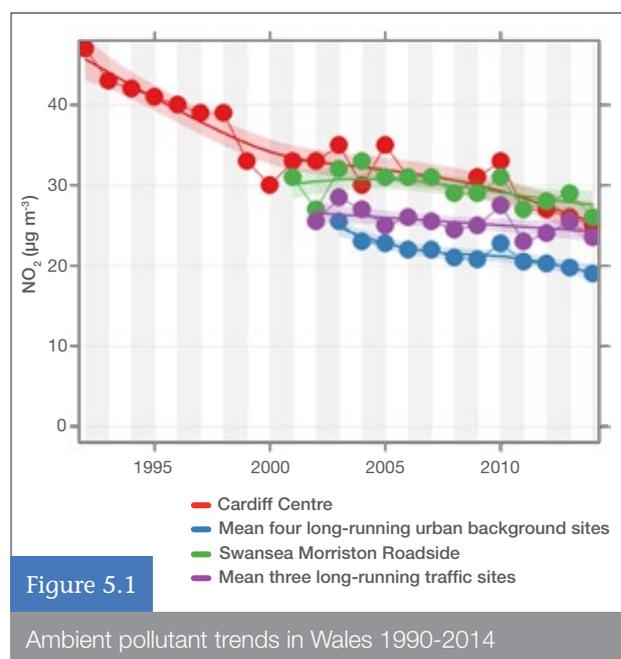
## Particulate Matter

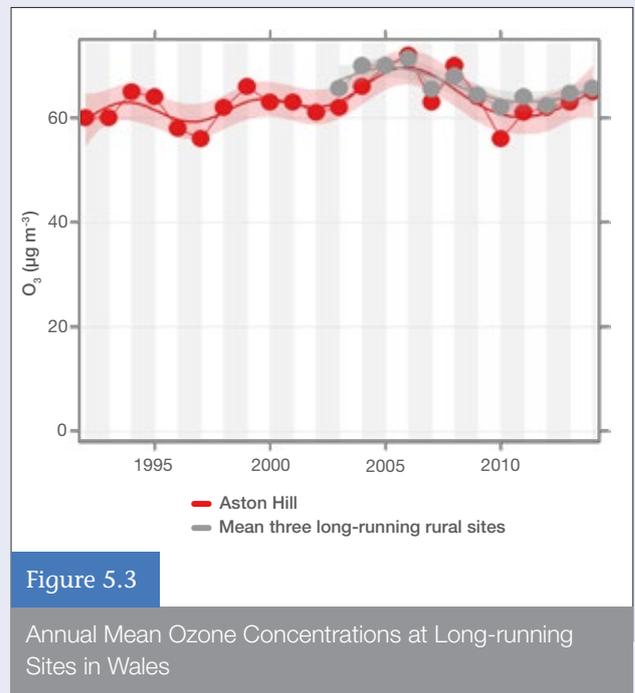
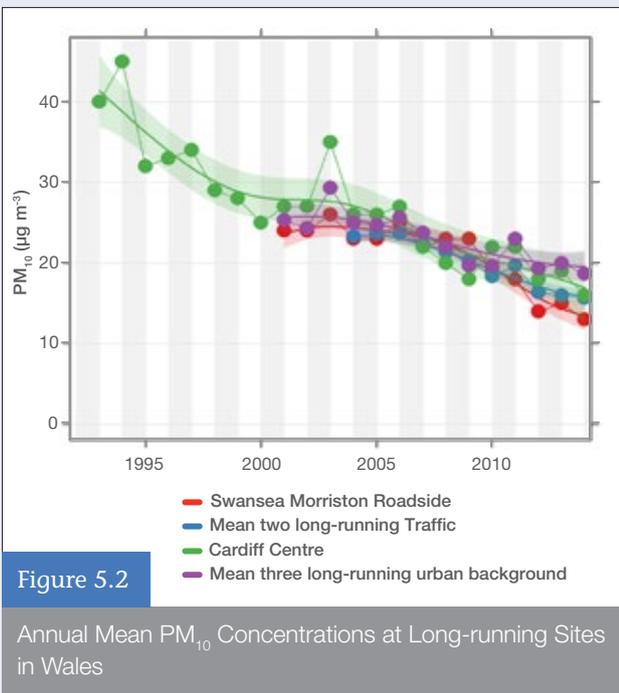
Figure 5.2 shows how annual mean concentrations of particulate matter up to  $10 \mu\text{m}$  in size ( $\text{PM}_{10}$ ) have generally decreased in recent years at urban background and urban traffic sites.

Urban non-roadsite sites are represented by the mean of three long-running sites from 2001 (Cardiff Centre, Cwmbran and Port Talbot/Port Talbot Margam – again, the latter two are treated as one site for this purpose). Please note that Port Talbot/Port Talbot Margam is classified as urban industrial rather than urban background as it is located in the vicinity of a large steelworks. It has been included because there are few long-running urban non-roadsite sites.

Cardiff Centre (which has operated for longer than any other site) is also shown individually. All sites have at least 70% annual data capture except Cardiff Centre in 2010.

Urban traffic sites are represented by the mean of two long-running sites from 2002 – Swansea Morrision and Wrexham. Swansea Morrision (the longest-running traffic site) is also shown individually.





## Ozone

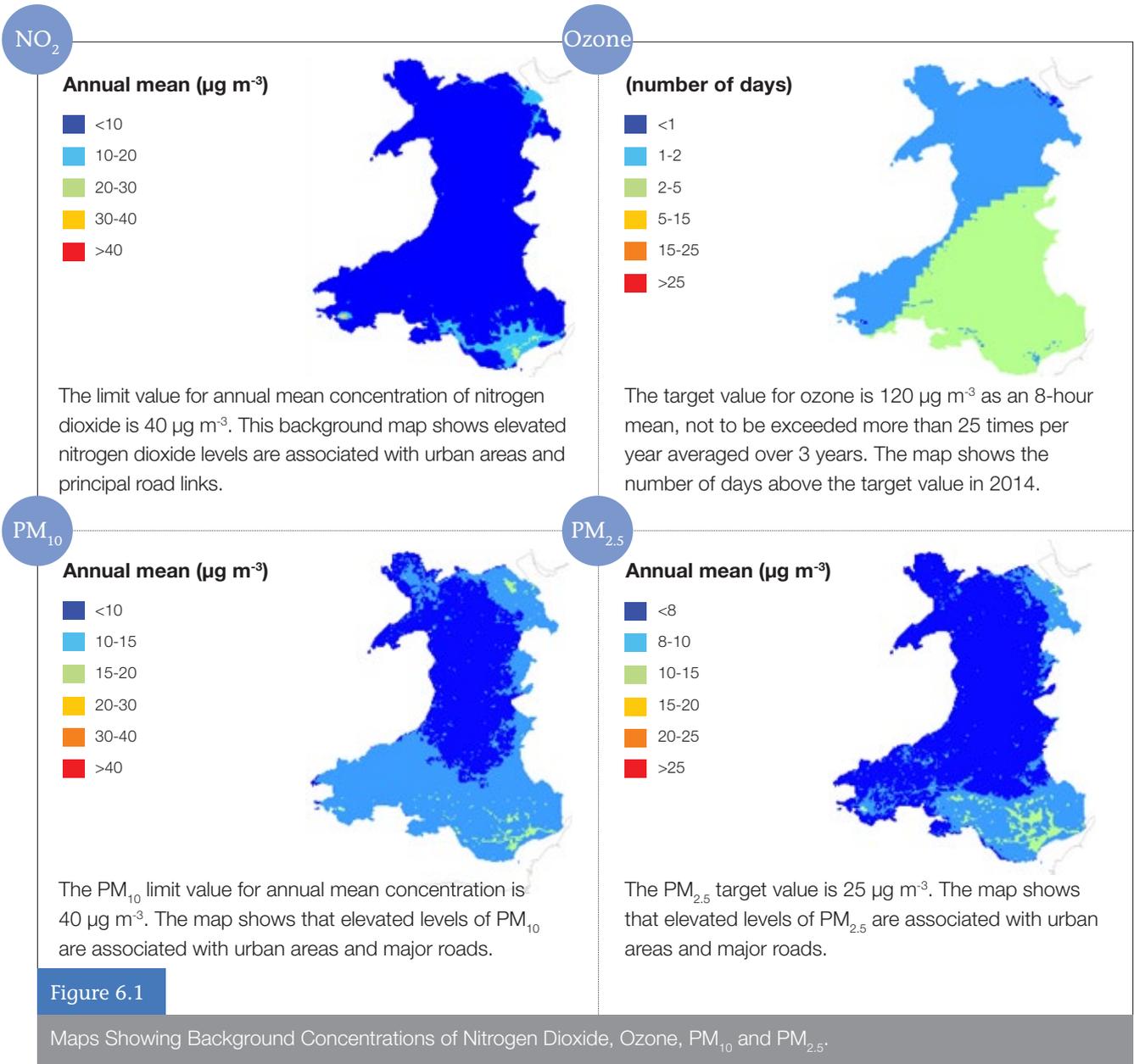
Ozone concentrations tend to be highest at rural locations. Figure 5.3 shows how annual mean rural ozone concentration has changed over time. This is based on the mean concentration measured by three long-running sites in Wales (shown by the grey line) – Aston Hill, Marchlyn

Mawr and Narbeth. All have been in operation since 2003 or earlier, with data capture of at least 70%. Also shown is Aston Hill alone – this site has been monitoring ozone since the late 1980s. Although there are no clear trends, concentrations vary considerably from year to year because of variation in meteorological factors.

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# Maps of Air Quality

The maps in Figure 6.1 present 2014 background concentrations for nitrogen dioxide, ozone, and particulate matter up to 10 µm in size (PM<sub>10</sub>) and smaller than 2.5 µm (PM<sub>2.5</sub>). These modelled maps of ambient concentrations were calculated from National Atmospheric Emissions Inventory (NAEI) data using a dispersion modelling approach. The model output was calibrated using monitored data from the national monitoring networks. These modelled maps were then verified against the local authority monitoring data. A more detailed report comparing the Welsh air quality monitoring data to modelled concentrations will be published in due course. In these maps, the modelled ambient concentrations are compared with EU limit values.



## Advances of the WQAF in the last 20 years

In last 20 years, the capability of the Welsh Air Quality Forum (WAQF) to deal with air quality issues has improved greatly. There have been increases in real-time monitoring and significant improvements in website tools. As a result, this has increased competence and capacity in the field.

In 2000, there were 16 continuous monitoring stations in Wales. By the end of 2014, this had increased to 42 stations. The number of non-continuous sites that measure on a daily-to-monthly basis has also increased from 591 in 2000 to over 900 in 2014.

Not only has access to the data gathered from the monitoring stations vastly improved in the last 20 years, but the usability of the data has also continued to develop. The WAQF website provides comprehensive data, graphs and information on health effects from a continually increasing number of monitoring stations, together with local forecasts of air quality over the next 5 days. This empowers the population of Wales through access to reliable, accurate and comprehensive information on the quality of the air we all breathe.

The website contains:

- A colour-coded map showing the current pollution situation in Wales at a glance.
- Current pollution levels at automatic monitoring sites in Wales.
- Air pollution forecasts for the whole of Wales.
- Information on the latest news, developments and publications.
- Interactive 7-day and 30-day graphs of pollution levels.
- Information on and photographs of automatic monitoring sites.
- A wide range of background information on air pollution sources, impacts, monitoring techniques, standards and policy issues.
- Access to air quality data and statistics – for automatic and sampler sites – going back to 1986.
- Provision to submit data via innovative web forms to the Archive.

- Links to national and global information resources on air quality.

The site also has been substantially upgraded to include a user-friendly interactive Google Map™ interface. This allows users to access and analyse data at a glance, zoom into monitoring site locations, and to swap between map and satellite views. By simply clicking on any site, users can obtain detailed information including graphs, current pollution levels and monitoring site pictures. A similar, interactive Google Earth™ interface is also provided for users wishing to use a desk based version. Users can download Google Earth and the KMZ layer and then view the data on their computer (<http://www.welshairquality.co.uk/download-kmz-layer.php?lg>).

In recent years, the website has continued to be improved, introducing on-line OpenAir data analysis tools in 2012. This development provides free, open-source and innovative tools to analyse, interpret and understand air pollution data. As an example, Figure 7.1 presents PM<sub>10</sub> pollution trends since 1992 at Cardiff Centre produced with the TheilSen tool. The TheilSen tool is a specialised statistical function used to determine trends in pollutant concentrations over several years. It calculates monthly or annual mean values from daily, hourly or higher time resolution data. Visit <http://www.welshairquality.co.uk/openair/openair.php?build=theilsen> for more information.

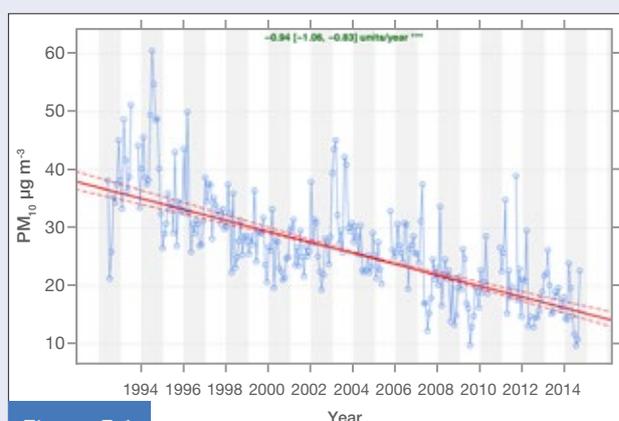


Figure 7.1

De-seasonalised Data Trend at Cardiff Centre for the Period 1992-2014.

The website now also includes the addition of a data download option allowing the user to list the monitoring sites that have exceeded an air quality limit value or objective during a given year.

For example, Figure 7.2 shows the list of monitoring sites that exceeded the Air Quality Strategy Objective for annual mean nitrogen dioxide in 2013.

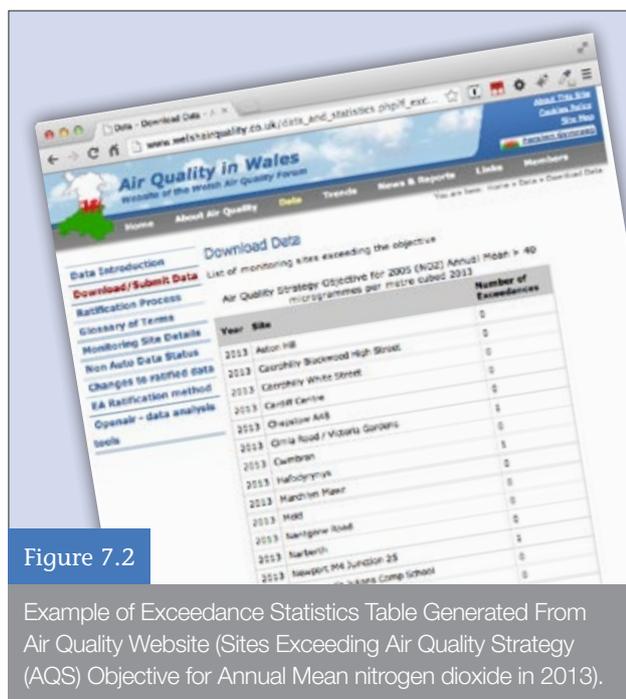


Figure 7.2 Example of Exceedance Statistics Table Generated From Air Quality Website (Sites Exceeding Air Quality Strategy (AQS) Objective for Annual Mean nitrogen dioxide in 2013).

- An informal discussion area, providing an open ‘chat’ facility to enable WAQF members to freely and interactively discuss air quality topics. The informal discussion area is steered by topic managers.

The WAQF has been encouraged to use the discussion area to advertise equipment available for loan or sale to make the best use of these assets. For example, this generated a request for a short-term arrangement for suitable PM<sub>10</sub> monitoring equipment needed to monitor an ongoing incident in Fforestfach, Swansea involving a tyre crumb fire.

Improvements in local real-time monitoring have also been used to provide vital information on long-range pollution whose sources can be hundreds of miles from Wales. During the eruption of the Eyjafjallajökull volcano in Iceland in April 2010, local-scale monitoring carried out by the WAQF provided invaluable information to monitor and protect the health of citizens across Wales. The Welsh Assembly Government’s Emergency Centre was activated to monitor the threat and experts assessed the changing situation. Throughout the eruption, local monitoring data from the Welsh Air Quality Database provided comprehensive real-time data to monitor the environmental impacts of the ash and sulphur dioxide at ground level, thus providing vital information on the potential health effects for Welsh citizens. Forecasters at Ricardo Energy & Environment and the Met Office provided daily assessments to the Emergency Centre until the volcanic activity ceased.

The ability of WAQF members to work together to improve air quality has continued to evolve. An advanced, web-based system has been developed that enables WAQF members to interact easily, which fosters member involvement in consultation, discussion and knowledge transfer on all matters pertaining to air quality monitoring and management in Wales. The two main areas of functionality on the website are:

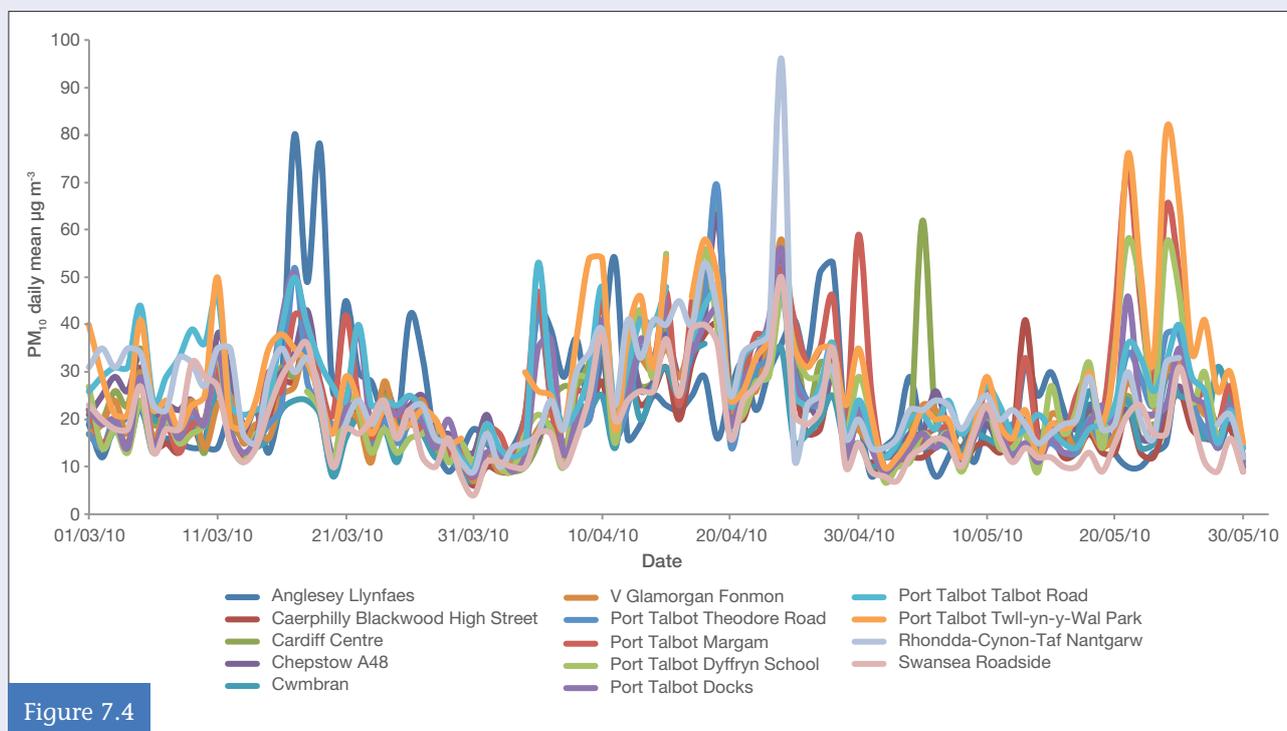
- A structured discussions area, proactively managed to aid the production of responses to formal consultations and WAQF Science and Innovation Reports.



Figure 7.3 Satellite Image of the Eruption From Eyjafjallajökull Volcano.

Measurements taken by airborne instruments showed that the size of the particles in the ash cloud were on average about 1.5 microns (0.0015 mm) in diameter. This fine particulate matter can be hazardous to human health, causing or exacerbating respiratory and cardiovascular diseases. However, no evidence was seen in the Welsh Air Quality Monitoring data that the plume reached ground level. Levels of particulate matter (see figure 7.4) and sulphur dioxide (the two main pollutants of concern in volcanic ash) remained normal.

The work of the WAQF over the last 20 years has resulted in vast improvements in our understanding of air pollution. It has also led to huge improvements in access to data through the Welsh Air Quality website and has helped improve how air pollution is dealt with, so improving the health of the Welsh population. Improving public health and the environment for the population of Wales is at the forefront of the work carried out by the WAQF and it is continually looking for ways to progress and streamline the way it manages air pollution.



**Figure 7.4**

Recorded Measurements of PM<sub>10</sub> at Automatic Sites Across Wales During the Volcanic Activity.

# More information

## The Air Quality in Wales Website



Figure 8.1

The Air Quality Website

The Air Quality in Wales website ([www.welshairquality.co.uk](http://www.welshairquality.co.uk)) is available in English and Welsh. It provides information on all aspects of air pollution in Wales. The site is one of a family of air quality websites produced by Ricardo Energy & Environment, which includes air quality websites for the UK, Northern Ireland, Scotland and England.

The website has been designed to be a user-friendly and interactive resource containing comprehensive information on all aspects of air pollution:

- A colour-coded Google map showing the overall current pollution situation at sites across Wales.
- Latest data from all automatic monitoring sites in Wales, accessible from this map.
- Air pollution forecasts for the whole of Wales.
- Information on the latest news, developments and publications.
- Detailed information on automatic monitoring sites.
- A wide range of background information on air pollution sources, health impacts, monitoring techniques, standards and policy issues.
- Access to air quality data and statistics – for automatic and sampler sites – going back to 1986.
- Provision to submit data via innovative web forms to the Archive.

- Headline air quality indicators, trends and modelled future scenarios.
- Links to national and global information resources on air quality.
- A password-protected area for members of the Welsh Air Quality Forum (WAQF).
- Overview of the data ratification and verification procedures.

To access data used in this Annual Report, follow these simple steps:

- From the home page, select “Data” from the main menu.
- Click “Download/Submit Data”.
- Click “Download Data”.
- Select “Parameter Group” (type of data required).
- Select “Pollutant Species”.
- Select “Local Authority Region”.
- Select “Statistic Type” (for example, daily mean).
- Select “Date Range”.
- Select “Specific Monitoring Site(s)”.

Then, provide your email address and the data will be emailed to you with a few seconds.

## Current and Forecast Air Quality (National and Local)

In addition to the Air Quality in Wales website, this information is rapidly available in a user-friendly form from:

- The Air Pollution Information Service on freephone 0800 556677.
- The UK Air Information Resource (<http://uk-air.defra.gov.uk/>).

## Health Effects of Air Pollution

Information on the health effects of air pollution and the UK pollution banding system can be found on the Department for Environment, Food and Rural Affairs (Defra) website (<http://uk-air.defra.gov.uk/air-pollution/daq>).

## General Information on Air Quality

- The Welsh Government Environment and Countryside links (<http://wales.gov.uk/topics/environmentcountryside/?lang=en>).
- The UK Air Information Resource (<http://uk-air.defra.gov.uk>).
- The National Atmospheric Emissions Inventory ([www.naei.co.uk](http://www.naei.co.uk)).
- The Defra Air Quality Information Web Resource (<http://uk-air.defra.gov.uk>).
- The Northern Ireland Air Quality website ([www.airqualityni.co.uk](http://www.airqualityni.co.uk)).
- The Scottish Air quality website ([www.scottishairquality.co.uk](http://www.scottishairquality.co.uk)).
- The English Air quality website at ([www.airqualityengland.co.uk](http://www.airqualityengland.co.uk)).
- The Pollutant Release and Transfer Register (<http://prtr.defra.gov.uk>).
- The Environment Agency ([www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)).
- Natural Resources Wales at ([www.naturalresourceswales.gov.uk](http://www.naturalresourceswales.gov.uk)).

## Local Air Quality Issues

For further information on air quality issues in your area, please contact the Environmental Health Department at your local district council office. Further information on Local Air Quality Management may also be found on:

- The Defra website at (<http://aqma.defra.gov.uk>).
- The Local Authority support site (<http://laqm.defra.gov.uk>).

## Welsh Automatic Monitoring Sites in 2014

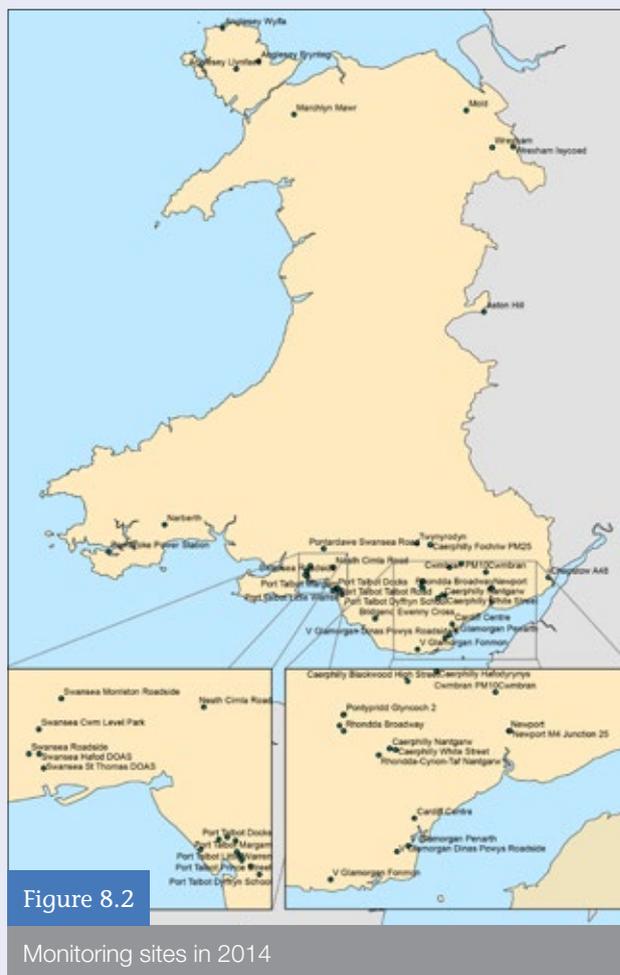


Figure 8.2

Monitoring sites in 2014