APPENDIX B

Baseline Data and Key Issues and Opportunities

CONTENTS

Abbreviations Used in this Appendix

Abbreviation	Definition
AONB	Area of Outstanding Natural Beauty
ASNW	Ancient Semi-Natural Woodland
AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
CO_2	Carbon Dioxide
CSI	Core Subject Indicator
DBEIS	Department for Business, Energy and Industrial Strategy
Defra	Department for Environment, Food and Rural Affairs
EC	European Commission
FPI	Foundation Phase Indicator
GDP	Gross Domestic Product
GDHI	Gross Disposable Income
GVA	Gross Value Added
HBAI	Households Below Average Income
HMO	Houses in Multiple Occupancy
ISA	Integrated Sustainability Appraisal
LA	Local Authority
LCA	Landscape Character Area
LSOA	Lower Super Output Area
MCA	Marine Character Area
MCZ	Marine Conservation Zone
NDF	National Development Framework
NEET	Not in education, employment or training
NI	National Indicator
NLCA	National Character Areas
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides

Abbreviation	Definition
NRW	Natural Resources Wales
ONS	Office for National Statistics
NQF	National Qualifications Framework
NVZ	Nitrate Vulnerable Zone
PM	Particulate Matter
RIGS	Regionally Important Geodiversity Sites
SAP	Standard Assessment Procedure
SAC	Special Area of Conservation
SCA	Seascape Character Assessment
SME	Small to Medium Enterprises
SoNaRR	State of Natural Resources Report
SMP	Shoreline Management Plan
SPA	Special Protection Area
SPP	Statement of Public Participation
SSSI	Site of Special Scientific Interest
TAN	Technical Advice Note
TSA	Tourism Satellite Account
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCVA	Wales Council for Voluntary Action
WIMD	Welsh Index of Multiple Deprivation
WTS	Wales Transport Strategy

1 Introduction

This appendix provides the baseline social, economic, cultural and environmental data for Wales that is being used to help undertake the following aspects of the ISA:

- Identify the current baseline social, economic, cultural and environmental situation within Wales, against which the likely effect of the Wales Transport Strategy will be predicted.
- Identify key trends issues and opportunities for the ISA and WTS to consider.
- Develop the ISA Framework to use for the appraisal of the WTS.
- Ultimately assist the development of a monitoring framework to monitor the significant effects of the WTS.

The appendix has been structured around each of the seven well-being goals. Within those goals, the baseline data has been sub-divided into a series of ISA topics. Each section is structured as follows:

1. Wellbeing Goal and identification of relevant ISA topics within it.
2. Overview of Baseline Conditions for each topic. This comprises:
    a. The relevance of that topic to the WTS;
    b. The baseline conditions and trends structured around the baseline data sets; and
    c. Any data gaps that are in the process of being filled.
3. Key Issues derived from the above that are relevant to the WTS and opportunities for it to address them.

Note on the baseline data sets

In the ISA the baseline data sets used are specific facts and statistics that are gathered by different organisations including, for example, the Welsh Government; the UK Government; or statutory bodies such as Natural Resources Wales (NRW), amongst others. These have been carefully selected to help give an appropriate overview of the baseline conditions and trends over time at a national scale and where necessary more detail on regional variations within Wales.

It is intended that the baseline data sets can be used as factual yardsticks to support the appraisal of the effects of the WTS against each of the relevant ISA Framework Objectives.

Ultimately, once the ISA is complete and the WTS is adopted, indicators will be produced to help monitor the predicted significant effects of the WTS as it is used.

There are hundreds of potential baseline data sets that could be used, many providing only subtly different information. As such, the selection of indictors for this ISA will be focussed, streamlined and reflective of the national scale and influence that the WTS is expected to have.

2 Well-Being Goal: A Prosperous Wales

This section provides baseline data relating to the following well-being goal:

'An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.'

The data relates primarily to:

- The Economy, Employment and Income in Wales; and
- Education in Wales.

2.1 Overview of Baseline Conditions

2.1.1 The Economy, Employment and Income in Wales

Relevance to the WTS

A strong national economy is vitally important for securing people's wealth, jobs and incomes. This has a large contribution to the quality of life and the economic, social, cultural and environmental well-being of people and communities in Wales. Investment in transport networks can influence the functioning of labour markets, business productivity and competitiveness. These impacts interact over time and can lead to improvements in economic output and the geographical distribution of economic activity. They can also impact on the environment, quality of life and the overall attractiveness of towns and cities.[1]

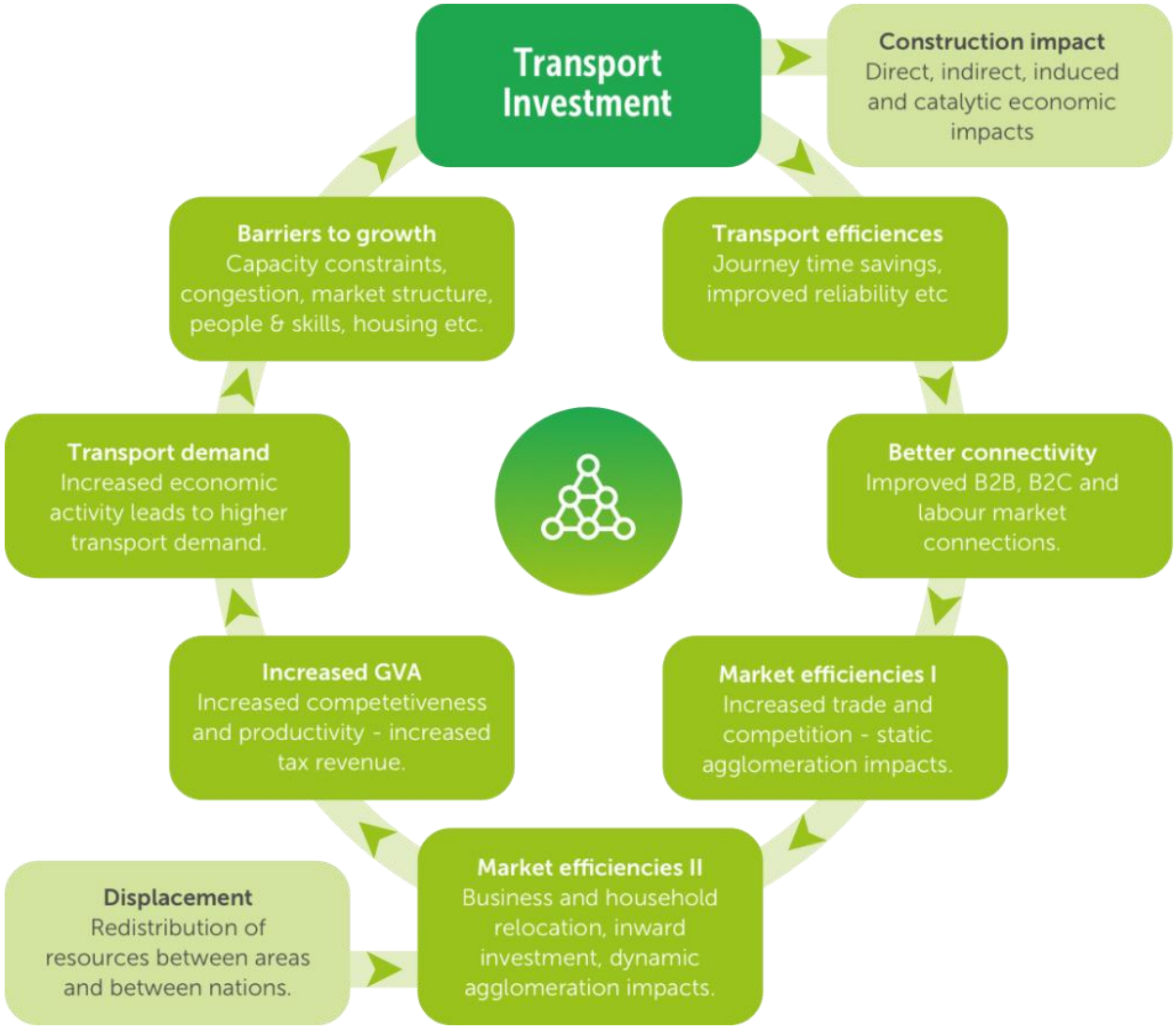
Figure 2-1 highlights how direct impacts from investment could create market efficiencies leading to investment and relocation decisions which in-turn can lead to changes in productivity and economic growth. The mechanisms for delivering economic impacts include:

- Benefits to non-users. In the case of public transport investments, these include reduced negative externalities from car travel (i.e. reduced congestion and CO_2 emissions) and option values (i.e. the value that is placed on maintaining a public asset or service even if there is little or no likelihood of the individual actually ever using it).
- Productivity effects. Productivity impacts generated through efficiencies resulting from improved connectivity, which effectively brings businesses, suppliers and workers closer together. These benefits are additional to user and non-user benefits at the national level.
- Induced investment impacts. Changes in the level or location of private sector investment as a result of a transport investment. These benefits are context specific and may be partially displaced from other areas.
- Employment impacts. Labour market impacts resulting from connectivity improvements, which may allow people to move to more productive jobs or enter the labour market as a result of reduced and cheaper commuting journeys.
- Regeneration impacts. Local economic impacts resulting from improved local image and attraction of land use development. In some cases, transport can act as a catalyst of local economic growth. These benefits may not be completely additional at a national level and may arise as a result of displacement of economic activity from elsewhere.

In addition to the potential long term impacts on productivity, the construction of large infrastructure projects provides an injection of resources into local economies during construction which may create new employment opportunities. Whilst this expenditure may simply be redirected from other government activities, the local impacts could be both significant in the short term and catalytic over the longer term.

[1] https://transportknowledgehub.org.uk/guidance-tool/relationship-between-transport-economy/

Figure 2-1 Transport investment and economic growth



Source: https://transportknowledgehub.org.uk/guidance-tool/relationship-between-transport-economy/

The WTS has a key role in supporting the national economy, through helping to guide decisions relating its supporting infrastructure.

The Welsh Government Strategy for Tourism[2] seeks to promote improved transport links by air, sea, road and rail. This could be supported by the WTS.

Baseline conditions and trends

The economy of Wales is closely aligned with that of the rest of the UK. However, for a long time, economic output has been lower in Wales compared with other areas. In 2018, the GVA (a key measure of economic output) was £65.1 billion, or £20,738 per head[3]. This was 72.8% of the average for the total of all UK regions, up by 2.9% on 2017, the third highest increase over the year of the 12 UK countries and English regions. Wales had the second lowest level of GVA per head in the UK (measured against the other UK regions), ahead of the North East where GVA per head was 72.1% of the UK average respectively (Welsh Government, ONS – 2020). GVA is rising, however the economic future of the whole of the UK is currently uncertain in light of the exit of the UK from the European Union. Economists and politicians are currently divided over what this will mean for the UK, with many schools of thought suggesting a short-term economic downturn, with potential for higher growth in the longer term.

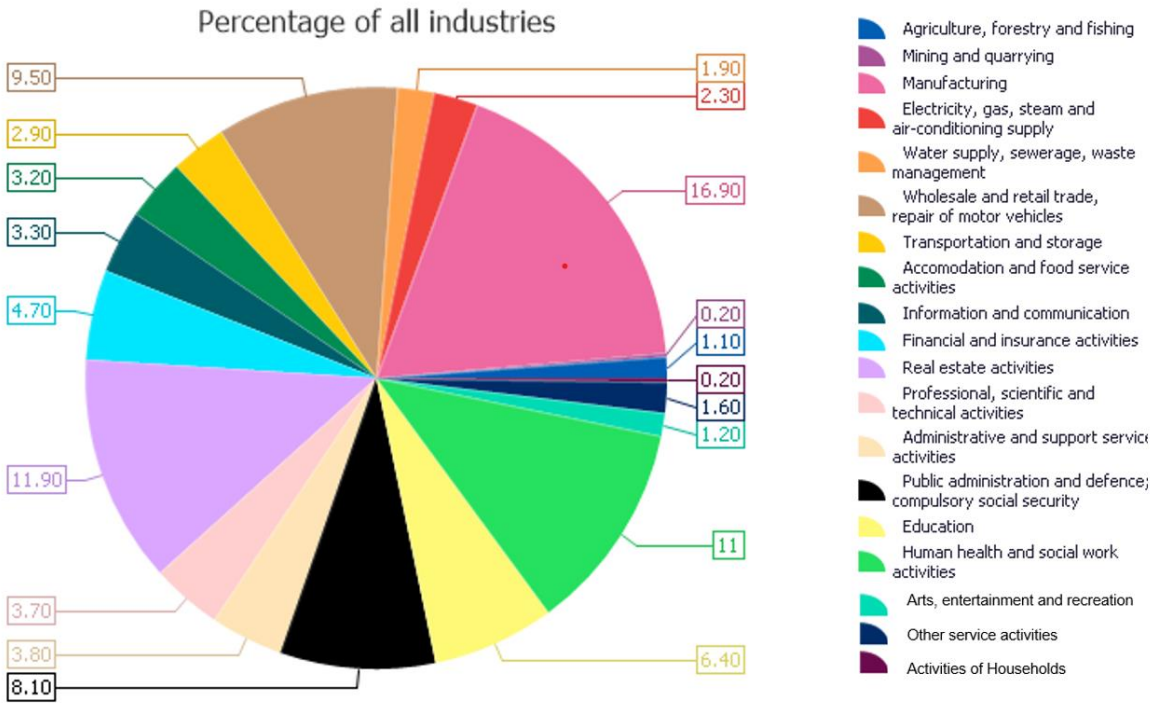
[2] https://gov.wales/sites/default/files/publications/2019-07/strategy-for-tourism-2013-to-2020-framework-action-plan-year-2.pdf
[3] Welsh Government (2018) https://gov.wales/regional-gross-domestic-product-and-gross-value-added-1998-2018

The highest levels of output in 2018 were from Cardiff; Swansea; Monmouthshire; Newport; Flintshire; and Wrexham, reflecting the larger proportion of industry, population and services in those areas. GVA per head is significantly lower across much of the rest of Wales, reflecting its more rural nature. Blaenau Gwent recorded the lowest GVA per head in 2017 (£12,671). The fastest growth over the last decade has been in the Central Valleys region (all figures from Stats Wales).

In 2017, GVA per hour worked in Wales was approximately 16% below the UK average – making it the second lowest region in the UK, less than 1% above Northern Ireland. This reflects a lower than average level of productivity in Wales (ONS)[4].

The second half of the 20th century saw a significant decline in the traditional manufacturing and extractive industries in Wales with a move towards service sector employment. The modern Welsh economy is now dominated by the service sector including public health, education, defence and administration, accounting for over half of the total Wales GVA. Figure 2-2 shows the split of GVA per industry.

Figure 2-2 Gross Value Added in Wales by industry (%)



Source: Stats Wales (2020)

After the service industry, the next largest group is the 'Production' industry. Whilst heavy industry has been in decline, Wales still has a diverse manufacturing sector. This includes:

- Metal ore refining at plants in, for example, Port Talbot, Llanwern, Newport, Trostre, Shotton, Ammanford, Pontarddulais, Tafarnaubach and Caerphilly;
- Oil refining at Milford Haven;
- Automotive component production; and
- Growth in the electronics industry.

[4] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/regionalandsubregionalproductivityintheuk/february2019

Rural economy

Wales is largely rural in nature, so agriculture and forestry represent a large area of economic land-use. This is dominated by beef, sheep and dairy farming on relatively small farms, compared to the rest of the UK. Economic output from these industries is, however, relatively small.

Tourism

The National Heritage Memorial Fund[5] (25/10/2016) sets out the following from 'The Impact of heritage tourism for the UK economy 2016', which is the second follow-up to Investing in Success, HLF's original report on heritage tourism, published in 2010 in partnership with VisitBritain. The three reports analyse the impact of the heritage-based visitor economy and highlight the importance of continued investment from leisure, culture and heritage budgets in supporting UK tourism.

- Wales' heritage makes a £1bn GVA[6] contribution to UK tourism economy (Cultural, historic and natural heritage attractions refer to museums, theatres, historic houses, historic parks or natural landscapes such as wetlands and national parks).
- Heritage tourism supports over 24,000 jobs in Wales.
- Wales' cultural and heritage attractions receive more than 10m visitors per year.
- Heritage tourism more important as economic driver in Wales than the UK as a whole.

With its rich natural and cultural assets, tourism is also a significant and growing part of the national economy. Cardiff, in particular, is a primary tourist destination due to its large number of high-quality attractions. This brings income and employment opportunities for a range of associated businesses such as hotels, food and retail outlets. The Wales Tourism Satellite Account (TSA) estimated a total tourism GVA of £1.8bn – around 4.4% of total direct GVA for the Welsh economy in that year. Emerging research suggests that when indirect impacts are added, the Tourism GVA increases to £2.5bn, which represents 6% of the whole economy (The Welsh Government Strategy for Tourism 2013 – 2020).

Between September 2018 and 2019 there were 10.4 million overnight domestic Great Britain trips to Wales which was an increase of 6.3% on the previous year which generated an expenditure of £1,973 million (9.2% increase) (Wales Gov 2020).[7] These figures compare to a 0.1% increase in overnight domestic trips in Great Britain and a 0.7% increase in expenditure. For both Great Britain and Wales, the total expenditure increased but the number of nights spent decreased. The volume of international trips and expenditure also increased in Wales by 4% and 12%, respectively. In contrast, the number of tourism day visits taken in Wales decreased by 13% in the same period, compared to a decrease of 3% of trips taken in Great Britain.

Third sector

The third sector, as defined by the Wales Council for Voluntary Action (WCVA), is a very diverse range of organisations, including voluntary organisations and social enterprises, which share a set of values and characteristics. In 2017, approximately 100,000 people in Wales were employed in the charity/voluntary sector in Wales, accounting for just over 8% of all employment in Wales (WCVA Statistical Resource 2020).

The value of the third sector has been estimated by WCVA by adding the value of volunteer time (provided by organisations) – an estimated 61 million hours is given in a year and this has a monetary value of £757 million. In 2019 the sector had an estimated value of £3.8 billion[8].

Micro-businesses

In 2019, there were an estimated 267,045 enterprises, the highest estimate since the start of the series in 2003. There was a steady annual increase from 2009-2019 and this trend is likely to continue (StatsWales). The overall increase was largely attributed to growth in the micro size-band enterprises - 0-9 employees which grew by 29% between 2009 and 2019. This could be a result of the recent labour market conditions, which may have encouraged people to set up businesses, as they are made redundant (for example).

[5] Gross value added (GVA) is a measure of the value of goods and services produced in an area, industry or sector of an economy. GVA is linked as a measure to gross domestic product (GDP).
[6] Gross value added (GVA) is a measure of the value of goods and services produced in an area, industry or sector of an economy. GVA is linked as a measure to gross domestic product (GDP).
[7] https://gov.wales/sites/default/files/statistics-and-research/2020-02/wales-tourism-performance-january-september-2019-537.pdf
[8] https://gov.wales/sites/default/files/publications/2019-03/third-sector-annual-report-2017-18_0.pdf

Regionally, micro enterprises in 2019 accounted for 34.9% of employment, however in mid-wales they represented 52% of employment. The production sector had the smallest proportion of total employment in micro businesses in Wales at 5.6 per cent.

Innovation

The Welsh Government also monitors the levels of innovation in the economy. It identified that between 2014-2018, 46% of Welsh businesses were innovation active, comparable to levels in Scotland, but just behind England (49%) and ahead of Northern Ireland (Stats Wales)[9].

Economic Activity

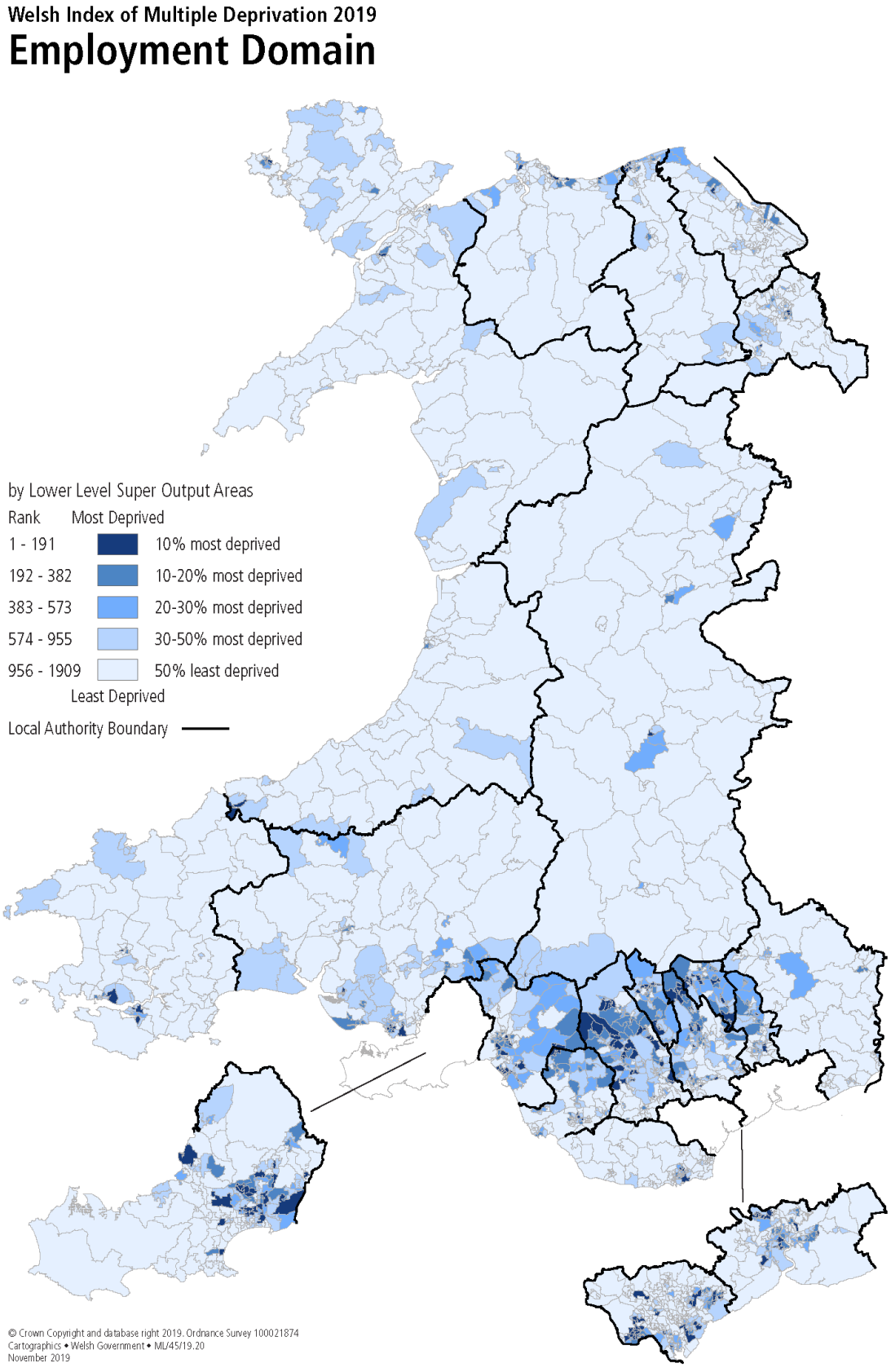
The 2010, the Welsh Government publication, *Economic Renewal: a new direction*, identified two important factors responsible for Wales weaker economic position compared to the rest of the UK. These are a low employment rate and low average wages (reflecting low average productivity). In December 2019, the employment rate in Wales was 74.4% compared to 76.55 in the UK. In September 2019, the number of people economically inactive had decreased in Wales over the past decade by 4% from 23.7% to 19.7% (between September 2009 – September2019). The national trend decrease in Wales has been above the UK average over this period with the UK decreasing by only 2.6%, however the percentage of economic inactivity in Wales remains above the UK average of 17.4 in 2019. The future direction of this trend is likely to be affected by the outcome of Brexit.

According to the Welsh Index of Multiple Deprivation (WIMD)[10] 2019 employment domain (see Figure 2-3), the highest levels of employment deprivation were in the South Wales valleys and in some North Wales coastal towns. In terms of local authorities, Blaenau Gwent Merthyr Tydfil recorded the highest proportion of LSOAs in the most 10% in Wales for the employment domain. Monmouthshire had no LSOAs in the most deprived 10%.

[9] https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Businesses/Innovation/businessesthatareinnovationactive-by-year

[10] The WIMD ranks each of the 1909 Lower Super Output Areas (LSOAs) in Wales in terms of the level of deprivation that LSOA exhibits for a given domain. Those ranked in the bottom 191 LSOAs are, therefore, in the 10% most deprived nationally.

Figure 2-3 WIMD 2014 Map for Wales, Employment Domain



Source: WIMD 2019

Earnings

In April 2019, the average (median) gross weekly earning for full-time adults working in in Wales was £535.00, this compares to a UK average of £584.90[11]. However, median gross earnings in Wales increased by 5.1% between 2018 and 2019, compared to 2.9% across the UK.

The highest average earnings were in the South East and West Wales economic regions, followed closely by the North Wales economic region with the Mid Wales region significantly lower (Stats Wales).

In Wales, 67.5% of people in employment were either on permanent contracts (or have a temporary contract and are not seeking permanent employment) and were earning more than two thirds of the UK median wage for August to October 2018 (Stats Wales)[12].

The WIMD 2019 income domain focuses on the proportion of people with income below a defined level and has a weight of 22% in the overall index. In the WIMD 2019 income domain, there were pockets of high deprivation in the South Wales valleys, and in some North Wales coastal towns. The local authorities with the highest proportion of LSOAs in the most deprived 10% in Wales, for the income domain, was Newport, Merthyr Tydfil and Cardiff (at around 20%).

Job Satisfaction

Findings from the Work in Wales Skills and Employment Survey (2006-2017) found that, in terms of overall work satisfaction, workers in Wales exhibited the highest levels of low job satisfaction (9% compared to 7% in Britain) and very high job satisfaction (21 % compared to 18% in Britain).[13] In 2013-14, respondents (to the National Survey of Wales) were asked how satisfied they were with their present job. On a scale of 0-10, the average satisfaction score was 7.5. There appears to be a strong correlation between satisfaction with present job and satisfaction with commuting time. 66% of people who were highly satisfied with their present job were also highly satisfied their commuting time.

Distance travelled to work

Table 2-1 shows the majority of Welsh residents travel less than 10km to work. The majority of residents living within all Welsh regions travel a maximum distance of less than 10km to work at a proportion ranging between 37.9 to 58%. Of the residents who work from home Mid and West Wales work have significantly higher numbers than the Welsh and other regional levels.

Table 2-1 Distance travelled to work by Welsh Regions

Distance travelled to work	Mid and West Wales	North Wales	South Wales Central	South Wales East	South Wales West	Wales
Less than 10km	37.9%	48.6%	58.0%	51.2%	55.9%	50.5%
10km to less than 30km	23.0%	23.5%	20.4%	25.8%	21.1%	22.8%
30km and over	11.7%	9.6%	6.1%	7.6%	8.1%	8.5%
Work mainly at or from home	18.2%	10.8%	7.8%	8.1%	7.7%	10.4%
Other	9.3%	7.6%	7.7%	7.3%	7.2%	7.8%

Source: 2011 Census

Journey to work by mode

The method of travel to work census data (QS701EW) for Welsh residents are illustrated in Table 2-2. The results show a similar split between each mode type compared across each country by Welsh regions. The results for Wales overall the majority of residents travel by car (car or van driver, car passenger or motorcyclist) 45% and lower for active travel (walking or cycling) 7%, whilst the proportion of residents

[11] https://gov.wales/annual-survey-hours-and-earnings-2019
[12] https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/People-and-Work/Earnings/peopleinemploymentwhoareonpermanentcontractsearnmorethantwothirdsukmedianwage-by-quarter
[13] Welsh Government (2019) - https://gov.wales/sites/default/files/statistics-and-research/2019-04/work-in-wales-2006-2017.pdf

travelling via public transport (bus or rail) lower at 4%. The proportion of residents not in employment in Wales overall at 39%.

Table 2-2 Method travelled to work by Welsh Regions, 2011 Census

Distance travelled to work	Mid and West Wales	North Wales	South Wales Central	South Wales East	South Wales West	Wales
Car	44%	48%	42%	47%	46%	45%
Public Transport	2%	4%	7%	5%	4%	4%
Active	8%	7%	9%	6%	6%	7%
Other method of travel to work	1%	0%	0%	0%	0%	0%
Not in employment	38%	37%	39%	40%	42%	39%
Working from home	7%	3%	2%	2%	2%	3%

Source: 2011 Census

Broadband

Ofcom[14] reported in 2018 that Superfast Broadband is available to 93% of premises in Wales, up 4% from the previous year. However, of the 93% of the homes and businesses with access only 38% of homes/businesses have taken up the services which is the lowest up take in any of the UK nations. Whilst the coverage of internet access is growing, speeds and, in particular, access to superfast broadband can be a particular issue in rural communities, particularly amongst those with low incomes (National Survey for Wales, 2014-15). Poorer households across Wales are less likely to have internet access in their home. This is exacerbated in rural areas by relatively poor access to good quality broadband (Rural broadband ICT Toolkit, Welsh Government). Notwithstanding, full fibre broadband coverage to rural premises is the highest in Wales compared to the other nations in the UK, with 16% of homes/businesses having access to this, compared to 8% in rural England and Northern Ireland and 3% in rural Scotland. Over time, it is anticipated that the coverage of high-speed broadband will improve.

Access to Services

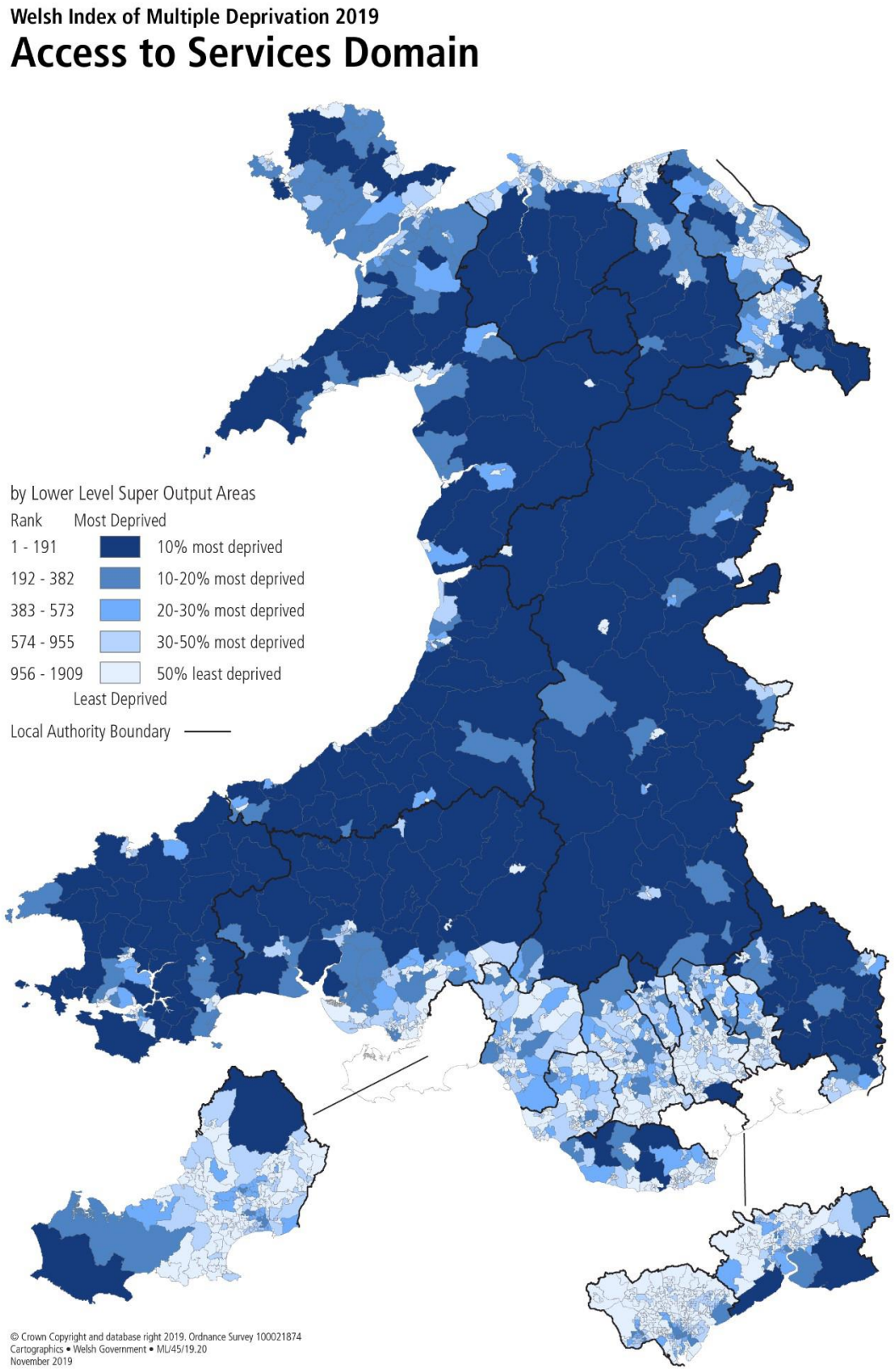
The Welsh Index of Multiple Deprivation 2019[15]sets out deprivation in relation to access to services. The access to services domain measures travel times to a range of services as a proxy for wider physical access to services. For WIMD 2019, the domain also considers access to digital services, through an indicator on the availability of superfast broadband. The domain measures include access to the following services:

- Food shop
- General Practitioner (GP) Surgery
- Post Office
- %Unavailability of broadband at 30Mb/s
- Primary School
- Public Library
- Sports Facility
- Secondary School
- Petrol Station
- Pharmacy

[14] Ofcom (2018) Connected Nations 2018 - https://www.ofcom.org.uk/__data/assets/pdf_file/0020/130736/Connected-Nations-2018-main-report.pdf
[15] https://gov.wales/sites/default/files/statistics-and-research/2020-02/welsh-index-multiple-deprivation-2019-results-report.pdf

Figure 2-4 presents the overall scores across Wales. In the WIMD 2019 access to services domain, high deprivation was widespread across rural areas of Wales. There were also some deprived pockets near large urban areas. The local authorities with the highest proportion of small areas in the most deprived 10% in Wales for access to services were Powys (50.6%) and Ceredigion (50.0%). Cardiff, Neath Port Talbot, Bridgend, Rhondda Cynon Taf, Blaenau Gwent and Torfaen local authorities had no areas in the most deprived 10%. For the access to services domain, the most deprived small area in Wales was Cynwyl Gaeo, Carmarthenshire, the same as for WIMD 2014. Six of the 10 most deprived areas in WIMD 2019 were also in the 10 most deprived areas in WIMD 2014. The overall patterns of access to services deprivation in WIMD 2019 are similar to those for WIMD 2014. However, there have been notable changes to relative ranks at the least deprived end. This reflects the significant improvements in the travel time calculations, as well as possible changes to service locations, public transport and road networks since 2014, and the inclusion of the new access to digital services indicator.

Figure 2-4 Access to services for LSOAs in Wales



2.1.2 Education in Wales

Relevance to the WTS

Education is a fundamental factor in developing people's skills, both for future employment and for life in general. Improvements in educational attainment are directly linked to increased incomes, employment and overall economic growth. In particular, education and training to meet the skill sets required to grow the economy are of greatest importance. Chapter 4 of this appendix sets out further specific information in relation to the links between transport and young people, including in relation to accessing educational opportunities.

The WTS has a key role in ensuring that everyone can access education and training opportunities and, in doing so, support educational development and a healthy economy.

Baseline conditions and trends

Education/ Training

The Welsh Government publishes data on the learning activities and labour market status of young people (aged 16 to 24) in Wales. The provisional data series for 2018 further focuses on the proportion of young people who are not in education, employment or training (NEET) in Wales.

In terms of 16-18 year olds, around 78.3% were in education or training (down from 79.8% in 2017). The proportion in employment had increased annually since 2011 and in 2018 37.6% were in full or part-time employment. In addition, 10.3% of 16-18 year olds were reported as NEETs, an increase of 0.9% from the previous year.

Since 2004, the proportion of 19-24 year olds in education or training has remained around a similar level (37 to 39 per cent), whilst the proportion who are NEET increased to higher levels, following the start of the 2008 recession, reflecting contracting employment levels. There has, however, been an increase in employment, and a decrease in the proportion who are NEET in the last 3 successive years. As with many economic statistics, the immediate future direction of this trend is likely to be influenced by Brexit.

In terms of 19-24 year olds, around 38.4% were in education or training and 64% were in full or part-time employment. In addition, 16.1% of 19-24 year olds were reported as NEETs which is similar to the previous year.

Educational attainment in Wales is slightly below the UK average. The proportion of adults of working age holding Higher Education or equivalent level qualifications (NQF level 4 or above) in 2018 was 37.8%, compared with 27.9% in 2008. Wales is below the UK average level for NQF level 4 (which is 44%[16]). However, Wales is above Northern Ireland (33%) and some other UK regions. Over 78% of adults were qualified to NQF level 2 or above.

The trend is rising, with a 10% increase in NQF level 4 attainment in working age adults since 2008, with the greatest rises being amongst women.

In terms of regional distribution, adults in Mid Wales had the highest level of qualifications, whereas adults in South West Wales had the highest number of adults with no form of qualifications. The results for 2018 are presented in Table 2-3. More specifically, qualification levels were highest in Cardiff, Monmouthshire, and Vale of Glamorgan and lowest in Blaenau Gwent, Merthyr Tydfil and Neath Port Talbot.

[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/757675/UKETS_2018_Text.pdf

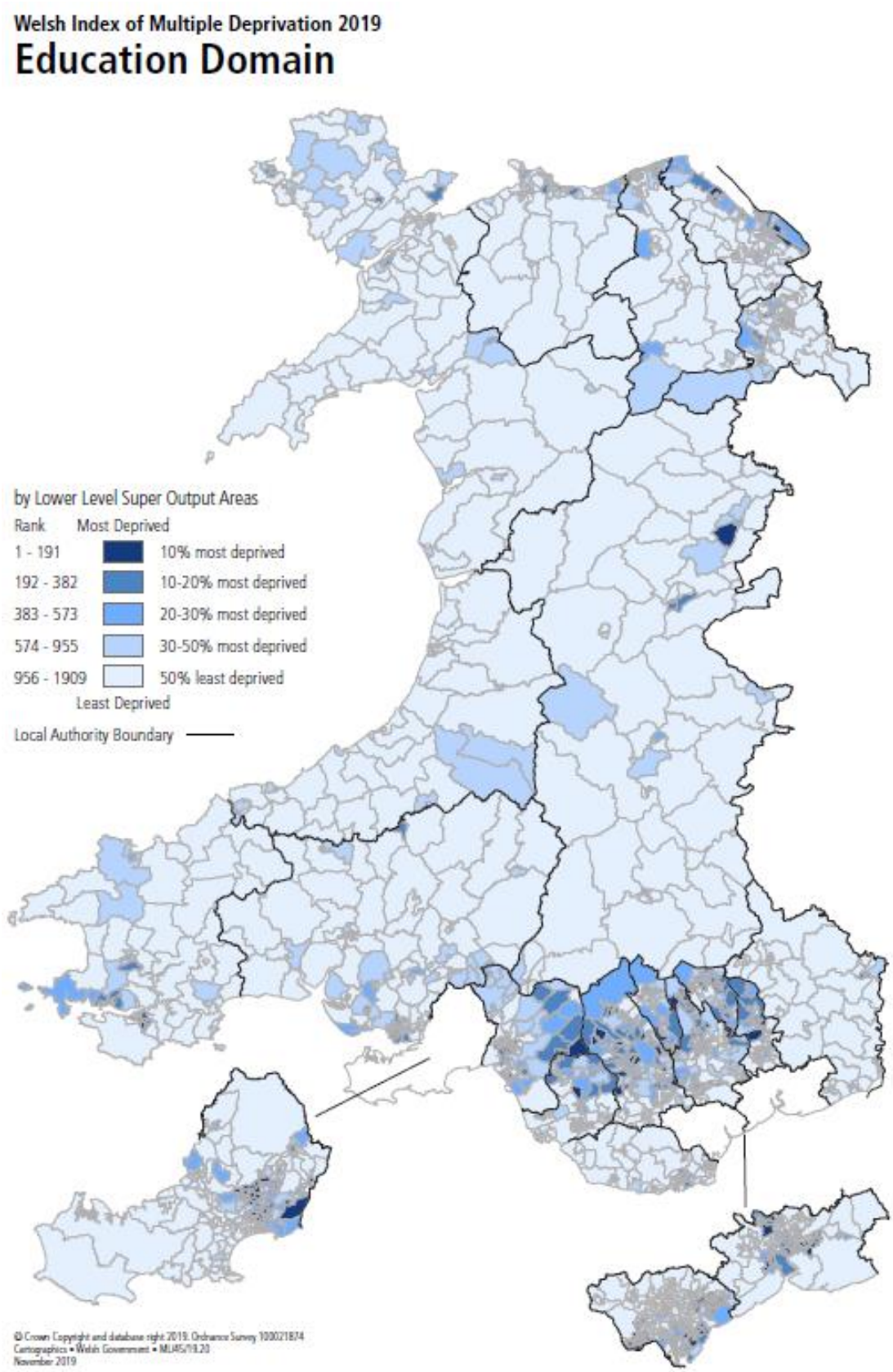
Table 2-3 Percentage of adults with qualifications at the different levels of the NQF

Area	No qualifications	Qualified to below level 2	Qualified to NQF level 2 or above	Qualified to NQF level 3 or above	Qualified to NQF level 4 or above
Wales	8.4%	12.7%	78.9%	59.1%	37.8%
North Wales	7.0%	12.9%	80.1%	59.0%	36.3%
Mid Wales	6.4%	12.2%	81.4%	63.8%	38.8%
South West Wales	9.2%	12.0%	78.8%	57.9%	36.1%
South East Wales	8.9%	13.0%	78.0%	59.0%	39.1%

Source: Stats Wales

The distribution of LSOAs and their relative deprivation in the education domain illustrates regional variation in educational attainment and access to education. This is shown in Figure 2-5 below. The South Wales valleys are the most educationally deprived area of Wales. This area includes the local authorities of Merthyr Tydfil, Torfaen, Blaenau Gwent and Rhondda Cynon Taff. There are also parts of the urban areas of Cardiff, Newport and Swansea that are suffering from education deprivation. Parts of Monmouthshire, Powys, Vale of Glamorgan and the North-East corner of Wales exhibit relatively low levels of education deprivation.

Figure 2-5 Education Deprivation for LSOAs in Wales



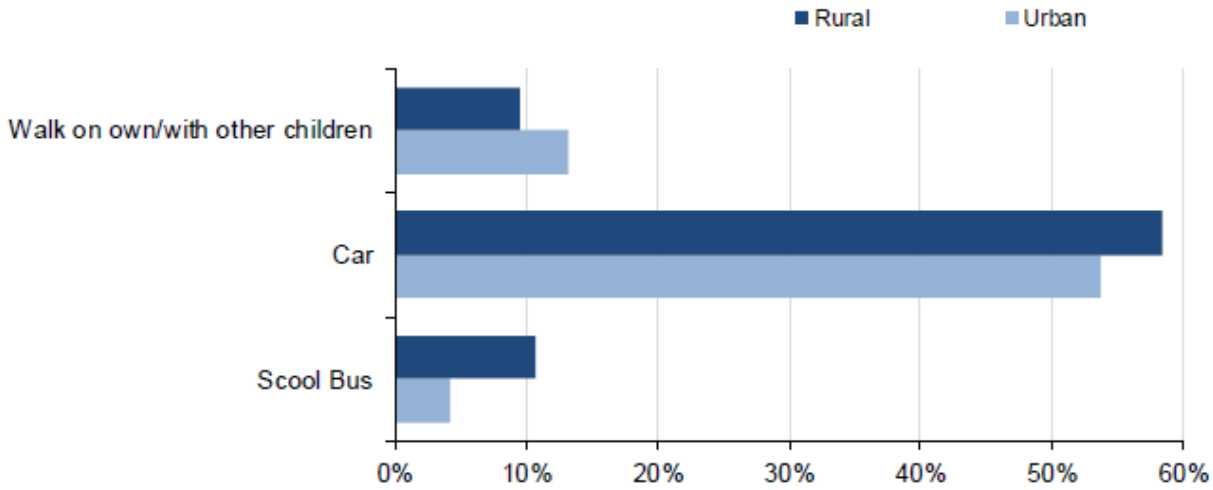
Source: Welsh Index of Multiple Deprivation 2014

Travel to School[17]

National Survey results (2019) indicate that car was the most common mode of transport used to get to a primary school (55%), followed by walking with an adult (32%). At secondary school the most popular modes of transport were catching a school bus and walking.

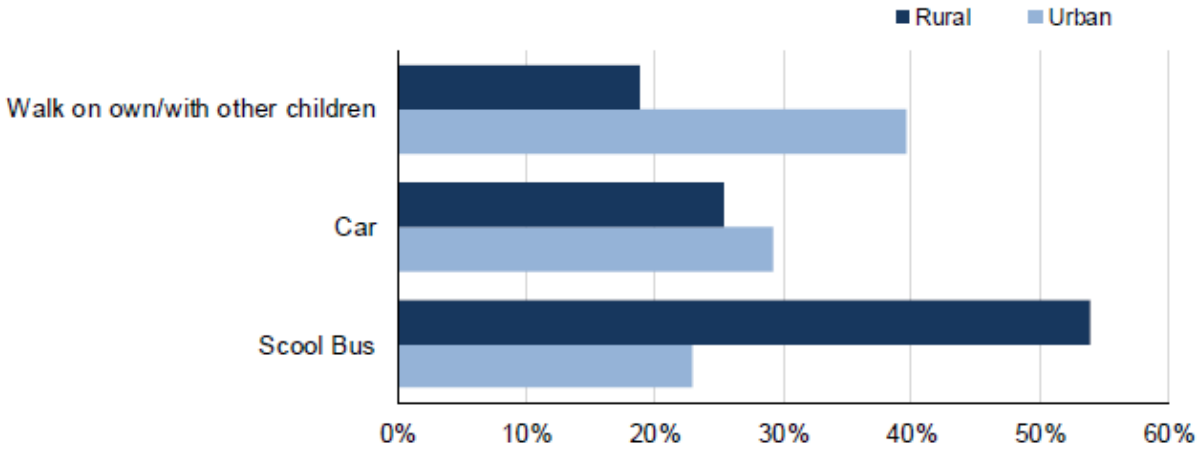
Figures 2-6 and 2-7 illustrate the mode of travel to/from school by urban/rural classification.

Figure 2-6 Mode of travel to/from primary school by urban/rural classification (a)



(a) Totals may not sum to 100% as multiple modes of transport can be selected

Figure 2-6 Mode of travel to/from Secondary school by urban/rural classification (a)



(a) Totals may not sum to 100% as multiple modes of transport can be selected

Data gaps

Data relating to the barriers to walking to school.

[17] https://gov.wales/sites/default/files/statistics-and-research/2019-11/active-travel-walking-and-cycling-april-2018-march-2019-073.pdf

There are also relevant data gaps to be considered from the data collated from the 2011 Census, as it may not be accurate to the current population and these figures will not be updated until 2021/2022.

Data relating to the modal split of transport journeys within Wales.

For all data collected, there may be gendered differences that are not reflected in the sources they were collected from.

2.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

The economy of Wales is closely aligned with that of the rest of the UK. There has been a move towards service sector employment and a decline in heavy industry; Wales still has a diverse manufacturing sector.

There are clear geographical differences in employment activity in Wales with pockets of higher than average deprivation in the South Wales valleys and in some North Wales coastal towns.

Key reasons for relatively poor economic performance include:

- Relatively low skills levels and poor educational attainment levels (although improving), particularly in the more deprived parts of the country.
- The largely rural nature of the country results in relatively small urban areas which would otherwise be more strongly associated with agglomeration effects.
- There is a relatively high proportion of older people who are retirement age.

The UK Climate Change Risk Assessment 2017: Evidence Report highlights a number of key risks and opportunities facing Wales with regard to business. These could have effects on a number of factors including health and well-being, employment and the economy. Such matters facing Wales can be summarised as risks to business from flooding, loss of coastal locations, water scarcity, reduced access to capital, reduced productivity from disruption to infrastructure etc., disruption to supply chains and changes in demands for goods and services. These could all be taken into consideration in the WTS as they will all influence the habits of transport users.

There are issues with provisioning access to schools and employment, as the highest density areas for these are in the South of Wales. These facilities are much more difficult to access by any means other than private owned car in the North of Wales.

Opportunities

The WTS has a role to play in achieving balanced and sustainable growth, and the transition to a low resource use (including low carbon) economy, to enable the population to live within environmental limits. The WTS provides an opportunity for the economy to be guided towards a more sustainable future. This can be through the promotion of sustainable travel infrastructure and improvement of access to employment centres. It can also provide a framework that is more responsive to the needs of the economy and able to support new, emerging sectors and support transition of existing ones through the creation and enhancement of networks. Furthermore, it can also help to guide the creation of an environment that is attractive to inward investment and encourages sustainable access to jobs. As part of this, it could seek to address the geographical differences within the country. Similarly, the WTS may facilitate improvements to educational provision and sustainable access and it could seek to address the geographical differences within the country.

Many of the proposals of the WTS will look to address issues related to poverty and inequality through access to better education, better connectivity between communities and access to jobs and the job market. Overall, the WTS must help to achieve the important balance of economic and social improvement that is also sustainable and respects the country's valuable natural and cultural environment.

The WTS could seek to improve walking to school, through measures to improve the environment within which this would occur. The WTS has a key role in ensuring that everyone can access education and training opportunities and, in doing so, support educational development and a healthy economy.

There is an opportunity to promote the use of active travel to primary and secondary schools through walk to school schemes.
There is also an opportunity through improved public transport schemes to enable people to access a wider range of employment and education options.

3 Well-Being Goal: A Resilient Wales

This section provides baseline data relating to the following well-being goal:

'A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).'

The data relates primarily to:

- Air Quality;
- Biodiversity, Flora and Fauna;
- Climate and Flood Risk;
- Geology and Soils;
- Water Environment; and
- Minerals and Waste.

3.1 Overview of Baseline Conditions

3.1.1 Air Quality

Relevance to the WTS

Clean air is important for both human health and the health of the natural environment. Poor air quality is the largest environmental risk to public health in the UK, as long-term exposure to air pollution can cause chronic conditions such as cardiovascular and respiratory diseases as well as lung cancer, leading to reduced life expectancy[18]. It is estimated that the life expectancy of every person in the UK is reduced by an average of 7-8 months due to air pollution[19]. Air pollution can directly affect vegetation (e.g. through exposure to sulphur dioxide or high levels of ozone), or indirectly affect the wider environment through pollutant deposition. Deposition of pollutants can adversely affect the acid and nutrient status of soils and waters, which, in turn, can affect habitat integrity and the fauna and flora they support. The introduction of environmental protection legislation has led to significant changes in the way air quality is managed and controlled, although the planning system also has a large role to play.

Transport is the biggest source of air and noise pollution in the UK. The WTS can affect air quality and noise pollution through ensuring decisions are based on the principle of reducing emissions through the transition to implementing the sustainable transport hierarchy.

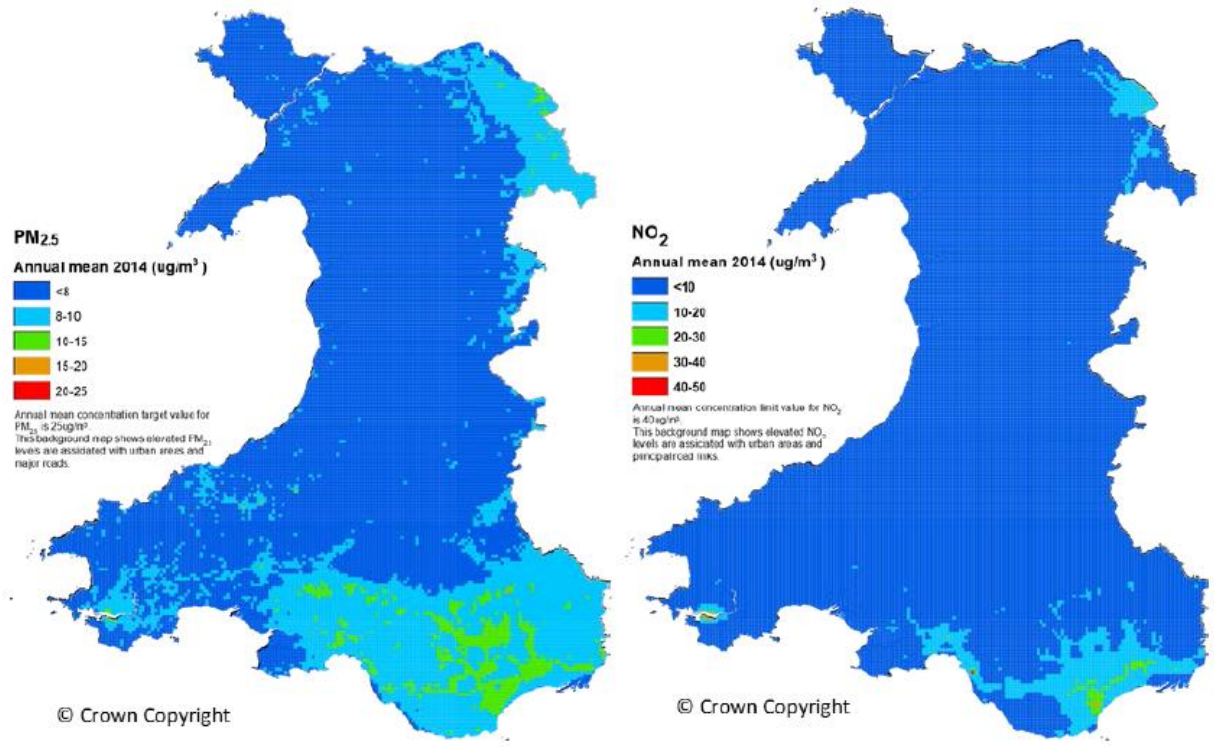
Baseline conditions and trends

Air pollution is a local, national and international problem caused by the emission of pollutants. In Wales, air quality is generally very good, largely due to its predominantly rural nature and historic decline in heavy industry which has resulted in a reduction in emissions of some pollutants, such as particulate matter (PM) and Nitrogen Dioxide (NO_2). However, there are some parts of the country that experience highly elevated levels of localised pollution, notably due to road traffic. Targets for NO_2, PM, nickel and polycyclic aromatic hydrocarbons are still being breached in certain parts of Wales thereby posing a threat to human health and the natural environment (SoNaRR, 2016).

There are currently 38 designated Air Quality Management Areas (AQMAs) in Wales all of which are found in the south particularly centred around urban centres such as Cardiff, Newport and Swansea and relate to vehicle emissions. However, one area of elevated air pollution from an industrial source also exists associated with Port Talbot, where Tata Steel is located (Defra, 2017). Only four designated AQMAs have been revoked in Wales, with the last AQMA being revoked in 2015 in Rhondda Cynon Taff. The other three revocations occurred in Cardiff in 2007 (two AQMAs revoked) and 2013. Figure 3-1 illustrates the highest concentrations of PM and NO_2 nationally.

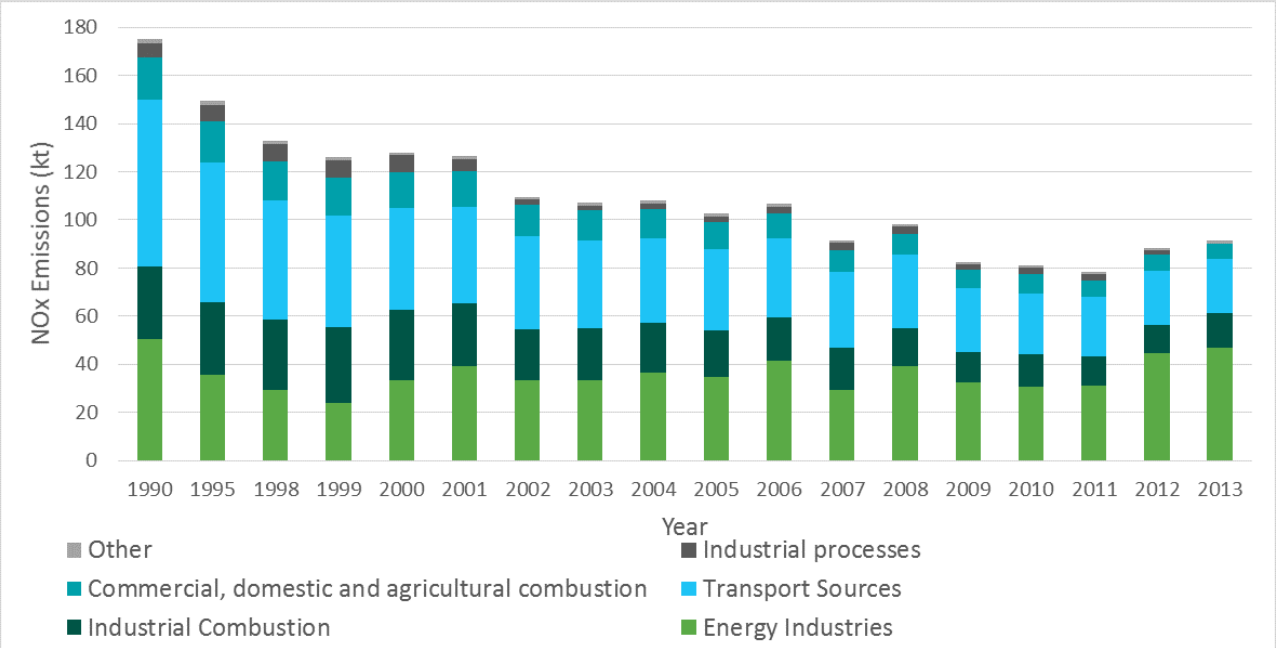
[18] https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
[19] Defra in partnership with the Scottish Executive, Welsh Assembly Government and the Department of the Environment Northern Ireland (2007) the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1.

Figure 3-1 $PM_{2.5}$ and NO_2 concentrations in Wales (SoNaRR, 2016).



Levels of Nitrogen Oxides (NO_x) emissions have seen a significant decrease of over 50% between 1990 and 2013. The major contributor to NO_x emissions is the energy industry, however, the largest decrease in emissions between 1990 and 2013 was recorded by transport sources (see Figure 3-2).

Figure 3-2 Wales nitrogen oxides (NO_x) emissions by source sector (Defra, 2017)

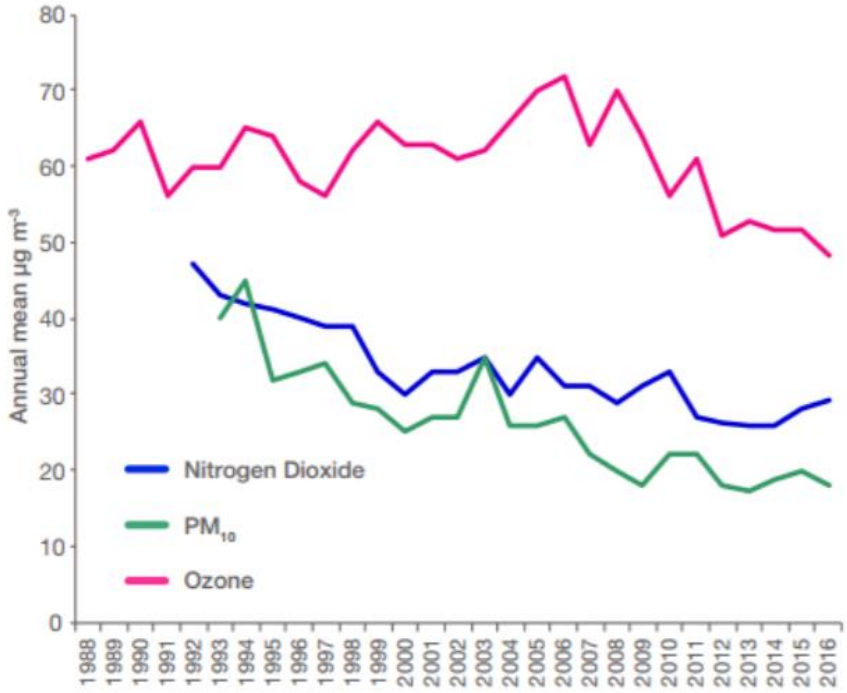


Ammonia also remains an issue, both as a local air pollutant and as a contributor to the formation of secondary particulate matter. Concentrations of secondary particulate matter have risen in Wales in recent years, largely due to changes in agricultural practice. Indeed, 90% of semi-natural nitrogen sensitive Welsh habitats are subject to nitrogen deposition in excess of critical load limits (SoNaRR, 2016).

Wales has some of the worst air quality in the UK, which is surprising given its low population density and relatively small cities. A report in 2018 found that Cardiff and Port Talbot both have higher PM_{10} levels than either Birmingham or Manchester. Hafod-yr-ynys, a road in Caerphilly, is the most polluted road in the UK outside London. It exceeded hourly NO_2 limits on 60 occasions in 2016 (42 times more than allowed under EU law) and its annual mean NO_2 is almost double the EU limit (however the houses on this road are to be demolished by the council).

Figure 3-3 shows the trends in ambient air pollution from 1990 to 2016. Whilst there were no instances in 2016 of EU PM_{10} air quality limits being reached; NO_2 limits were exceeded at five sites. NO_2 and is the catalyst for the designation of all (except one) Air Quality Management Areas (AQMAs) in Wales. Road transport accounts for nearly a third of all NO_2 emissions in the UK.[20]

Figure 3-3 Ambient Pollution Trends in Wales 1990-2016



Source: Abernethy, 2018

Data gaps

No significant data gaps have been identified for this topic at this stage.

3.1.2 Noise

Relevance to the WTS

Noise pollution can have a damaging effect on people's health and the environment, from disrupting protected habitats to causing hearing loss and tinnitus. Transport is responsible for a lot of noise pollution in the UK. The WTS must plan transport networks to avoid areas sensitive to noise pollution. It must also seek

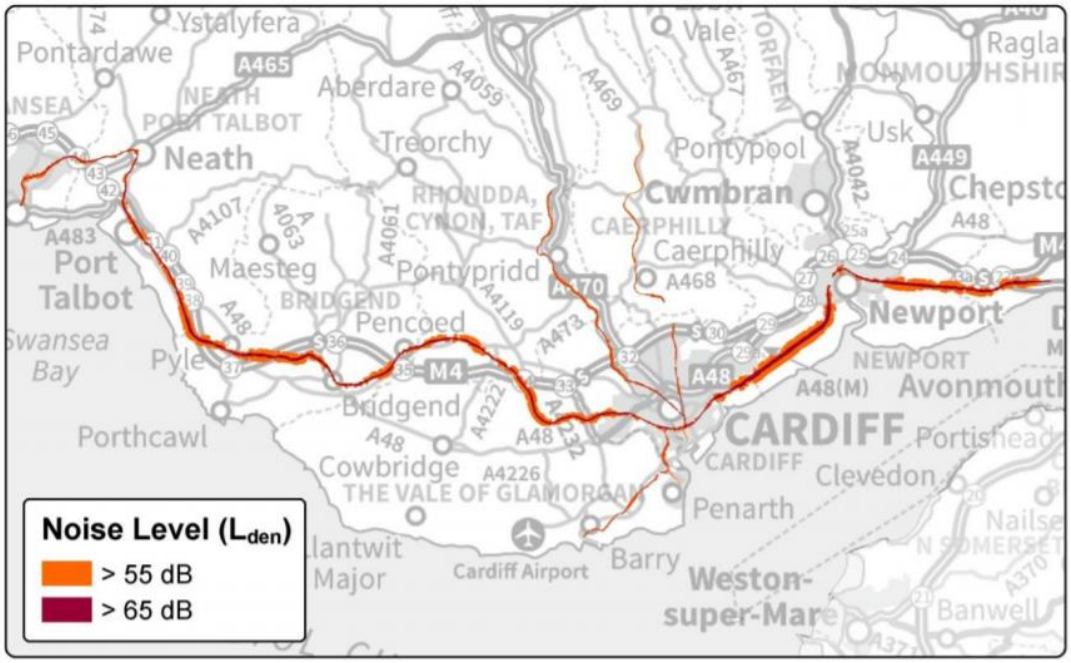
[20] https://www.assembly.wales/Research%20Documents/18-009/18-009-Web-English.pdf

to implement measures that will seek to reduce traffic overall, leading to a reduction in overall noise pollution and reduction in pressure on tranquil environments.

Baseline Conditions and trends

Noise pollution from railways mostly takes place in the south of Wales around Cardiff. Figure 3-4 shows the noise from major railways 2012/2017.

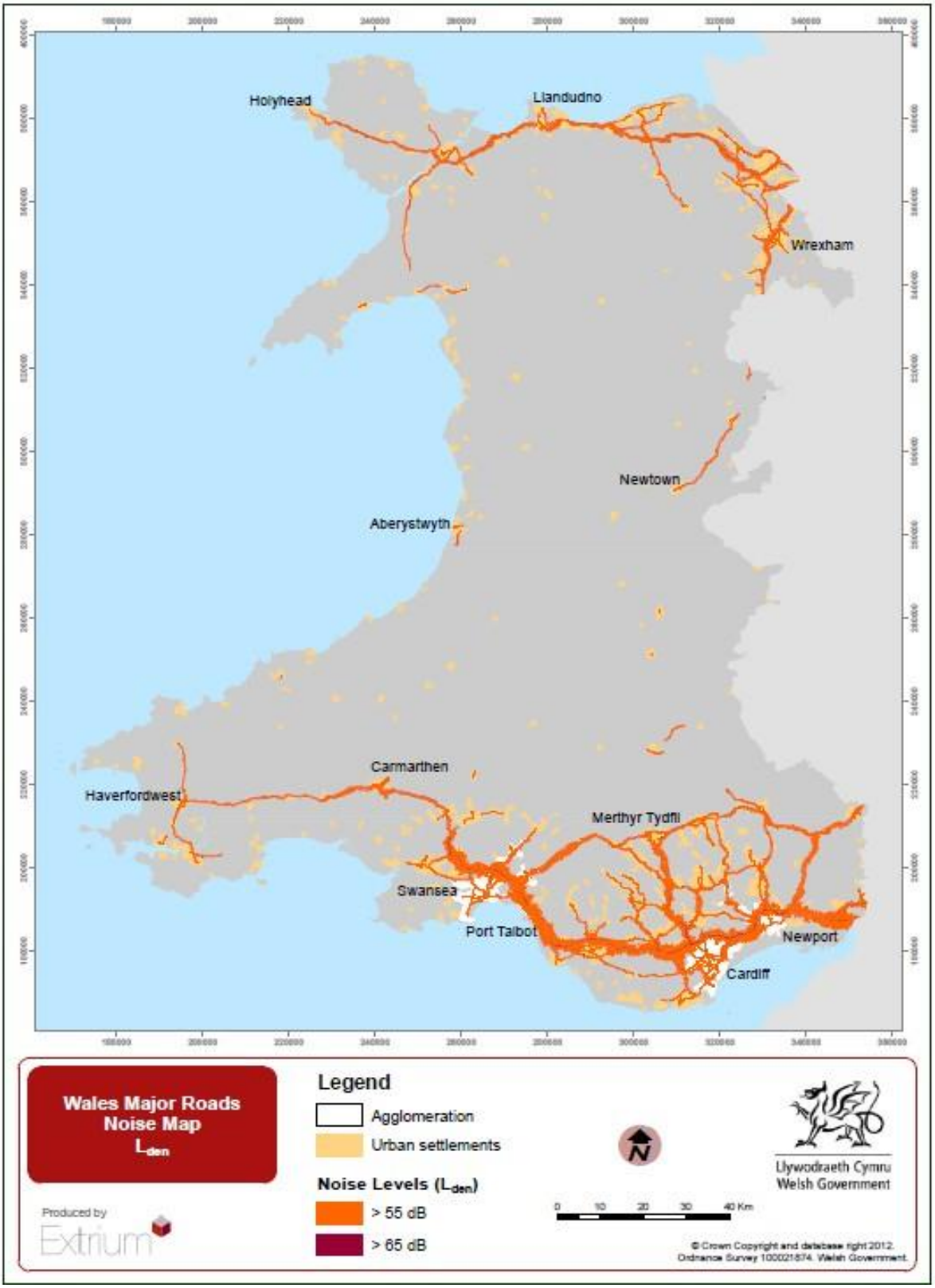
Figure 3-4 Noise of major railways in Wales (2012/2017)



Source: Welsh Government, 2018.

Noise mapping carried out by the Welsh Government in 2013 under the Environmental Noise Directive (see Figure 3-5) highlights that road noise is focused around the M4 in South Wales and adjoining ‘A’ roads. The A55 and adjoining ‘A’ Roads in North Wales, and the A483 in Mid Wales, also contribute to high levels of noise pollution.

Figure 3-5 Wales Major Roads Noise Map

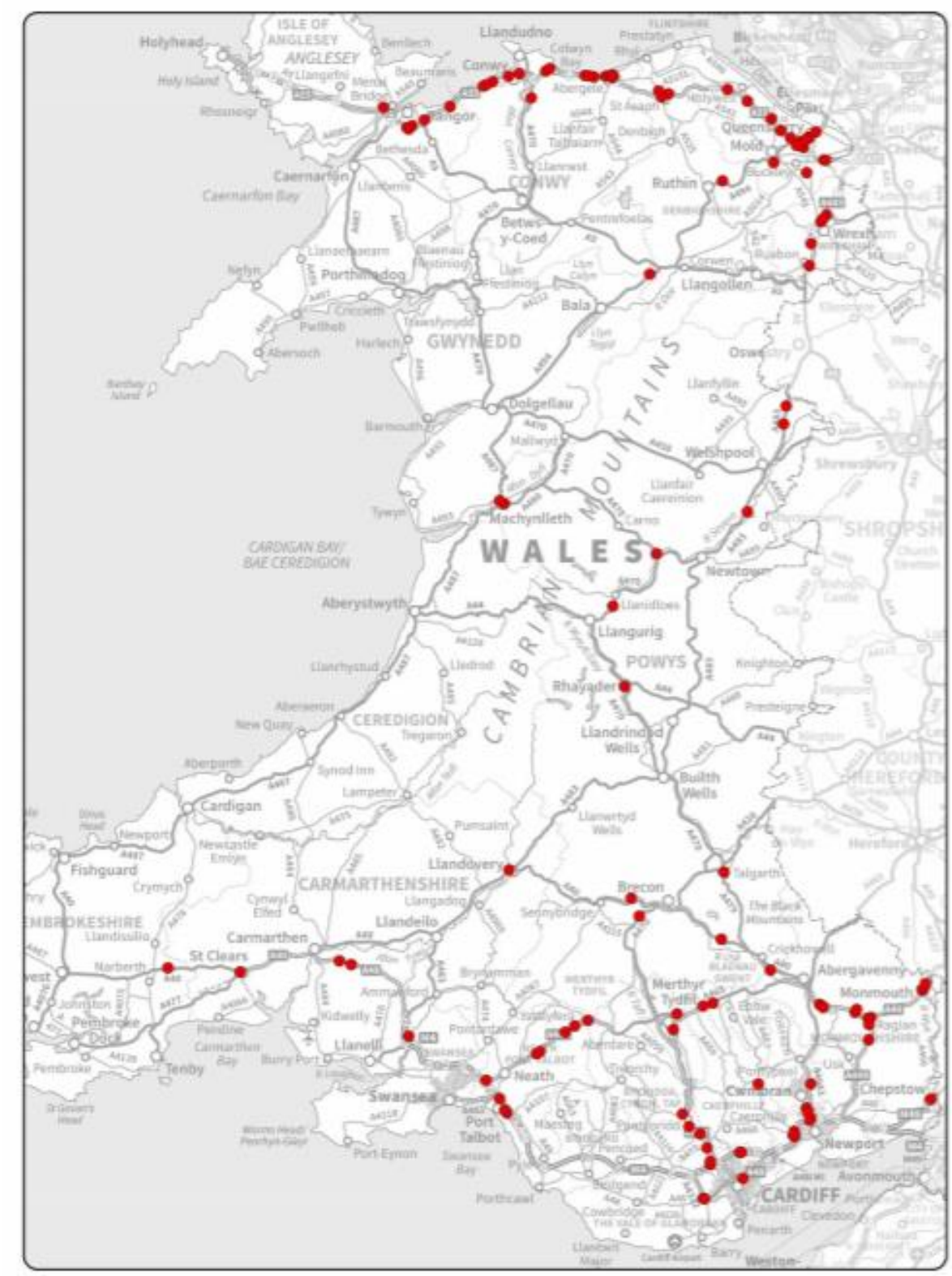


Source: Welsh Government (2013) Data Flow 4 and 8 Supplementary Report Major Roads in Wales.[21]

[21] Available at http://gov.wales/docs/desh/publications/130214noise-major-roads-en.pdf [Accessed January 2016].

The Welsh government has received many complaints about transport noise, the location of these complaints is shown in Figure 3-6.

Figure 3-6 Transport noise complaints received by the Welsh Government

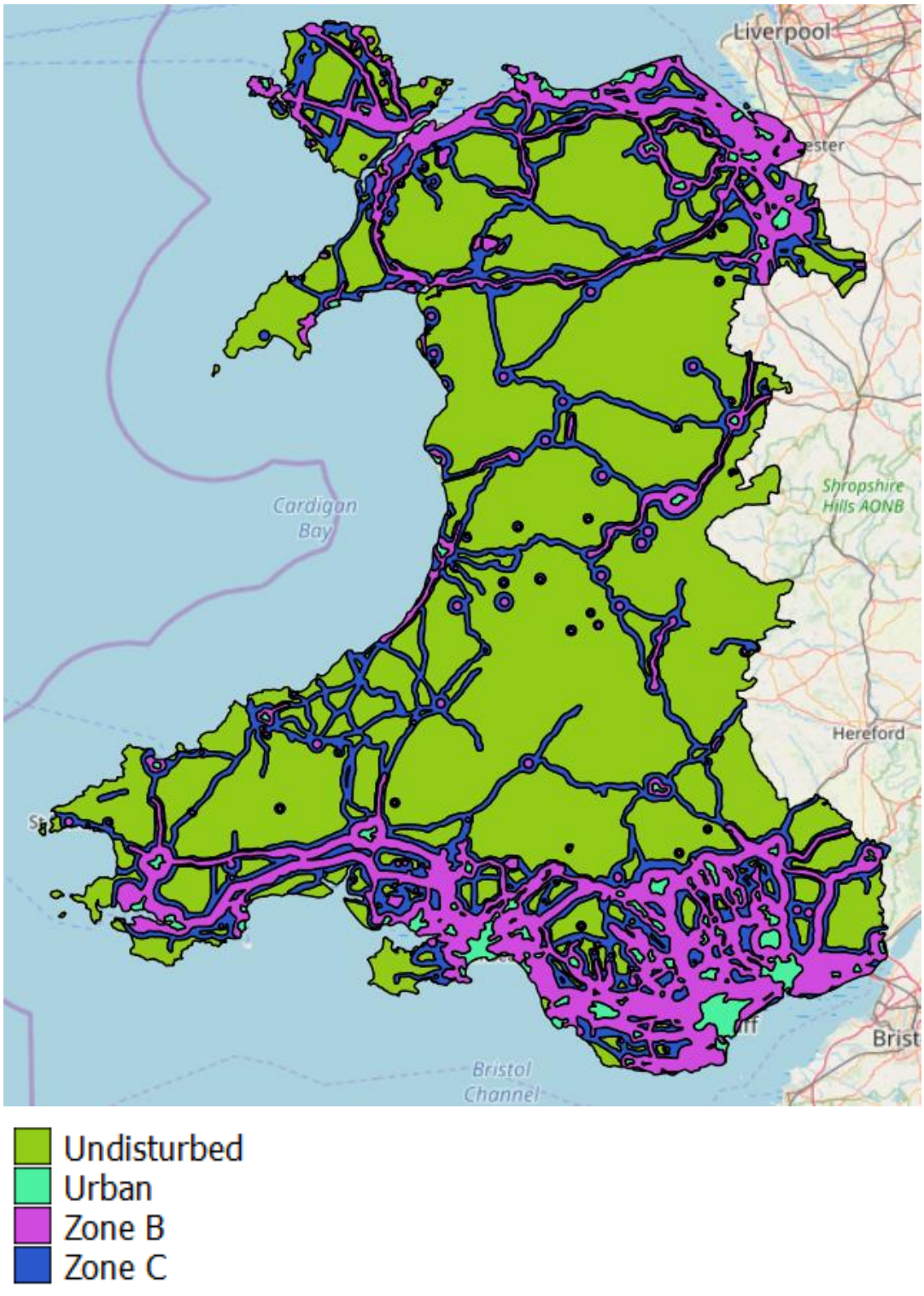


Source: Welsh Government, 2018.

When surveyed on noise complaints, 24% of Welsh people said they had regularly been bothered by noise from outside their home in the previous 12 months, 45% of these complaints were related to traffic, business or factories.

In Wales there is an official designation for areas of tranquillity, these different areas are mapped out below in Figure 3-7.

Figure 3-7 Map of Tranquil areas Wales 2009



Source: NRW

3.1.3 Biodiversity, Flora and Fauna

Relevance to the WTS

Biodiversity refers to the variety of all living organisms. It can be seen at a number of levels, in terms of the diversity within species, the diversity between different species, and the diversity of different ecosystems (i.e. the environments within which species live). High levels of diversity ensure habitats and species are more robust and able to cope with changes in the environment, both in terms of natural fluctuations and those caused by human activity, therefore supporting their long-term survival.

Ensuring the protection of biodiversity, including important marine and terrestrial habitats, species and protected sites, as well as biodiversity in general (including non-designated sites) and its resulting benefits in terms of ecosystems services, in turn, will have benefits to an improved economic and social health of an area. Therefore, conserving biodiversity not only fulfils our global responsibility but will improve the quality of life for Wales' residents and help maintain its attraction as a place to live and visit.

The WTS can significantly influence biodiversity through helping to guide decisions through the planning of transport infrastructure to ensure features of ecological importance, as well as their connectivity and the ecosystems services they provide, are protected and enhanced.

The RSPB[22] has provided guidance on the potential impacts to be considered in transport (particularly road) schemes. These include:

Habitat loss effects

- Permanent habitat loss on site
- Temporary habitat loss on site e.g. land taken up by construction equipment/temporary roads
- Physical removal of soils and vegetation

Habitat fragmentation effects

- Reduced habitat connectivity in the landscape – can disrupt the established relationships between different habitats or patches of the same habitat e.g. routes linking sleeping or roosting areas to feeding grounds or migration routes may be physically interrupted
- Barrier effects on species – can affect the movement of wildlife: population viability may be affected if populations of a scarce species are separated especially if they have poor dispersal activities
- Increased mortality due to wildlife casualties
- Edge effects – if vegetation is removed the new linear gap creates a new microclimate and a change in physical conditions which can extend varying distances from the road edge. This newly created habitat may provide habitat for edge species and facilitate dispersal for some species.
- Reduced patch size - may reduce populations of key plant species, which in turn may affect the abundance of insects including butterflies they support.
- These require a minimum area to sustain viable populations and may in turn affect other species e.g. predatory birds. Also small patch size may not be able to support the range of habitat structure needed to sustain a range of different species

Changes in habitat quality and other indirect impacts

Changes to natural processes

- Groundwater regimes - changes in the groundwater regime may adversely affect habitats dependent on the watertable e.g. marsh, fen and bog.
- Depending on the geology, lowering the water table can impact habitats a considerable distance from the development.
- Stream/river flows - Increases or reductions in natural rates of flow e.g.flash flooding from hard surfaces may affect aquatic ecosystems.

[22] http://ww2.rspb.org.uk/Images/BiodiversityImpact_tcm9-257019.pdf

- Accumulation of construction spoil can alter flow, volume and composition of water. These increased solids increase turbidity which can cause abrasion damage and gill blockage in fish and lead to the disappearance of filter feeding invertebrates
- Flooding regimes
- Soil leaching and changes in soil structure
- Soil erosion patterns

Water pollution
Water pollution from accidental spillages, de-icing chemicals, runoff and road spray can lead to adverse changes in aquatic biodiversity as can changes in sediment and solid loads in watercourses.

Soil pollution
Road spray, vehicle emissions and dust and other particulates (including aggregate and sealant materials used in road construction) can be deposited directly on the land or by polluted precipitation and by polluted groundwater. These can change soil pH and structure. Soil conditions can also greatly alter the effective toxicity of pollutants.

Air pollution
Emissions of lead, zinc, nitrogen, de-icing materials and particulates such as dust can affect biodiversity.

Changes to microclimate
Light and radiation emissions may alter the microclimate. These microclimatic changes may be sufficiently great to alter the performance of some species of plants and animals.

Windfunnelling
Where woodlands are bisected interior trees become exposed and liable to wind-blow effects leading to changes in the new marginal vegetation. Cuttings can have an additional windfunnelling ‘jet’ effect increasing windblow and evaporation that may result in a water supply shortfall which may lead to changes in species composition.

Disturbance
Fauna can be disturbed by noise, lighting and vibrations from traffic and by road lighting.

Reduced visibility
Road structures e.g. bridges and viaducts may cause problems for certain birds/mammals by reducing visibility

Introduction of exotics
The edge habitat or ecotone and traffic on the road may facilitate dispersal for some species. This may result in dispersal and establishment of alien and invasive species or pest species that may have secondary effects on biological communities.

Changes to habitat management eg frequency of verge cutting.

Public pressure
Surrounding habitats may be placed under increasing public pressure, because of access, leading to effects including the disturbance of animals, and physical destruction of ground flora. Also, litter may accumulate along road

Off site habitat losses and changes in habitat quality
In relation to the obtaining and disposal of materials e.g. mining for aggregates for road building.

Cumulative effects

Even relatively minor habitat loss, fragmentation and indirect impacts of an individual road project can, when added to other past, present and reasonably foreseeable future impacts of other projects and activities, contribute to significant impacts in an area. All relevant types of future projects and activities should be considered (i.e. not just other road projects) including induced development.

Positive effects

- Habitat enhancement
- Improved habitat management
- New structures e.g. bridges and tunnels may provide habitats for some species e.g. bats
- Habitat creation

Baseline conditions and trends

The land area of Wales covers 2,078,224 ha. The Welsh marine area extends out to 12 nautical miles, covering just under 15,000 km^2 or 41% of the territory of Wales.

Wales has a wide representation of species across a broad range of taxonomic groups with estimates varying from 25,000 to 50,000 different species of animals, plants and other organisms. There are 20 Special Protection Areas (SPAs) for internationally important populations of birds and 92 Special Areas of Conservation (SACs) for other threatened species and natural habitats. 562 of the total 1,016 Sites of Special Scientific Interest (SSSI) (as of 2010) have individually qualifying species and 54 have species assemblages which qualify. Many of the same species are also found on sites that qualify for their habitat. The list of species and habitats of principal importance in Wales (the interim Section 7 list) includes 557 species (SoNaRR, 2016).

Species

The 2013 reports on the Annexes of the Habitats Directive and Birds Directive summarise the UK status and trends of the selected habitats and species and are important evidence resources. A summary of the Welsh results for species is presented in Figure 2-4.

From monitoring data collected for species features on Natura 2000 sites, the overall condition of SAC and SPA species features on these sites in Wales, as reported in 2013, was mostly unfavourable (55%) with the exception of birds and mammals of which 86% and 68% were in favourable condition respectively.

In Wales, the interim Section 7 list of the Environment (Wales) Act has 557 species and 55 habitats of principle importance. These were originally selected for the Section 42 list of the Natural Environment and Rural Communities Act 2006 for prioritised action from the UK Biodiversity Action Plan using criteria based on the level of threat they face, the level of responsibility in Wales for their populations and whether remedial action could be taken to improve their status. The list includes species as diverse as slow-worm (*Anguis fragilis*), hornet robber fly (*Asilus crabroniformis*) and long-snouted seahorse (*Hippocampus guttulatus*).

An assessment of the status of some of the interim Section 7 species in comparison to their condition at the time of the last Biodiversity Action Plan report in 2008 is shown in Box 1 below.

Box 1 Assessment of the state of some of the Welsh priority species at broad taxonomic group level (SoNaRR, 2016).

Of the 104 invertebrate species listed as priorities, 67 were assessed. *21% of these were declining*, the outlook was *improving for 25%*, and the remaining *54% showed little change* in their status.

83 vertebrate species appear on the list of priority species and we assessed 78 of them. *37% of these were declining* and the outlook was *improving for 21%*. The remaining *42% showed little change* in their status.

Of the 87 fungi and lichens listed as priorities, 55 were assessed. *29% of these were declining*, the outlook was *improving for 27%* and the remaining *44% showed little change* in their status.

52 bryophytes feature on the priority species list and we assessed 49 of them. *47% of these were declining*, the outlook was *improving for 24%* and the remaining *29% showed little change* in their status.

A study of the impact of the 1995 drought on butterfly abundance showed that some widespread species, including large skipper (*Ochlodes sylvanus*) and green-veined white (*Pieris napi*), were particularly drought-sensitive. The impact of extreme weather events is also relevant to many invertebrates and birds on a yearly basis.

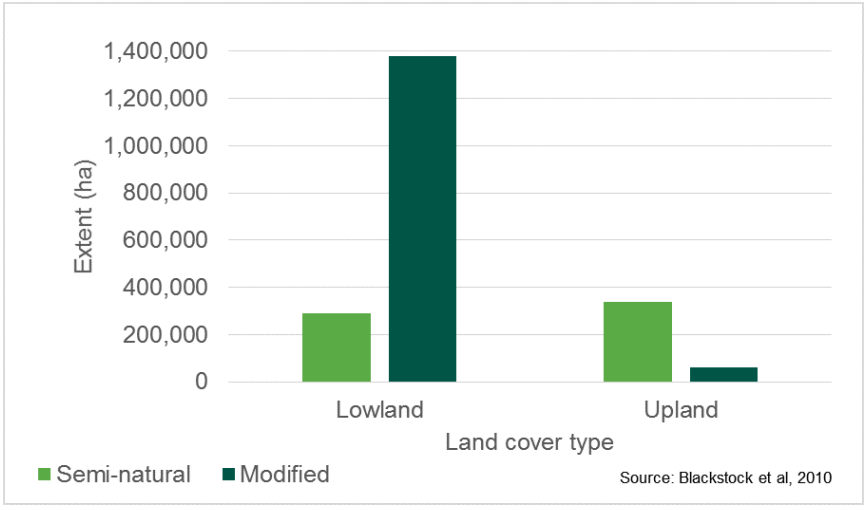
Climate change impacts such as acidification, sea temperature rises and extreme weather events have the potential to affect marine species through a number of factors including prey population dynamics, reproduction and distribution.

Habitats

The Habitat Survey of Wales provides complete coverage of the country and was undertaken between 1979 and 1997. More detailed information for habitats which are a priority for conservation measures is provided by NRW's ongoing Phase 2 Habitat Survey.

The land-cover of Wales can be divided broadly into semi-natural habitats and modified land-cover types. Semi-natural habitats retain many of their characteristic species. Modified land-cover types include the built environment as well as land where ecological processes and species composition have been hugely altered, for example, improved grassland, arable land and conifer plantations. The representation of semi-natural habitat varies significantly across Wales. The Welsh lowlands are highly modified as shown in Figure 3-8. Of the lowlands 17.3% is semi-natural habitat, whereas of the upland area 84% is semi-natural habitat. Semi-natural habitats in Wales cover a total of 626,100 ha (30% of the Welsh land surface) (SoNaRR, 2016).

Figure 3-8 Summary of the representation of semi-natural habitats and modified land-cover types in Wales.



The extent, condition and trends of terrestrial species in Wales are influenced primarily by habitat management and by climate change. Habitat management directly influences plant community composition, amounts of bare substrate, shading and vegetation structure. Shading due to scrub encroachment, following changes in grazing regime, can be as damaging for butterflies and many other species groups as overgrazing or agricultural improvement. These effects are compounded by direct habitat loss which leads to fragmentation of suitable habitat types or conditions and the increasing influence of nutrient enrichment which leads to changes in plant communities and patterns of growth. As above, climate change is also a significant threat to both habitats and the species they support (SoNaRR, 2016).

Habitats of Principle Importance

In Wales, the interim Section 7 list has 55 habitats of principle importance, which were originally selected for the Section 42 list of the Natural Environment and Rural Communities Act 2006. These habitats cover terrestrial, freshwater and marine. They include blanket bog, ponds and seagrass beds and were selected for prioritised action from the UK Biodiversity Action Plan (BAP) using criteria based on the level of threat they face, their relative importance as habitat in Wales and whether remedial action will be able to improve their status. Terrestrial habitats of principle importance extend over a total area of 387,300 ha. The most extensive of these in Wales (each with a resource of greater than 30,000 ha) include upland heathland, blanket bog, upland oak woodland, purple moor-grass and rush pasture, lowland dry acid grassland and coastal and floodplain grazing marsh. However, some key habitats of conservation importance are scarce, small in extent and highly vulnerable. Marine Intertidal BAP habitats extend over 15,000 ha. The most extensive intertidal BAP habitat, mudflats, covers over 14,000 ha and is found all around the coast of Wales. Honeycomb worm reefs cover 476 ha and are mainly found in South and West Wales. More than 50% of all BAP habitats were in decline in Wales in 2008 (SoNaRR, 2016).

Ancient Woodland

The area of Ancient Woodland in Ancient Wood Inventory (AWI) 2011 is 33,000ha (53 percent) greater than in AWI 2004. Largely, the revised figure consists of Ancient Semi-Natural Woodland (ASNW) in private ownership (29,000ha). 5,000 ha more Ancient Woodland has been identified on the Welsh Government Woodland Estate managed by Natural Resources Wales, compared with the AWI 2004. The AWI shows that South Wales Valleys and South Powys are the most populous ancient woodland areas. Most of these woodland resources are designated Plantations on Ancient Woodland Sites (SoNaRR, 2016).

European and UK Protected Sites

European protected sites are designated either as exemplars of listed habitat and species types or specifically to conserve wild birds that are listed as rare and vulnerable. The protection of these sites makes a significant contribution to conserving the habitats and wildlife species that live there. Protected sites also exist in the marine environment, and work continues to ensure these sites contribute to an ecologically coherent network of marine protected areas in UK seas.

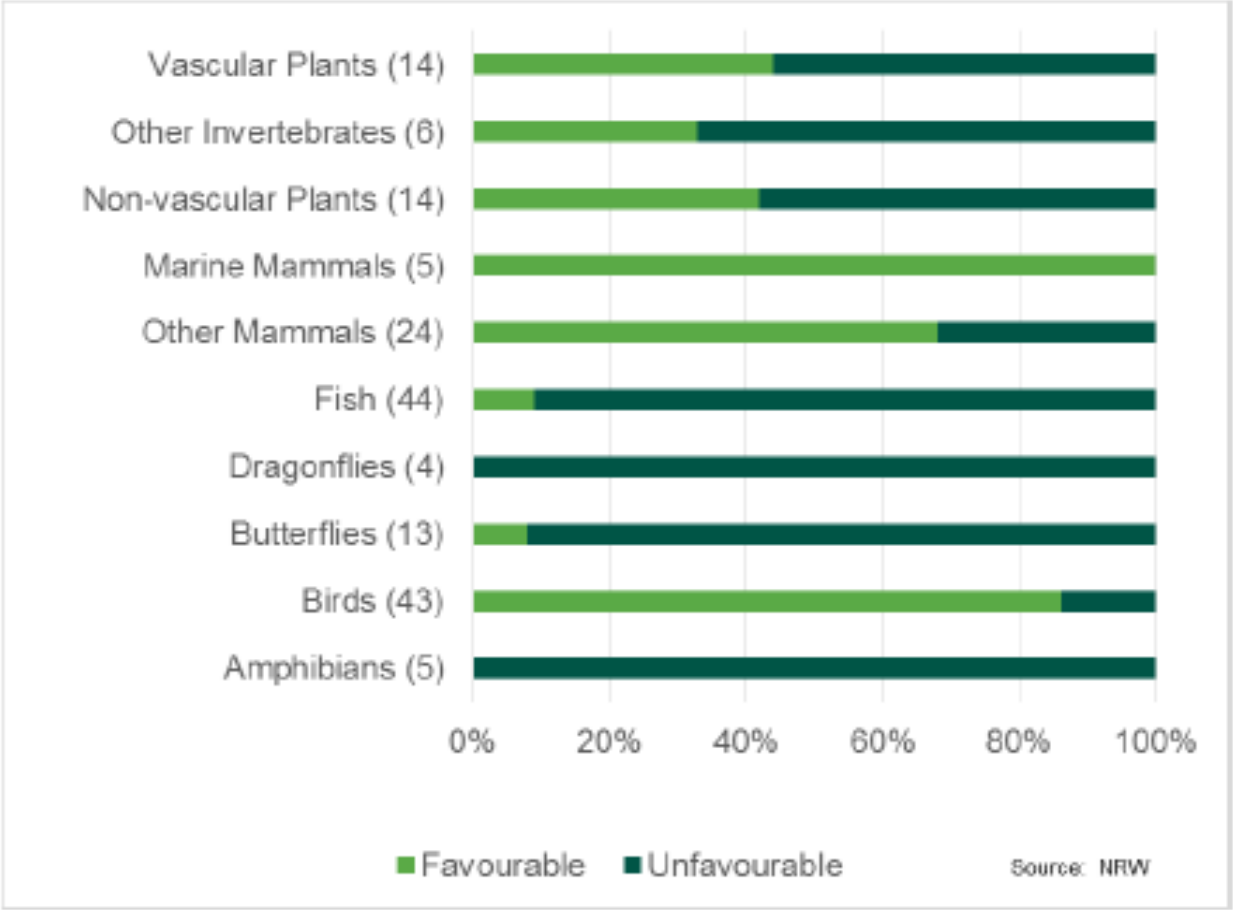
Special Protection Areas (SPA)

SPAs are strictly protected sites classified in accordance with Article 4 of the EC Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species (Defra, 2013).

SPAs in Wales include the coastline between Burry Port and Saundersfoot, sections of the Pembrokeshire coast and the coastline from Penarth to the Severn Bridge in South Wales. The area between Llandrindod Wells and Tregaron in Mid Wales and the South Gwynedd area and Northern coastline in North Wales. The spatial distributions of Welsh SPAs can be found in Figure 1 - Designated Nature Conservation Sites.

The condition of SAC and SPA species features on sites in Wales, as reported in 2013, remains mostly unfavourable (55%), with the exception of birds and mammals of which 86% and 68% were in favourable condition, respectively. A summary of the results for species is shown in Figure 3-9.

Figure 3-9 Overview of condition of Habitat and Bird Directive species features on SACs and SPAs. Number of features in assessment shown in brackets.

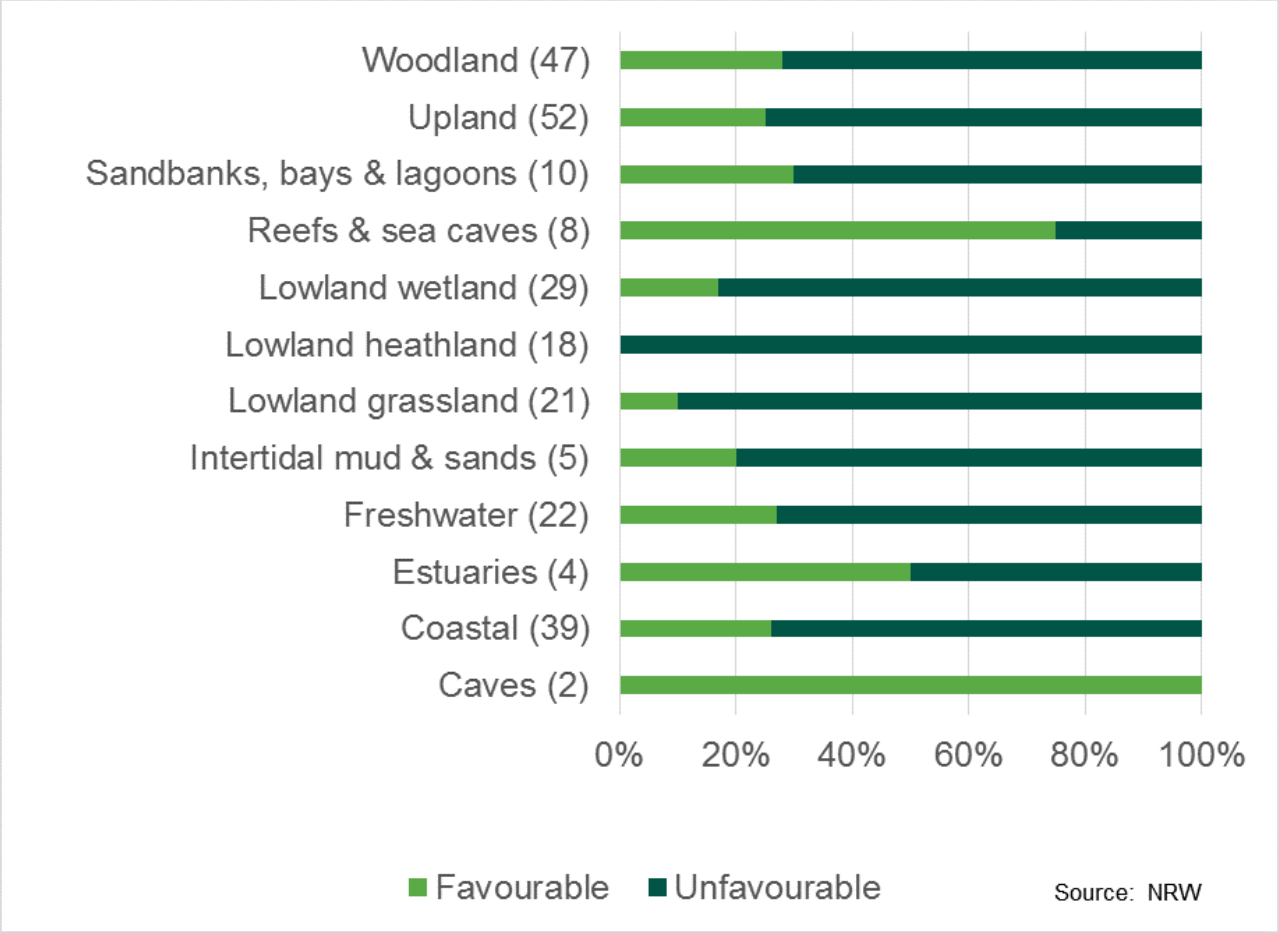


Special Areas of Conservation (SAC)

A Special Area of Conservation (or SAC) is a site designated under the Habitats Directive. These sites, together with Special Protection Areas (or SPAs), are called Natura 2000 sites and they are internationally important for threatened habitats and species.

SACs in Wales include the coastline between Burry Port and St. Davids; sections of the Pembrokeshire coast; and the coastline from Penarth to the Severn Bridge in South Wales. Large sections of the coastline between Cardigan up to Caernarfon in Mid Wales and the coast between Bangor and Conwy in North Wales are also protected under this designation. The spatial distributions of Welsh SACs can be found in Figure 1 – Designated Nature Conservation Sites. As an overview, roughly a quarter of SAC habitats in Wales are in a favourable condition, see Figure 3-10.

Figure 3-10 Percentage of SAC habitat features in favourable and unfavourable condition. Number of habitat features in assessment shown in brackets (SoNaRR, 2016)



Ramsar Sites

The Ramsar Sites in Wales include wetlands that are considered to of international importance under the Ramsar Convention. Wales currently has 10 Ramsar Sites including The Dee Estuary, Llyn Idwal, Llyn Tegid and Corsydd Mon a Llyn in the north, Cors Caron, Cors Fochno and Midland Meres and Mosses in Mid Wales/Midlands and Burry Inlet, Crymlyn Bog and Severn Estuary in the south. The spatial distributions of Welsh Ramsar sites can be found in Figure 1 – Designated Nature Conservation Sites.

Sites of Special Scientific Interest (SSSI)

SSSIs are the most important sites for Wales' natural heritage. They help conserve and protect the best of the nation's wildlife, geological and physiographical heritage for the benefit of present and future generations.

SSSIs in Wales include coastline, freshwater, upland and lowland sites and range from small fens or sand dunes to woodlands and vast reaches of mountain. They contain important types of land, plants and wildlife. Geological sites range from quarries to rocky outcrops and massive sea-cliffs (Natural Resources Wales, 2016). As demonstrated in Figure 1 – Designated Nature Conservation Sites, the SSSIs in Wales are geographically spread across the country with a slight cluster in the rural areas North Powys and South Gwynedd. As of 2019 there are 1078 SSSIs within Wales[23].

[23] https://lle.gov.wales/catalogue/item/ProtectedSitesSitesOfSpecialScientificInterest/?lang=en

National Nature Reserves

National Nature Reserves tend to occupy the coastal areas of the country. There is a strong presence of nature reserves in the coastal areas of Wales. The highest concentration is to the east of the Llyn Peninsula. The spatial distributions of Welsh National Nature Reserves can be found in Figure 1 – Designated Nature Conservation Sites.

Marine Conservation Zones (MCZ)

The marine environment includes 2,740 km of coastline. The marine ecosystems in Wales form part of two wider biogeographic regions: the Irish Sea, and the Western Channel and Celtic Sea. There is a high diversity of habitats and species including sediment and biogenic habitats, sessile and highly mobile species. A proportion of marine habitats are surveyed and mapped, but for some areas our understanding only comes from modelling.

In 2014, the first MCZ in Welsh waters was established. Skomer MCZ is situated around the island of Skomer and the Marloes Peninsula in Pembrokeshire, South West Wales. Before 2014 the area had been Wales' only Marine Nature Reserve for 24 years (Joint Nature Conservation Committee). This is clearly visible in Figure 3-11 below.

Figure 3-11 Skomer Marine Conservation Zones – The first and only current MCZ in Wales situated off the South-West coast of Wales.

Data gaps

No significant data gaps have been identified for this topic at this stage. Information in this section comes mostly from the SoNaRR, 2016 report, this information has not been updated online in an accessible form since then, even though there is a 2019 interim report.

3.1.4 Climate Change Adaptation and Flood Risk

Relevance to the WTS

Measurements indicate that over the past century air and ocean temperatures have increased, rates of ice melt in valley glaciers and ice caps have accelerated and sea levels have risen. However, the extent of future warming and both the nature and geographical distribution of its impacts are the subject of much greater uncertainty. Scientists predict that climate change will result in increased sea-levels, increased average annual temperatures, warmer wetter winters, hotter drier summers and an increase in extreme weather events. These factors have significant implications for both our human and natural environment.

The implications of climate change for the WTS are related to the need to arrest, or mitigate, the causes of global warming, and to adapt to future conditions. Flooding is a key area in which the effects of climate change are felt locally.

Baseline conditions and trends

Flooding is a key area in which the effects of climate change are felt locally. Flood risk is a significant issue in Wales including coastal, fluvial and surface water flooding.

Figure 3-12 presents the Technical Advice Note (TAN) 15 development flood risk areas, including the identification of areas served by significant infrastructure including flood defences; areas without flood defences; areas known to have had past flooding events; and areas at little or no risk of fluvial coastal or tidal flooding. The North West, North East, and South East regions are areas that have a high risk of flooding due to the extent of watercourses. Shoreline Management Plans (SMPs) provide a large-scale assessment of the risks associated with coastal processes that result in both erosion and flooding and presents a policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner. Wales is covered by the following SMPs:

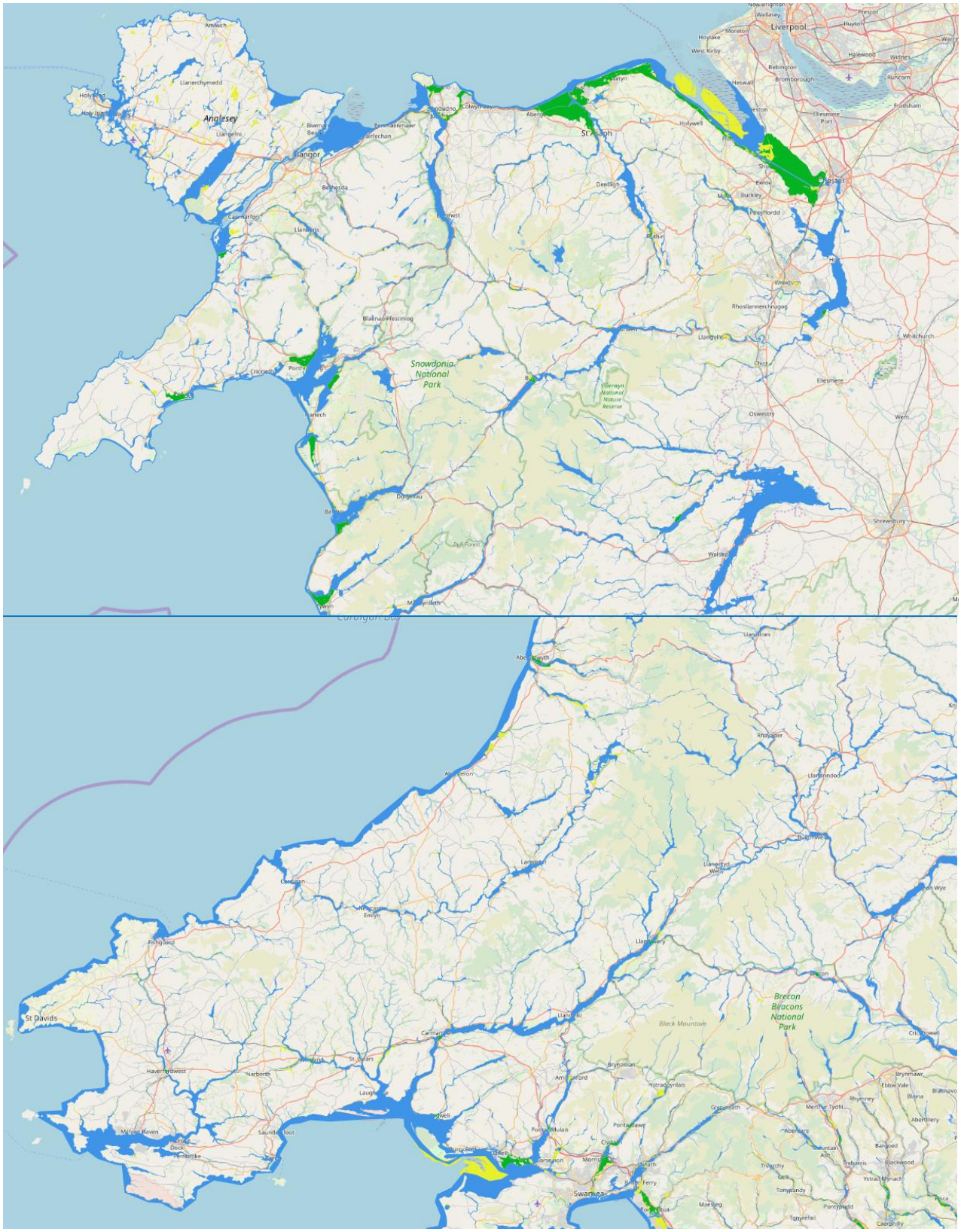
- SMP 19 Anchor Head to Lavernock Point (Severn Estuary);
- SMP 20 Lavernock Point to St Ann's Head (South Wales);
- SMP 21 St Ann's Head to Great Ormes Head (West of Wales); and
- SMP 22 Great Ormes Head to Scotland (North West England and North Wales).

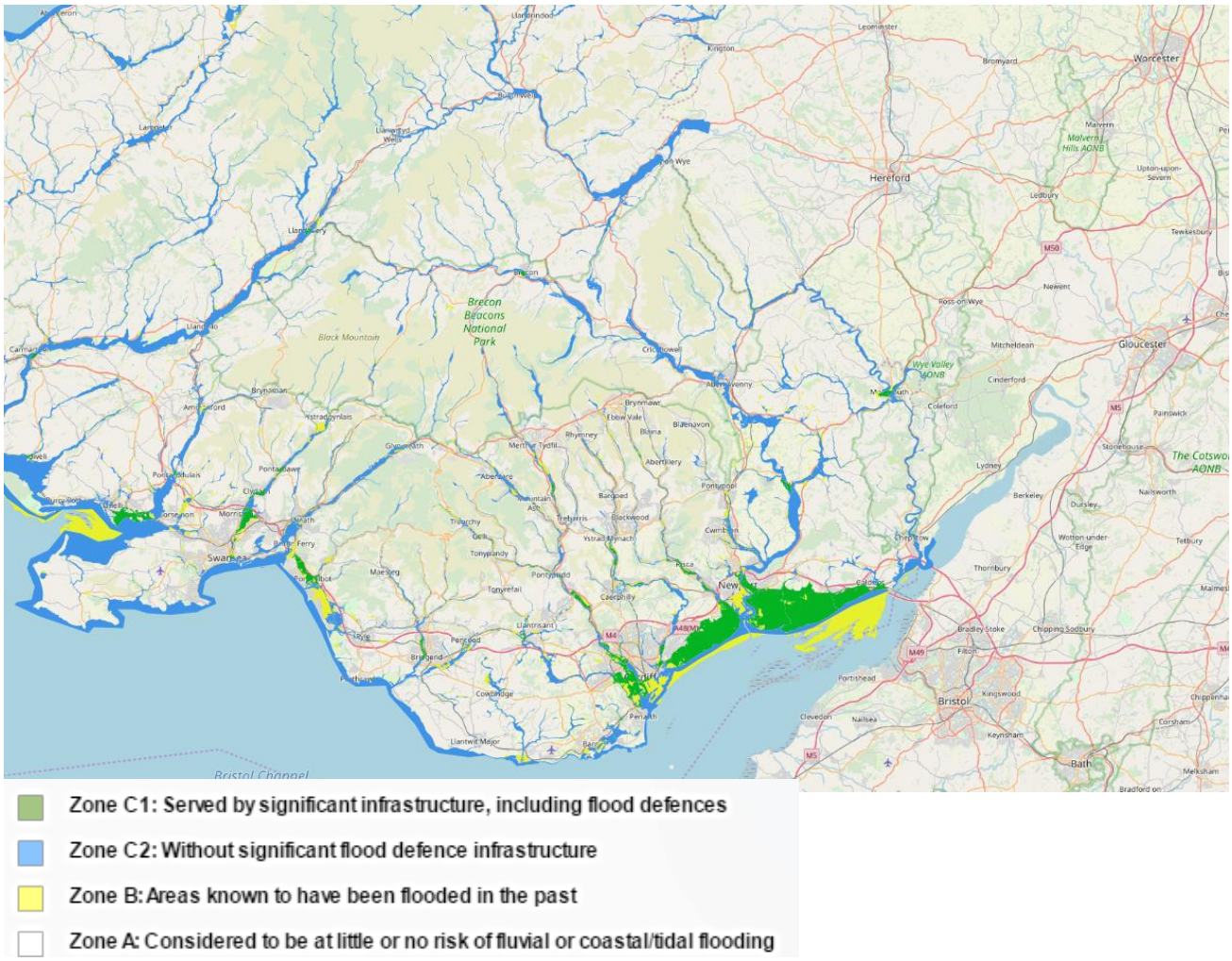
Overall it has been assessed by the National assembly in Wales in 2017 that:

- There are at present around 208,500 properties at risk from flooding from rivers and sea in Wales. Around 163,000 properties are at risk from surface water flooding (based on 2014 data).
- Natural Resources Wales[24] estimates that 33 properties could be lost to coastal erosion over the next 20-50 years, and about 156 could be lost in the next 50-100 years. These estimates take into account the interventions proposed in the Second Generation Shoreline Management Plans. Without the interventions, these figures could increase to about 559 properties within 20-50 years and about 2,126 in 50-100 years.

[24] NRW (2017) Flood and Coastal Erosion Risk Management in Wales https://www.assembly.wales/Research%20Documents/17-024/17-024-Web-English.pdf

Figure 3-12 TAN 15 Development Flood Risk





Source: Development Advice Maps, Welsh Government

Flood risk and the need to manage and adapt to it is a very significant issue for Wales in the future as the risks brought about by climate change are anticipated to exacerbate flooding issues in the future. The most recent information for Wales from the UK Climate Impacts Programme (UKCP09) forecasts that by 2080 (under a medium emissions scenario), there will be an increase in winter mean precipitation of 19% (it is very unlikely to be less than 4% and it very unlikely to be more than 42%). Sea levels are forecast to increase by 36.2 cm compared to 1990 levels[25].

Almost 28% of the coast has some form of artificial protection, whilst 23.1% of the Welsh coast is considered to be eroding, with the potential to affect people, properties and infrastructure. In addition, both erosion and coastal protection have the potential to affect protected sites, although allowing dynamic processes to take place is usually considered to be positive.

Flooding is not only a pressure on communities and built structures but also causes impacts on the environment, as seen in the 2013-14 winter storms. These storms caused £8.1 million of damage to flood defence structures, in addition to the financial costs associated with the approximately 300 properties that were flooded. The work by NRW, Lead Local Flood Authorities, Internal Drainage Boards and Water and Sewerage companies has sought manage flooding and coastal erosion. In the winter storms of 2013/14, it is estimated that approximately 75,000 properties and 34,000 hectares of agricultural land was protected from flooding. Between 2011 and 2014, in excess of 340 coastal and river flood defence schemes were delivered, reducing flood risk to approximately 6,700 properties (Welsh Government Climate Change Annual Report 2014). It is estimated that £2.96 billion of damage to properties was avoided as a result of protection from

[25] UK Climate projections (2009) maps and key findings. Available: http://ukclimateprojections.defra.gov.uk/21708#key (accessed March 2017)

defences (SoNaRR, 2016). The trends in hydrological processes, which include sea-level rise and increased storminess, are likely to increase the likelihood and consequences of coastal flooding and erosion.

Data gaps

No significant data gaps have been identified for this topic at this stage.

3.1.5 Geology and Soils

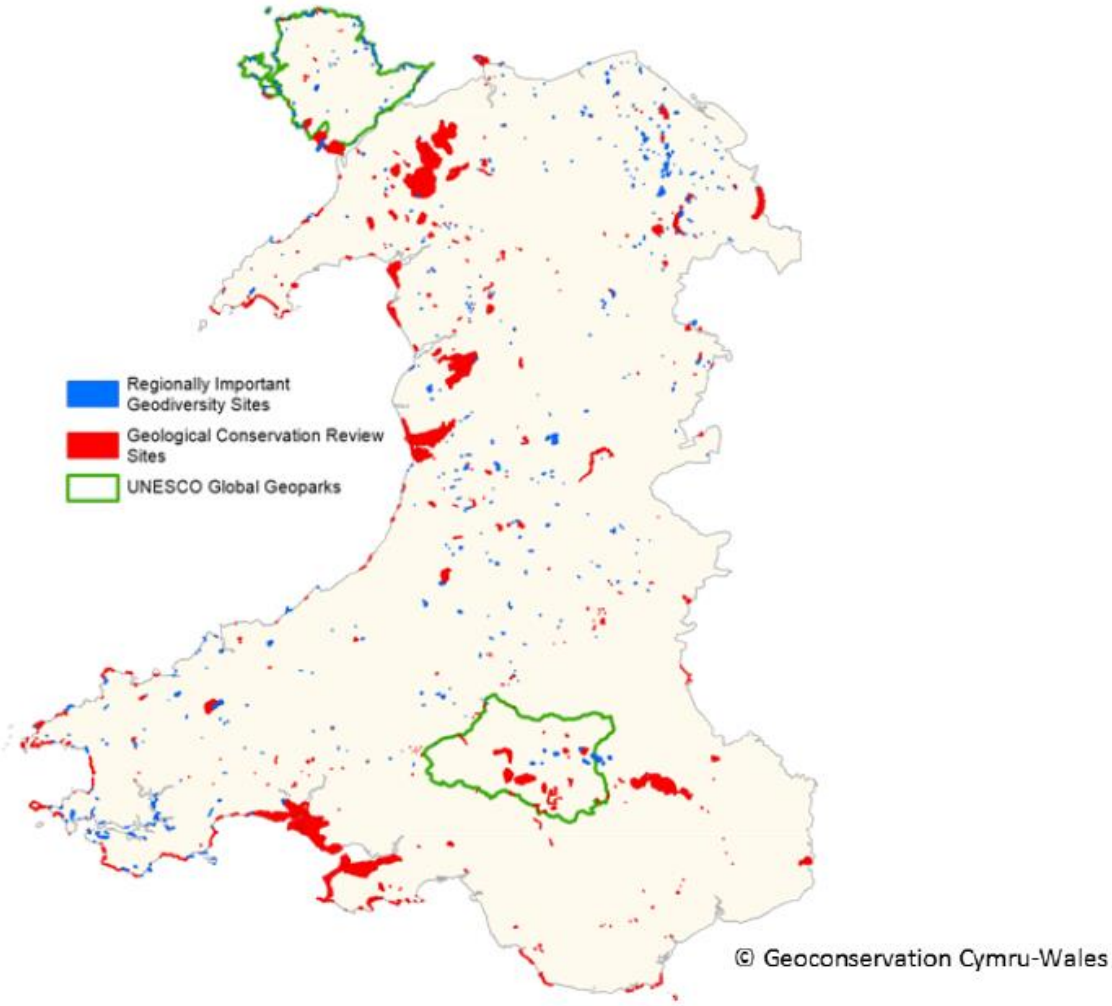
Relevance to the WTS

Wales has some of the most varied geology in the world representing all geological periods and spanning 1.4 billion years of the Earth's history. This diverse geology not only underpins the country's biodiversity and landscape but also provides important mineral resources. The protection and sustainable use of geological diversity, soil resources and minerals can be delivered through the guidance within the WTS.

Baseline conditions and trends

As identified above, Wales' geodiversity is significant. 300 SSSIs in Wales, covering 48,815 ha, contain some 500 geological features and 93% of these features are in favourable condition. Figure 3-13 illustrates the distribution of geological SSSIs and Regionally Important Geodiversity Sites (RIGS). Two UNESCO Global Geoparks, Geo Môn and Fforest Fawr, cover 1,483 km^2 of Wales and are also designated for the primary purpose of promoting geo-tourism (SoNaRR, 2016).

Figure 3-13 Welsh Geodiversity Sites (SoNaRR, 2016).



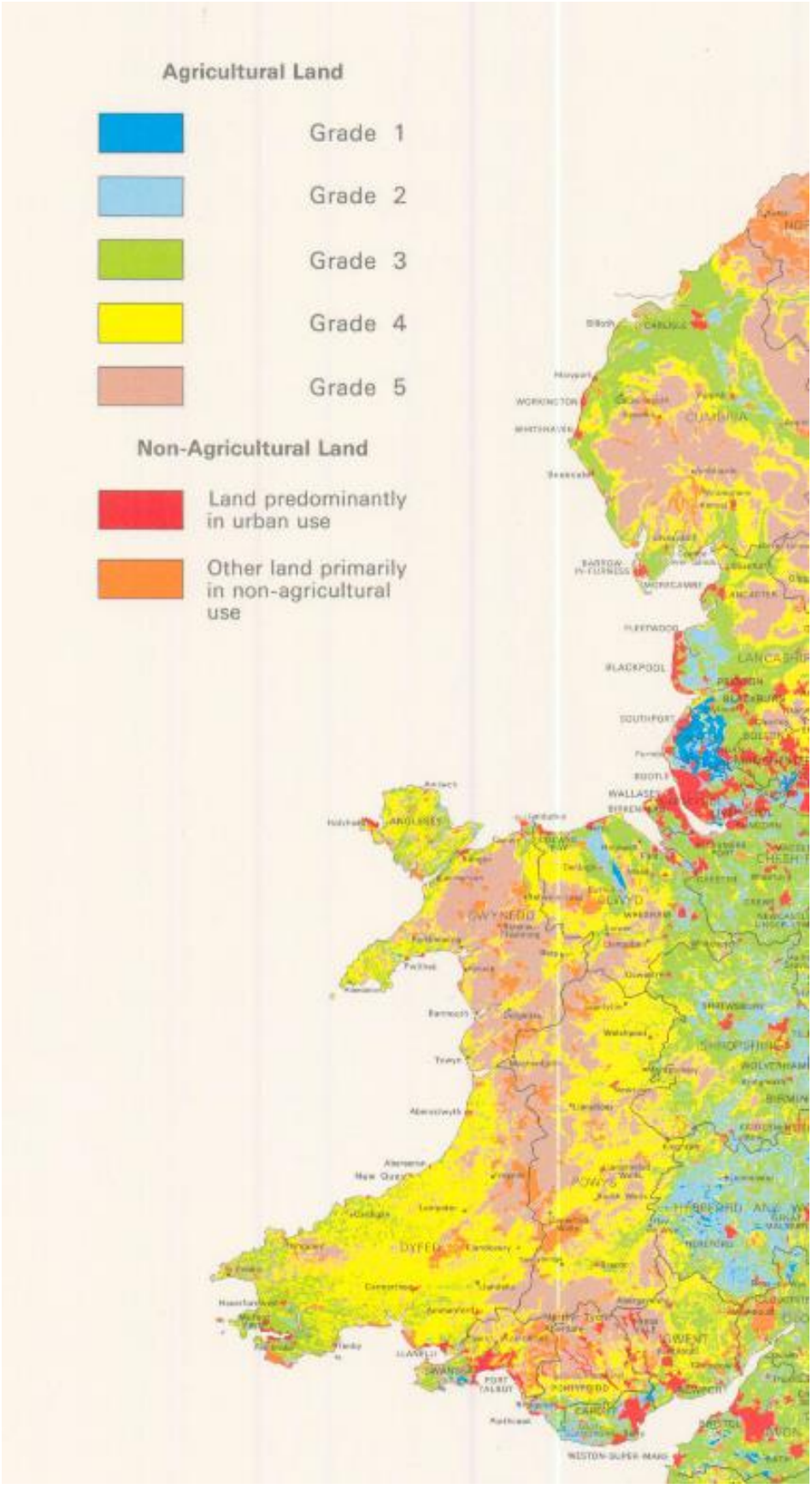
Source: SoNaRR, 2016.

In the future, geological hazards may change as a response to climate change. For example, coastal erosion, landslides and pollution from former mine sites. Exploration for conventional and unconventional sources of oil and gas also remains a possibility in Wales and its consideration will form a part of the emerging Welsh Government Energy Strategy.

The soil and agricultural land quality of Wales is reflective of the topography and geology of the country. The soil types are diverse with over 400 different soil types present across the country, which contribute to a rich geodiversity and biodiversity, landscapes and land uses. The majority of Wales is either Grade 4 or 5 in the Agricultural Land Classification. This classification is generally considered to be of poor or very poor quality agricultural land and is largely due to the predominantly upland nature of Wales. This has a strong influence on the types of agriculture feasible, lending itself more towards livestock farming. The soils of best quality and most productive agricultural land are a scarce and finite resource in Wales accounting for less than 7% of land area.

Soil quality has deteriorated over time across all habitats apart from woodlands where there has been some improvement (SoNaRR, 2016).

Figure 3-14 Agricultural Land Classification Map of England and Wales (extract) (Natural England).



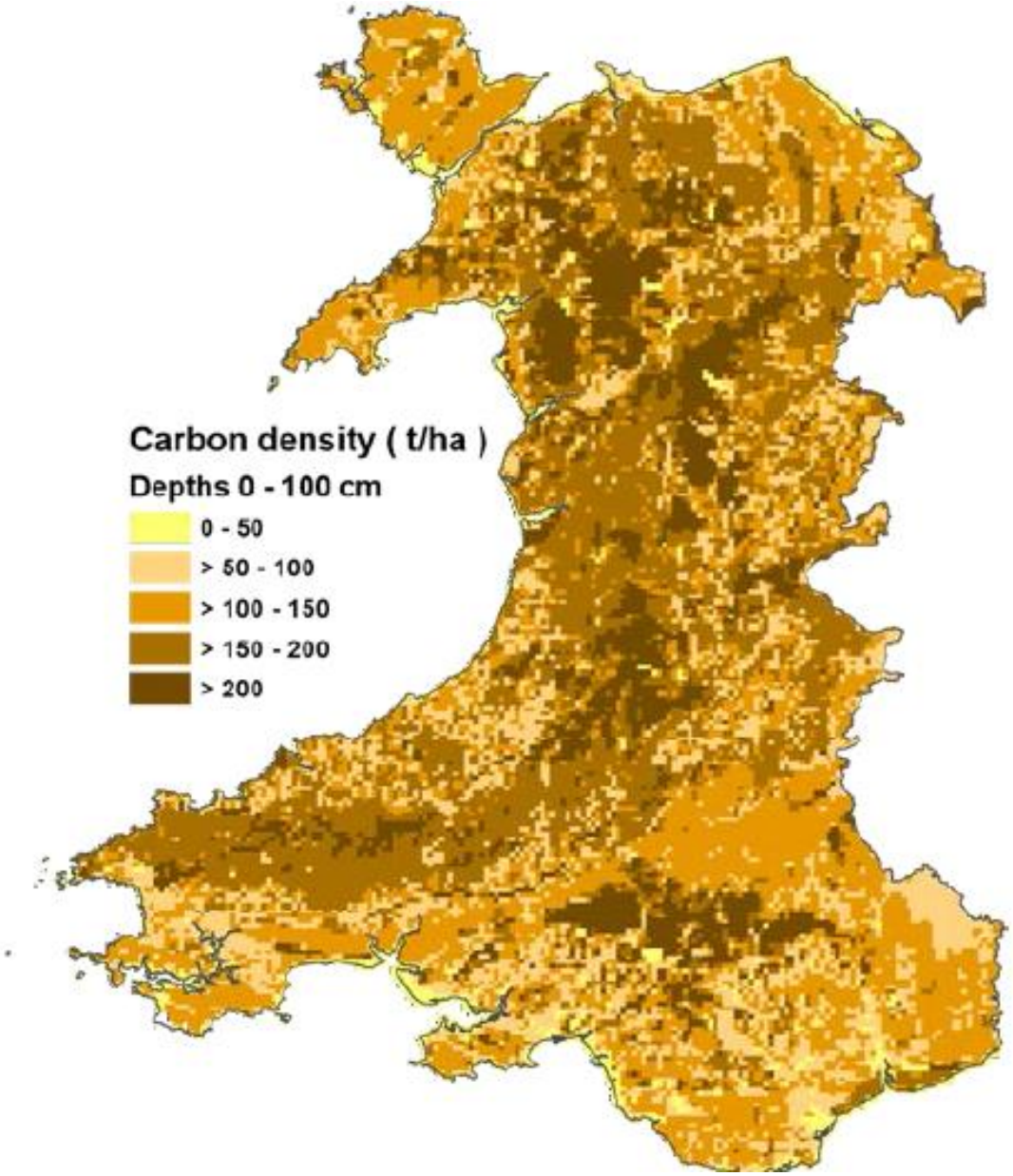
Source: Natural England

Whilst the severity and spatial extent of soil erosion has not been directly quantified in Wales, around 10-15% of grassland fields in England and Wales are thought to be affected by severe soil compaction and 50-60% are in moderate condition. Only 30% of the Welsh peat soil area is considered to be in 'good condition' (SoNaRR, 2016).

Remediation has been completed at 97 of the 111 Contaminated Land sites identified in Wales, but around 9,330 potentially contaminated sites have yet to be investigated (SoNaRR, 2016).

Welsh soils contain 410 million tonnes of carbon. The carbon density of Wales on the whole, is relatively high with the densest areas mainly being upland parts of the country. Again, this reflects the country's upland nature and large quantities of peaty soils. Figure 3-15 below, shows the carbon density of Wales at a depth of 0-100cm. Topsoil carbon concentrations are generally stable and there is ongoing recovery from soil acidification (SoNaRR, 2016).

Figure 3-15 Distribution of soil carbon in Wales, shown as carbon density (t/ha) depth 0-100 cm (SoNaRR, 2016).



Source: SoNaRR, 2016).

Data gaps

No significant data gaps have been identified for this topic at this stage.

3.1.6 Water Environment

Relevance to the WTS

Water is central to life. Wales relies on considerable quantities of water to produce resources, transport goods, provide recreational benefits, as a drinking resource and to grow food. The quality and quantity of water is therefore vitally important.

The WTS can help manage the water environment through helping to guide decisions through the planning process relating to development of transport infrastructure that could harm water quality or put pressure on water resources. It also has a role to play in environmental protection in general through its guidance.

Baseline conditions and trends

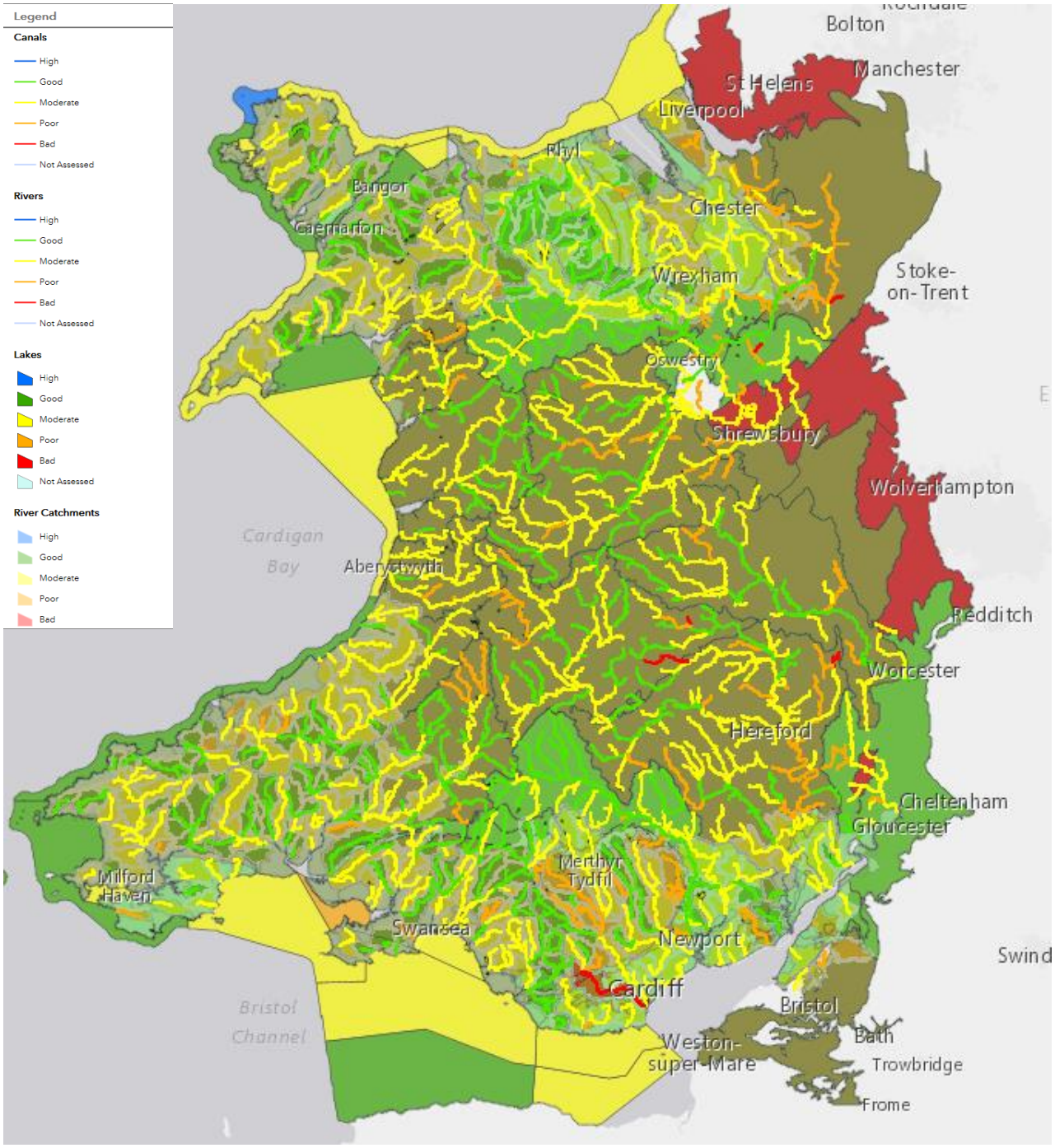
The water features map of Wales in Figure 3-16 was produced under the requirements of the Water Framework Directive. The map shows the river catchments and other water features in Wales. Water resources across Wales tend to range from a good to poor classification but are very rarely classed as high or bad. In particular, the river catchments in the south and Cardigan Bay are classed as moderate or good.

The Water Framework Directive required the UK to achieve ‘good’ status of all water bodies (including rivers, streams, lakes, estuaries, coastal waters and groundwater) by 2015.

In 2014 42% of water bodies in Wales were classified as being of ‘good’ ecological status compared to 21% in England. There was a slight decrease to 39% classified as being of ‘good’ ecological status in 2015 (Natural Resources Wales).

In many Welsh rivers, flows are particularly vulnerable to climate change because they tend to rise and fall quickly in response to rainfall. Increased flows during winter may also increase pressure upon sewerage and drainage systems and diffuse pollution (SoNaRR, 2016).

Figure 3-16 Water Features and Quality in Wales



(Source: Natural Resources Wales)

Groundwater provides a third of the drinking water in England and Wales, and it also maintains the flow in many of our rivers. All of Wales is classified as groundwater inner source protection zone. The zone is defined as the 50-day travel time from any point below the water table to the source. These areas apply at and below the water table. The criteria are set to protect against transmission of toxic chemicals and water-borne disease.

In Wales, the EC Nitrates Directive (91/676/EEC) was brought into law through the Nitrate Pollution Prevention (Wales) Regulations 2013. A Nitrate Vulnerable Zone (NVZ) is an area of land draining into ground or surface waters that are currently high in nitrate; or may become so if appropriate actions are not taken. Around 2.4% of Wales is currently within an NVZ.

Data gaps

No significant data gaps have been identified for this topic at this stage.

3.1.7 Minerals and Waste

Relevance to the WTS

As described above, Wales' diverse geology provides important mineral resources which underpins the country's construction and energy industries and is therefore an important aspect of the economy. Waste can also be viewed as a resource, both in terms of recycling and re-use for other purposes or as a source of energy. The future of transport in Wales will interact with this through both Waste creation, pathways for minerals and waste and use of waste and minerals in development of transport infrastructure.

The sustainable use of these minerals and waste resources can be delivered through the guidance within the WTS.

Baseline conditions and trends

Following a long history, metal mining has ceased and there is only localised coal mining and slate quarrying in Wales. The aggregates industry is now the main mineral extraction industry in Wales, including marine and terrestrially derived aggregates. In 2014, the largest extraction of minerals in tonnes was limestone and dolomite (see Table 3-1 (SoNaRR, 2016)).

Table 3-1 Mineral Production in Wales for 2014 (SoNaRR, 2016)

Mineral	Thousand Tonnes Extracted
Coal (deep-mining)	91
Coal (opencast)	2,343
Igneous Rock	1,905
Limestone and Dolomite	8,934
Sand and gravel (land)	673
Sand and gravel (marine)	632
Sandstone	2,774
Total	**17,352**

The future trend in minerals extraction is heavily influenced by the national economy and confidence in the construction industry. Exploration for conventional and unconventional sources of oil and gas also remains a possibility in Wales and its consideration will form a part of the emerging Welsh Government Energy Strategy.

The Welsh Government publication, 'Towards Zero Waste 2010–2050' aims for Wales to become a a high recycling nation by 2025 and a zero-waste nation by 2050. The 2015 Progress Report identifies the following key statistics and trends:

- Wales leads the UK in recycling municipal waste by a significant margin, achieving 54.3% in 2013/14.
- Wales has reduced waste sent to landfill at permitted sites by 37% between 2010 and 2013.
- Since 2009-10, Wales has made progress in reducing household waste arisings by an average of 1.8% per year, and the recycling rate of local authority collected waste has improved by 13.8%.
- Wales met the EU target 2020 for biodegradable waste collected by local authorities and others sent to landfill eight years early.
- Wales has also reduced the greenhouse gas emissions from waste by 4.7% per year since 2007, exceeding the target reduction of 3% per year set in the Climate Change Strategy.

Table 3-2 shows the total amount of waste per sector that was not recycled, re-used or composted as a percentage of overall municipal waste production. This shows a steady decrease in the amount of waste sent to landfill. This trend is echoed in the commercial and construction sectors.

Table 3-2 Percentage of Municipal Waste sent to Landfill (Statistical Bulletin 'Local authority municipal waste management report for Wales, 2013-14', Welsh Government)

Year	% municipal waste sent to landfill
2009-10	59.5%
2011-12	50.0%
2013-14	45.7%

Data gaps

Data gap relating to how recycled materials are used in the transport industry as a percentage of total materials used.

Data relating to the transportation and management of waste and minerals.

3.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

Air Quality

Air quality in Wales is generally very good, reflective of its largely rural nature and high-quality natural environment. However, targets are being breached for a number of key pollutants which pose a risk to human health and the natural environment so the transport plan must take this into account. These notably occur in urban areas and adjacent to busy roads.

90% of semi-natural nitrogen sensitive Welsh habitats are subject to nitrogen deposition in excess of critical load limits.

Noise Pollution

Road noise is focused around the M4 in South Wales and adjoining 'A' roads. The A55 and adjoining 'A' Roads in North Wales, and the A483 in Mid Wales, also contribute to high levels of noise pollution. Noise pollution from railways mostly takes place in the south of Wales around Cardiff.

Biodiversity, Flora and Fauna

Wales has a rich and varied natural environment including a wide representation of important habitats and species. However, the condition of species features in European designated sites in Wales and the condition of priority habitats in Wales remains mostly unfavourable, the transport plan must do its best to not impede on the habitats via habitat fragmentation or indirect effects such as nitrogen deposition, wildlife fatalities or noise disturbance.

Terrestrial and marine biodiversity is under threat from transport infrastructure, pollution and climate change, all of which are effects that come from the transport network.

Changes in habitat quality coming from changes to the groundwater regime, changes in natural rates of flow from hard surfaces increasing surface water flooding.

A change in soil leaching and erosion patterns.

Changes to microclimate from light and radiation emissions.

Windfunnelling from bisected trees.

Disturbance to fauna from noise, lighting and vibrations from traffic and road lighting.

Road structures may cause problems for certain birds/mammals by reducing visibility.

The edge habitat or ecotone and traffic on the road may facilitate dispersal for some species. This may result in dispersal and establishment of alien and invasive species or pest species that may have secondary effects on biological communities.

Surrounding habitats may be placed under increasing public pressure, because of access, leading to effects including the disturbance of animals, and physical destruction of ground flora. Also, litter may accumulate along road

Off-site habitat losses and changes in habitat quality in relation to the obtaining and disposal of materials e.g. mining for aggregates for road building.

Even relatively minor habitat loss, fragmentation and indirect impacts of an individual road project can, when added to other past, present and reasonably foreseeable future impacts of other projects and activities, contribute to significant impacts in an area. All relevant types of future projects and activities should be considered (i.e. not just other road projects) including induced development.

Climate and Flood Risk

The effects of climate change are increasing and adaptation and resilience to its effects is an increasing necessity. Notably, flood risk is a significant issue in Wales including coastal, fluvial and surface water flooding that may affect transport infrastructure. This is exacerbated by an increase in extreme weather events and this means that properties and businesses are increasingly becoming at risk. Disruption can disproportionately impact communities with fewer and less resilient transport options.

Transport is a big contributor to greenhouse gas emissions which are the leading cause of climate change, this effect must be reduced by promoting more sustainable modes of transport and reducing the use of high emission private cars.

Geology and Soils

In the future, geological hazards may change as a response to climate change. For example, coastal erosion, landslides and pollution from former mine sites. This poses significant risks to the transport system.

The soils of best quality and most productive agricultural land are a scarce and finite resource in Wales and soil quality has deteriorated over time across all habitats. Only 30% of the Welsh peat soil area is considered to be in 'good condition'. This is important for biodiversity, landscape character, tourism, agricultural productivity and climate change resilience. Topsoil, in particular peaty soils in Wales are a major carbon sink which needs protection**.** All of this must be taken into account when planning the location of future transport infrastructure.

Water Environment

The quality of Wales' water bodies is still not up to Water Framework Directive requirements with only 42% being of good ecological status in 2014. Transport activities can be a big contributor to poor water quality.

In many Welsh rivers, flows are particularly vulnerable to climate change because they tend to rise and fall quickly in response to rainfall. Increased flows during winter may also increase pressure upon sewerage and drainage systems and diffuse pollution (which may come from road surface run-off).

Whilst Wales is perceived to be water-rich, it is already facing challenges in terms of supply and water resources can become relatively scarce during prolonged warm, dry weather.

Run off from roads and spillages on roads and during construction can all lead to pollution in surface waters, ground waters and marine environments (around ports).

Minerals and Waste

The country still has substantial resources if required. However, such extraction can be very damaging to the natural and human environment and as such sustainable management of this is a key issue for any ongoing or future activity. Minerals safeguarding can sometimes also conflict with other forms of development e.g. transport infrastructure.

There may be high material requirements for construction of transport infrastructure putting further strain on the limited resources.

Opportunities

Air Quality

The transport system is a significant contributor to air pollution at present, an opportunity to reduce this negative effect on air quality could be affected by helping to minimise pollution from transport through minimising the distance travelled and encouraging more sustainable modes of transport. Sustainable design and landscaping policies could help to provide opportunities for absorbing some pollutants.

Noise Pollution

The WTS can affect noise pollution through ensuring decisions are based on the principle of reducing emissions through the transition to implementing the sustainable transport hierarchy. Sustainable design and landscaping policies could help to reduce the effect of noise and the potential impact from transport on tranquil areas.

Biodiversity, Flora and Fauna

The WTS can both benefit and enhance biodiversity through guiding the location and manner in which new transport infrastructure occurs. It provides opportunities to ensure biodiversity is protected and enhanced through the transport system, not just in terms of protected sites but also in terms of biodiversity and connectivity in general. Other benefits might include improved habitat management; new structures e.g. bridges and tunnels may provide habitats for some species e.g. bats; and habitat creation.

Climate and Flood Risk

The WTS has a significant role to play in terms of climate change adaptation and resilience. Flooding and coastal erosion are key areas in which the effects of climate change are felt locally and the WTS can help provide guidance on the location and design of development to help minimise this risk. It is also an opportunity to further work with partners such as NRW in developing flood management and protection schemes as part of encouraging sustainable land and ecosystem management.

The WTS has a focus on significantly reducing greenhouse gas emissions from transport through the promotion of more sustainable transport methods such as public transport and active travel, instead of using methods such as private cars.

Geology and Soils

The WTS has an opportunity to guide the sustainable use of Wales' geology and soils in the transport system in terms of their use in the construction of transport infrastructure.

The WTS could also help to avoid future risks by managing or avoiding geological hazards through the planning of the transport system. Exploration for conventional and unconventional sources of oil and gas also remains a possibility in Wales and its consideration will form a part of the emerging Welsh Government Energy Strategy.

Water Environment

The WTS can help to guide new development of transport infrastructure and transport routes in a manner that seeks to avoid pollution of water bodies. It could also be cognisant of the potential limitations of water supply and could promote measures to reduce water use in developments.

Minerals and Waste

The WTS has an important role to play with regard to minerals demand (through economic aspirations), planning and management. It can help to guide the sustainable use of such resources through its policies.

4 Well-Being Goal: A Healthier Wales and A More Equal Wales

This section provides data relating to the following well-being goal:

'A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.' And 'To deliver better public services, helping everyone who needs them, when they need them, where they need them.'

The data relates primarily to:

- Human Health;
- Well-Being; and
- Population.

4.1 Overview of Baseline Conditions

4.1.1 Health and Well-being

Relevance to the WTS

Information with regard to the links between transport, health and priority groups can be found in section 4.1.3. In terms of equality, transport plays an important role in delivering an inclusive Wales, everyone, regardless of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex and sexual orientation should be able to, and have the confidence to, make seamless independent and unassisted journeys across all modes of transport – from door to door and on a turn-up-and-go basis.

Baseline conditions and trends

In many ways, health in Wales is improving; people are living longer and rates of certain types of diseases are coming down. In many parts of Wales, the health of those living in rural communities is generally good, in comparison to those in a more urban setting. However, there are factors specific to a rural environment compared to those of urban environments that can impact on health more significantly and lead to inequalities and poorer health, such as distance from public services and support; availability of transport; housing standards; and an ageing population.

Active Travel

'"Active travel" is walking or cycling as a means of transport; that is walking or cycling in order to get to a particular destination such as school, work, shops, visit friends and many other journeys.'

Between 2018 and 2019 the Walking and cycling in Wales report[26] identified –

- 6% of adults cycled at least once per week for active travel purposes
- 57% of adults walked at least once per week for active travel purposes
- 70 per cent of people in urban areas walked for more than 10 minutes as a means of transport at least once a month, compared with 56 per cent of people in rural areas (Figure 4-1).
- Men, younger people, those without limiting illnesses and those who have qualifications were more likely than others to cycle.
- 44 per cent of children actively travel to primary school, and 34 per cent to secondary school.
- National Survey respondents who were in 'very good' or 'good' health were more likely to walk or cycle regularly.

[26] Walking and cycling in Wales: Active travel, 2018-19 Statistical Bulletin

Figure 4-1 Active travel (walking) by urban and rural classification

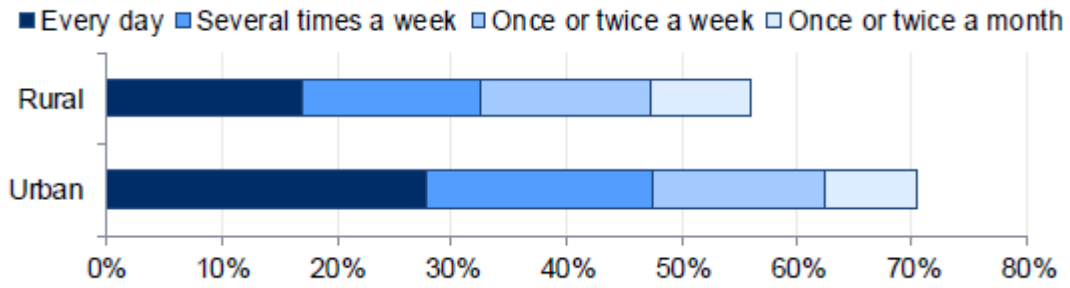
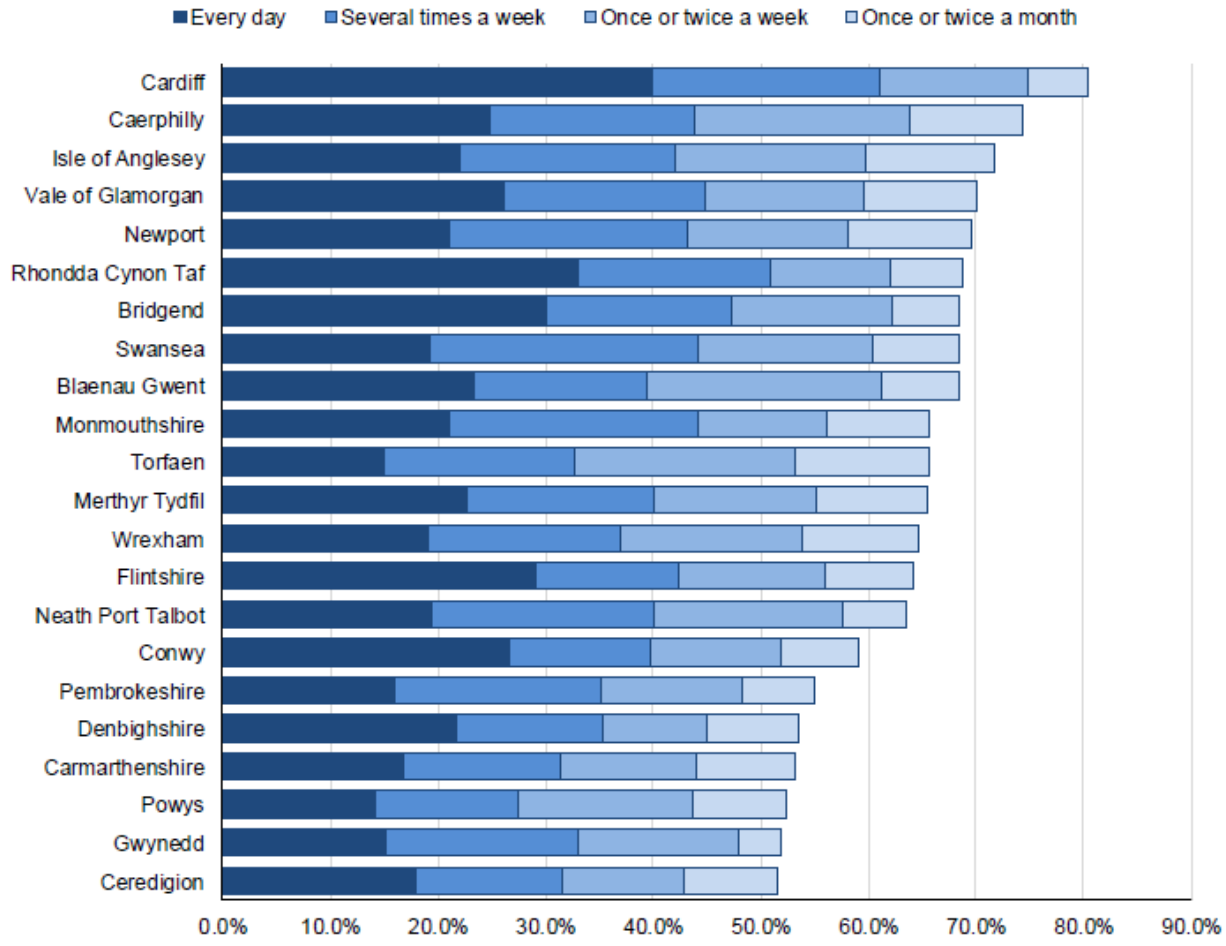


Figure 4-2 Active travel by walking, by local authority



Percentage of adults who have fewer than two healthy lifestyle behaviours

The 2019 Welsh Health Survey[27] assessed whether Welsh respondents exhibited the following healthy lifestyle behaviours:

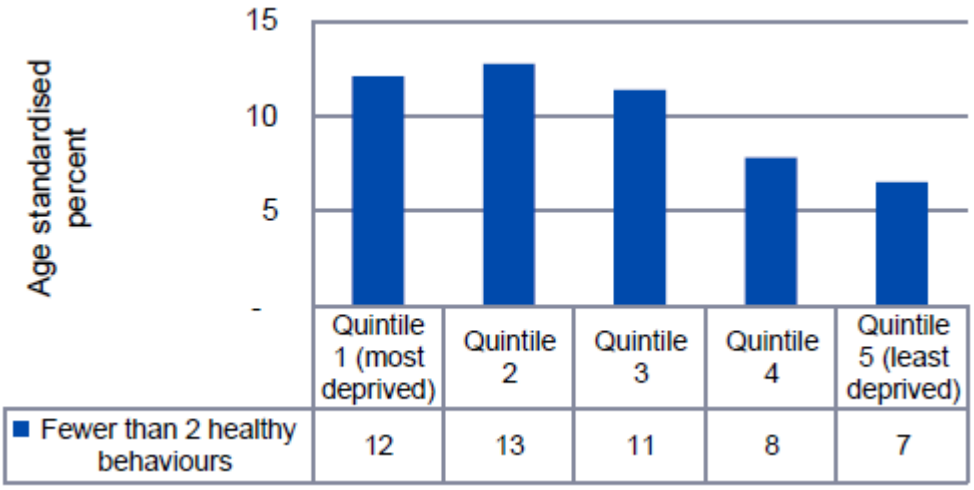
- Not smoking;
- Not drinking above daily guidelines in the previous week;
- Eating five or more portions of fruit and vegetables the previous day;
- Being physically active for at least 150 minutes in the previous week; and
- Maintaining a healthy weight/body mass index.

Around 10% of adults reported following less than 2 healthy lifestyle behaviours, 64% of adults reported either 2 or 3 healthy lifestyle behaviours

In terms of specific groups, the percentage of adults who followed fewer than 2 healthy lifestyles was slightly more common in men (12%) than women (8%), and among adults aged 45-64.

Figure 4-3 shows that the percentage of adults who reported following 0 or 1 healthy lifestyles was more prevalent in the most deprived areas (age-standardised).

Figure 4-3 Percentage of adults who exhibited 0 or 1 healthy lifestyles, by deprivation quintile



Source: Welsh Government

The Welsh Health Survey (2019) established that for 2018 and 2019, amongst local health boards, the highest reports of 'Active less than 30 minutes a week' (50%) and lowest reports of 'Active 150 minutes a week' (39%) was in Cwm Taf Morgannwg. In contrast, Powys has the lowest records of less than 30 minutes of exercise (25%) and highest records of 150 minutes of exercise (65%).

Percentage of people who are lonely

In 2017-18, the National Survey for Wales asked people whether they agreed with a series of statements about their current life status. Users of care and social services were the most likely to agree that they often felt lonely (29% compared with 13% of those who were not users or carers).

Health facilities in Wales

There are a number of hospital facilities within Wales spread across a number of departmental requirements, the number and types of facilities are shown in Table 4-1. As of 2018 there were 421 GP Practices in Wales

[27] National Survey for Wales 2018-19: Adult Lifestyle Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-06/national-survey-for-wales-april-2018-to-march-2019-adult-lifestyle-534.pdf

of which 89% were for all daily core hours were open for all of core hours or within one hour of core hours (08:00 to 18:30), Monday to Friday. (GP Access, Welsh Government, 2019).

Table 4-1 Number and Type of Hospital Facilities within Wales

Hospital Facility Type	Number
Major A&E Unit	13
Minor A&E Unit	1
Minor Injuries Unit	24
Other Hospitals	
Acute	2
CHC Local Committee	3
Clinic	19
Community	28
Community Hospital: Elderly Mental Infirm	3
Day Hospital	5
Major Acute	1
Psychiatric: Learning Disability	2
Psychiatric: Mental Illness	17
Psychiatric: Mental Illness / Learning Disability	2
Specialist Acute	3

Source: NHS Wales

Percentage of people overweight in particular levels of childhood

In 2019, 59% of adults were classified as overweight or obese, including 23% obese. Obesity levels in Wales have seen an increase since the Welsh Health Survey began in 2003/2004. Childhood obesity rates were higher in Wales in 2014 than in England. The prevalence of overweight and obese children in Wales was highest in Merthyr Tydfil (34%), Gwynedd and Bridgend (both 30%) and lowest in Monmouthshire (21%) and the Vale of Glamorgan (22%) (Public Health Wales).

In 2019 four and five year olds in Wales were found to have an obesity rate of 3.3%[28].

Number and distribution of LSOAs in bottom 10% of most deprived in terms of access to services

Latest figures for the LSOAs in Wales (there are 1909 LSOAs in total in Wales) include average travel times using private transport when access to services have been considered. The WIMD 2019 access to services domain results have demonstrated that there is a widespread deprivation across Wales and also particularly within rural areas in terms of access. Furthermore, there are some deprived pockets near large urban areas.

The local authorities with the highest proportion of small areas in the most deprived 10% in Wales for access to services were Powys (50.6%) and Ceredigion (50.0%).

Cardiff, Neath Port Talbot, Bridgend, Rhondda Cynon Taf, Blaenau Gwent and Torfaen local authorities had no areas in the most deprived 10%.

The most deprived small area in Wales was Cynwyl Gaeo, Carmarthenshire, the same as for WIMD 2014.[29]

Access to services and facilities

In the 2019 Wales National Survey[30], 69% of people surveyed were satisfied that good services and facilities are available in their local area, but 3% said that there were no services or facilities in their area. 80% were satisfied with their ability to get to or access the facilities and service they needed.

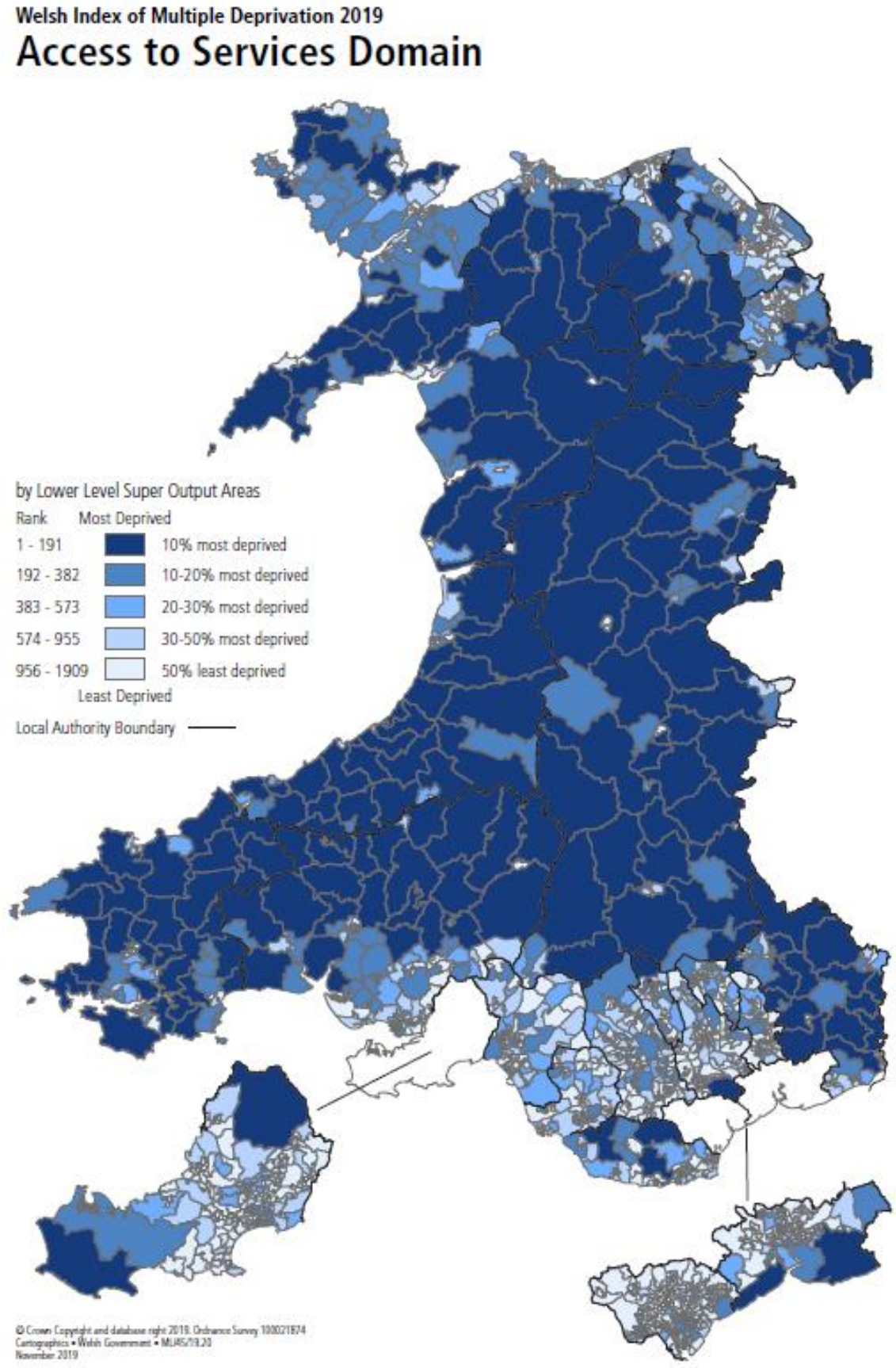
Figure 4-4 shows the deprivation levels of the LSOAs in Wales with regard to access to services.

[28] https://www.bbc.co.uk/news/uk-wales-47483203

[29] Welsh Index of Multiple Deprivation, 2019 https://gov.wales/welsh-index-multiple-deprivation-full-index-update-ranks-2019

[30] National Survey for Wales, 2018-19 Community cohesion and safety in the local area Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-11/community-cohesion-and-safety-local-national-survey-wales-april-2018-march-2019-739.pdf

Figure 4-4 Access to Services Deprivation Map for Wales



Source: WIMD 2019

No of LSOAs in bottom 10% Health deprivation domain

Patterns in health deprivation in Wales have remained largely unchanged since the 2011 WIMD. High deprivation levels were recorded in South Wales valleys and large cities, coastal areas of North Wales and border towns. The local authority the highest proportion of LSOAs in the most deprived 10% in Wales for health domain was Merthyr Tydfil. Three local authorities (The Isle of Anglesey, Ceredigion and Monmouthshire) were recorded as having had no LSOAs in the most deprived 10%.

For the health domain, the most deprived LSOA in Wales was Rhyl West 2, Denbighshire.

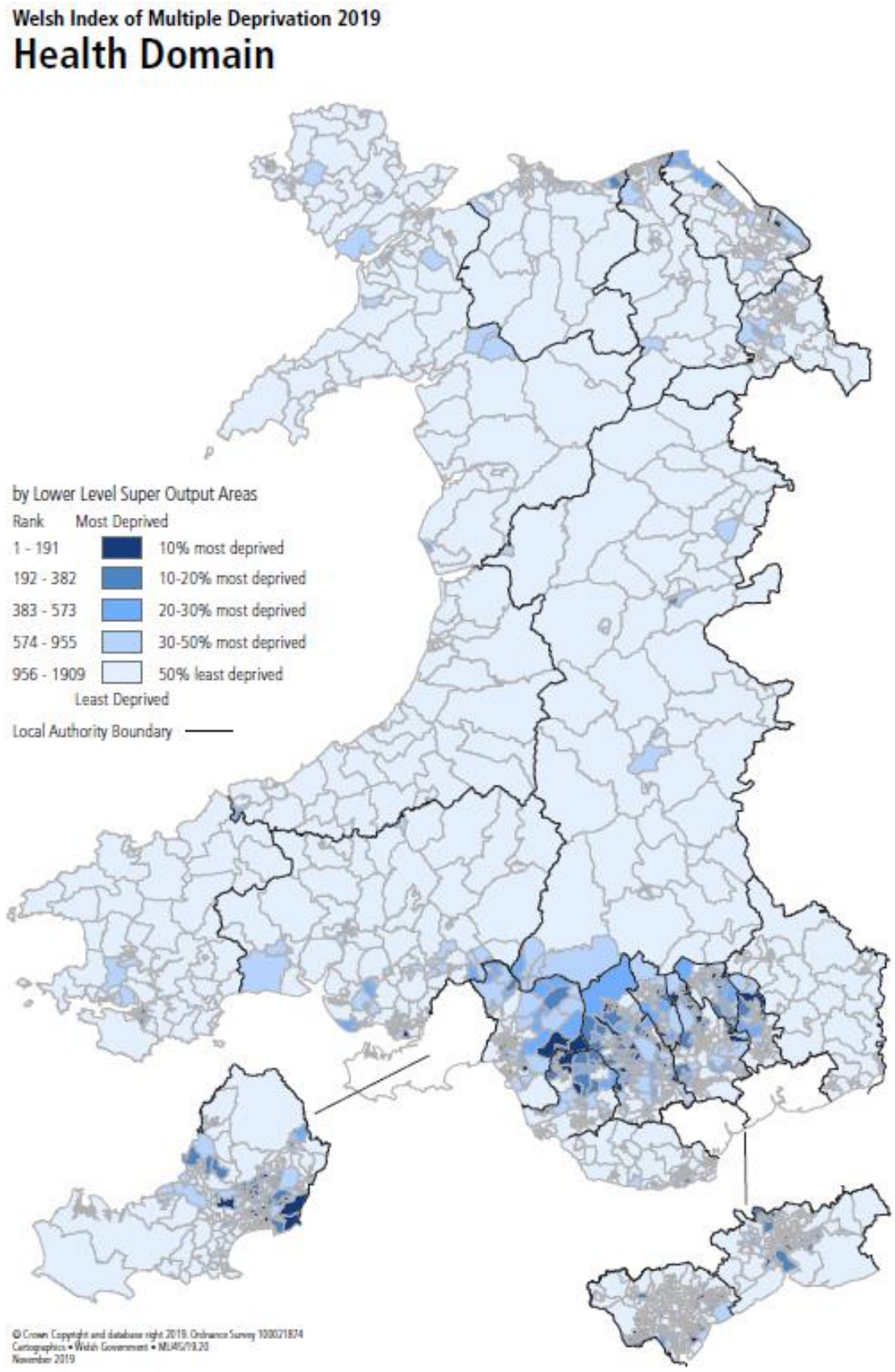
Percentage of good / bad health

In 2018, 70% of people in Wales reported their general health as either ‘Very good’ or ‘Good’. The gap between local health board reporting the highest (Powys: 76%) and lowest (Cwn Taf: 67 per cent) percentages of ‘Very good’ and ‘Good’ general health was 9%. The concentration of low percentages of ‘Good’ general health recorded in 2019 corresponds with the former coal mining and heavy industrial centres of the Welsh valleys in 2019 suggesting that these former industries have had long term health implications.

Isle of Anglesey, Ceredigion and Monmouthshire had no LSOAs in the most deprived 10%. Only 15.2% of the LSOAs in Ceredigion were in the most deprived 50% in Wales. Blaenau Gwent had the highest proportion of LSOAs in the most deprived 50% in Wales (95.7%). The next highest was Merthyr Tydfil, with 86.1% of its LSOAs in the most deprived half of Wales.

Figure 4-5 shows the deprivation levels of the LSOAs in Wales with regard to Health Domains.

Figure 4-5 Health Deprivation Map for Wales



Source: WIMD 2019

4.1.2 Population

Relevance to the WTS

An equal society in Wales can help to ensure that public transport services are fair and accessible to all and completely inclusive. The WTS could contribute positively towards making more fair and inclusive societies. Further detail is provided in section 4.1.3.

Baseline conditions and trends

The following baseline indicators have been used to characterise existing conditions relating to goal 4 of the Well-being of Future Generations (Wales) Act 2015 for population in Wales:

Percentage of Ethnic Groups

The ethnic make-up of the Welsh local authorities compared to national figures is shown in Table 4-2 below.

Table 4-2 Percentage of Ethnic Groups in Wales and local authorities

Area	All categories: Ethnic group	White (%)	Mixed (%)	Asian (%)	Black (%)	Other (%)
United Kingdom	63,182,178	87.2	2.0	6.9	3.0	0.9
Wales	3,063,456	95.6	1.0	2.3	0.6	0.5
Anglesey	69,751	98.2	0.7	0.7	0.1	0.3
Blaenau Gwent	69,814	98.5	0.6	0.7	0.1	0.1
Bridgend	139,178	97.8	0.7	1.1	0.2	0.2
Caerphilly	178,806	98.3	0.7	0.8	0.1	0.1
Cardiff	346,090	84.7	2.9	8.1	2.4	2.0
Carmarthenshire	183,777	98.1	0.6	1.0	0.2	0.2
Ceredigion	75,922	96.7	1.0	1.4	0.4	0.5
Conwy	115,228	97.7	0.8	1.1	0.2	0.3
Denbighshire	93,734	97.4	0.8	1.5	0.2	0.1
Flintshire	152,506	98.5	0.6	0.8	0.1	0.1
Gwynedd	121,874	96.5	0.8	1.8	0.2	0.7
Merthyr Tydfil	58,802	97.6	0.8	1.2	0.2	0.2
Monmouthshire	91,323	98.0	0.7	1.0	0.2	0.1
Neath Port Talbot	139,812	98.1	0.7	1.0	0.2	0.1
Newport	145,736	89.9	1.9	5.5	1.7	1.0
Pembrokeshire	122,439	98.1	0.6	1.0	0.1	0.2
Powys	132,976	98.4	0.6	0.9	0.1	0.1
Rhondda Cynon Taf	234,410	97.4	0.6	1.3	0.6	0.1
Swansea	239,023	94.0	0.9	3.3	0.8	1.0

Area	All categories: Ethnic group	White (%)	Mixed (%)	Asian (%)	Black (%)	Other (%)
The Vale of Glamorgan	126,336	96.4	1.3	1.6	0.4	0.3
Torfaen	91,075	98.0	0.7	1.1	0.2	0.1
Wrexham	134,844	96.9	0.7	1.7	0.5	0.2

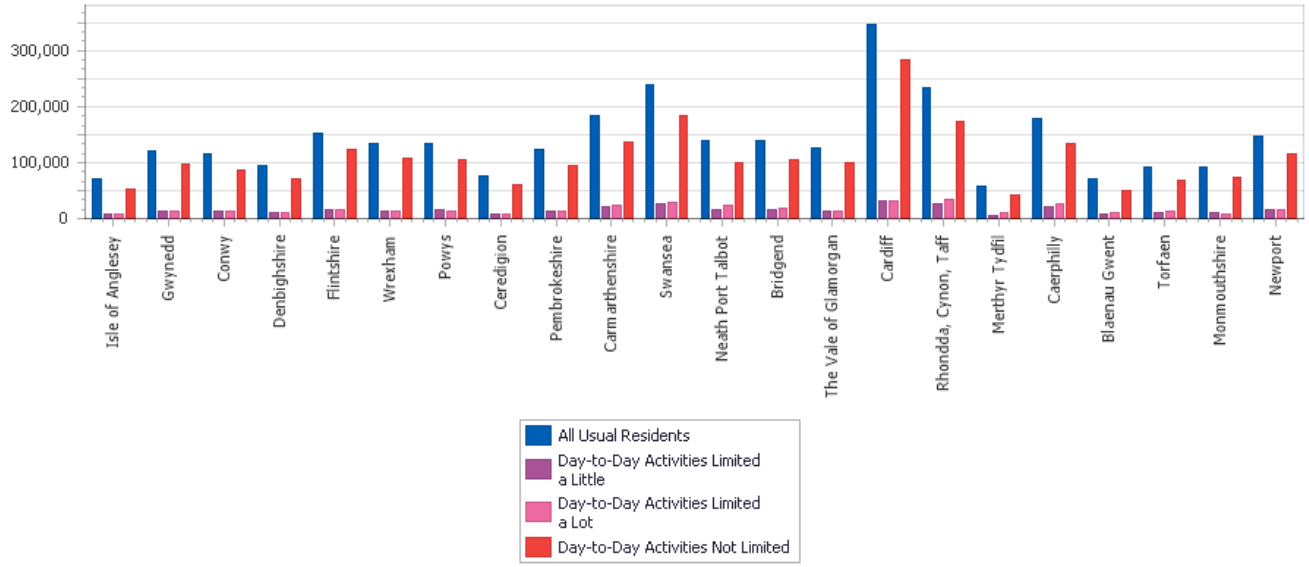
Source: 2011 Census – Nomis

In 2011, Wales had 8% more of its population who were white compared to the rest of the United Kingdom and a lower percentage of people who were Asian, black, mixed or other. The white ethnic group is dominant across all of the local authorities. The urban areas of Cardiff and Newport have a slightly more multicultural population and their percentages of white persons compares similarly with the UK figures.

Limiting long term illness or disability by local authority

Figure 4-6 shows the extent of illness or disability by local authority in Wales. In all cases, the majority of residents do not have an illness or disability that limits their day-to-day activities. The trend of results on a national scale for Wales is similar to that of the local authorities with 11.9% limited a lot and 10.8% limited a little. However, levels in Wales were slightly higher than that of England with 8.3% limited a lot and 9.3% limited a little in England (ONS).

Figure 4-6 Limiting long term illness or disability by local authority



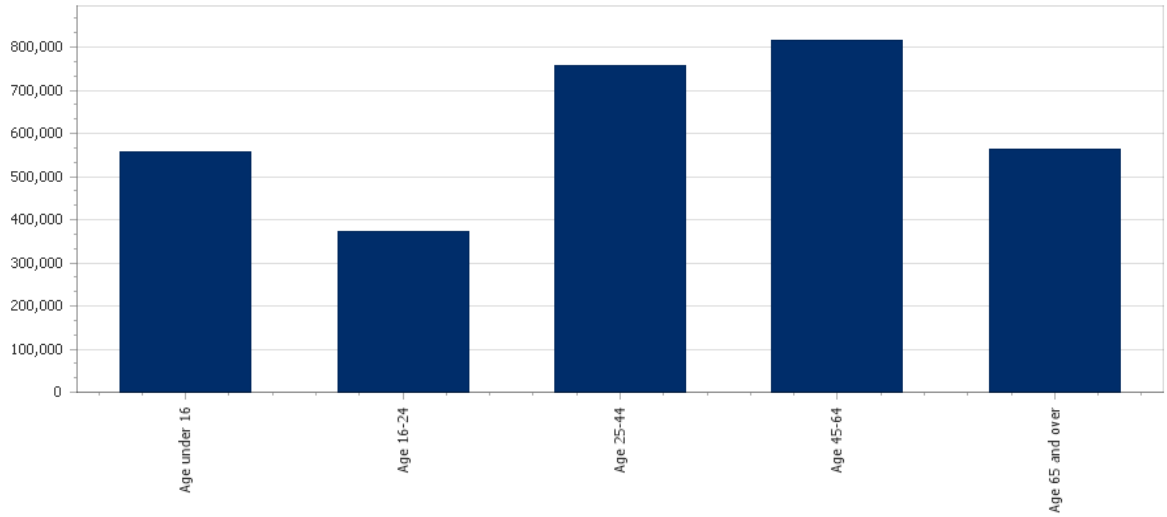
Source: StatsWales

Population Age Structure

Wales' population age structure for 2011 is shown in Figure 4-7. It shows the dominant age group is 45 – 64 years old. The results would also suggest that Wales is an 'aging' population with the higher figures leaning towards the older age groups. The number of people aged 65 and over is projected to increase by 292,000 (44%) between 2014 and 2039 (ONS). The 2009 Older People's Wellbeing Monitor identified that 44% of older people in Wales had a limiting long-term illness or disability.

In local authority terms, the majority of the authorities have a higher population between 25 and 64 with a fairly even split between the 25-44 and 45-64 age groups. Cardiff has a considerably higher proportion of 25-44 year olds.

Figure 4-7 Resident Population in Wales by broad age group

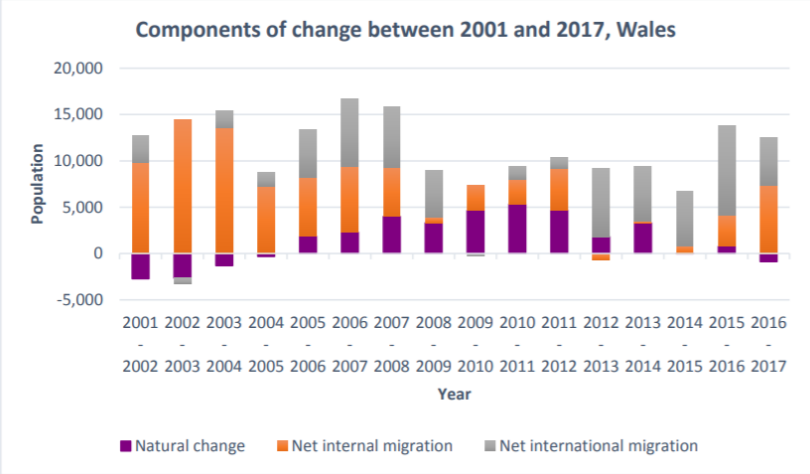


(Source: statswales.wales.gov.uk)

Net Migration Trends

Net migration in Wales has fluctuated over the past 12 years. Between 2012 and 2013 showed a considerable upturn in net migration (14,000) compared to the preceding years. Figure 4-8 shows the changes of migration in Wales over 16 years.

Figure 4-8 Migration in Wales between 2001 and 2017



Source: Bevan Foundation, 2018[31]

Gender

Travel by public transport is highly gendered. In 2017 it was found that in England, a third more women than men travelled by bus and a third more men than women travelled by rail. Overall, expenditure on UK public transport (2016/17) was £29.1bn. This includes spending on national and local roads, public transport and national rail. 54% of this was spent on rail, compared to 8% on 'public transport' including local buses. The

[31] https://41ydvd1cuyvlonsm03mpf21pub-wpengine.netdna-ssl.com/wp-content/uploads/2018/11/Demographic-trends-FINAL.pdf

vast majority of politicians and policy makers involved in high level decision making about public transport are white men[32].

Gender Pay Gap

In 2019 the gender pay gap in Wales increased to 14.5%, this is a 1% increase on the 2018 figure of 13.5%, but still remains below the UK average of 17.3%[33].

4.1.3 Links between transport, population and health of relevance to the study area

The identification of links between transport systems and health, covering health determinants, pathways and outcomes are presented in Table 4-3. This analysis has informed the identification of potential health impacts of the Scheme on identified vulnerable groups during construction and operation (Section 7).

The following definitions have been adapted:

a) Health Determinants: Factors that cause outcomes and influence our state of health. Factors are personal, social, cultural, economic and environmental. They include our physical environment, income, employment, education, social support and housing (Birley, 2011);
b) Health Pathways: Routes leading to a change in determinant which affect the health risks (the probability that a particular harms will occur) (Birley, 2011); and
c) Health Outcomes: medically defined states of disease and disability, as well as community defined states of wellbeing (Birley, 2011).

Table 4-3 identifies potential linkages between transport schemes and health, based on findings from research. However, the MRC Guide advocates that the findings from research be assessed against the local profile and qualitative evidence, to determine whether these findings are likely to be applicable.
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[32] 2018 WBG Briefing: Public Transport and Gender: https://wbg.org.uk/analysis/2018-wbg-briefing-transport-and-gender/
[33] https://chwaraeteg.com/news/wales-gender-pay-gap-increases/

Table 4-3 Health determinants, pathways and outcomes

Relevance to the WTS: Health Determinants, Pathways and Outcomes Relevant to Transport Schemes

Determinant and Explanation	Pathways	Health Outcomes
Accessibility to transport options and community facilities Accessible and affordable transport, enabling good access to education, employment, fresh food, friends and family, leisure and health services, enhances general physical health and wellbeing. Accessibility is a critical component of locally-based travel, which is influenced by socio-economic activity. Poor transport provision disproportionately affects lower-income groups and vulnerable groups and can lead to social exclusion and contribute negatively to quality of life and health. Specific groups include teenagers, the elderly, job seekers, and people living in rural locations. Car ownership amongst vulnerable groups is low. Therefore, the availability of other transport options is important for the wellbeing of vulnerable social groups.	**Construction** Transport routes and modes can be adversely affected by construction activities. There can be disruption and reduced access to existing transport modes and routes from route closures and diversions.	**Construction** Limited and disrupted accessibility may reduce access to amenities and services, adversely affecting general physical health and wellbeing. This is due to greater difficulties in traveling to the service or amenities and the increased stress caused by the disruption while travelling. Research shows that journey duration, predictability and convenience appear to be associated with lower stress levels.[34] Disruption to pedestrian routes may result in a temporary increase in local traffic and congestion.
	Operation Transport schemes can lead to an increase in the provision of public transport use and an improvement of the walking/cycling environment. This can lead to a reduction in car usage.	**Operation** The identified pathways can lead to improvement in physical fitness, physical health and mental wellbeing.
Risk of injuries and deaths and driver stress Road traffic accidents are a significant cause of mortality, disability and serious injuries across all age groups.[35] Since the development of the DMRB methodology, understanding of the principal factors which cause driver stress has developed. Frustration at the inability to drive at a constant speed, as well as unreliable journey times, are now considered to represent factors of increased importance in assessing driver	**Construction** Increased construction traffic in residential area and alteration to existing traffic routes and patterns, can increase the risk of injury as a result of increase traffic levels and an unawareness of altered traffic movements. The risk of driver stress could be increased during construction activity.	**Construction** Vulnerable road users, including motorcyclists, elderly drivers, children, pedestrians, new drivers and cyclists, may be at more risk of injury due to increased construction traffic and altered traffic movements. Driver stress could be increased during construction activity.

[34] MRC Social and Public Health Sciences Unit and Institute of Occupational Medicine, *Health Impact assessment of Transport Initiatives: A Guide*, 2007, p34

[35] Eastern Region Public Health Observatory, *Transport, Access and Health in the East of England, 2005, p16-23*

Determinant and Explanation	Pathways	Health Outcomes
stress.	**Operation** Transport schemes can improve road safety, which can improve actual and perceived road safety. Driver stress can be improved by the introduction of transport schemes.	**Operation** There can be a reduction in traffic-related injury and death and the risk of such. Vulnerable groups are similar to the ones identified for the construction stage. Driver stress can be improved by the introduction of transport schemes.
Active travel Walking and cycling are physically active forms of transport. A supportive environment for physical activity is a decisive factor in stimulating uptake. High quality, accessible new routes for pedestrians and cyclists with appropriate and safe crossing points are vital.	**Construction** Increased disruption, altered traffic movements and perception that routes have become unsafe can reduce active travel.	**Construction** Reduced levels of active travel may lead to increased prevalence of sedentary lifestyles, proven to increase risks of many preventable health conditions, including cardiovascular disease, obesity, osteoporosis and depression.[36]
	Operation Transport schemes can enhance walking and cycling through new and more accessible, attractive and improved walking and cycling routes.	**Operation** An increase in active travel would increase the rate of physical activity leading to a potential improvement in wellbeing and improvement in physical fitness. This could lead to a decrease in conditions related to sedentary lifestyles.
Access to green space and land blight Studies[37] have shown that exposure to the natural environment, or green space, has an independent effect on health and health-related behaviours.	**Construction** Transport schemes may lead to disruption of the normal uses of, or reduced access to, and potential loss of, green space. This can reduce the use of green space and have a negative aesthetic impact on the use and perception of the green space.	**Construction** Green space can affect health by inducing beneficial physical activity and by ameliorating stress level. Reducing or disrupting access to green space may therefore have negative health consequences. The fear of land being blighted by the proposals may lead to an increase in stress and affect wellbeing.

[36] Health Scotland, MRC Social and Public Health Sciences Unit and Institute of Occupational Medicine, *Health Impact assessment of Transport Initiatives: A Guide*, 2007, p18

[37] Mitchell, R and Popham, F, *Effect of exposure to natural environment on health inequalities: an observational population study,* 2008

Determinant and Explanation	Pathways	Health Outcomes
	Operation Transport schemes can encourage active travel and improve access to local amenities, including green spaces. However, transport schemes could also lead to a loss of green space due to land-take.	**Operation** An increase in access and interaction with green spaces could lead to an improvement in mental health and wellbeing. It would also lead to an improvement in physical fitness, and a potential decrease in conditions related to sedentary lifestyles or air pollution. Loss of green space could cause the reverse of the above, as well as generate blight. This could have a further negative effect on wellbeing and health.
Air pollution Road traffic is a main source of air pollution. Pollutants that adversely impact health from road traffic include particulate matter (PM) and nitrogen dioxide (NO_2).	**Construction** Construction activities can have a short term negative impact on air quality. There can be dust from site works and construction vehicles carrying site materials or waste along with exhaust emissions from construction and other traffic due to road disruption and diversions.	**Construction and Operation** Increases in outdoor air pollution can lead to increased cardiovascular and respiratory mortality and morbidity. Some effects are more or less immediate and affect vulnerable groups (e.g. children or people whose health is already impaired) in particular, whereas the effects of long-term exposure are more widespread. PM is the constituent most closely associated with adverse health effects. Some evidence shows that PM from traffic is more toxic (per unit mass) than PM from other sources.[38] A reduction in air pollution can reduce the above adverse health effects.
	Operation Transport schemes can increase car or motor vehicle usage leading to an increase in air pollution. They can also reduce car usage, which in turn could reduce air pollution. Increased efficiency of the road network could also lead to an overall neutral effect on air pollution, as although motor vehicle usage may increase, there may be less congestion.	

[38] MRC Social and Public Health Sciences Unit and Institute of Occupational Medicine, *Health Impact assessment of Transport Initiatives: A Guide*, 2007, p26-31

Determinant and Explanation	Pathways	Health Outcomes
Noise pollution and vibration Motorised forms of transport are a common source of noise pollution.	**Construction** Construction activities can lead to an increase in localised noise and vibration. **Operation** Transport schemes can increase noise pollution and vibration through increase motor vehicle usage and the construction of new road and rail routes. They can also reduce noise and vibration by encouraging a shift from cars to active travel and public transport or through smoother traffic flows.	**Construction and Operation** Noise pollution and vibration at the levels generated by traffic can lead to annoyance, interference with speech and sleep disturbance. It can also have cardiovascular and physiological effects. Stress has been suggested as a possible mechanism through which noise may affect mental and physical health. Evidence suggests noise pollution may limit children's learning. An improvement in mental and physical health may result during operation, should noise and vibration levels decrease.
Soil and water pollution Surface water run-off containing particles from car tyres, brake linings and road surfaces contribute to the spread of hazardous substances in the environment and impact on water and soil quality. Oil and vehicle fuel also contain harmful organic substances.	**Construction and Operation** Potential for localised contamination can occur during the construction period from construction spills and road run- off. Road construction activities can bring about changes in groundwater levels and pollute nearby waterbodies. During operation, potential for pollution as a result of drainage contaminated with vehicle emission particulates and grit/salt spreading residues. Also, potential contamination as a result of fuel/chemical spillages following major traffic accidents.	**Construction and Operation** Soil and water pollution can lead to public health impacts directly when people come into contact with water and soil through recreation activities and or indirectly through the use of water for gardens or other green spaces.
Quality of life Quality of life is typically measured using a range of indices, encompassing health, happiness, prosperity, arts, safety, community, public realm, access to transport, access to green space, diet, etc.	**Construction** A combination of all pathways. Light pollution could result from an increase in lighting relating to construction activities.	**Construction** A combination of all outcomes. There is evidence showing that exposure to light at night can lead to associated problems including psychological stresses; increased cancer rates; disruption in sleeping patterns; and negative

Determinant and Explanation	Pathways	Health Outcomes
		impacts on immune systems.[39] Glare from poorly shielded outdoor lighting is also harmful to health, because it decreases vision by reducing contrast. This limits our ability to see potential dangers at night. Aging eyes are especially affected.[40]
	Operation Increasing the accessibility of transport options can lead to an increase in access to education, employment facilities, health and social care facilities, leisure facilities, and family and friends. This could improve quality of life. Community severance could reduce accessibility and hence reduce quality of life. Light pollution could result from an increase in lighting as part of transport schemes, particularly new infrastructure such as roads.	**Operation** Increased quality of life can improve wellbeing and mental health and vice versa. There is evidence showing that exposure to light at night can lead to associated problems including psychological stresses; increased cancer rates; disruption in sleeping patterns; and negative impacts on immune systems. Glare from poorly shielded outdoor lighting is also harmful to health, because it decreases vision by reducing contrast. This limits our ability to see potential dangers at night. Aging eyes are especially affected.
Personal safety and perceptions of safety More segregated spaces with limited natural surveillance may lead to enhanced fear of crime.[41]	**Construction** During construction, the perception of safety along routes could decrease due to the removal of open spaces, presence of site hoardings, construction activities, access diversions, a reduction on the attractiveness of walking and cycling, decreased interaction with other people (as construction reduces access and prevents people from walking or cycling) and the general construction environment generating noise/vibration, which may create the perception that the area is unsafe.	**Construction** Fear of crime and perception of safety can be an important factor influencing travel choices. Women's fear is generally greater than men's. Women are therefore more likely to avoid segregated spaces and disrupted routes. Elderly people and people with disabilities may also avoid disrupted routes. Personal safety may also affect decisions to walk or cycle. This has implications for public health directly (fear of crime) and indirectly (decrease in active lifestyle).

[39] http://www.britastro.org/dark-skies/health.html
[40] http://darksky.org/light-pollution/human-health/
[41] Hillier, B. and Sahbaz, O, Crime and Urban Design, 2009 In: Cooper, R. Evans, G. and Boyko, C. Designing Sustainable Cities, 2009

Determinant and Explanation	Pathways	Health Outcomes
	Operation Transport schemes can enhance actual and perceived safety through road safety improvements and increase natural surveillance. They can also enable more strangers to travel through an area which can reduce perceived safety. However, the use of underpasses could increase the fear or crime and reduce usage, in comparison to bridges.	**Operation** In addition to the above, an increased use of public transport during operation could increase interaction with other people, which could increase perceptions of a safer community through natural surveillance. This could reduce stress and improve mental wellbeing. Improvements to the walking and cycling environment should also increase perceptions of safety.
Social interaction and community severance There is an observed relationship between positive social capital and health. Well-connected and walkable neighbourhoods can enhance social capital by increasing co-presence and encounter opportunities, which are vital for interaction.	**Construction** During construction, there could be a decrease in access to services and amenities resulting from road closures/diversions and disruption to traffic and road flows. Construction can decrease transport mode and route options and can increase the cost of travel. There is also a risk of communities being severed by the construction traffic routes through an increase in the levels of traffic.	**Construction** Community severance can result from the divisive effects of major roads and railways running through an existing community including through the construction of new routes or increased traffic on existing routes. Potential severance during construction can lead to a decrease in interaction with other people. This can be of particular importance to those who rely heavily of local social networks e.g. the elderly and parents with young children. Reduced social interaction and increased community severance can reduce wellbeing and mental health as well as lead to reduced active travel and reduced physical fitness and a potential increase in obesity and cardiovascular disease.
	Operation Enhanced connectivity and new travel modes and route options could increase social interaction and reduce community severance. However, new routes through or near existing communities could increase community severance and reduce social interaction.	**Operation** An increase in social interaction and reduced community severance could improve wellbeing and mental health as well as lead to increased active travel and improved physical fitness. This could improve physical and mental health.

Determinant and Explanation	Pathways	Health Outcomes
Climate Change Greenhouse gases (GHGs) from transport contribute to climate change.	**Construction** During construction, increased vehicle movements from construction vehicles and car movements, as well as the embodied energy in construction materials, can lead to an increase in fossil fuel use and an increase in GHG emissions.	**Construction** Climate change consequences, at local level, are likely to affect the health of the population, particularly with an increase in flooding, summer temperatures, levels of solar radiation and frequency of extreme weather events leading to, for example, increased levels of fatalities, injuries, infectious diseases, heat related deaths , skin cancer cases and cataracts.
	Operation Transport schemes may reduce the efficiency in the use of roads or a reduction in car usage. These aspects could decrease the use of fossil fuels, which could lead to a reduction in GHG emissions.	**Operation** In addition to the above, a reduction in GHG emissions could have positive implications for public health.
Employment The implementation of infrastructure projects generates new employment opportunities. Employment is a positive factor for health, providing financial security and contributing to self-esteem.	**Construction** New employment opportunities can be generated by construction activities.	**Construction and Operation** The HUDU planning tool states that unemployment generally leads to poverty, illness and a decrease in personal and social esteem. People in employment are healthier, particularly those who have more control over their working conditions. Employment is also associated with income, a feeling of security, increase friendship networks and social status. In turn, these are linked to better health. These positive impacts are particularly important at a time where economic downturn is recent, which may have had negative effects on mental health.
	Operation Transport schemes may improve access to employment opportunities for various social groups.	

Source: Adapted from Highways England: M4 Junctions 3 to 12 smart motorway (Arcadis Ltd, October 2015) and Atkins Limited, South Bristol Link: Environmental Statement Volume 2: Health Impact, July 2013

An HIA considers the effects of a project on both the health of the population affected by a project overall and the distribution of those impacts within the affected population. However, it is necessary to identify particular priority groups because changes to overall health determinants can have greater or lesser effects on population sub-groups depending on, for example, their age, health status, income and social support. The term "Vulnerable or Priority Groups" is derived from the HUDU guidance.

Vulnerable sub-groups are more likely to be susceptible to the WTS's impacts than other social groups due to various factors as explained in Table 4-4. Other wider target groups including adults and professionals and the general population living in Wales may also be impacted by the WTS.

Table 4-4 Vulnerable or Priority groups and health outcomes related to the WTS

Vulnerable or Priority Groups

Vulnerable/ Priority Group	Explanation and Health Outcomes
Younger people (children and young people, up to 18)	Children and adolescents constitute a vulnerable population group due partly to their need to be able to move around freely to and from school and recreational activities, whilst they lack the experience and judgement displayed by adults when moving around in traffic and public spaces. Hence, children and adolescents as pedestrians and cyclists are at elevated risk from danger distributed by motorised transport. Furthermore, children are more sensitive than adults to air pollution, noise and other environmental factors. A particularly sensitive group is children in low-income families. Walking, cycling and travel by bus are important modes of travel for young people. Over half of children will walk to school for at least part of the week and 40 per cent will travel by bus. Bus travel is important for young people to access college, leisure facilities and work. Affordability of travel is an issue for younger people. 16-24 year olds have higher risk of becoming a road casualty. They represent 12 percent of the population but 25 percent of fatal and serious casualties. The Plan contains schemes to improve active travel opportunities, support and improve access to key services by bus, address affordability of bus fares for young people and reduce road casualties.
Women	Women are more likely to not own a car and as a result can find it harder to travel to shops, employment, healthcare and other services. They are more reliant on the provision of public transport. Women may also have more safety and security concerns when travelling alone and when there are more strangers in an area e.g. resulting from an influx of construction workers. Estimates for 2011/12 indicate 80 percent of men and 67 percent of women in Wales hold a full driver's licence, nearly identical to Great Britain as a whole. The National Travel Survey reports that women have different travel patterns to men and this has major implications for travel requirements. In particular women are: • more likely to work irregular shifts and need to commute outside normal working hours • more likely to be carers and to take escort trips • more likely to travel with luggage, bags and pushchairs • more likely to have a physical condition which makes it difficult to use the bus • are more likely than male users to say they would prefer to travel by car • are twice as likely as male users to say they feel unsafe using the bus at night The Welsh Bus Passenger Survey also reported that a substantial number of bus users who are women were also travelling with children and / or with a pushchair. Women are less likely to travel to work by car (80 percent compared to 85 percent of men) and more likely to travel by bus (6 percent compared to 3 percent).

	Overall distance travelled per year by all modes is greater for men than women. Men tend to make more commuting and more business trips than women and travel further for both purposes. Both men and women will benefit from schemes to improve the road network, public transport and active travel facilities.
Older People (50+)	Generally, the older people are, the slower their movement and reactions are and the poorer their hearing and vision can be. Therefore, older people are considered to be more sensitive as users when compared with younger and middle-aged adults. Older people can be more at risk from injury, may fear falls, and may be concerned about a lack of safe crossing points and short crossing times at safe crossing points. This can deter them from outdoor activity, especially walking, which can be critical for muscle strength and reduces the risk of falls, amongst other benefits. Older people can feel more vulnerable using public transport. They also often need to seek health services. Their continuing independence at home is often dependent on having availability to a range of transport mode and route options. Around 48 percent of pensioner households do not have access to a car compared to 26 percent of all households. The Plan contains commitments to provide funding to support socially necessary services and continue a concessionary fares scheme for older people. Public and Community Transport services provide access to key services including health but also enable improved social interaction for older people helping to tackle chronic loneliness.
People who are disabled	This group may not be able to access many forms of transport or need special arrangements and/or support to access those. They are more likely to find it difficult to walk or travel independently and can also be disadvantaged by the cost of transport. Chronically ill persons, for example, people with impaired lung function, can be more adversely affected by air pollution. The same is true of hypersensitive individuals such as asthmatics. Noise can cause hypertension and cardio-vascular problems. Those who already have these conditions can be more troubled by noise than others. People with existing physical and mental illnesses, including sleep disturbance, anxiety and depression, can be more sensitive to even small changes to their local environment. Disabled people or people with a long term illness are less likely than other people to have the use of a car (six of ten do so compared to 8 out of 10 other people). Employed disabled people are nearly twice as likely not to have the use of a car as other people. The 2010 Welsh Bus Passenger Survey reported that 25% of respondents had a disability or long term illness. Within this group, around 12% of bus users had mobility problems and 1% used wheelchairs. Disabled passengers who use buses use them as intensively as other passengers. Some 75% of disabled bus users use a bus three or more times a week, compared to 72% of bus users without a disability. This is despite disabled users having a different pattern of bus use. Compared to non-disabled bus users, disabled people are less likely to use a bus to commute and travel to education, but more likely to us a bus for shopping, visiting friends and relatives, and for leisure. Around two-thirds of passengers reporting that they had a disability or long-term illness were entitled to free concessionary bus travel because they met either the age or disability criteria of that scheme. The availability of accessible information, including on-board audio and visual announcements and a high standard of customer care are key factors impacting on equality of travel opportunities. Rail – Passenger focus published its report on the experiences of disabled rail passengers in October 2012. Key conclusions from the report were: • About 5% of rail journeys are made by passengers with disabilities or long term illness; • Half of these journeys are undertaken by people with impaired mobility; • About 1% of passengers have sensory impairment; • Passengers with disabilities tend to be older and are less likely to be in work compared to passengers in general; • 30% of journeys by disabled people are for commuting although this rises to 40% in

	peak time; • 78% of passenger journeys by disabled people are made alone, although disabled passengers are more likely to travel with another adult than other passengers (22% compared to 15%); • A railcard is used in 43% of journeys made by disabled passengers; Disabled travellers will benefit from schemes to secure improved quality and accessibility of bus services, including bus driver training, to provide funding to support socially necessary services and continue to provide a concessionary fares scheme for disabled people.
Those in low-income groups/ People without access to a car	People on low incomes (living in a deprived area is used as a proxy for a low income) and without access to a car are likely to walk further. Their lack of transport options, which may include affordability of public transport, may limit life and work opportunities. People living in deprived areas can be particularly vulnerable to road traffic incidents (deaths and injuries), noise and air pollution. Deprived areas are often characterised by higher traffic volumes as well as other environmental burdens such as industrial facilities.[42] This group is generally more likely to already have reduced access to health and social care as well as other services and amenities. This group may have existing increased stress levels due to the factors above. A poor physical environment can also act as a barrier to active travel, or travel in general. In addition, this group is more vulnerable to food insecurity (meaning "consistent access to adequate food is limited by a lack of money and other resources at times during the year"), which has an access dimension.[43]
Ethnic minority people e.g. Asian, Black	The National Travel Survey data shows that minority ethnic adults are more likely to live in a household without access to a car compared to a white British adult, so a greater reliance on public transport may exist in parts of Wales (South East and North East) where the majority of train and bus services are provided. About 60% of the passenger activity on the Wales and Borders Franchise area is focused on the Valleys Lines and Cardiff area. The same survey also suggested that minority ethnic adults make twice as many local bus trips as white adults. The ethnic background of bus users as compiled from the 2010 Welsh Bus Passenger Survey is that 93% reported that they were white, 5% were from another ethnic background, and 2% declined to answer. In comparison, around 4% of people in Wales are from a minority ethnic group. Rail – Railway crimes reported by British Transport Police and published by the Office of National statistics reported that 77 racially aggravated offences on the railways were reported in the three years to 2011/2012, representing almost 13% of the reported violent offences against the person. (Source Rail transport statistics 2011/2012 published by ONS 30 October 2012). Schemes to improve public transport, including personal safety at waiting facilities and on vehicles, and the availability and accessibility of public transport information in the Plan will impact positively on all public transport users including those from minority ethnic backgrounds.

Source: Adapted from Highways England: M4 Junctions 3 to 12 smart motorway (Arcadis Ltd, October 2015) and Atkins Limited, South Bristol Link: Environmental Statement Volume 2: Health Impact, July 2013[44] as well as the National Transport Finance Plan 2015 – Impact Assessments [45]

Data Gaps

- Up to date national data relating to access to open space.

[42] Greater London Authority, London Health Commission and London Health Observatory (2002) Rapid review of health evidence for the draft London Plan; and Jarvis, S., Towner, E. et al 1995 cited in Cave, B (2001) "Accidents" in The health of our children ed. Botting, B, London, Office of Population Censuses and Surveys, HMSO

[43] S.Tsang, MHSc, RD (1); A.M.Holt, MHSc(2); E.Azevedo, MSc, RD (1), An assessment of the barriers to accessing food among food-insecure people n Cobourg, Ontario, Chronic Diseases and Injuries in Canada, Volume 31, no.3, June 2011

[44] The APHO website includes the SBL report as a good practice example of an HIA for a road project: http://www.apho.org.uk/resource/item.aspx?RID=136453

[45] https://gov.wales/sites/default/files/publications/2017-08/national-transport-finance-plan-2015-impact-assessments.pdf

- Up to date data regarding the specific distribution of hospital or healthcare facilities in Wales.
- Information relating to the potential impact of the WTS on transgender people.
- Information relating to the potential impact of the WTS on people by religion and belief or non-belief.
- Information relating to the potential impact of the WTS on people by sexual orientation.
- Information relating to the potential impact of the WTS on Asylum Seekers and Refugees
- Information relating to the potential impact of the WTS on Gypsies and Travellers
- Information relating to the potential impact of the WTS on Migrants
- Impact of health emergencies on transport
- The health impacts of schemes such as smart motorways
- Data relating to the national cycle network
- Data relating to the national walking networks and Wales Coastal Path
- There are also relevant data gaps to be considered from the data collated from the 2011 Census, as it may not be accurate to the current population and these figures will not be updated until 2021/2022.
- Information relating to the percentage of men and women using different modes of public transport within Wales.
- For all data collected, there may be gendered differences that are not reflected in the sources they were collected from.

4.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

Overall health statistics for Wales are improving with life expectancy increasing and fewer people with reported poor health over the past decade however health gains are not distributed equally across the country and in particular access to services is varied, being good in more urban areas, notably the south, but relatively poor across much of rural Wales. Although the health of those living in rural communities is generally good compared to those of urban environments.

Factors specific to a rural environment compared to those of urban environments that can impact on health more significantly and lead to inequalities and poorer health, such as distance from public services and support, availability of transport and the ageing population. Access to healthcare can be limited in many parts of rural Wales.

Whilst people are living longer and the rates of some diseases is decreasing, challenges such as living environment and modern lifestyles can contribute towards increasing levels of chronic diseases such as diabetes, joint problems, heart disease and some cancers which in turn can lead to disability and increased demand on health services. In addition, poor mental health can also be an underpinning factor in a number of physical diseases and unhealthy lifestyles. Poor air quality, noise and light pollution as well as road traffic accidents can have direct effects on the physical and mental health of the population.

The transport system could be put under strain through a projected increase in net-migration mainly from within the UK and with urban areas projected to see greatest increase.

Increasing levels of those aged 65 and over could present pressures across the country (dependent on whether healthy life expectancy i.e. the number of years you live a healthy life, continues to track overall life expectancy) e.g. provision of appropriate services for an older generation (e.g. transport).

Issues relating to young people relate to their transition from dependence to independence, as transport plays an important role at particular ‘trigger points’ such as the move from primary to secondary school, and the move from education to employment.

Health inequalities reflect inequalities in the distribution of health determinants, such as access to transport, education and employment opportunities.

Issues relating to women specifically can relate to a fear of crime on public transport.

Physical accessibility to transport may have an effect on disabled people accessing public transport.

There is still a high risk of road casualties for younger people which must be addressed by the WTS.

There is still a large disparity between the number of drivers' licenses owned by women and men, with women having much fewer, this makes it more difficult for women to have the same access to facilities and amenities as men.

Chronically ill or disabled people are extremely sensitive to noise or air pollution in their local environment, with impacts ranging from sleep disturbance to hypertension.

People on low incomes (living in a deprived area is used as a proxy for a low income) and without access to a car are likely to walk further. Their lack of transport options, which may include affordability of public transport, may limit life and work opportunities. People living in deprived areas can be particularly vulnerable to road traffic incidents. This group may also have increased stress levels, a poor physical environment can be considered a barrier to active travel.

Minority groups are more likely to live in a household without a car and so will be more reliant on public transport. 77 racially aggravated offences took place across three years on British railways. The WTS must provision for the safety and inclusion of minorities across all modes of public transport.

Women and minority groups are more likely to travel by bus, however more investment is being put into rail as a method of public transport. The WTS must provision for a more equal Wales by placing the necessary investment in the public transport most used by these groups or removing any potential barriers to other types of transport to these groups.

The gender pay gap overall is increasing within Wales. The WTS must ensure that men and women working for the transport system are paid equally for carrying out the same job.

Levels of noise pollution around key roads within Wales are high. Noise can have multi-ranging effects, including on landscape receptors, ecological resources and human health.

Opportunities

Overall, the WTS must help to achieve the important balance of economic and social improvement that is also sustainable and respects the country's valuable natural and cultural environment.

The WTS could seek to re-balance its investments, to commit a greater percentage of spending on the national cycle network in Wales.

Build on the potential of the Valleys Regional Park (which is in the NDF), establish a Wales-wide National Greenways Programme, which will provide better access to green and blue space for everyone, with partners such as the National Parks, Sustrans Cymru, Ramblers Cymru and Living Streets Wales

The WTS could recognise the potential for natural green spaces as places for health and recreation, connecting habitats and supporting community interaction. Improving the access to green and open spaces can greatly encourage healthier lifestyles and a healthier population could enable people (including children) to achieve their potential and to make Wales a more equal society.

The WTS has an important contribution to make towards ensuring that human health is provisioned through improved access to health facilities, a focus on reducing air pollution emissions, road safety and the encouragement of active travel in order to improve health and well-being and reduce inequalities.

Overall, the WTS can help to address issues surrounding the aging population through facilitating the provision of accessible transport services supported by connective infrastructure to meet local population growth needs.

An equal Wales can enable people to reach their full potential whilst addressing social, economic, cultural and environmental inequality. The WTS could provide an opportunity to reduce isolation and encourage the development of integrated and liveable communities through provisioning the inclusivity of public transport to allow everyone to have the same level of access. The WTS could provide funding to local authorities to remove access barriers (gates, bollards, bins and other street clutter) to the National Cycle Network in Wales (ie the physical barriers to entrances that make wheelchair, adapted cycles and pushchair access difficult; as well as making it hard for blind or partially sighted people to navigate that landscape)

The transport system could ensure that all groups are able to access public transport and the transport network equally and without fear or prejudice.

5 Well-Being Goal: A Wales of Cohesive Communities

This section provides baseline data relating to the following well-being goal:

'Attractive, viable, safe and well-connected communities.'

The data relates primarily to:

- Crime and Safety

5.1 Overview of Baseline Conditions

5.1.1 Crime and Safety

Relevance to the WTS

The creation of cohesive communities which are attractive, well-connected, safe and meet the needs of the population are important for Wales and the Wales Transport Strategy. The WTS has a key role to play in helping to guide decisions through the planning process relating to the development of space which can help to reduce crime related to transport. Further information on this topic is included in Chapter 4 relating to Health and Well-being. Other aspects relating to the connectivity of communities are included throughout this Appendix.

Baseline Conditions and trends

Percentage of people feeling safe at home, walking in the local area and when travelling

In 2019, In the National Survey[46], people were asked how safe they felt in a variety of situations after dark:

- 81% of people said they felt safe walking alone in their local area after dark;
- 97% of people felt safe at home after dark;
- 79% of people felt safe on public transport after dark; and
- 97% of people felt safe travelling by car after dark.

Percentage of people satisfied with local area as a place to live

In 2019, the National Survey included a series of questions on the quality of the local area. These were included in the survey to help investigate the environmental dimension of well-being.

- 72% of people were satisfied with the level of traffic noise in their local area; and
- 73% of people were satisfied with the level of air pollution in their local area.

Latest figures for year ending September 2019[47] show the total crime rate per 1000 number of vehicle owning households / unweighted base households in England and Wales. Broken down in key transport related crime statistics the crime rates compared to the change from year ending September 2018 figures are as follows (Source ONS):

- Total Vehicle related theft – 45/1000 (-5%)
- Theft from vehicles – 33/1000 (-4%)
- Theft of vehicles – 3/1000 (-19%)
- Attempts of and from vehicles – 9/1000 (-2%)
- Criminal damage to a vehicle – 36/1000(-8%)
- Bicycle theft – 25/1000 (-2%)

[46] National Survey for Wales, 2018-19 Community cohesion and safety in the local area Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-11/community-cohesion-and-safety-local-national-survey-wales-april-2018-march-2019-739.pdf

[47] Office for National Statistics https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/crimeinenglandandwales/yearendingseptember2019

In the report, Family Spending in the UK: April 2017 to March 2018[48], it was found that the top spending category in Wales is transport, with households in Wales spending 15% of their total expenditure in this category, this mirrors the statistic that 85% of households in Wales owned a car or van in this three-year period. Households in Wales spent an average of £25.80 a week on the purchase of vehicles, which was 5% of total expenditure.

Crime on the rail network in Wales in 2017-18 increased by 15% compared to the previous year. Prior to this, the number of offences had been relatively stable. The largest categories of recorded offences were public order (308), violence against the person (294) and theft of passenger property (199), which accounted for 59%[49].

Transport user's satisfaction

Passenger satisfaction figures were collected by the National Passenger Survey (NPS)[50], in a report called 'Overall passenger satisfaction with their journey on Arriva Trains Wales', it was found that in August 2018, 7% of passengers were dissatisfied with the service, 11% were neither satisfied nor dissatisfied and 82% were satisfied with the service. Across all regional operators 79% of passengers were satisfied with the service.

A study of Public Service Vehicles (buses and taxis) found that bus fares in Wales increased by 3.6% from 2017 to 2018[51].

Road accidents by area by year and people killed or seriously injured on roads

In 2018, 103 people were killed (2 more than in 2017) and 1,028 people seriously injured on Welsh roads (69 more than in 2017).

In 2018, there were 4,215 road accidents in Wales involving personal injury recorded by the police, a reduction of 333 on 2017 (7.9% reduction). These recorded accidents resulted in 5,759 casualties.

Although there has been a slight increase in road traffic deaths and serious injuries, the number of road traffic accidents in general in Wales is trending downwards as the volume of traffic on the roads is trending upwards.[52]

Railway Incidents

In 2017, there were 13 railway fatalities, 11 of which were suicides.

In 2017-18 there were 1,369 notifiable offences reported on Welsh railways, an increase of 15.3 per cent from previous years.[53]

Data Gaps

Data relating to crime and death/injury on buses or in bus stations.

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[48] Office for National Statistics https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/bulletins/familyspendingintheuk/financialyearending2018#spending-levels-on-transport-in-fye-2018-remained-similar-to-fye-2017

[49] Rail Transport, April 2017 to March 2018, Welsh Government, 2019 https://gov.wales/sites/default/files/statistics-and-research/2019-04/rail-transport-april-2017-to-march-2018-824.pdf

[50] StatsWales.gov https://statswales.gov.wales/Catalogue/Transport/rail/rail-transport/overallpassengersatisfactionwiththeirjourneyonarrivatrainswales-by-timeofsurvey

[51] Public service vehicles (buses and taxis), 2017-18 Statistical Bulletin Source: https://gov.wales/sites/default/files/statistics-and-research/2019-03/public-service-vehicles-buses-and-taxis-april-2017-to-march-2018_0.pdf

[52] Police recorded road accidents, 2018 Statistical Bulletin Source: https://gov.wales/sites/default/files/statistics-and-research/2019-06/police-recorded-road-accidents-2018.pdf

[53] Rail Transport, April 2017 to March 2018 Statistical Bulletin Source: https://gov.wales/sites/default/files/statistics-and-research/2019-04/rail-transport-april-2017-to-march-2018-824.pdf

5.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

Bus fares are rising in cost at a rate higher than inflation, this could exclude some people or communities from this form of transport due to a price barrier.

The number of deaths on the road is remaining consistent year to year when it should be improving, more efforts should be made to provision the safety of drivers as much as possible.

Rural Isolation and loneliness can lead to mental health problems, this can be caused by a less accessible transport system reducing access to communities.

When people are travelling, they should be able to do so without the fear or threat of crime.

Opportunities

The creation of safe and well-maintained communities, where there is a sense of cohesion, should be a priority.

The WTS could consider transport schemes that will improve road safety, as transport schemes can improve road safety, which can improve actual and perceived road safety.

Transport schemes can improve road safety, which can improve actual and perceived road safety. Driver stress can also be improved by the introduction of transport schemes,

Driver stress can be improved by the introduction of transport schemes**,** the WTS could also plan for reducing the need to travel; and provide opportunities to access new and existing development and services by a range of sustainable travel modes and or improvements to digital connectivity.

The WTS could consider strategic transport proposals in terms of the opportunities they present to encourage regional equality as well as improving human health, landscape and nature conservation from a reduction in noise and light pollution.

6 Well-Being Goal: A Wales of Vibrant Culture and Thriving Welsh Language

This section provides baseline data relating to the following well-being goal:

'A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.'

The data relate primarily to:

- Welsh Language;
- Landscape and Townscape Character; and
- Cultural and Heritage Assets.

6.1 Overview of Baseline Conditions

6.1.1 Welsh Language

Relevance to the WTS

Wales is a bilingual country and the Welsh language is an important component of Welsh national identity and culture. As such, the protection and promotion of Welsh Language needs to be a core element of the WTS. Cymraeg 2050[54] sets out that Welsh-medium immersion education is our principal method for ensuring that children can develop their Welsh language skills, and for creating new speakers. The WTS should seek to ensure that access to Welsh-Medium education facilities is specifically targeted as part of this aim, to support the strategy seeking to expand Welsh-Medium education provision. The WTS could also seek to support the aim to increase the range of services offered to Welsh speakers, and an increase in use of Welsh-language services. The WTS could also seek to 'support the socioeconomic infrastructure of Welsh-speaking communities' through its policies, helping to support the aim of 'Develop[ing] a new regional focus to economic development to help all parts of Wales to benefit from prosperity and support each area to develop its own distinctive identity.' Within the WTS there will be opportunities to promote the Welsh language through its use in station announcements, road signs and signs within rail and bus stations.

Baseline conditions and trends

The historic decline in use of the Welsh language has been halted and has now been on a general upward trend since the early 1990s. This is, in part due to Welsh entering the national curriculum and being a compulsory subject in schools. However, levels of fluency are still low and there are large regional variations.

The Welsh language use survey is funded jointly by Welsh Government and the Welsh Language Commissioner. It provides information about Welsh speakers' use of the Welsh language. The average fluency across Wales is 29%, this can be seen in Figure 6-1 which shows the fluency of Welsh people across local authorities.

Attitudes towards the Welsh Language

In the National Survey for Wales 2017-18[55], Welsh Language: Confidence and attitudes, it was found that:

In terms of ability –

- 19% of adults aged 16 and over reported that they can speak Welsh, with a further 12% reporting to have some Welsh-speaking ability.
- Younger people aged 16 to 24 were most likely to be able to understand, speak, read and write Welsh.

In terms of confidence –

[54] https://gov.wales/sites/default/files/publications/2018-12/cymraeg-2050-welsh-language-strategy.pdf
[55] National Survey for Wales, 2017-18 Welsh Language: Confidence and attitudes Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-01/national-survey-wales-welsh-language-confidence-attitudes-2017-18.pdf

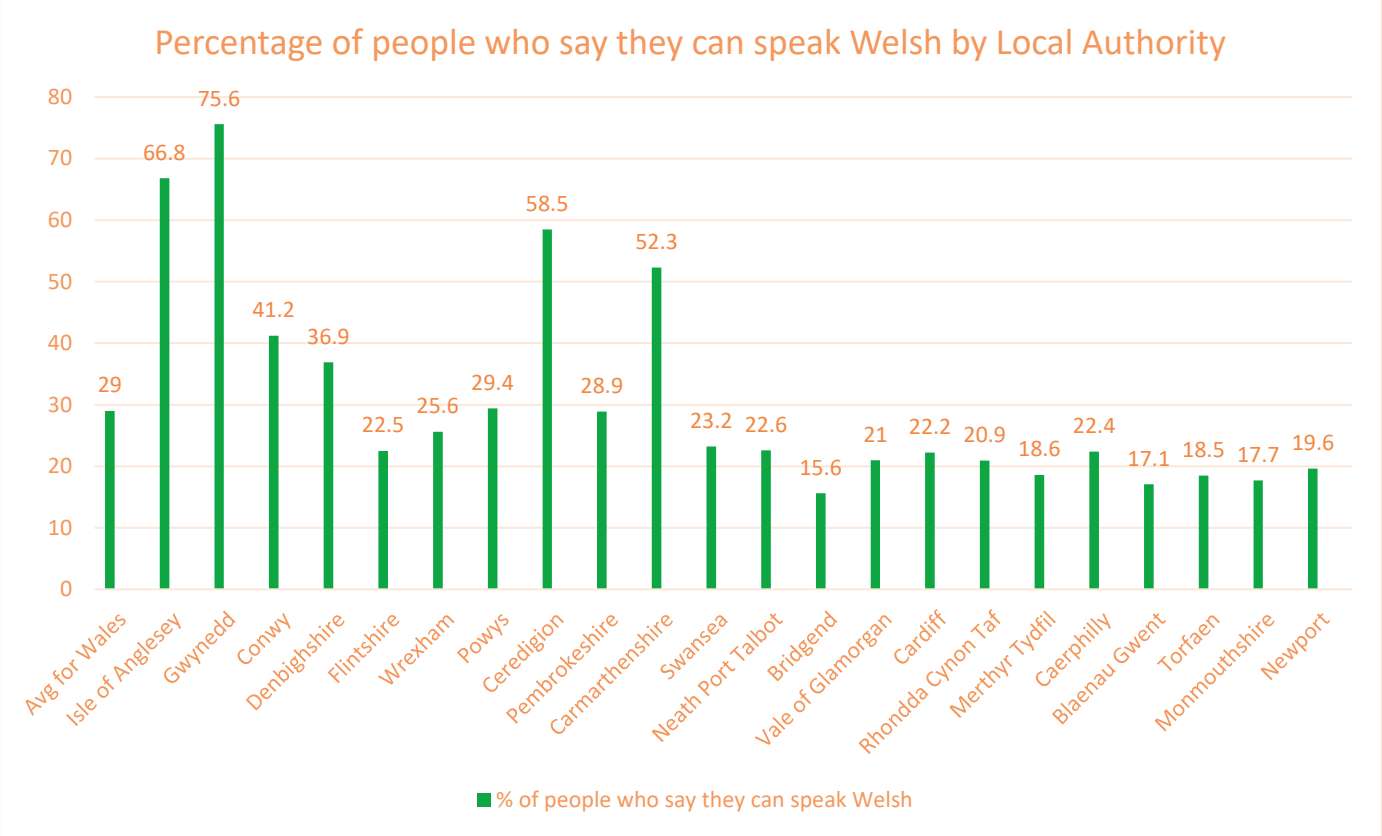
- 68% of Welsh speakers felt confident speaking Welsh. 72% wanted to speak it with other Welsh speakers and 36% worried they would be judged on how well they spoke it.
- Welsh speakers' fluency levels were strongly correlated with their confidence when speaking Welsh.
- 95% of fluent Welsh speakers were confident speaking Welsh; however, 21% of fluent speakers worried they'd be judged on how well they speak it.
- Women were slightly more likely than men to worry about feeling judged.

In terms of attitudes –

- 86% of people felt the language was something to be proud of.
- 67% thought more effort needed to be put into supporting the language.
- 62% of those who couldn't speak Welsh would like to be able to speak it, and 85% of those with some ability in Welsh wanted to speak it better.
- People were least likely to agree with the statement 'The Welsh language will be stronger in 10 years' time': 40% agreed with that statement. Those living in the North East of Wales were least likely to agree with this statement.

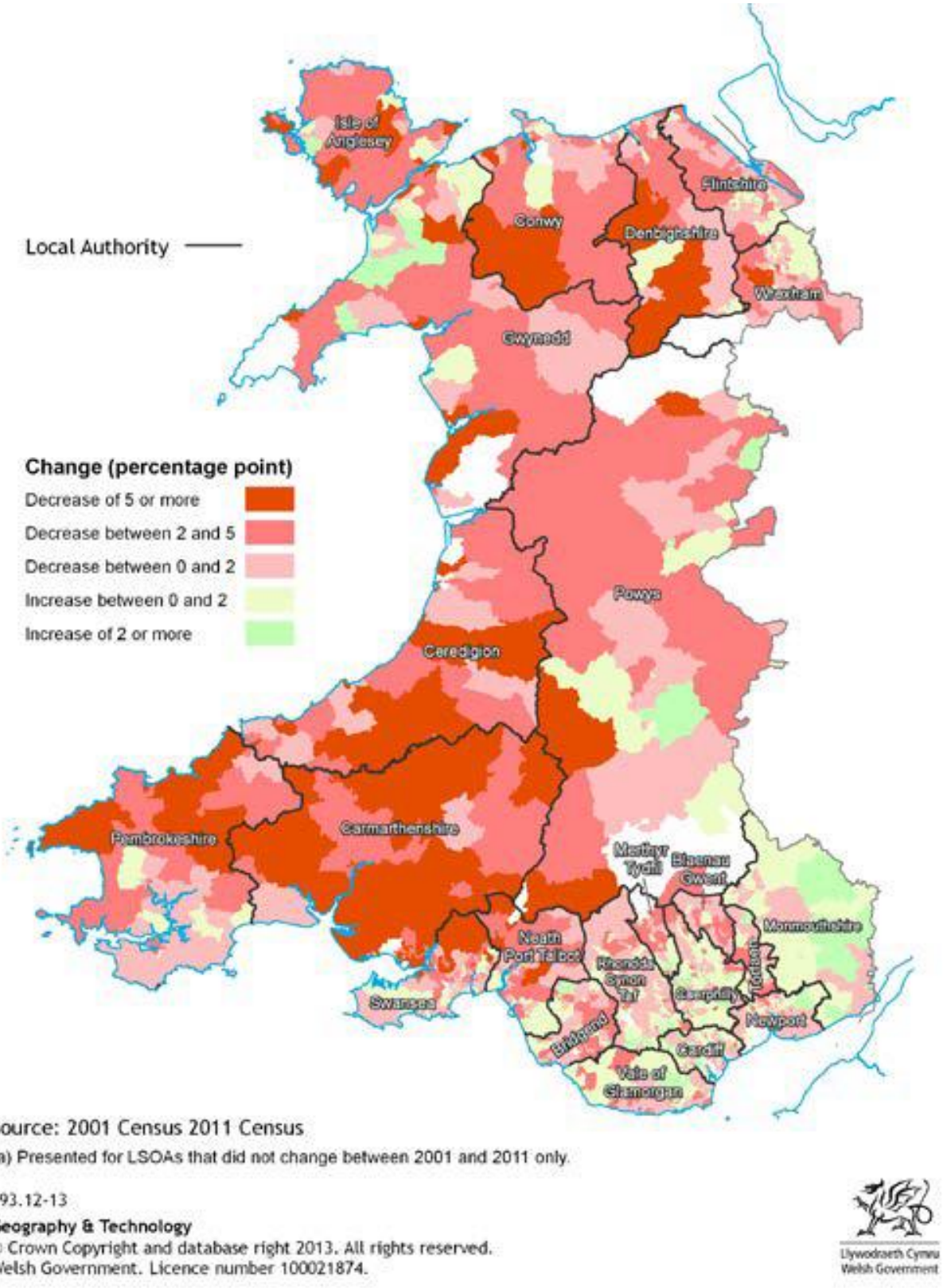
The Annual Population Survey[56] (last updated January 2020) found the percentage of people who can speak Welsh by Local Authorities:

Figure 6-1: Percentage of Welsh Speakers who are fluent by local authority area



[56] StatWales.gov https://statswales.gov.wales/Catalogue/Welsh-Language/Annual-Population-Survey-Welsh-Language/annualpopulationsurveyestimatesofpersonsaged3andoverwhosaytheycanspeakwelsh-by-localauthority-measure

Figure 6-2 Change in proportion of people able to speak Welsh by LSOA, 2001 to 2011



Source: Cymraeg 2050[57]

[57] https://gov.wales/sites/default/files/publications/2018-12/cymraeg-2050-welsh-language-strategy.pdf

Data Gaps

There are no specific statistics found with regards to the satisfaction of Welsh speakers and their ability to travel using Welsh.

6.1.2 Landscape and Townscape Character

Relevance to the WTS

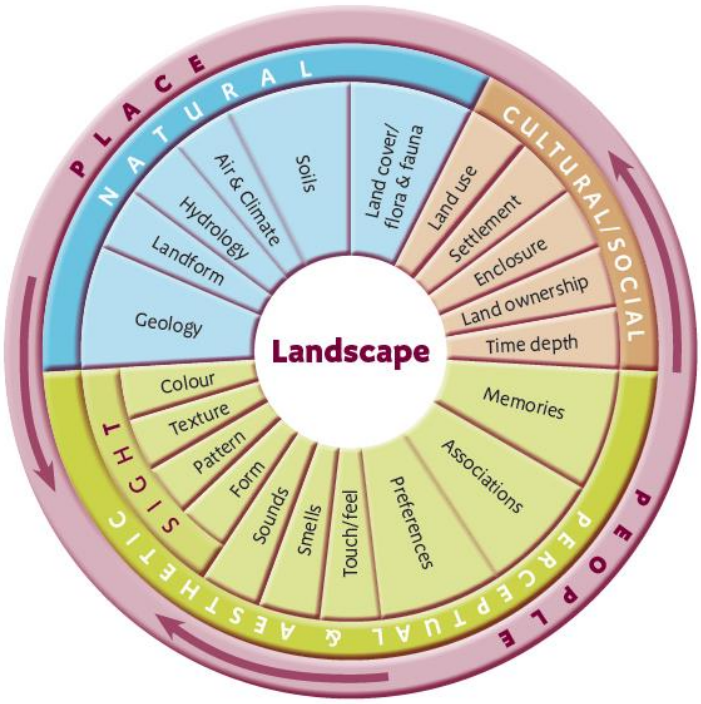
Welsh landscapes reflect the extent and condition of a range of natural resources and ecosystems against the complexity of human influences and land-use decisions. Townscapes and urban character also reflect a long history of human development. Similarly, seascape information complements the landscape/townscape information and together the two types of information provide an understanding of the cultural benefits to be had from both the terrestrial and the marine environment.

These elements have been strongly shaped by human intervention and land-uses throughout history and the WTS will continue to play an important role in shaping this character through its guidance on transport infrastructure planning. Landscape, townscape and seascape character are important in terms of Wales' strong sense of place and cultural identity with close links to the tourism industry.

Transport can have many potential impacts on landscape and townscape character, negative impacts could be new infrastructure developments reducing the visual amenity of a valued landscape by building a new road through it, or the removal of buildings or green spaces within towns for road widening schemes that may have value to the local community. A positive potential impact could be enhanced access to greenspaces and viewpoints.

Figure 6-3 is from the 2014 Landscape Character Assessment (LCA Approach directly adapted from the 2002 guidance) and shows the range of factors generally considered to be part of landscape[58].

Figure 6-3 The range of factors generally considered to be part of landscape



[58] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691184/landscape-character-assessment.pdf

Baseline conditions and trends

Wales has a varied and, generally high-quality landscape with over 50% of the land area being nationally valued for its scenic quality and character. Many Welsh landscapes are iconic with a clear sense of place and recognisable identity (SoNaRR, 2016). The country is predominantly rural in character with 60% of the landscape defined as Field Pattern/Mosaic and 20% is categorised as Open Land (SoNaRR, 2016).

National landscape change to 2015 has been small overall, but some changes have been substantial locally. The key contributors to landscape change in the built environment include: the expansion of settlements, commercial and industrial developments, quarries and road improvements, onshore windfarms, turbines and large recreational related developments. In the rural environment examples include: the felling of conifers and replanting with broadleaves, woodland expansion and changing bracken cover.

Climate change over time is likely to have significant impacts on landscape character, local distinctiveness and quality, directly through changing land cover (migrating habitat and species ranges) and indirectly by influencing land use decisions. Landscape changes may also be evident from mitigation measures, such as renewable energy generation, water resource management and adaptation through the planned expansion of woodland. Climate change also poses a risk to landscapes from pests, pathogens and invasive species and from changes in frequency and/or magnitude of extreme weather and wildfire events.

25% of Wales is designated as either National Park or Area of Outstanding Natural Beauty.

Protected Landscapes

Within Wales there are three National Parks; Brecon Beacons, Pembrokeshire Coast and Snowdonia. Each National Park also has local planning authority status in Wales. Combined these National Parks in Wales cover around 20% of the land area of Wales. The locations of the National Parks in Wales are presented on Figure 2 – Landscape Features.

Brecon Beacons

The Brecon Beacons National Park contains some of the most distinctive upland landforms in southern Britain. The Park covers 520 square miles (1344 square kilometres) and lies between rural Mid Wales and the industrial South Wales Valleys. It is a diverse landscape, where sweeping uplands contrast with green valleys, with dramatic waterfalls, ancient woodland, caves, forests and reservoirs. The highest point is Pen y Fan, at the centre of the National Park. Its distinctive table topped summit stands at 886m, and it is climbed by hundreds of thousands of people each year.

The National Park is also home to 33,000 people, over 9000 different plants and animals, and has a strong Welsh heritage and rich economic, social and cultural life. The largest settlement is the cathedral town of Brecon with a population of approximately 7,500[59].

Snowdonia National Park

The Snowdonia National Park takes its name from Snowdon which, at 1085m (3,560 feet), is the highest peak in Wales. The Snowdonia National Park is rich in landscape and townscape and has 60km of coastline. In addition to this, Snowdonia has extensive areas of woodlands and over 96,000 hectares of moorland. The landscape within the National Park has been formed over millions of years. Since the end of the last Ice Age, 10,000 years ago, the interaction between people and nature has shaped the landscape of the National Park and there are strong cultural associations between people and place. The traditional rural character of settlements is distinct to the National Park and forms part of its historic landscape character. Fourteen towns and villages in Snowdonia have Conservation Areas and there are 1,900 listed buildings, 13 being Grade I and 116 buildings at Grade II*, there are also 21 Historic Parks and Gardens within the National Park. The Welsh language is a fundamental part of the area's culture. Welsh is the spoken and written language of approximately 62% of the population of Snowdonia and in some communities the percentage is as high as 85%. The 2001 Census showed a population of 25,482, with a small increase to 25,745 in the Mid-2006 Population Estimates for National Parks[60].

[59] Brecon Beacons National Park Authority Local Development Plan 2007-2022
[60] Eryri Local Development Plan 2007-2022

Pembrokeshire Coast National Park

Pembrokeshire Coast National Park boasts some of the most spectacular scenery and diverse wildlife in Britain including internationally important nature reserves, geology and archaeology. The Park was designated in 1952 and remains the only UK National Park recognised primarily for its coastline. It is one of the smallest UK National Parks; but has one of the most diverse landscapes – sandy beaches, rugged cliffs and islands, quiet wooded estuary and hill country with big sea views. The Park covers 232.5 square miles (602 sq km). At the widest point, it is about 16km, at its narrowest about 100m. Around 22,500 people live in the National Park[61].

In Wales, there are five AONBs: Anglesey, Gower, Llŷn, the Clwydian Range and Dee Valley and Wye Valley. See Figure 2 – Landscape Features.

Anglesey AONB

Designated in 1966 the Isle of Anglesey's AONB, has one of the most distinctive, attractive and varied landscapes in the British Isles. It is also home to approximately 7,000 people. Some of the main features of the Anglesey AONB are:

- Low cliffs alternating with coves and pebble beaches;
- Sheer limestone cliffs interspersed with fine sandy beaches; and
- Stretches of sand dunes with beaches.

A number of the habitats found on Anglesey are afforded even greater protection both through UK and European designations because of their nature conservation value, these include:

- 5 Special Areas of Conservation;
- 3 Special Protection Areas;
- 1 National Nature Reserve;
- 31 Sites of Special Scientific Interest; and
- 75 Scheduled Monuments[62]

Gower AONB

The Gower AONB was designated in 1956 for its classic limestone coast and the variety of its natural habitats, it was the first AONB designated in the UK. Rich and diverse, Gower's scenery ranges from fragile dune and salt marsh in the north to the dramatic limestone cliffs along the south coast, intercut by sand beaches. Inland, the hills of Cefn Bryn and Rhossili Down dominate the landscape of traditional small fields, wooded valleys and open commons[63].

Pen Llyn AONB

The Pen Llyn was designated as an AONB in 1956, the third to be designated in the UK. The Llŷn Peninsula is renowned for its diverse and interesting coastline. The AONB encompasses around one quarter of the peninsula a total of 15,500 hectares, mostly along the coast, but it also extends inland and includes prominent igneous protrusions. Llŷn, whose complex geology includes ancient pre-Cambrian rock formations, is a natural extension of the Snowdonia massif. The geology is typified by the wide variation of coastal landscapes, ranging from the steep cliffs of Aberdaron Bay and promontories to the sand dune systems in the Abersoch area. The highest point in Llŷn is the Eifl (564m) mountain range which levels out to a plateau that extends towards the sea and the black rocks of Mynydd Mawr at the tip of the Peninsula. The area is typified by narrow and winding roads, farms and whitewashed cottages and also includes open areas of ancient common land[64].

Clwydian Range and Dee Valley AONB

The Clwydian Range was designated as an AONB in July 1985, then in November 2011 the Welsh Government's Environment Minister confirmed a southerly extension to include much of the Dee Valley from

[61] http://www.pembrokeshirecoast.org.uk/?PID=552
[62] http://www.anglesey.gov.uk/planning-and-waste/countryside/areas-of-outstanding-natural-beauty-aonbs/aonbs-in-wales/
[63] http://www.swansea.gov.uk/aonb
[64] Penrhyn Llŷn Area of Outstanding Natural Beauty, Management Plan, 2010-2015

Corwen to Newbridge along with stunning natural features such as the Eglwyseg Escarpment, Horseshoe Pass and Esclusham Mountain. At the same time the whole area became known as the Clwydian Range and Dee Valley AONB. Its special qualities include historic landmarks such as Pontcysyllte Aqueduct and Canal and the Iron Age hillforts that crown the Clwydian Range. They also include cultural and artistic inspirations such as the eisteddfodau held all over the area, its quarrying and mining heritage[65].

Wye Valley AONB

The rich combination of breath taking views, impressive geology, historic legacies and diverse wildlife in the valley of the River Wye between Hereford and Chepstow led to the designation, in 1971, of the valley and adjoining plateaux and hills as an AONB. The Wye Valley AONB covers 92km (58 miles) of the lower reaches of the River Wye totalling an area of 327km^2. It stretches from Mordiford in the north, just east of the city of Hereford, southwards to the outskirts of Chepstow[66].

The location of AONBs in Wales are presented on Figure-002 Landscape Features.

Quality of Landscapes

The most detailed landscape baseline in Wales reporting on landscape state, condition and trend is LANDMAP. LANDMAP is an all-Wales landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated. LANDMAP explains the physical, geological, ecological, visual, historic and cultural landscape: the summary descriptions, evaluations and management recommendations aid understanding of landscape and identify important landscape qualities and characteristics. By capturing multi-dimensional landscape information, it ensures that all aspects of the landscape can be taken into account. It is the focus for landscape monitoring in Wales, enabling the tracking of change and identifying key factors determining landscape change, condition and resilience.

Landscape Character Areas (LCAs) are identified at both a local planning authority level and at a national level, with 48 National Landscape Character Areas (NLCA) identifying regional landscapes. They offer overall landscape summaries linked to the five LANDMAP layers, key characteristics, and forces for change, and may be linked to design or sensitivity studies.

Special Landscape Areas that identify areas of high landscape importance, often linked to LCAs, are identified by some authorities (SoNaRR, 2016) within Wales there are many of these landscapes designated.

Marine Character Areas

70% of Wales' coastline is designated or registered AONB, National Park, Heritage Coast or Historic Landscape (Seascapes and Marine Planning in Wales, 2014). Seascape information complements available landscape information and together the two types of information provide an understanding of the cultural benefits to be had from the marine environment. There 29 national Marine Character Areas (MCAs) (National Seascape Assessment for Wales, NRW Evidence Report 80[67], the 50 Regional Seascapes (Welsh seascapes and their sensitivity to offshore developments, CCW Policy Research Report 08/5, 2009) and the local Seascape Character Assessments (SCA) of Pembrokeshire, Snowdonia and Ynys Mon provide comprehensive seascape information for Wales as a whole.

Landscapes of Historic Importance

The landscape of Wales is a vital resource for social, economic, cultural and environmental well-being. It has also been historically shaped by human activity and is rich in evidence of the past. To recognise the value of historic landscapes, and raise awareness of their importance, Cadw, in partnership with NRW and the ICOMOS UK compiled a Register of Landscape of Historic Interest in Wales. The Register identifies 58 landscapes of outstanding or special historic interest, which are considered to be the best examples of different types of historic landscapes in Wales. Figure 3 – Heritage Features shows the locations of historic landscapes.

The Register provides information to decision makers and landscape managers, to help ensure that the historic character of the landscape is sustained, and that where change is contemplated, it is well-informed (Cadw).

[65] http://www.clwydianrangeaonb.org.uk/landscape/
[66] Wye Valley Area of Outstanding Natural Beauty (AONB), Management Plan, 2015 – 2016
[67] http://naturalresources.wales/our-evidence-and-reports/marine-character-areas/?lang=en

6.1.3 Dark Skies and Tranquil Areas

Relevance to the WTS

It is recognised that dark skies and tranquil areas can bring benefits to an area including enhancing the environment, attracting visitors and can boost the local economy. The WTS has a key role to play in helping to guide decisions through the planning of new transport networks.

Baseline Conditions and trends

Dark sky areas are a good indicator of very low light pollution. There are three locations in Wales that have been designated as part of the International Dark Sky Places Program. These are:

- Brecon Beacons National Park (Dark Sky Reserve status)
- Snowdonia National Park (Dark Sky Reserve status)
- Elan Valley Estate, Powys (A Silver-tier International Dark Sky Park)

The Countryside Council for Wales (now NRW) commissioned a tranquil areas assessment in 2009, following an earlier assessment in 1997. This identified 55% of Wales (11,600 km^2) as tranquil in 2009, a loss of 1500km^2 of tranquil landscapes from 1997.

The two largest Tranquil Areas on the 2009 Map are both over 1,000km^2. These areas are parts of the Berwyn Mountains, bordered by the towns of Dolgellau, Bala, Llangollen and Welshpool, and the southern part of the Cambrian Mountains, bordered by Llangurig, Rhayader, Llandovery, Lampeter and Tregaron.

Between 1997 and 2009, there was a loss of Tranquil Areas of nearly 1,500km^2 of land. This is over 6% of the total land area of Wales; and is greater than the area of the Brecon Beacons National Park.

Data Gaps

No significant data gaps have been identified for this topic at this stage.

6.1.4 Historic Environment, Cultural and Heritage Assets

Relevance to the WTS

Cultural heritage comprises archaeological remains, intact structures and relict landscapes associated with past human activity. This section also covers cultural activities undertaken by the population. Wales has a large number of designated and non-designated cultural heritage assets reflecting its long history of human occupation. Many of these provide important tourist attractions in addition to being central to Welsh cultural identify.

The WTS has a key role to play in the provisioning of access, protection and enhancement of cultural heritage through guiding decisions made in the planning system. New development can have a range of direct and indirect effects on heritage assets which need to be avoided or mitigated. This includes effects from noise and air pollution from construction of busy traffic routes in close proximity to culturally significant areas which may make them less appealing to visit or decrease their visual amenity (indirect effects), it also includes the physical removal of heritage assets as this may be required for the development of new travel infrastructure. Impacts on the historic environment can include the intensification of existing traffic or the construction of new road or rail. Increasing levels of congestion can affect historic towns, cities and the countryside, while development of new transport infrastructure can affect historic landscapes and may cause direct damage to heritage assets.

Transport infrastructure may also be an important historic asset in its own right from prehistoric trackways and Roman roads, to medieval bridges, the development of canals and railways during the industrial revolution and the introduction of motor transport and aviation in the 20th century.

Baseline conditions and trends

Heritage assets in Wales are numerous. This section describes the key types of asset present.

World Heritage Sites

World Heritage Sites are regarded as being universally important and 'belonging to all the peoples of the world, irrespective of the territory on which they are located'. They are listed by UNESCO.

Wales currently has three world heritage sites:

- The Castles and Town Walls of Edward I in Gwynedd at Caernarfon, Conwy, Beaumaris and Harlech in North-West Wales;
- Blaenavon Industrial Landscape in South-East Wales; and
- Pontcysyllte Aqueduct and Canal in North-East Wales.

Each of these cover large areas straddling a number of local authorities and have management plans which detail the planning policies of each authority regarding the protection of the World Heritage Sites. Some, such as Pontcysyllte, have buffer zones to add a supplementary degree of protection within the landscape adjacent to the site while others, such as Edward's Castles, have defined their Essential Setting and Significant Views within the management plan to protect the surrounding area. Each of the Welsh World Heritage Sites, their buffer zone, or their essential setting/significant view contain privately owned houses or land. Figure 3 – Heritage Features shows the locations of the World Heritage Sites in Wales.

Listed Buildings

The National Assembly for Wales is required by law to compile lists of buildings of special architectural or historic interest; and listed buildings. The lists are used to help planning authorities make decisions with the interests of the historic environment clearly identified. Compilation of the lists is undertaken by Cadw. Listed buildings are classified in grades to show their relative importance. The grades are:

- I — Buildings of exceptional, usually national, interest. Currently, fewer than two per cent of buildings listed in Wales qualify for this grade;
- II* — Particularly important buildings of more than special interest; and
- II — Buildings of special interest, which warrant every effort being made to preserve them.

There are over 30,000 Listed Buildings (Grade I, Grade II and Grade II *) within Wales (Cadw) distributed across its counties varying from medieval halls and castles to Edwardian villas.

Scheduled Monuments

Cadw compile and maintain a Schedule of Ancient Monuments. The monuments included on this Schedule are of national importance and cover a diverse range of archaeological sites. Some examples may be completely buried below ground and may only be known through archaeological excavation. Others are more prominent and include the great standing ruins of well-known medieval castles and abbeys. The oldest known example in Wales is a natural cave — found to contain the earliest evidence of people in Wales — dating to a quarter of a million years ago. At the other end of the spectrum are twentieth-century military structures. Scheduled monuments are often in a ruinous or semi-ruinous condition or take the form of earthworks.

Over 4,000 monuments have now been scheduled across Wales and the number is increasing as part of an ongoing planned policy of enhancing the Schedule (Cadw).

Scheduled monuments in Wales are distributed throughout its counties and their locations are presented on Figure 3 – Heritage Features.

Registered Historic Battlefields

The locations where historic battles took place can be significant historic assets. They often retain topographical and archaeological evidence, including war graves, which can increase understanding of these events. To date there is no formal Register of Historic Battlefields in Wales. However, this is something that is being developed by Cadw.

Conservation Areas

There are over 500 conservation areas in Wales. They are designated by local planning authorities for their special architectural and historic interest. Many local planning authorities have undertaken conservation area character appraisals which identify areas where enhancement through development may be desirable (Cadw).

Conservation areas in Wales are distributed throughout its counties and are largely situated within urban settlements from small villages to areas within towns and cities.

Heritage Coasts

Heritage coasts are 'defined' rather than designated, so there isn't a statutory designation process like that associated with National Parks and AONBs. However, they are largely located within areas that are afforded with National Park or AONB status.

Within Wales there are 14 heritage coasts:

- Glamorgan;
- Gower;
- South Pembrokeshire;
- Marloes and Dale;
- St Brides Bay;
- St Davids Peninsula;
- Dinas Head;
- St Dogmaels and Moylgrove;
- Ceredigion;
- Llŷn;
- Aberffraw Bay;
- Holyhead Mountain;
- North Anglesey; and
- Great Orme.

The location of heritage coasts is presented on Figure 3 – Heritage Features.

Historic Parks and Gardens

Wales has a rich inheritance of historic parks and gardens. They form an important and integral part of the historic and cultural fabric of the country.

Cadw has undertaken a comprehensive survey of historic parks and gardens in Wales. Those thought to be of national importance are included on the Cadw / ICOMOS Register of Parks and Gardens of Special Historic Interest in Wales. The Register was compiled in order to aid the informed conservation of historic parks and gardens by owners, local planning authorities, developers, statutory bodies and all concerned with them. Through the Historic Environment (Wales) Act 2016 it is now statutory and has six volumes. It was completed in 2002 however, sites can be added (or subtracted) at any time. There are currently almost 400 sites on the Register.

Sites on the Register are Graded I, II* and II in the same way as listed buildings. Approximately 10% are Grade I and 23% Grade II*. Grade I sites, such as Bodnant, Powis Castle, Dynevor Park, Margam Park, Erddig, Plas Brondanw and Raglan Castle, are of international importance.

Parks and gardens on the Register range from medieval to late twentieth century. Many are multi-period, with features of different styles and periods (Cadw).

Locations of historic parks and gardens are presented on Figure 3 – Heritage Features.

Heritage at Risk

A key element of Cadw's heritage regeneration activity is action related to heritage assets in a deteriorating condition. Cadw have been working to identify the number and type of listed buildings at risk in Wales. Surveys of the condition of listed buildings have been carried out in Wales for more than 15 years. 2015 data shows that the trend for buildings at risk is moving in the right direction. The number of buildings in an 'at risk' or 'vulnerable' condition has decreased since the last comparable data available (2013) and the percentage of buildings at risk has fallen from 8.92% to 8.54%. This figure is calculated using existing survey data and the most up-to-date data available from the 20% of the building stock which has been re-surveyed in the past year (Cadw).The percentage of building at risk over time has fallen since 2013.

Over time, there have been additional buildings given listed status. The Historic Environment (Wales) Act 2016 aims to give more effective protection to listed buildings and scheduled monuments, to improve the sustainable management of the historic environment and to introduce greater transparency and accountability into decisions taken on the historic environment. These seek to preserve the cultural heritage and historic environment of Wales and in turn will provide greater financial gain for the Welsh tourism sector.

Cultural activity

According to the National Survey for Wales[68] 75% of people attended or participated in arts, culture or heritage activities at least three times in the past year. 68% of people had been to an arts event in the previous 12 months, 40% of people had visited a museum in the last 12 months and 63% of people had visited a heritage site within the past 12 months (88% of these were in Wales).

34% of people had used a public library service in the past 12 months; 98% of these had visited a library in Wales. 5% went at least once a week. 58% of people said they had library in their local area. 39% of people with a library in their local area had visited one in the last 12 months, compared with 28% of those who did not.

When people were asked why they had not attended a museum in the past 12 months, only 3% cited a lack of transport as their reason (consistent with previous years), with 6% saying "Not enough museums close to where I live".

When people were asked why they had not visited a historic place in Wales in the past 12 months, only 5% cited a lack of transport as their reason (consistent with previous years), with 3% saying "Not enough museums close to where I live".

(National Survey for Wales, 2017 – 2018).

When people were asked "Whether they would go to more arts events if they were nearer, 2018-19", 25% strongly agreed and 26% agreed, 21% were neutral, 19% disagreed and only 9% strongly disagreed.

(National Survey for Wales, 2018 – 2019).

Data Gaps

The heritage value of transport infrastructure itself.

6.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

Welsh Language

There has been an upward trend since the 1990s in the number of people using the Welsh language, noting large regional variations; there are opportunities to increase levels of fluency.

In some cases, opportunities to use the Welsh language when utilising public transport is limited, such as due to customer service staff not speaking Welsh.

[68] https://gov.wales/national-survey-wales-results-viewer

Landscape and Townscape Character

Wales is renowned for its high-quality landscapes with over 50% of the land area being nationally valued for its scenic quality and character. This has implications for new transport infrastructure within these areas with a key challenge for sustainable management being to enable appropriate levels of growth whilst retaining the distinctiveness of places and landscapes. This must also recognise that the natural and historic components of landscape are important to both place and the cultural value of landscape.

The loss of visual amenity and character could have impacts on local people and tourists.

Historic Environment, Cultural Heritage and Assets

Wales has a wealth of historic and cultural assets which are important components of national cultural identity. Many such assets are at risk from, for example, decay, climatic factors, neglect and inappropriate development. As with other environmental factors, protecting and provisioning fair access to cultural heritage assets is a key challenge for sustainable planning of the transport system.

New development can have a range of direct and indirect effects on heritage assets which need to be avoided or mitigated. This includes effects from noise and air pollution from construction of busy traffic routes in close proximity to culturally significant areas which may make them less appealing to visit or decrease their visual amenity (indirect effects), it also includes the physical removal of heritage assets as this may be required for the development of new travel infrastructure. Effects on the historic environment can include the intensification of existing traffic or the construction of new road or rail. Increasing levels of congestion can affect historic towns, cities and the countryside, while development of new transport infrastructure can affect historic landscapes and may cause direct damage to heritage assets.

Opportunities

Welsh Language

The WTS has an opportunity to protect and promote the use of the Welsh language through the transport system through encouragement of its use in sign posting and employees of bus and train stations. The WTS could seek to ensure that access to Welsh-Medium education facilities is specifically targeted as part of this aim, to support the strategy seeking to expand Welsh-Medium education provision. The WTS could also seek to support the aim to increase the range of services offered to Welsh speakers, and an increase in use of Welsh-language services. The WTS could also seek to 'support the socioeconomic infrastructure of Welsh-speaking communities' through its policies, helping to support the aim of 'Develop[ing] a new regional focus to economic development to help all parts of Wales to benefit from prosperity and support each area to develop its own distinctive identity.' Within the WTS there will be opportunities to promote the Welsh language through its use in station announcements, road signs and signs within rail and bus stations.

Landscape and Townscape Character

The transport system has a major role to play in how future transport infrastructure development will affect landscape, townscape, and sense of place in general.

There is an opportunity for improved access to valued landscapes, townscapes and viewpoints.

Historic Environment, Cultural Heritage and Assets

As with landscape, the WTS has a major role to play in the protection and enhancement of cultural heritage through guidance to the transport system. This could include the recognition that non-designated heritage assets are also an important part of the make-up of cultural identify and sense of place and that indirect effects on the setting of assets are also important considerations.

Opportunities also exist for the WTS to promote awareness of cultural heritage and encourage the enhancement of access to cultural education centres.

The WTS could seek to identify and protect transport infrastructure that may be of heritage value in its own right.

7 Well-Being Goal: A Globally Responsible Wales

This section provides baseline data relating to the following well-being goal:

'A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.'

In many ways, this well-being goal relates to all of the ISA topics. However, for the purposes of presentation, the data in this section relate primarily to:

- Energy Consumption, Greenhouse Gas Emissions and Ecological Footprint

7.1 Overview of Baseline Conditions

7.1.1 Energy Consumption, Greenhouse Gas Emissions and Ecological Footprint

Relevance to the WTS

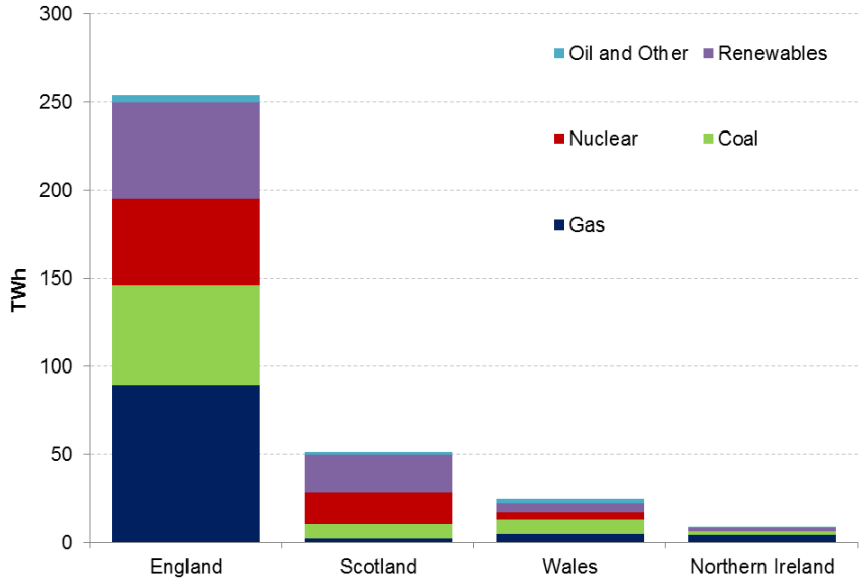
Wales is a globally responsible nation and the WTS has an important role in helping to guide planning and transport in a way that contributes positively to this. In particular energy consumption and greenhouse emissions are two things that occur locally through homes, businesses and transport but contribute to global consequences.

Baseline conditions and trends

Energy Generation

Energy generation in Wales is relatively evenly split between gas, coal, renewable and other sources with generation overall being significantly lower than in England and Scotland. Production has been in decline since 2010, largely due to the decline in energy from gas generation (Welsh Government, Energy Generation and Consumption Biennial Report, 2015). Figure 7-1 below shows energy generation by fuel in 2015 for England, Scotland, Wales and Northern Ireland in 2015.

Figure 7-1 Energy Generation by fuel in 2015 for England, Scotland, Wales and Northern Ireland in 2015



Sources: www.gov.uk

Between 2000 and 2013, the percentage of electricity generated from renewable energy sources has increased from less than 3% to over 10%. This is largely as a result of wind generation. However, this proportion of generation is still lower than any other UK country. The use of renewable energy could help to

reduce Wales' carbon footprint over time. The Capacity (in GWh) of renewable energy generated in Wales in a recent study was 5,182.6 GWh (DECC).

Between 2016 and 2017 there was an increase from 12.3% of energy in Wales being generated by renewables to 20.0%, an increase of 7.7% in only a year[69].

Energy Consumption

Energy use in Wales in 2015 was about 25TWh which is about a 10th of the 250TWh energy used in England. Total energy consumption has been falling since 2005, though more so since 2007, which coincides with the economic downturn (as of 2015). The industry and commercial sector accounts for a large proportion of this decline[70].

The average energy efficiency of new homes in Wales in monitored. Percentage of dwellings with a Standard Assessment Procedure (SAP) rating of 65 or above is considered adequate. The SAP is a methodology used by Government for assessing the energy performance of dwellings. The SAP rating is expressed on a scale of 1 to 100 – the higher the number, the lower the running costs. Average SAP rating of new homes in Wales in 2008 was 77.6 and in 2009 this was 77[71].

Greenhouse Gas Emissions

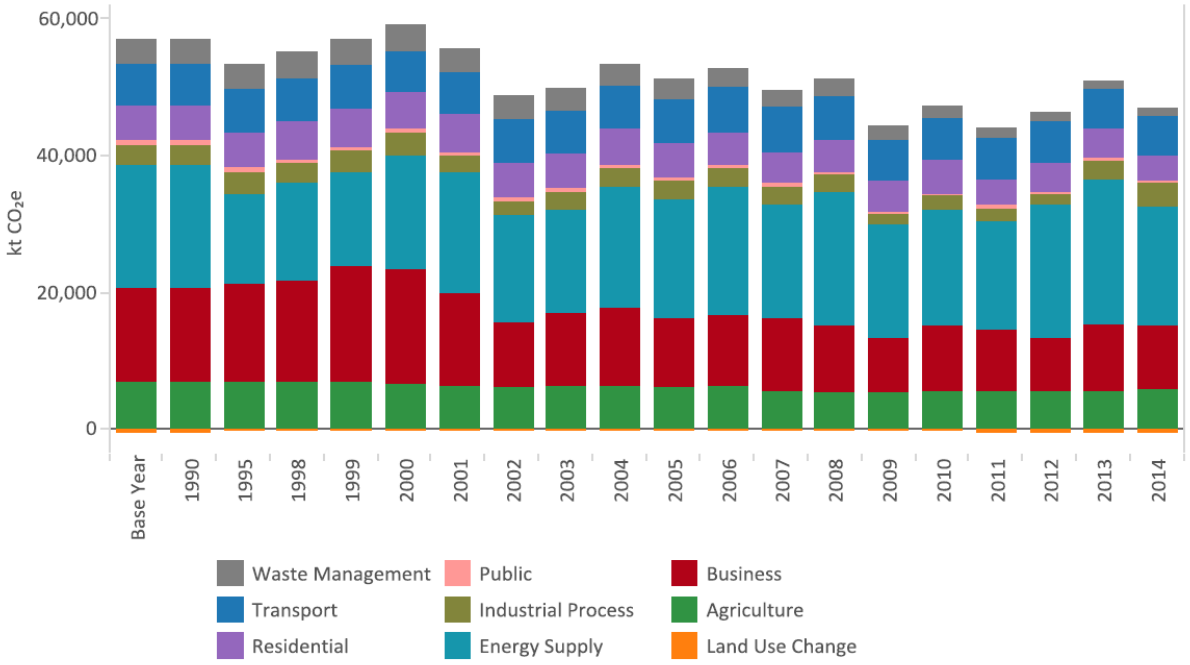
Total greenhouse gas emissions in Wales in 2014 amounted to 46,402 ktCO_{2e}. This compares to 56,620 ktCO_{2e} in 1995, although that figure has fluctuated over the period showing a gradual decreasing trend overall. Total greenhouse gas emissions from Wales have reduced between 1990 and 2014 by 18%, whilst carbon dioxide emissions have fallen by 12%. These emission reductions are mainly due to efficiencies in energy generation and business sector heating, the use of natural gas to replace some coal and other fuels as well as abatement in some chemical industries, and variations in manufacturing output (e.g. in iron and steel, bulk chemical production)[72].

Wales is moving in the right direction to help combat some of the most serious causes of climate change. The increase of renewable energy production is an example of this. A reduction of overall CO_2 emissions is helping Wales and the whole of the UK meet its reduction targets. However, although moving in the right direction, change needs to happen in Wales and across the UK to ensure reduction targets are met.

Figure 7-2 illustrates the split of emissions between different sources in Wales between 1990 and 2014. This shows that the largest contributor remains the energy supply industry. Since 1990, the sector that has decreased its proportion of emissions the most is the business sector (NAEI Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2014).

[69] Electricity generation and supply figures for Scotland, Wales, Northern Ireland and England, 2014 to 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770766/Regional_Electricity_Generation_and_Supply.pdf
[70] Welsh Government, Energy Generation and Consumption Biennial Report, 2015
[71] data.gov.uk
[72] NAEI Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2014

Figure 7-2 Total Greenhouse Gas Emissions per Sector in Wales (ktCO2e)

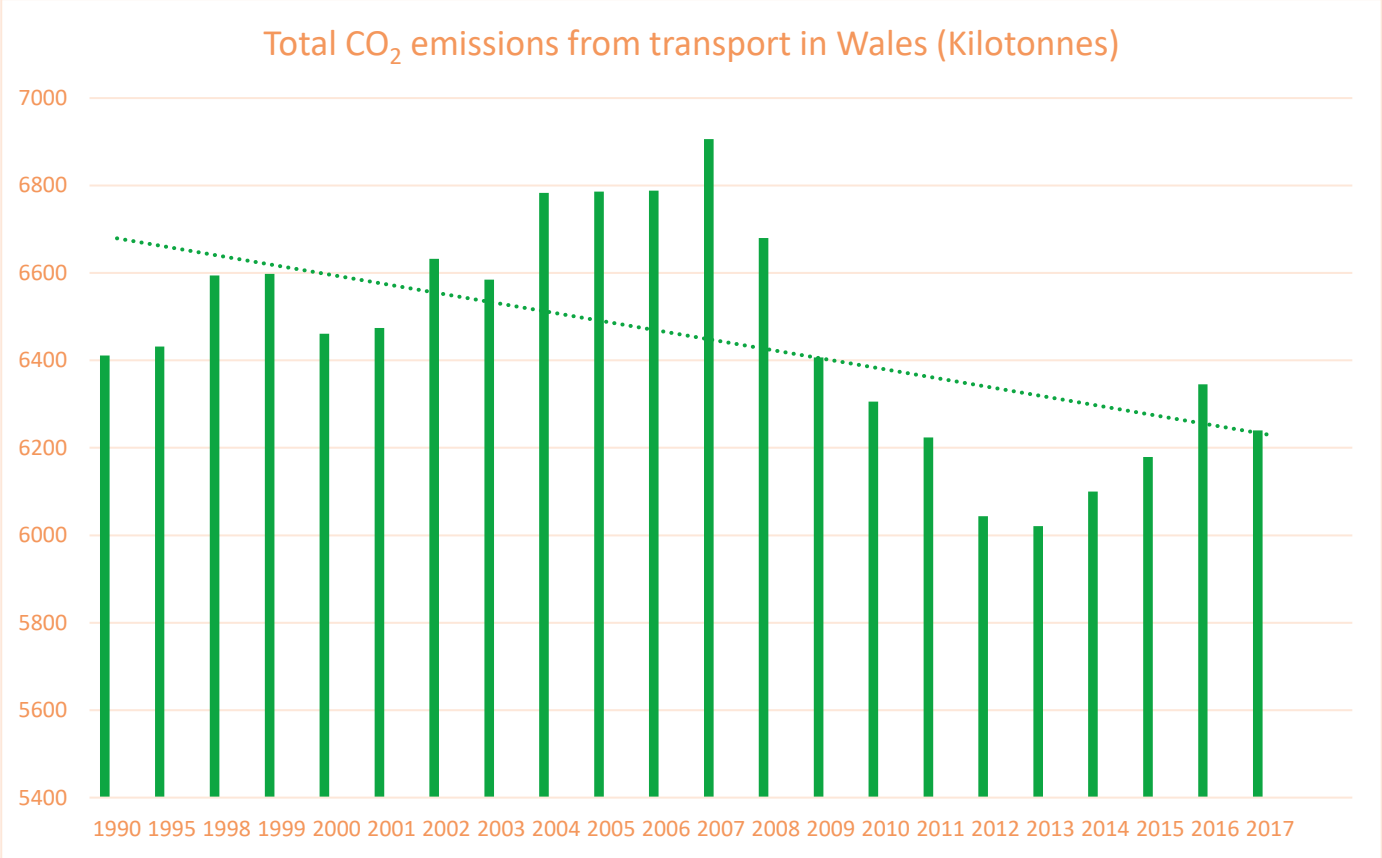


Change in greenhouse gas emissions from the transport sector

According to the National Atmospheric Emissions Inventory there is a declining rate of CO_2 emissions from the transport sector in Wales[73].

[73] https://statswales.gov.wales/Catalogue/Environment-and-Countryside/Greenhouse-Gas/emissionsofgreenhousegases-by-year

Figure 7-3 Total CO^2 emissions from the transport sector in wales (kT)



Energy from renewable sources used by public transport

According to a report on energy generation in Wales[74], around 91 TWh of energy per year is consumed in the country. 76.1 TWh of this is associated with transport, heating and industry.

7.4 out of 30.2 TWh of electricity generated in Wales is generated by renewable resources in 2018.

Ultra Low Emission Vehicles (ULEV)

There were 39% more licensed ULEVs at the end of 2018 compared to the previous year, this figure representing 200,000 ULEVs across the UK. ULEV's accounted for 0.5% of all licensed vehicles in the UK, regionally Wales had the lowest rate at 0.2% relating to 9,500 vehicles out of 1.9 million total vehicles in the country.[75]

Journeys made by sustainable travel modes

The number of rail passenger journeys in Wales reached the highest level on record in 2017-18[76], there were 31 million rail passenger journeys which either started or ended in Wales, an increase of 1.9 per cent compared with the previous year.

[74] Energy Generation in Wales, 2018 Welsh Government https://gov.wales/sites/default/files/publications/2019-10/energy-generation-in-wales-2018.pdf

[75] Vehicle Licensing Statistics: Annual 2018, Department of Transport https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/800502/vehicle-licensing-statistics-2018.pdf

[76] Rail Transport, April 2017 to March 2018 Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-04/rail-transport-april-2017-to-march-2018-824.pdf

Rail passenger journeys within Wales increased to 21.5 million in 2017-18, a 1.3 per cent increase compared to the previous year. Cardiff was the most common destination for within-Wales journeys, accounting for 41% of all journeys.

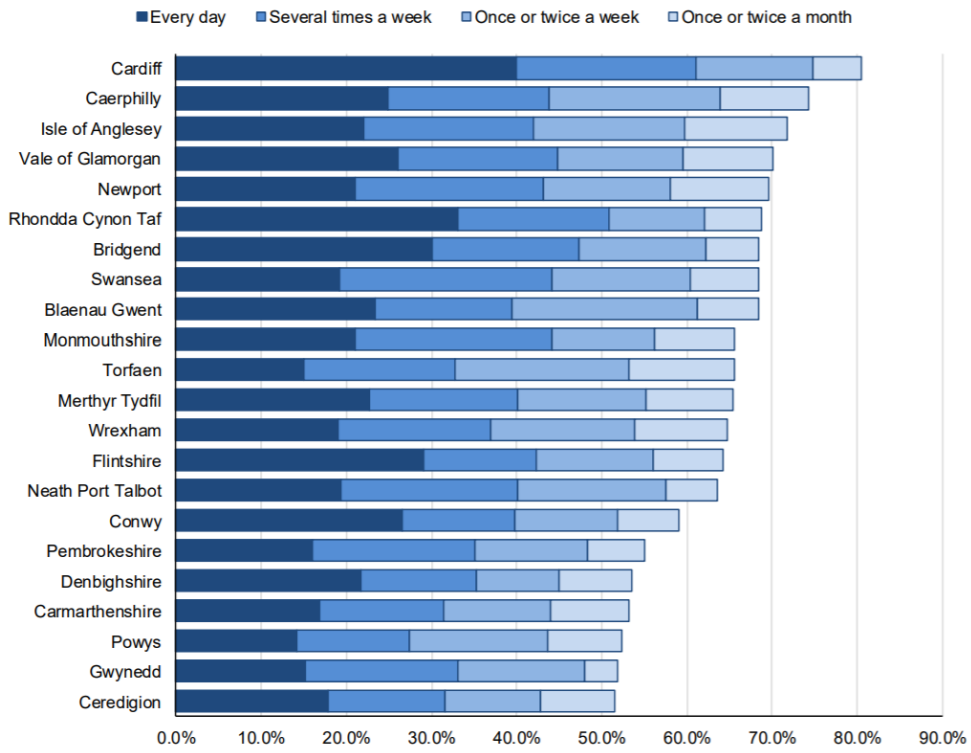
99.9 million passenger journeys were undertaken on local buses in Wales in 2017-18. These services covered a total 99.1 million vehicle kilometres.[77]

Active travel

In a Statistical Bulletin on the use of active travel in Wales (2018-19)[78], it was found that:

- 6% of adults cycled at least once a week for active travel purposes. This has not changed very much in recent years.
- 57% of adults walked at least once a week for active travel purposes. This is broadly unchanged from the previous year.
- 70% of people in urban areas walked for more than 10 minutes as a means of transport at least once a month, compared with 56% of people in rural areas.
- 44% of children actively travel to primary school, and 34% to secondary school.
- 225 seriously injured pedal cyclists were admitted to hospital in 2018-19.

Figure 7-4 Active Travel by Walking, by Local Authority



Source: gov.wales

Ecological footprint

A study in 2008 estimated that Wales' ecological footprint at 10.05 million global hectares (gha), which is roughly five times the size of Wales, or 3.28 global hectares per capita (gha/c). Wales' carbon footprint is

[77] Public service vehicles (buses and taxis), 2017-18 Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-03/public-service-vehicles-buses-and-taxis-april-2017-to-march-2018_0.pdf

[78] Walking and cycling in Wales: Active travel, 2018-19 Statistical Bulletin https://gov.wales/sites/default/files/statistics-and-research/2019-11/active-travel-walking-and-cycling-april-2018-march-2019-073.pdf

estimated at 34 Mt CO_{2e}, or 11 t CO_{2e} per capita. In comparison with other developed countries, Wales' ecological footprint is significantly higher (Stockholm Environment Institute/University of York).[79]

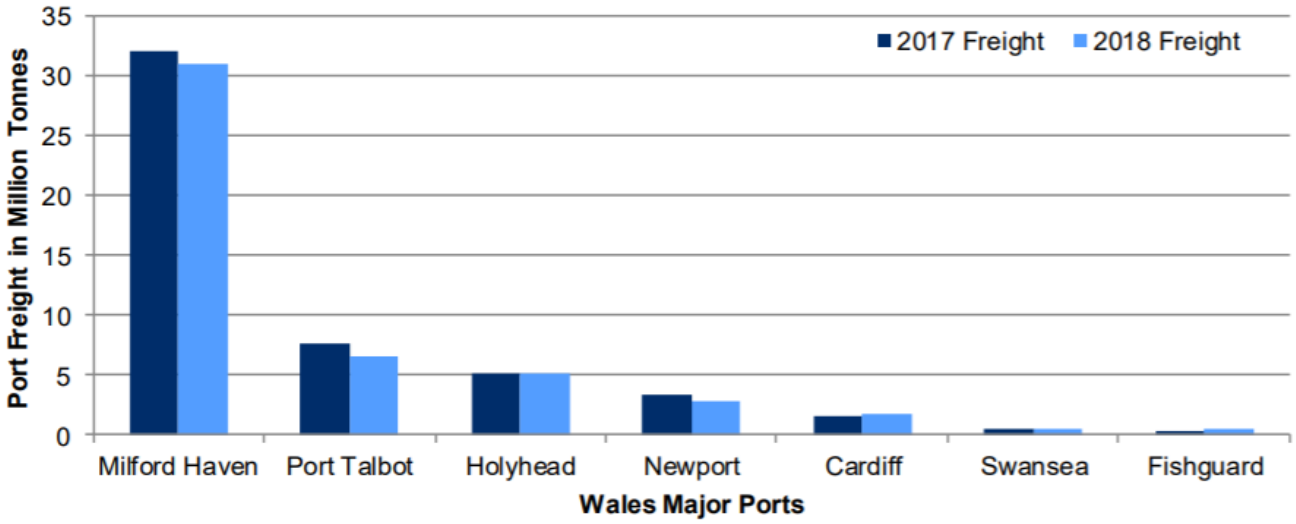
Hectares of healthy ecosystems that form part of the transport network

It states in the Welsh Transport Planning Appraisal Guidance (2008) that about 70% of the Welsh coastline is safeguarded in one way or another and 10% of all the land area in Wales is designated as a SSSI. There are over 1,500 protected sites across the country.[80]

Freight[81]

Freight traffic at Welsh ports was 49.2 million tonnes in 2018, a decrease of 4.8% from the previous year. Figure 7-5 below shows the total freight through major ports within Wales.

Figure 7-5 Total Freight through Wales Major Ports 2017 and 2018.



Source: Welsh Government, 2019.

Milford Haven handles the 5th highest traffic tonnage in the UK, accounting for 6.4% of UK traffic. The decrease in Wales' port traffic can be seen in Figure 7-6 which compares it to other UK countries and their change in port traffic.

[79] Ecological and Carbon Footprint Report: Wales
[80] Welsh Transport Planning and Appraisal Guidance https://gov.wales/sites/default/files/publications/2017-09/welsh-transport-appraisal-guidance-weltag.pdf
[81] https://gov.wales/sites/default/files/statistics-and-research/2019-11/sea-transport-2018-624.pdf

Figure 7-6 All port traffic inwards and outwards across the UK, 2017 and 2018

	Million tonnes		*Per cent*
	2017	**2018**	**% change 2017 to 2018**
England			
Inwards	231	240	**4.2%** ▲
Outwards	105	100	**-4.8%** ▼
All	336	340	**1.4%** ▲
Wales			
Inwards	35	33	**-5.7%** ▼
Outwards	17	16	**-3.0%** ▼
All	52	49	**-4.8%** ▼
Scotland			
Inwards	19	20	**4.2%** ▲
Outwards	48	45	**-5.6%** ▼
All	67	65	**-2.8%** ▼
Northern Ireland			
Inwards	17	17	**3.7%** ▲
Outwards	10	11	**6.0%** ▲
All	27	28	**4.6%** ▲
United Kingdom			
Inwards	301	310	**3.0%** ▲
Outwards	181	173	**-4.2%** ▼
All	482	483	**0.3%** ▲

Source: Welsh Government analysis of Department for Transport data

Data Gaps

Data relating to freight transported on roads and railways in Wales.

Transport Budget Headline Figures

Figure 7-7 Revenue and Capital of rail transport in Wales

	2020/21 (£m)
Capital	**610**
Approx 50% on public transport and active travel, including:	
Rail enhancements	47
South Wales Metro	142
North Wales Metro	23
Sustainable and AT	89
Revenue	**530**
But only around 10% of revenue budget could be considered as discretionary expenditure.	
Rail franchise	185
Bus services	58
Trunk road opex	71
Depreciation	188

Source: Economy, Skills and Natural Resources Group, Welsh Government

Figure 7-8 Pounds sterling per kilometre travelled by different transport modes

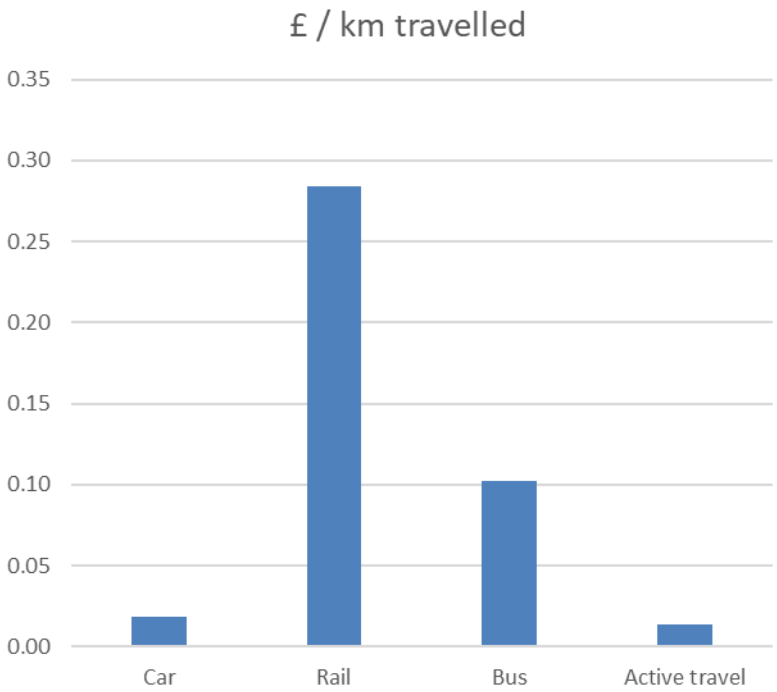


Figure 7-9 Money spent across different transport modes in Wales

	£m spent	Journeys (millions)	Modal share	Distance (billion km)	£ / journey	£ / km travelled
Car	682	849	62%	36.6	0.80	0.02
Rail	397	34	2%	1.3	11.63	0.31
Bus	198	103	8%	0.9	1.92	0.22
Active travel	42	384	28%	1.6	0.11	0.03
Total	1319					

Caveats

1. Funding levels not linear with patronage
2. Latest available data from each source has been used to produce these figures, meaning they are not always from directly comparable time periods
3. Wales-specific data not available for all modes, in which case estimates have been made using data for England

Source: Economy, Skills and Natural Resources Group, Welsh Government

Data Gaps

The largest gap in data is how specifically the transport network interacts with these factors e.g. how many hectares of healthy ecosystems does the transport network cross, how much energy used by the transport network is sourced from renewable resources, how many recycled materials are used in construction of transport infrastructure.

7.2 Key Issues relevant to the WTS and opportunities for it to address them

Issues

Greenhouse gas emissions have been steadily falling in Wales; there is still a long way to go to meet the emissions targets. This reduction is partly as a result of a gradual shift in energy generation to renewable and cleaner fuels together with technological and efficiency improvements in industry. However, again there are challenges to maintain these positive trends.

Wales' high ecological footprint must be maintained and not compromised by transport developments.

Measures must be taken to provision the safety of pedestrians and cyclists on the road in order to promote it as a viable form of transport.

The estimated global footprint of Wales is high compared with other developed countries. There is a challenge to reduce this whilst also accommodating new development and economic growth.

Opportunities

The WTS has an opportunity to help promote low carbon fuels and improved standards of energy efficiency in transport infrastructure.

The WTS must promote sustainable transport modes (including active travel and Ultra Low Emission Vehicles (ULEVs)).

The WTS presents an opportunity to implement the sustainable transport hierarchy:

Firstly, by reducing the need to travel unsustainably:

- bring services closer to people, integrated planning (communities built around transport hubs)
- ICT, flexible working, homeworking

Secondly, by widening and promoting more sustainable travel choices:

- integration, modal shift.

Thirdly; by make better use of the existing transport network:

- managing demand, facilities, capacity.