



Llywodraeth Cymru
Welsh Government

Wastewater Monitoring in Wales

Report Date: 19 May 2022

Using samples collected up to (unless indicated otherwise): 16 May 2022



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Public Health
Wales



Dŵr Cymru
Welsh Water

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Background

Introduction

In September 2020 Welsh Government began sampling wastewater from 19 Wastewater Treatment Works (WwTW) from across Wales in order to detect the levels of SARS-CoV-2. Since then the programme has undertaken work not only to expand the coverage of the wastewater monitoring but also to improve the testing methodology to make it more representative of the catchments served.

Welsh Government intends to monitor up to 50 WwTW catchments across Wales in order to assist in the early detection of changing viral levels and the potential scale of outbreaks to help inform any public health action taken in the management of the pandemic and beyond.

Methods

Wastewater-Based Epidemiology (WBE) provides comprehensive public health information at a community level. To achieve this, wastewater samples are collected at the inflow of sewage treatment plants across Wales. The samples are then analysed to determine the levels of specific pathogens, as well as summarising their physico-chemical characteristics. This data is then mapped against known infection rates and other public health indicators at the regional level.

Individuals with COVID-19 shed SARS-CoV-2 genetic material in their faeces in the form of ribonucleic acid (RNA), regardless of whether they have symptoms or not. Measurements quantify the amount of viral RNA present in wastewater alongside the presence of different mutations associated with SARS-CoV-2. This information therefore provides a representative and unbiased snapshot of the level of COVID-19 infection within a community at any point in time. In summary, WBE has the potential to act as key capability to aid in the surveillance and control of COVID-19.

Currently, a mixture of 'composite' and 'spot' samples (each comprising 1 litre of wastewater) are collected from each WwTW 5 times a week, Monday to Friday. Spot samples are taken at the same time each day to capture peak flow, while composite samples are collected over a 24-hour period at 15-minute intervals using automatic sampling machines. Welsh Government currently investigates levels of COVID-19 in wastewater at 47 sites across Wales within the Dŵr Cymru Welsh Water (DCWW) and Hafren Dyfrdwy networks.

SARS-CoV-2 Quantification

The reported SARS-CoV-2 wastewater data is the concentration of viral gene copies (gc) detected in the wastewater sample. The viral copy number is obtained using an average of measurements from a single N1 nucleocapsid gene or the average of N1 and E-Sarbeco genes.

Samples are collected from the WwTW and transported at 4°C to laboratories on the day of collection. Samples are clarified to remove solid faecal matter and are subject to a PEG (polyethylene glycol) precipitation process. The quantity of a SARS-CoV-2 RNA present in the wastewater sample is then determined using a RT-qPCR (reverse transcriptase quantitative polymerase chain reaction) laboratory method.

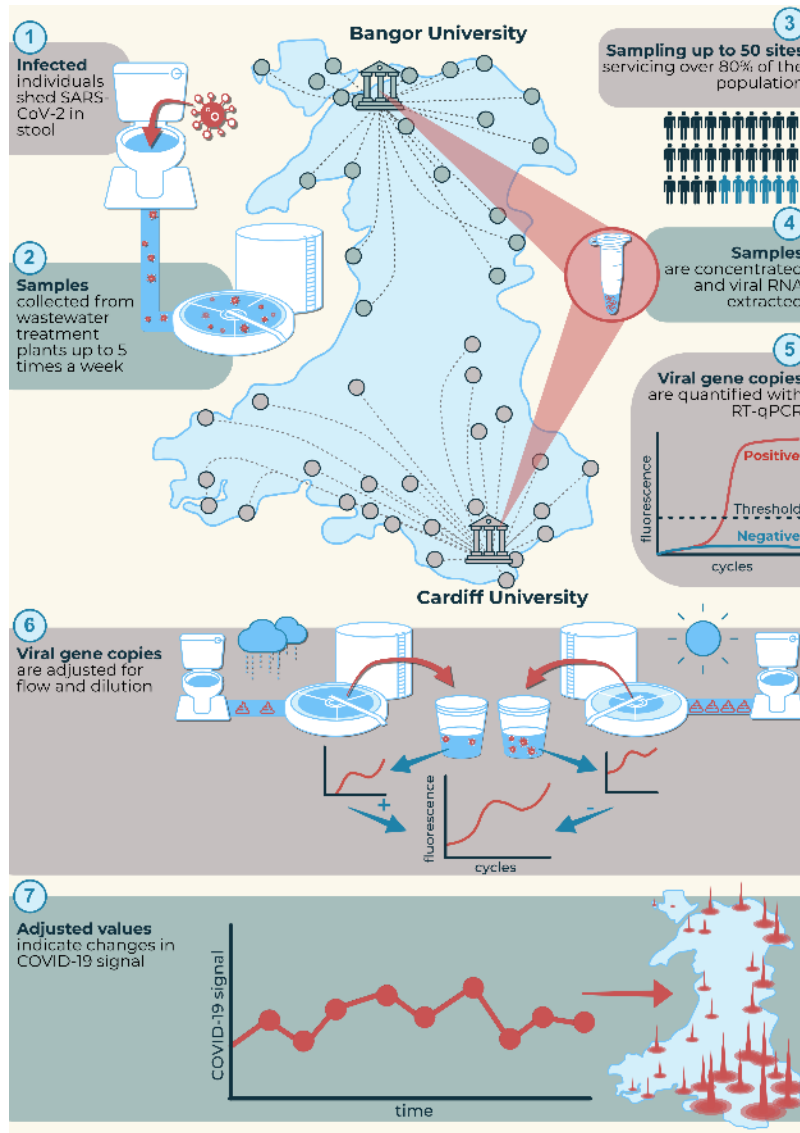


Figure 1 - Process diagram

Data Processing and Modelling

The total amount of SARS-CoV-2 RNA in the sample is corrected for various factors as a result of the RT-qPCR analysis, giving a raw copy number for each target gene. The data is reported as SARS-CoV-2 gene copies per litre (gc/L).

Most sewers in Wales are combined systems that collect waste waters (domestic, industrial, etc.) and stormwater from flooding and rainfall. As such, the collected wastewater samples vary through time and across WwTW. In particular, a sample's dilution can depend on the amount of rain that day. Each WwTW in Wales services a sewage network of different size and population.

The data is 'normalised' to account for variations in dilution and population. To adjust specifically for dilution, we have developed a method for recovering daily flow that is based on daily measures of flow indicators (Ammonium, Electrical conductivity, Orthophosphate concentrations) and dry weather flow. The serviced population at each wastewater site is estimated using the latest ONS population data for its drainage area. With these measures of daily flow dilution and population, we can then report the SARS-CoV-2 signal as a daily rate of gene copies per 100,000 people (gc/day per 100k). This value is then comparable across all the Welsh catchments. Day-to-day variability is smoothed using weekly averaging of the data.

In addition to normalising the data, the data are also studied for samples that could be deemed as 'outliers' on account of being significantly outside of the range of other recent samples. True outliers are then removed from datasets as they could have a negative impact on the trends observed in the figures produced for this report.

Using this Report

Wastewater monitoring is a type of environmental monitoring, so it is difficult to model data around local authorities or health boards. Sewer catchments can receive rainfall or environmental sources of water from anywhere within their relevant geography, which follows the topography of the land. Sewer networks are managed around regions that mostly correspond with river drainage basins and it is these management areas that have been chosen for wastewater regional reporting.

For both National and regional rolling averages the population of all catchments is taken into consideration when reporting the signal per 100,000 people. For example, in Region 4 there are two catchments: one with a population of approximately 400 and the other with a population of approximately 67,100. Individual catchment populations are detailed in Appendix A.

All data relating to wastewater signal (SARS-CoV-2 gc/day per 100k) is represented as an exponential figure ($\times 10^{12}$) where $1 \times 10^{12} = 1,000,000,000,000$ unless otherwise stated. The report uses a mixture of line graphs and spark charts; both are based on 10 day rolling averages.

Maps of individual sewer catchments are located in the appendix of this report. Each section of the report contains a map that represents the area that is covered by the region.

Each regional summary is given in the format:

- The trend within the region for the previous four weeks
- The trend within the region compared to the previous week
- Any indicators triggered for the region
- Any inconsistencies or issues in the region

To allow for noise in wastewater signal we only record changes greater than 10% to be decreases or increases.

Any questions on the report, or the Welsh Government Wastewater Programme, can be sent to wastewater@gov.wales.

Alerting Indicators

To highlight potentially concerning changes in wastewater signal, the three following types of alerting indicators are assessed once a week, based on the viral load (gc/day per 100k) measured. The indicator table in the National situation report indicates the number of sites within those regions that have triggered the indicators:

1. The **High Signal Level** indicator highlights the catchment areas where the viral load is high. It corresponds to a situation where the viral loads exceed half of the highest weekly average recorded in the previous 6 months.
2. The **Rapid Increase** indicator highlights the catchment areas where the viral loads have rapidly increased for the last week compared to the previous week. It corresponds to a situation where the weekly average of the viral load has increased by at least 100% since the previous week.
3. The **Increasing Signal Level** indicator highlights the catchment areas where the viral loads are showing signs of continuous increase. It corresponds to a situation where the weekly average of the viral load has increased since the previous week for at least 3 weeks in a row.

'0' corresponds to no alerts present for the region or site, whilst '-' represents no data being available.

To assist in locating which region is relevant for a particular Health Board or Local Authority they are broken down in the tables below.

| | |
|---|--|
| Betsi Cadwaladr University Health Board | Region 3: Clwyd Region 4: Conwy Region 5: Dee Region 6: Llŷn and Eryri Region 7: Meirionnydd Region 13: Ynys Môn |
| Hywel Dda University Health Board | Region 1: Carmarthen Bay and the Gower Region 2: Cleddau and Pembrokeshire Coastal Rivers Region 7: Meirionnydd Region 10: Teifi and North Ceredigion |
| Powys Teaching Health Board | Region 7: Meirionnydd Region 12: Wye Region 14: Hafren Dyfrdwy |
| Swansea Bay University Health Board | Region 1: Carmarthen Bay and the Gower Region 9: Tawe to Cadoxton |
| Cwm Taf University Health Board | Region 8: South East Valleys Region 9: Tawe to Cadoxton Region 11: Usk |
| Cardiff & Vale University Health Board | Region 8: South East Valleys Region 9: Tawe to Cadoxton |
| Aneurin Bevan University Health Board | Region 12: Wye Region 8: South East Valleys Region 11: Usk |

| | |
|---|--|
| Blaenau Gwent County Borough Council | Region 8: South East Valleys |
| Bridgend County Borough Council | Region 9: Tawe to Cadoxton |
| Caerphilly County Borough Council | Region 8: South East Valleys |
| Carmarthenshire County Council | Region 1: Carmarthen Bay and the Gower Region 10: Teifi and North Ceredigion |
| Ceredigion County Council | Region 7: Meirionnydd Region 10: Teifi and North Ceredigion |
| City and County of Swansea | Region 1: Carmarthen Bay and the Gower Region 9: Tawe to Cadoxton |
| City of Cardiff Council | Region 8: South East Valleys |
| Conwy County Borough Council | Region 3: Clwyd Region 4: Conwy Region 5: Dee |
| Denbighshire County Council | Region 3: Clwyd Region 5: Dee |
| Flintshire County Council | Region 5: Dee |
| Gwynedd Council | Region 5: Dee Region 6: Llŷn and Eryri Region 7: Meirionnydd |
| Isle of Anglesey County Council | Region 13: Ynys Môn |
| Merthyr Tydfil County Borough Council | Region 8: South East Valleys |
| Monmouthshire County Council | Region 11: Usk Region 12: Wye |
| Neath Port Talbot Council | Region 9: Tawe to Cadoxton |
| Newport City Council | Region 8: South East Valleys Region 11: Usk |
| Pembrokeshire County Council | Region 2: Cleddau and Pembrokeshire Coastal Rivers Region 10: Teifi and North Ceredigion |
| Powys County Council | Region 7: Meirionnydd Region 9: Tawe to Cadoxton Region 11: Usk Region 12: Wye Region 14: Hafren Dyfrdwy |
| Rhondda Cynon Taf County Borough Council | Region 8: South East Valleys |
| Torfaen County Borough Council | Region 11: Usk |
| Vale of Glamorgan Council | Region 9: Tawe to Cadoxton |
| Wrexham County Borough Council | Region 5: Dee |

Wales Situation Report

Since the last report, SARS-CoV-2 viral load has decreased across the country. However, the signal has increased at Llŷn and Eryri and Wye.

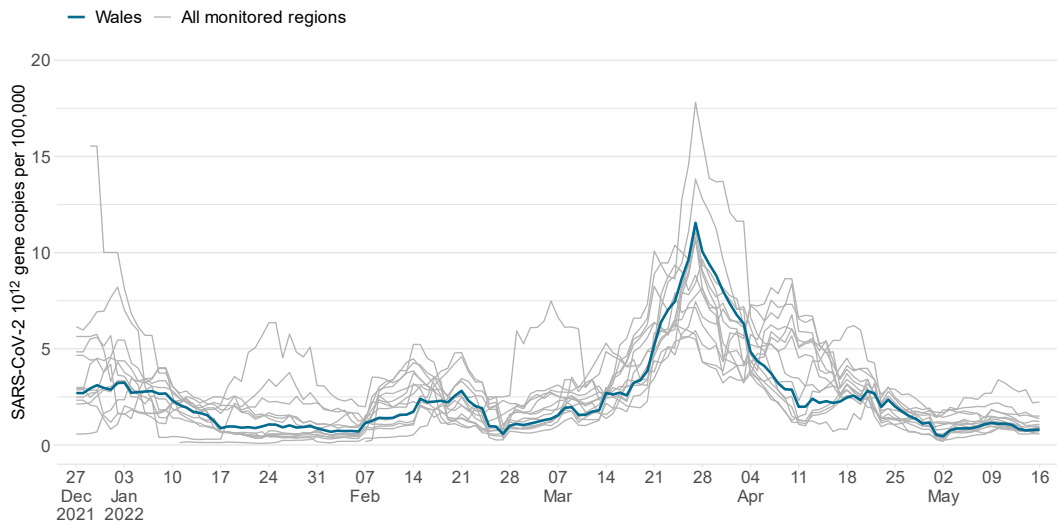


Figure 2 - National (blue lines) and Regions (grey lines) Rolling Mean SARS-CoV-2 gc/day per 100k

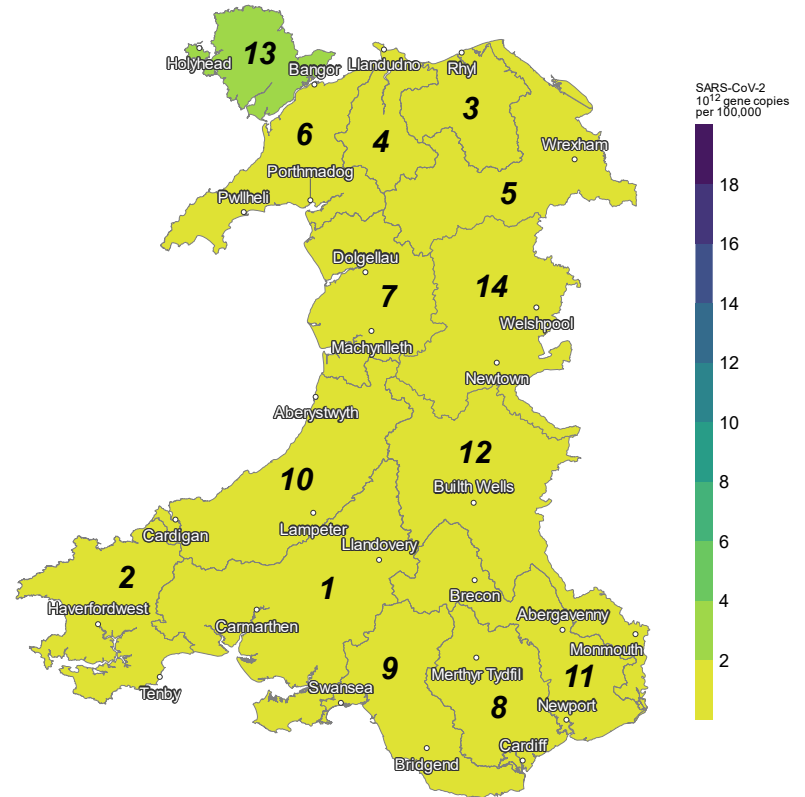


Figure 3 - National Heat Map showing Regional Mean SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

Wales Situation report:

- The trends in the national mean wastewater signal have become more stable following a period of decline over the last few weeks.

| Region name | Number of sites monitored | % regional population covered | No. sites with High level signal | No. sites with Rapid increase | No. sites with Increasing trend |
|---|---------------------------|-------------------------------|----------------------------------|-------------------------------|---------------------------------|
| Region 1: Carmarthen Bay and the Gower | 4 | 57 | 0 | 0 | 0 |
| Region 2: Cleddau and Pembrokeshire Coastal Rivers | 4 | 39 | 0 | 0 | 0 |
| Region 3: Clwyd | 2 | 54 | 0 | 0 | 0 |
| Region 4: Conwy | 2 | 82 | 0 | 1 | 0 |
| Region 5: Dee | 4 | 46 | 0 | 0 | 0 |
| Region 6: Llŷn and Eryri | 4 | 34 | 0 | 1 | 0 |
| Region 7: Meirionnydd | 3 | 28 | 0 | 0 | 0 |
| Region 8: South East Valleys | 2 | 82 | 0 | 1 | 0 |
| Region 9: Tawe to Cadoxton | 5 | 73 | 0 | 0 | 0 |
| Region 10: Teifi and North Ceredigion | 3 | 30 | 0 | 0 | 0 |
| Region 11: Usk | 4 | 86 | 0 | 0 | 0 |
| Region 12: Wye | 4 | 36 | 0 | 1 | 0 |
| Region 13: Ynys Môn | 3 | 37 | 0 | 0 | 0 |
| Region 14: Hafren Dyfrdwy | 3 | 26 | 0 | 0 | 0 |

Table 1 - Regional Alert Indicators Watchlist. Indicates how many sites in the region have hit trigger points since last report.

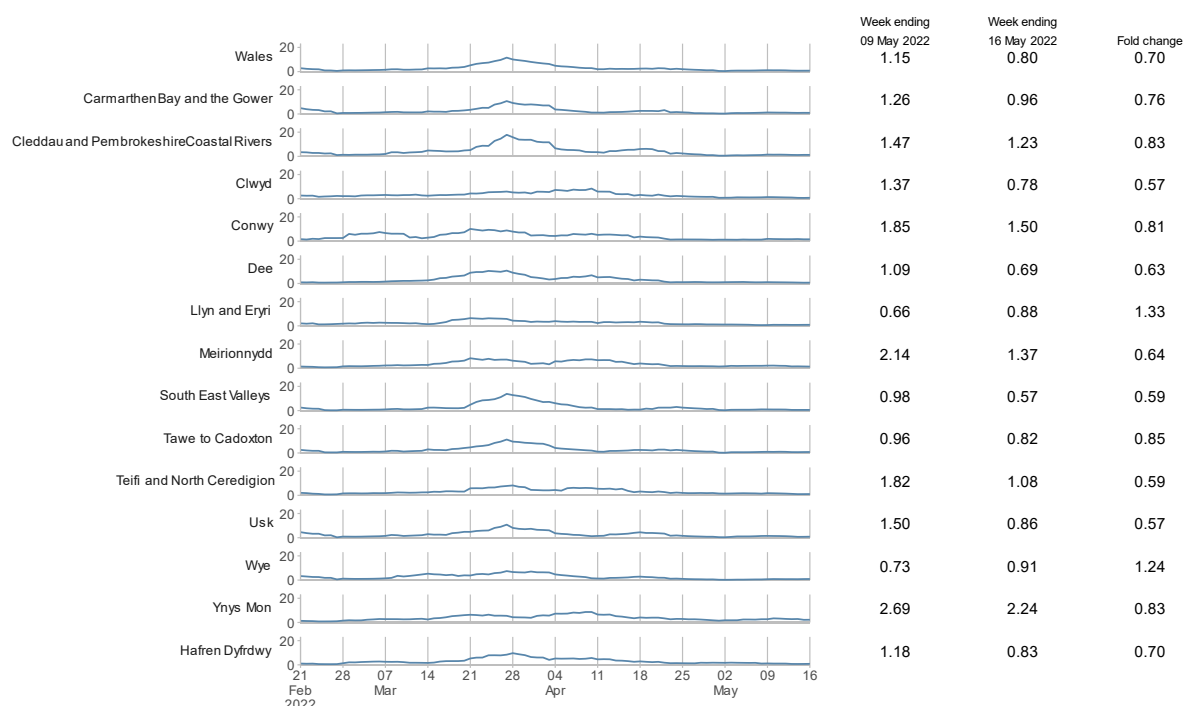


Figure 4 - National & Regional trends and fold change. SARS-CoV-2 gc/day per 100k

Region 1: Carmarthen Bay and the Gower

This section is relevant for:

Hywel Dda University Health Board
Swansea Bay University Health Board

Carmarthen County Council
Swansea Council

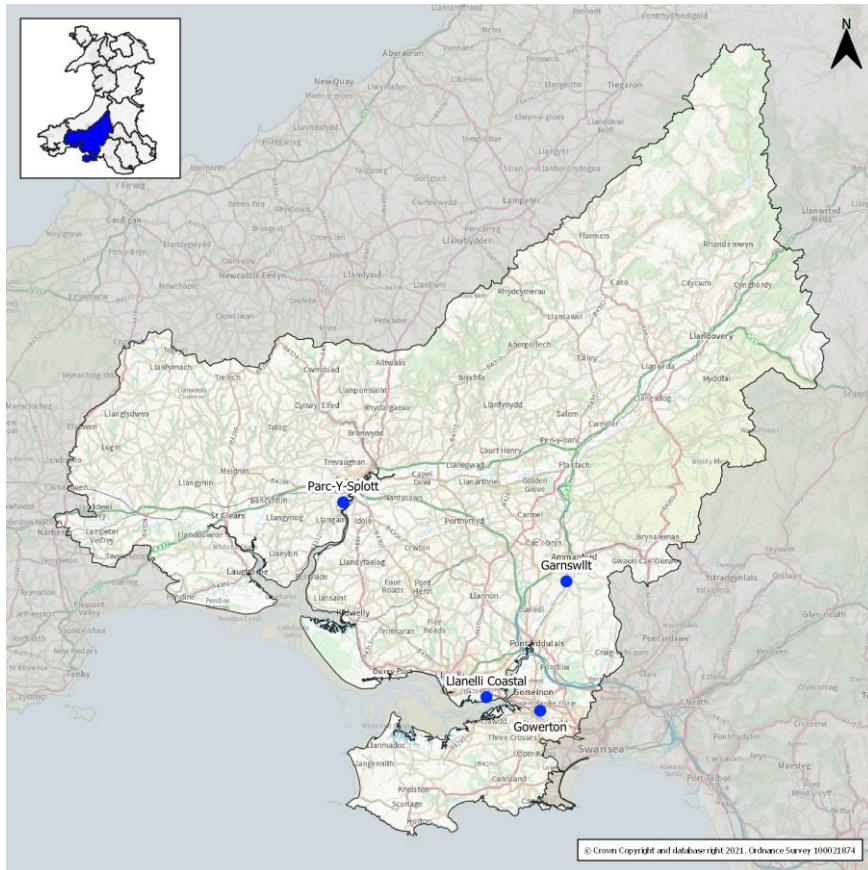


Figure 5 - Region 1 Map

Region 1 situation report:

- Wastewater signal in the region is somewhat unstable, with increases and decreases in the last four weeks. However, there has been an overall decrease in the signal in that period.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Llanelli Coastal and Parc-Y-Splott.
- No indicators were triggered during the last reporting period.
- There were three samples from Parc-Y-Splott and one sample from each of Llanelli Coastal, Gowerton and Garnswilt missing. Access issues at Gowerton between 13–27 April resulted in some missing samples causing a break in the series for that site. The signal for Parc-Y-Splott should be treated with caution due to low sample numbers.

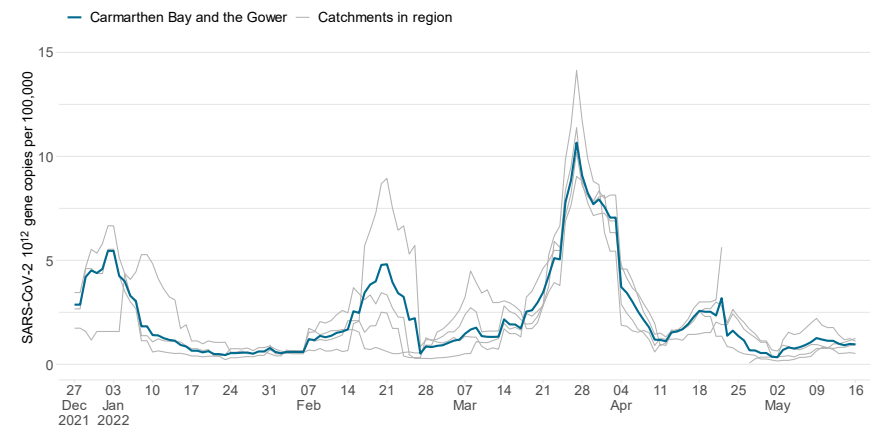


Figure 6 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

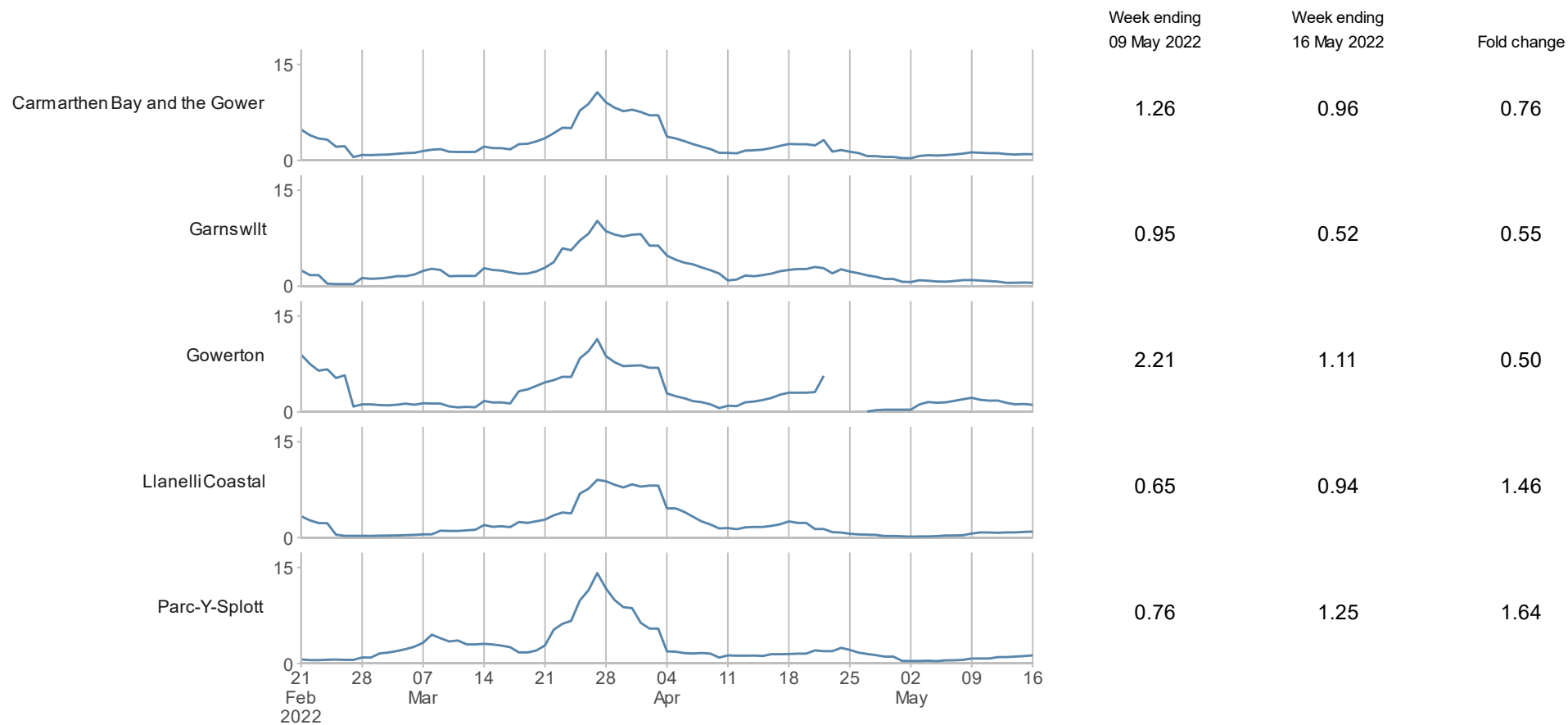


Figure 7 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 2: Cleddau and Pembrokeshire Coastal Rivers

This section is relevant for:

Hywel Dda University Health Board

Pembrokeshire County Council

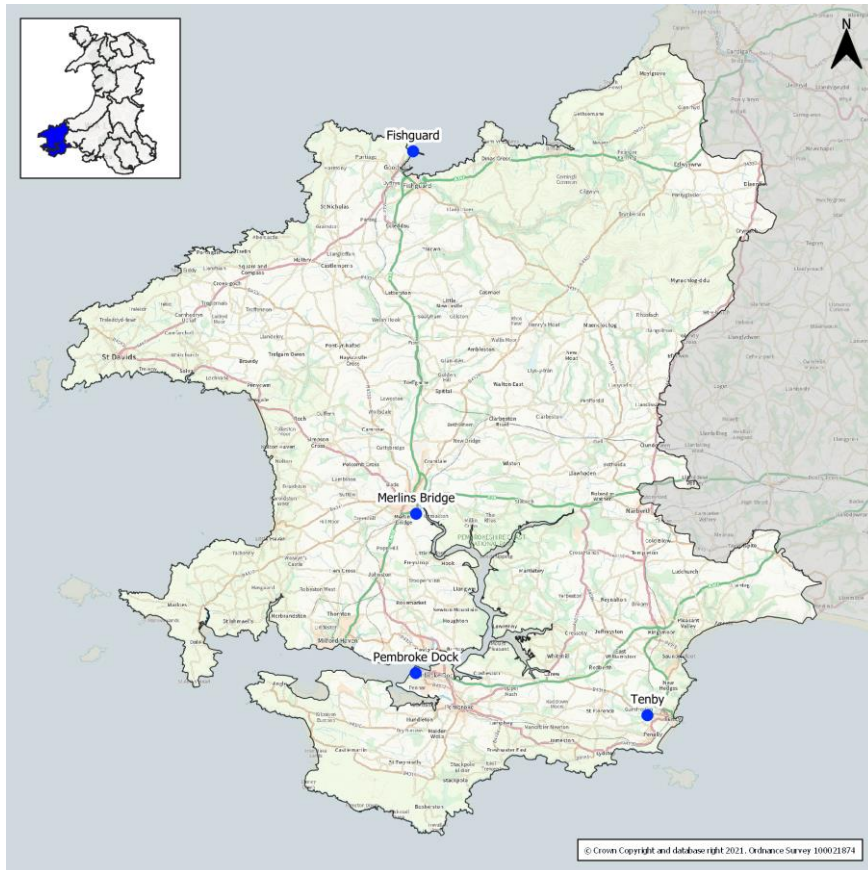


Figure 8 - Region 2 Map

Region 2 situation report:

- Wastewater signal in the region has decreased in the last four weeks and appears to be stabilising.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Merlins Bridge and remained level at Pembroke Dock.
- No indicators were triggered during the last reporting period.
- There was one sample from each of the sites in the region missing.

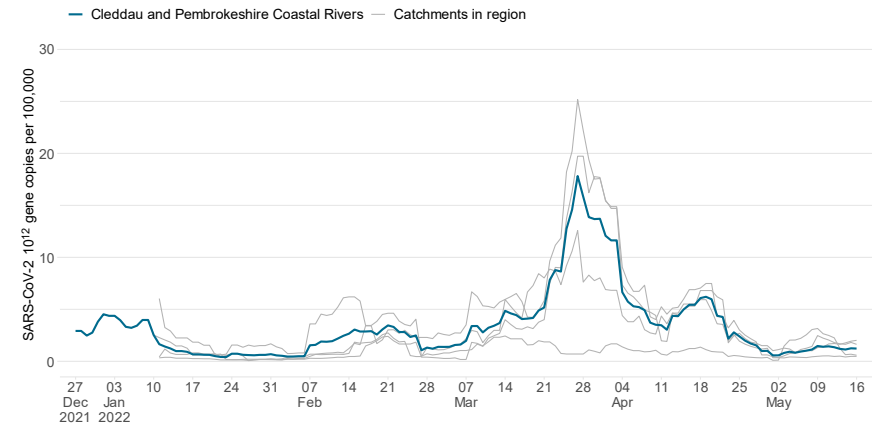


Figure 9 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

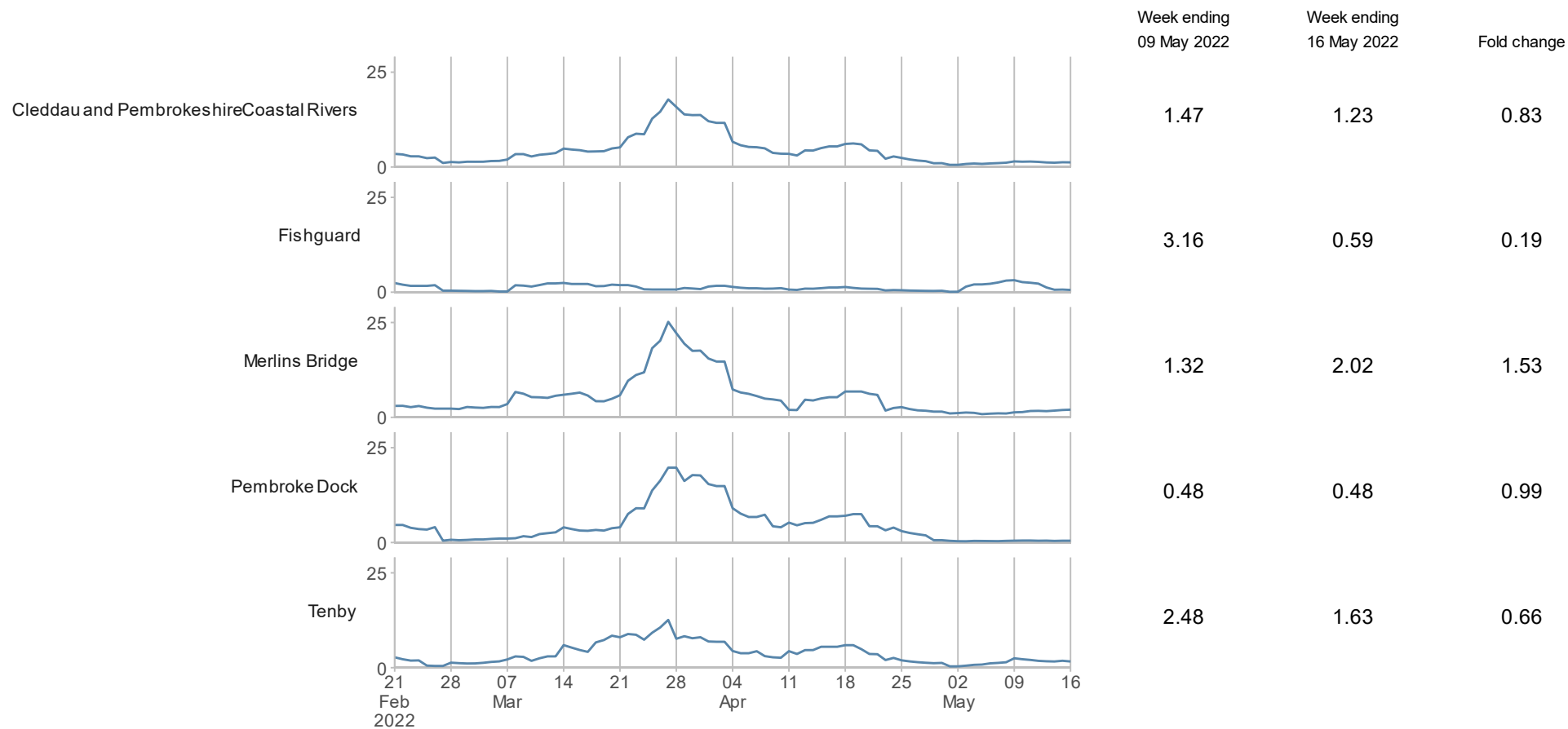


Figure 10 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 3: Clwyd

This section is relevant for:

Betsi Cadwaladr University Health Board

Denbighshire County Council
Conwy County Council

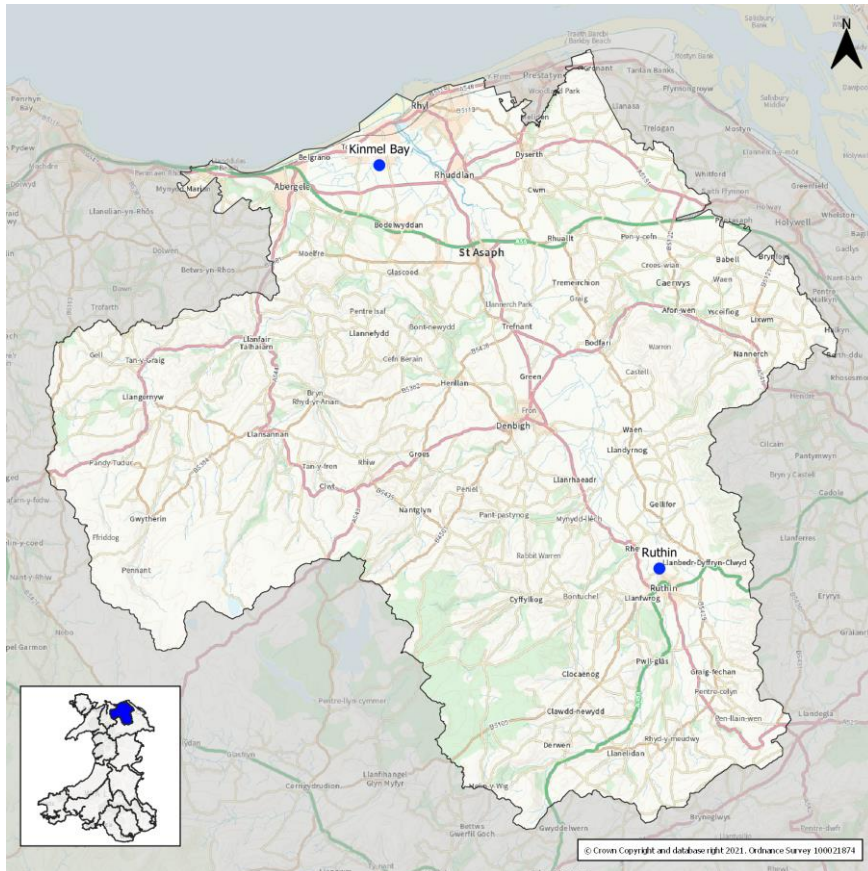


Figure 11 - Region 3 Map

Region 3 situation report:

- Wastewater signal in the region has decreased in the last four weeks.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Ruthin.
- No indicators were triggered during the last reporting period.
- There was one sample from Kinmel Bay missing.

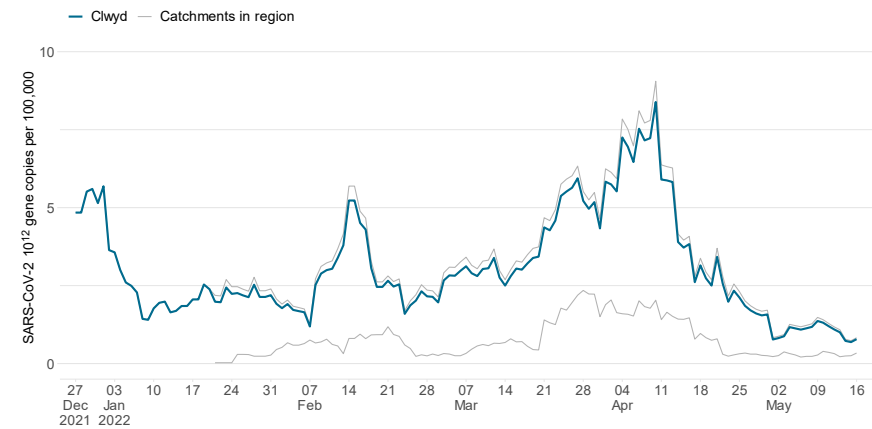


Figure 12 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

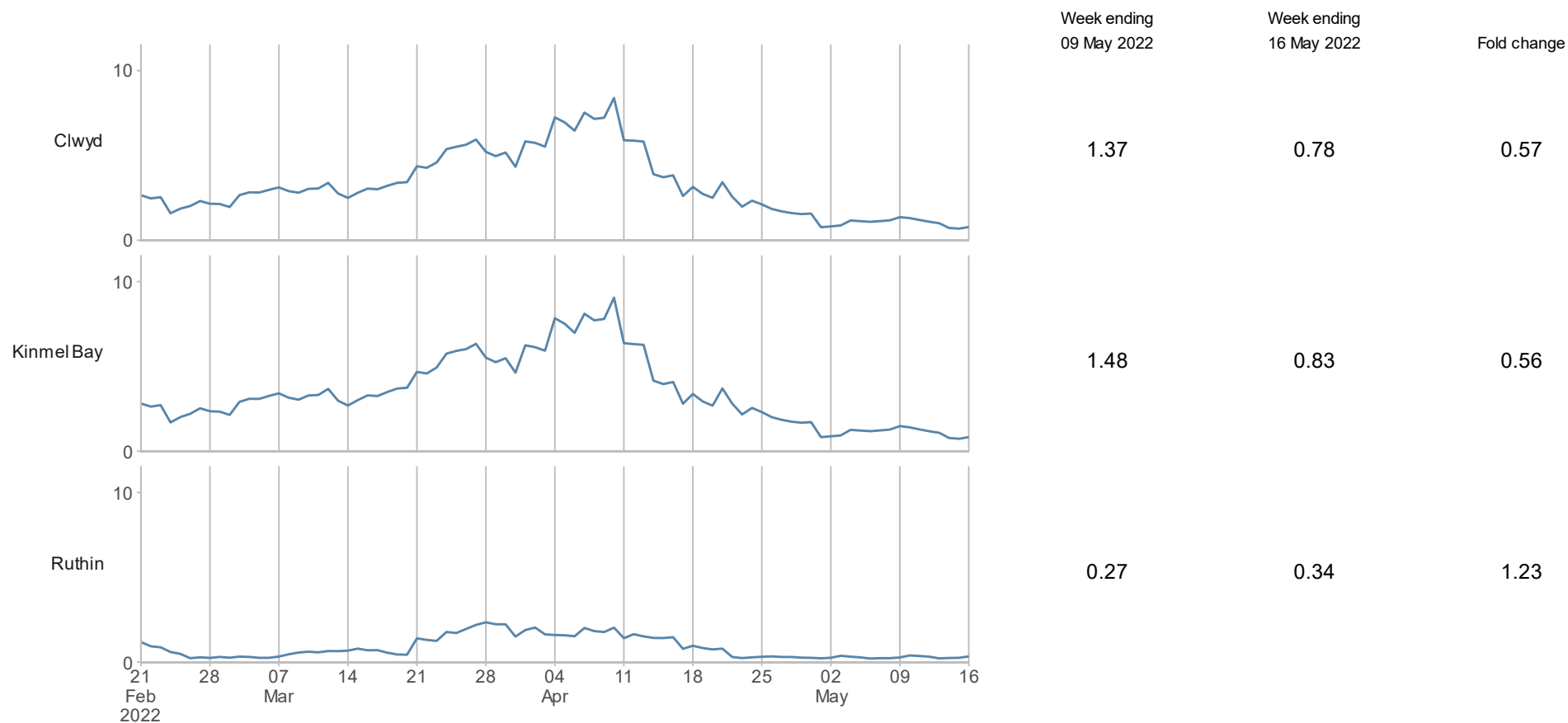


Figure 13 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 4: Conwy

This section is relevant for:

Betsi Cadwaladr University Health Board

Conwy County Council

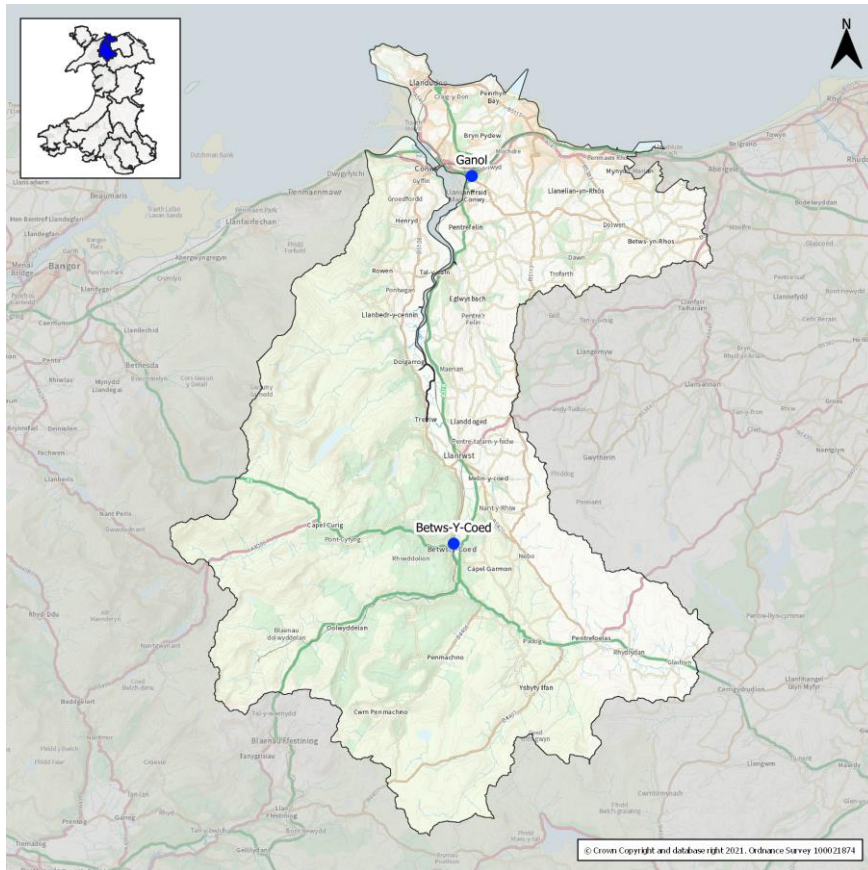


Figure 14 - Region 4 Map

Region 4 situation report:

- Wastewater signal in the region has decreased in the last four weeks and appears to be stabilising.
- Compared with last week, the signal has decreased across the region. However, the signal increased rapidly at Betws-Y-Coed.
- The rapid increase indicators were triggered at Betws-Y-Coed.
- One sample from Betws-Y-Coed was missing.

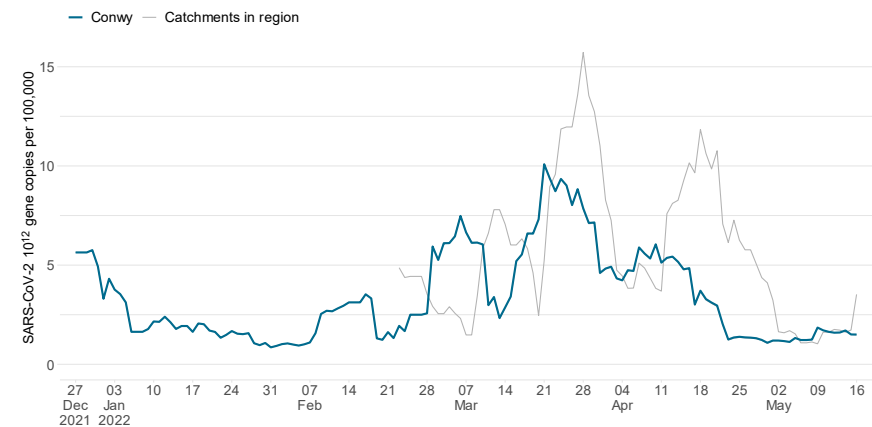


Figure 15 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

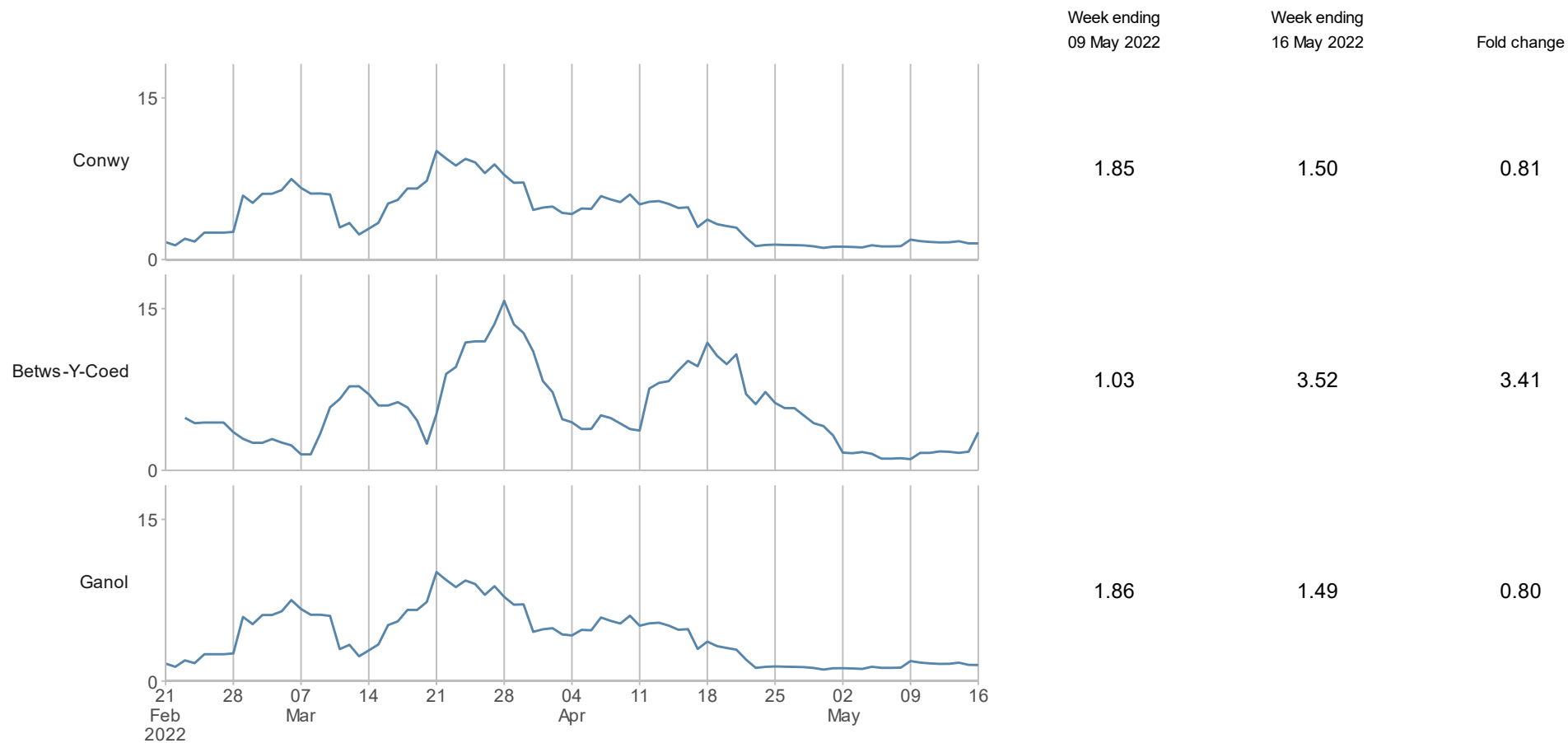


Figure 16 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 5: Dee

This section is relevant for: Betsi Cadwaladr University Health Board

Flintshire County Council
Denbighshire County Council
Wrexham Council

Conwy County Council
Gwynedd County Council

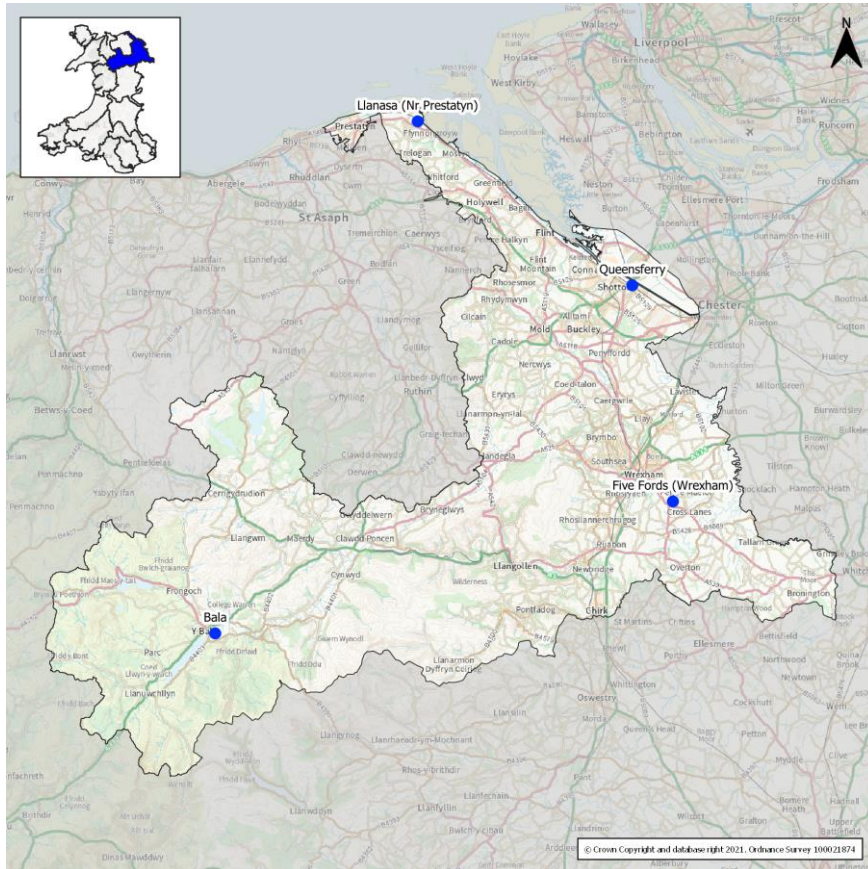


Figure 17 - Region 5 Map

Region 5 situation report:

- Wastewater signal in the region has decreased in the last four weeks and appears to be stabilising.
- Compared with last week, the signal has decreased across the region.
- No indicators were triggered during the last reporting period.
- There was one sample from Llanasa (Nr Prestatyn) missing.

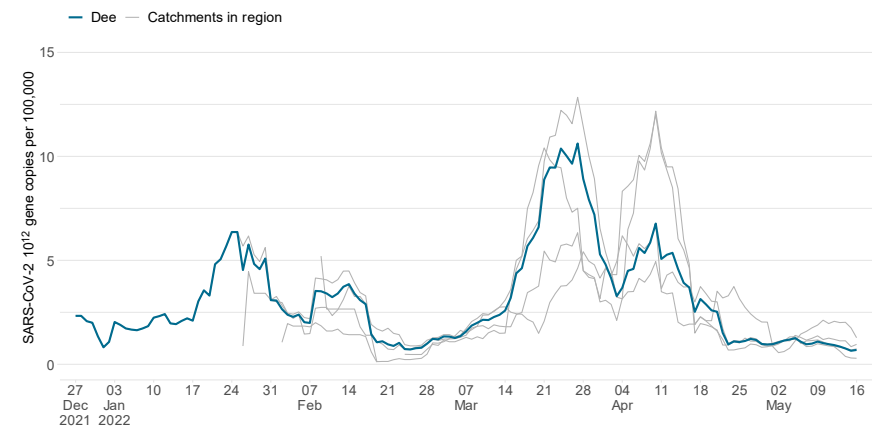


Figure 18 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

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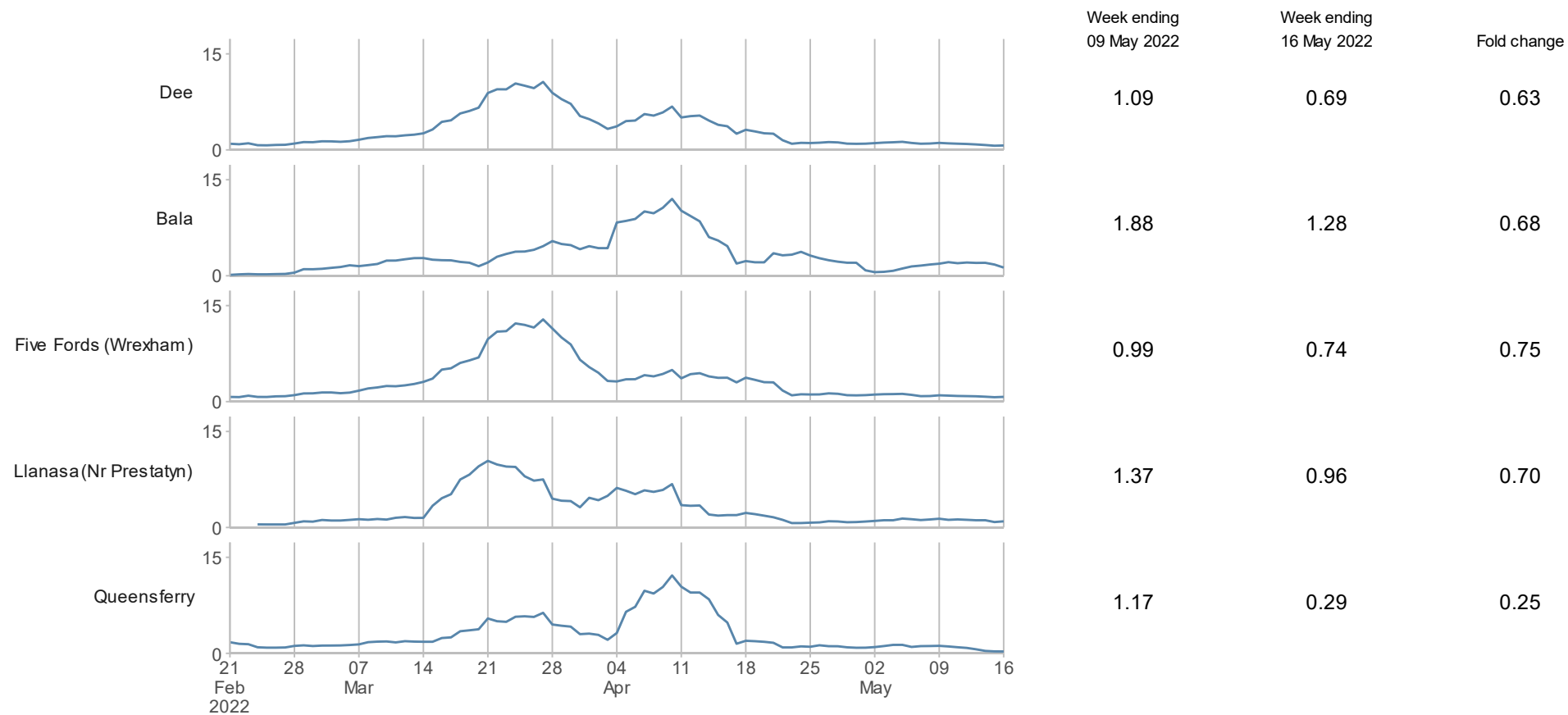


Figure 19 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 6: Llŷn and Eryri

This section is relevant for:

Betsi Cadwaladr University Health Board

Gwynedd County Council

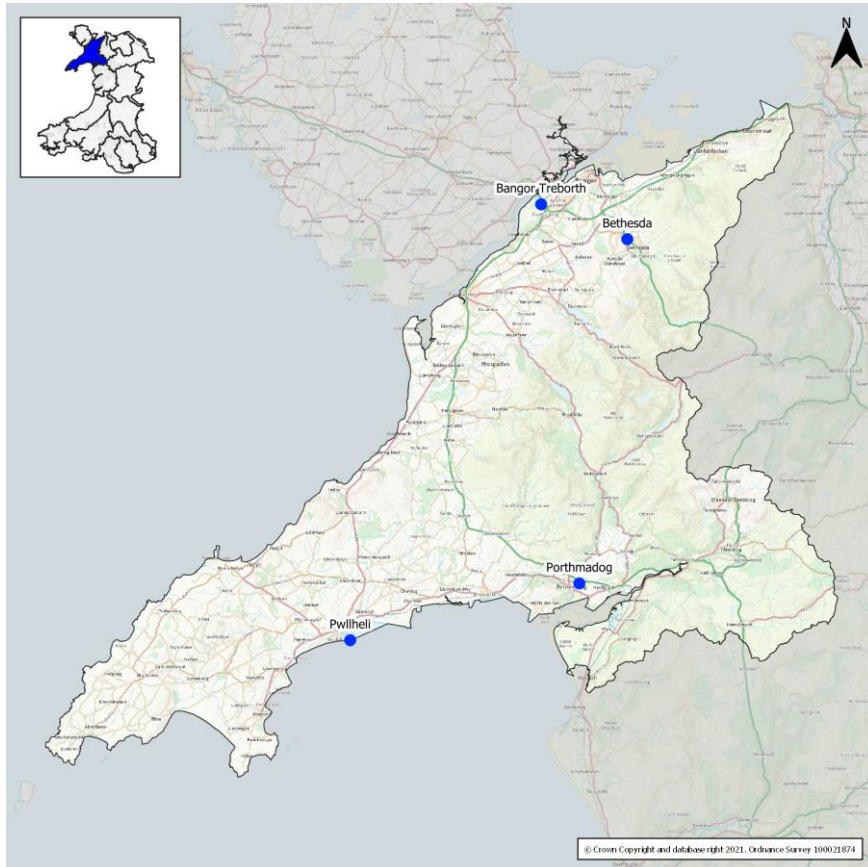


Figure 20 - Region 6 Map

Region 6 situation report:

- Wastewater signal in the region has decreased in the last four weeks and appears to be stabilising.
- Compared with last week, the signal has increased across the region. However, the signal decreased at Bethesda and Pwllheli and remained level at Porthmadog.
- The rapid increase indicator was triggered at Bangor Treborth.
- There was one sample from Porthmadog with SARS-CoV-2 concentration below the limit of detection (LOD).

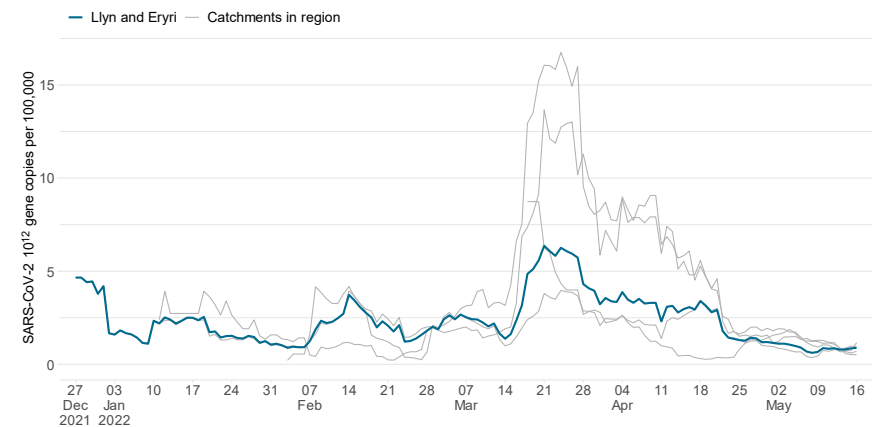


Figure 21 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

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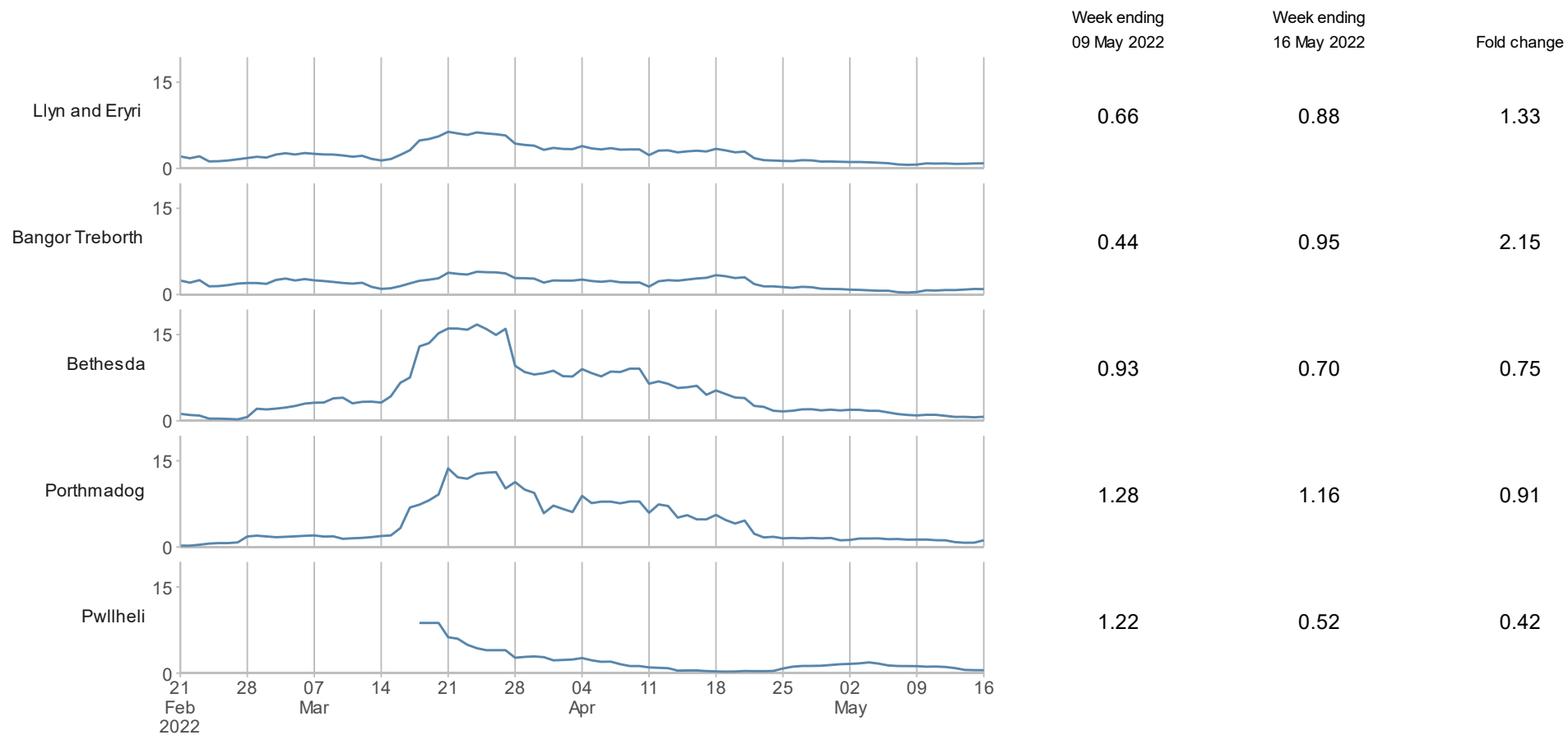


Figure 22 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 7: Meirionnydd

| | | |
|--------------------------------------|---|---------------------------|
| This section is relevant for: | Betsi Cadwaladr University Health Board | Gwynedd County Council |
| | Powys Teaching Health Board | Powys County Council |
| | Hywel Dda University Health Board | Ceredigion County Council |

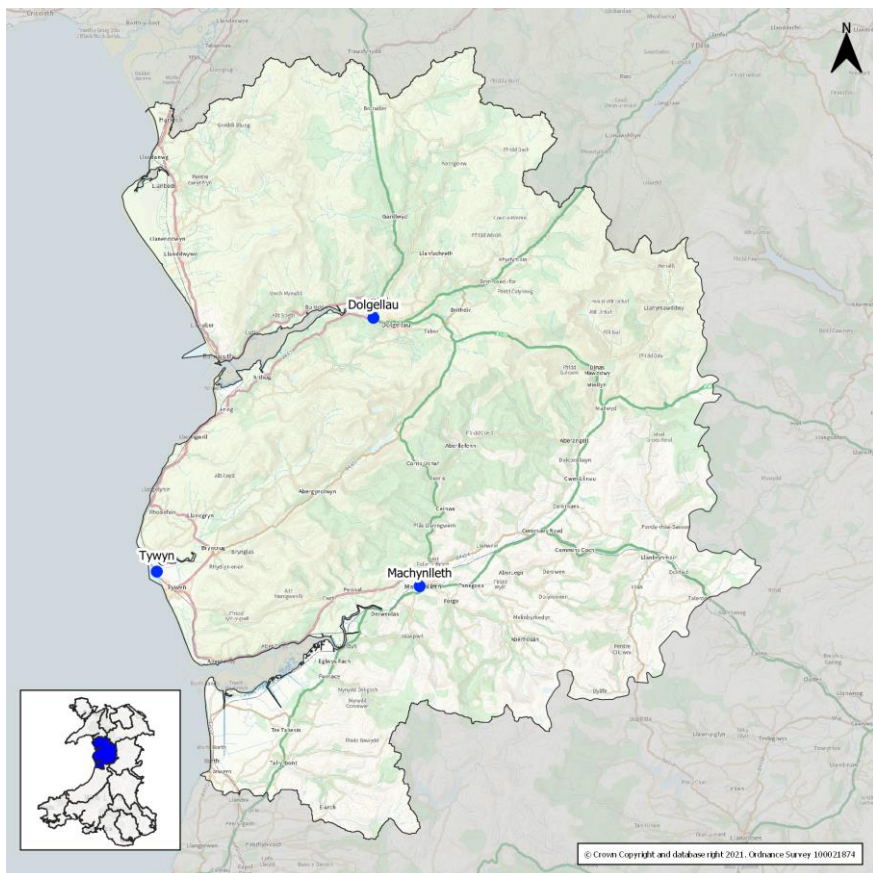


Figure 23 - Region 7 Map

Region 7 situation report:

- Wastewater signal in the region has decreased in the last four weeks and appears to be stabilising.
- Compared with last week, the signal has decreased across the region.
- No indicators were triggered during the last reporting period.
- There were no sampling issues in the last reporting period.

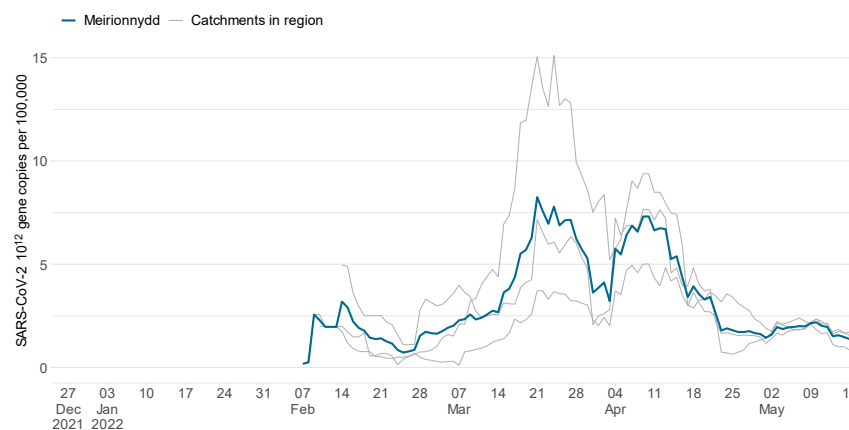


Figure 24 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

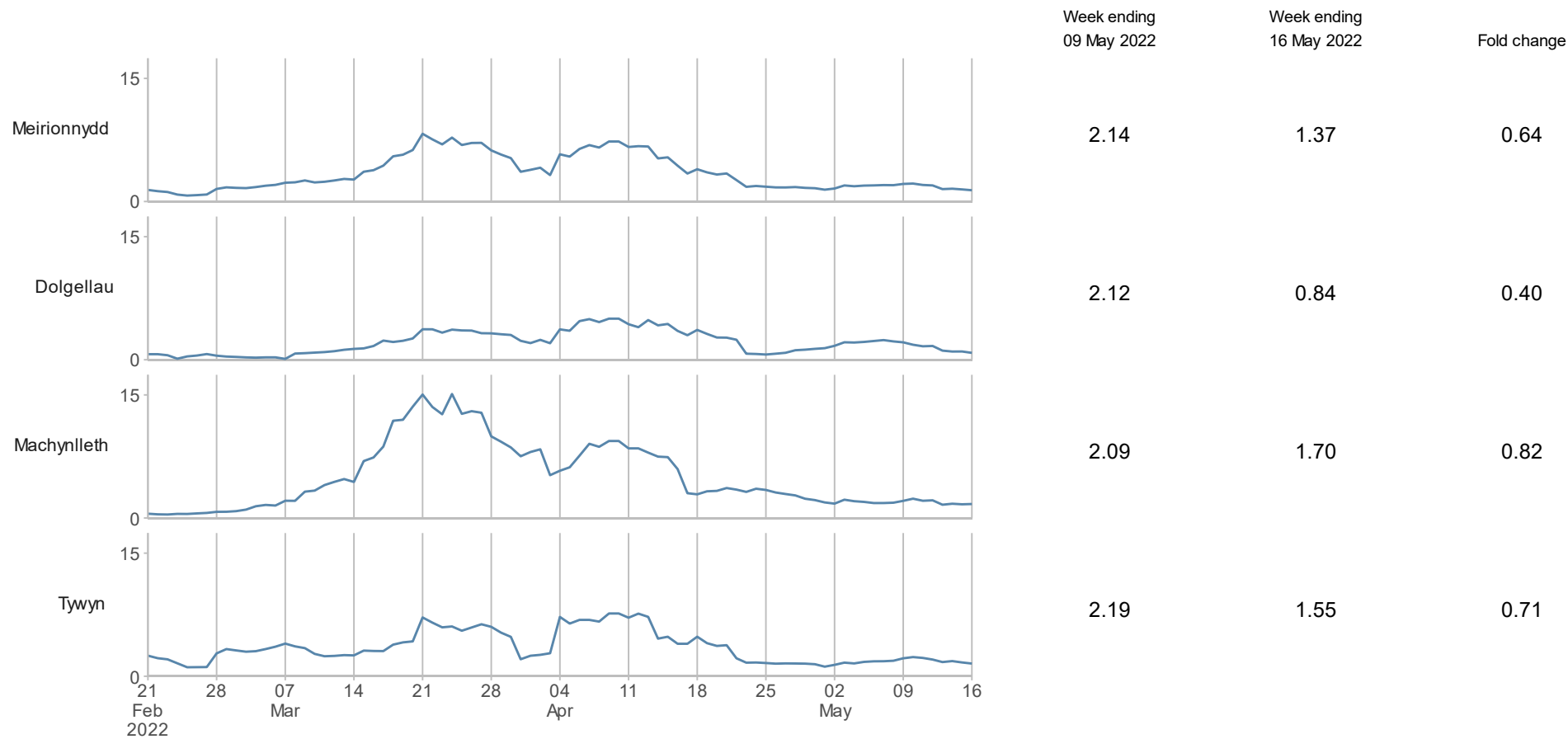


Figure 25 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 8: South East Valleys

This section is relevant for:

Aneurin Bevan University Health Board
Cardiff & Vale University Health Board
Cwm Taf University Health Board

Cardiff Council
Rhondda Cynon Taf Council
Merthyr Tydfil Council

Caerphilly Council
Blaenau Gwent Council
Newport Council

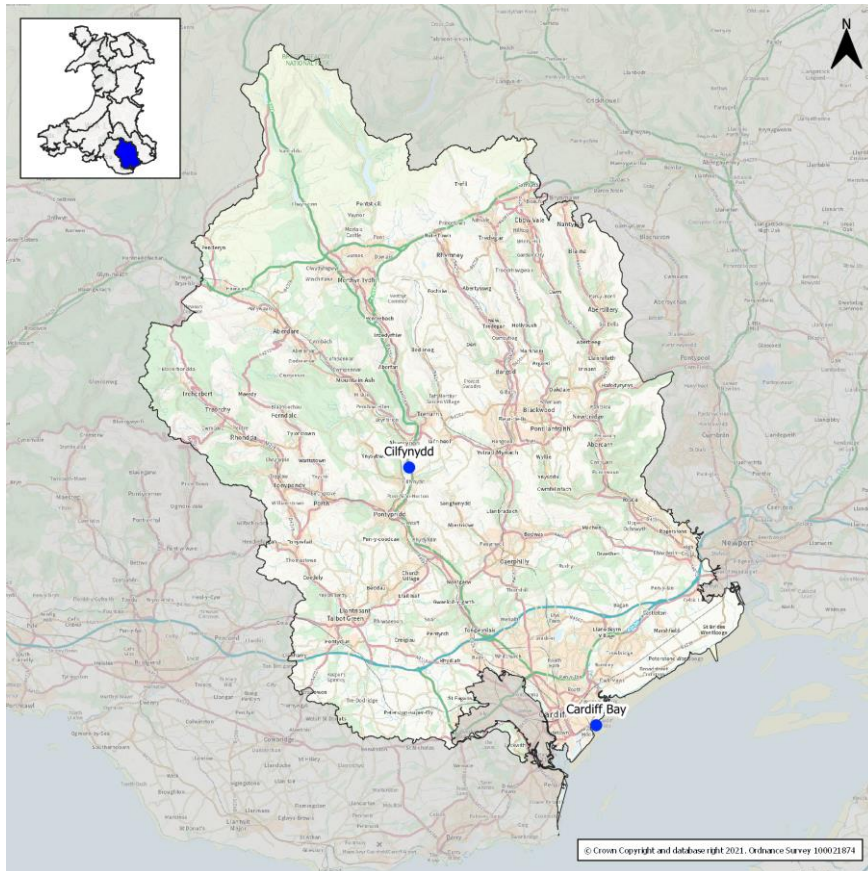


Figure 26 - Region 8 Map

Region 8 situation report:

- Wastewater signal in the region has been unstable, with both increases and decreases over the last four weeks. However, the overall change over that period is a decrease.
- Compared with last week, the signal has decreased across the region. However, the signal increased rapidly at Cilfynydd.
- The rapid increase indicator was triggered at Cilfynydd.
- There was one sample from each of the sites in the region missing.

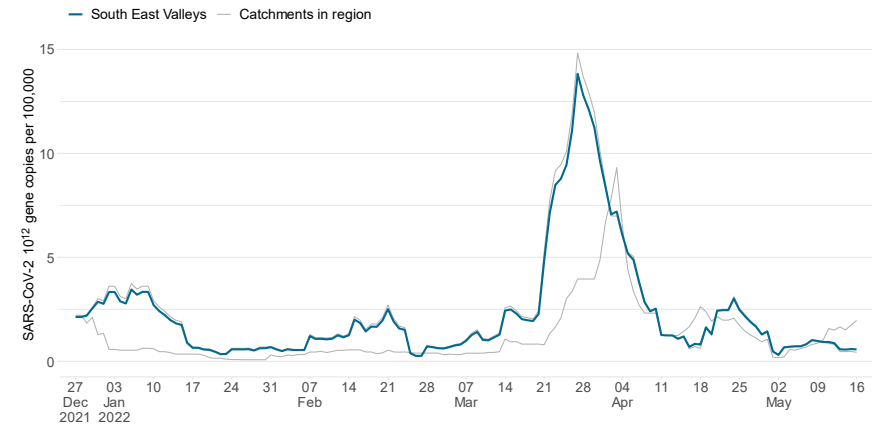


Figure 27 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

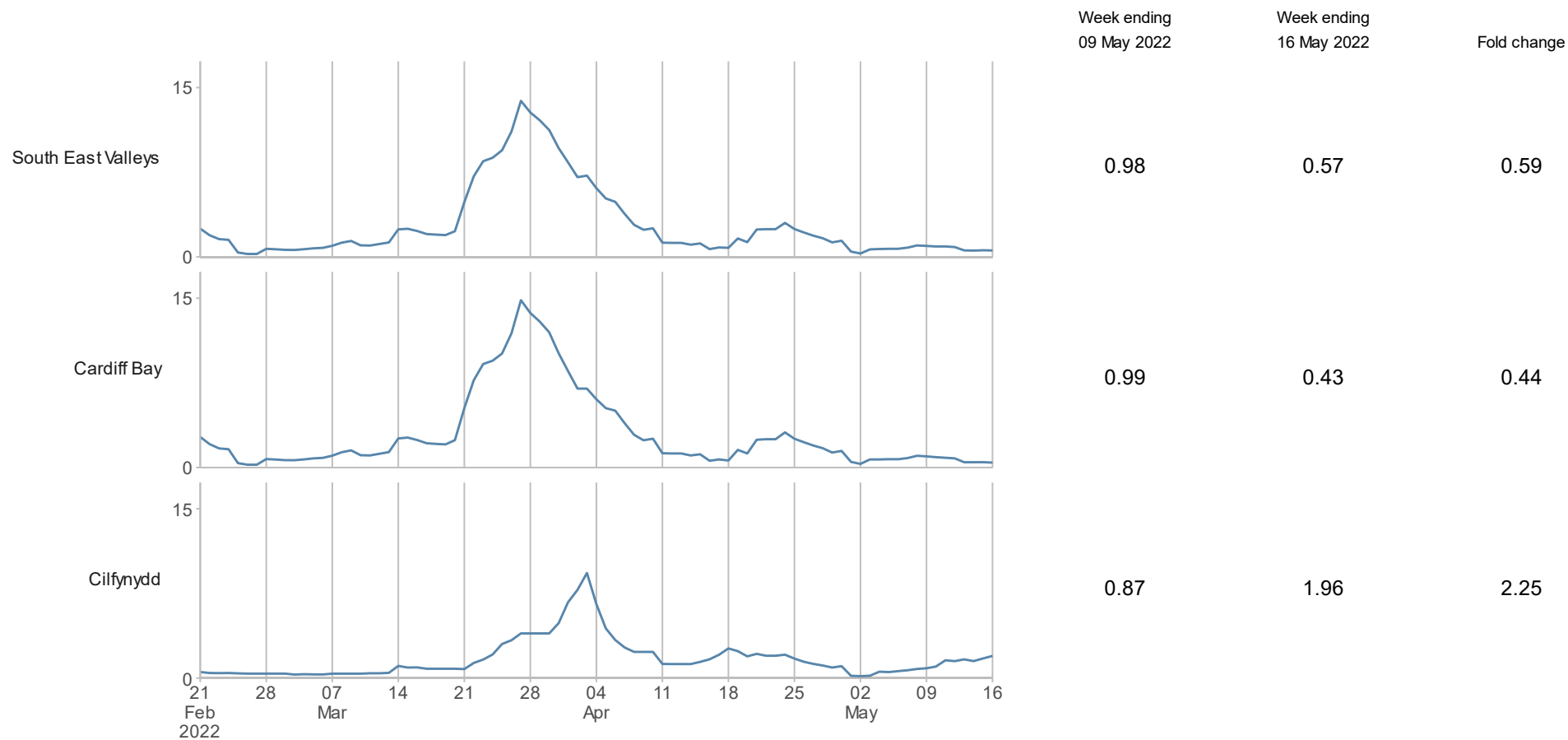


Figure 28 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 9: Tawe to Cadoxton

| | | | |
|--------------------------------------|--|-------------------|---------|
| This section is relevant for: | Cardiff & Vale University Health Board | Vale of Glamorgan | Swansea |
| | Cwm Taf University Health Board | Bridgend | Powys |
| | Swansea Bay University Health Board | Neath Port Talbot | |

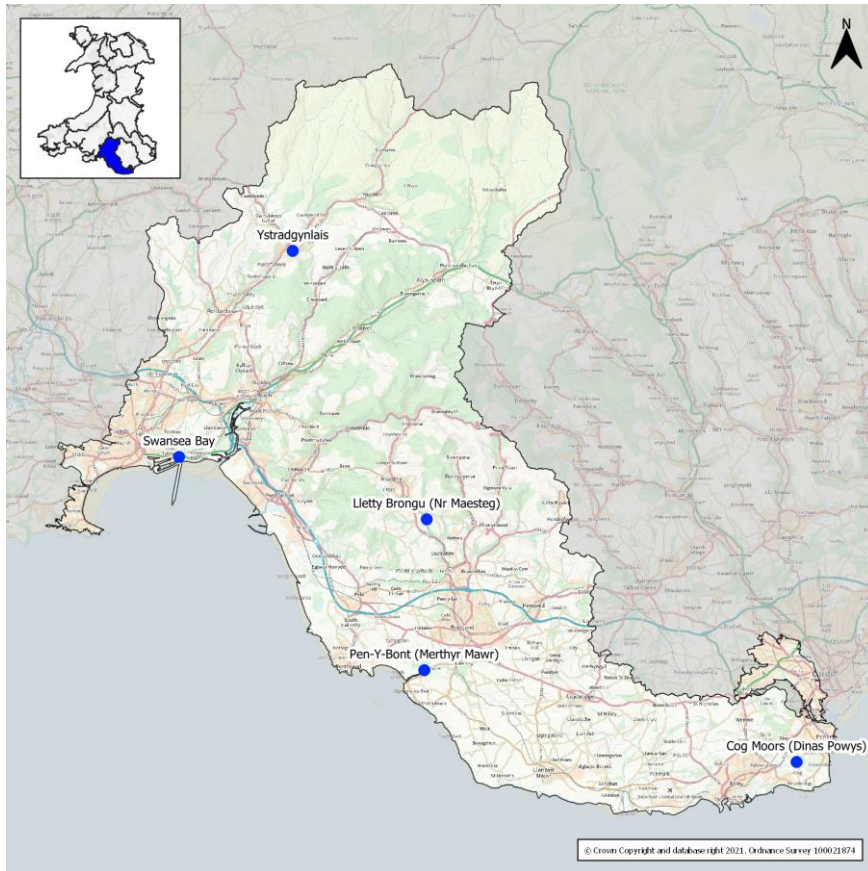


Figure 29 - Region 9 Map

Region 9 situation report:

- Wastewater signal in the region has been unstable, with both increases and decreases over the last four weeks. However, the overall change over that period is a decrease.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Lletty Brongu (Nr Maesteg) and remained level at Swansea Bay and Ystradgynlais.
- No indicators were triggered during the last reporting period.
- There was one sample from each of the sites in the region missing.

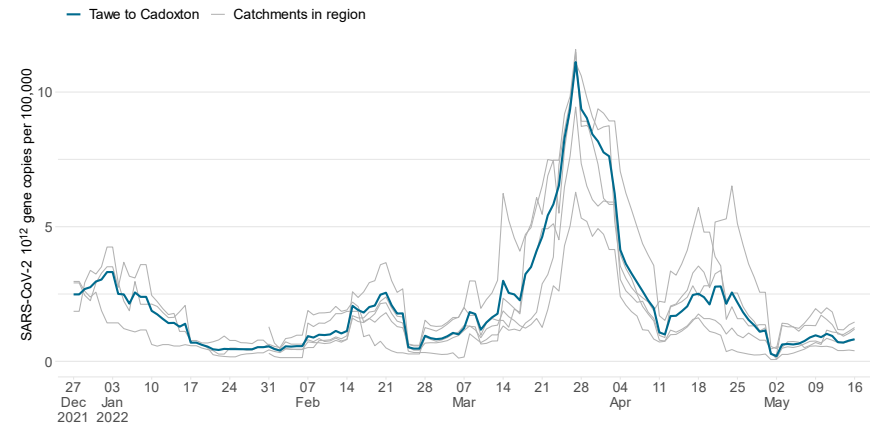


Figure 30 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

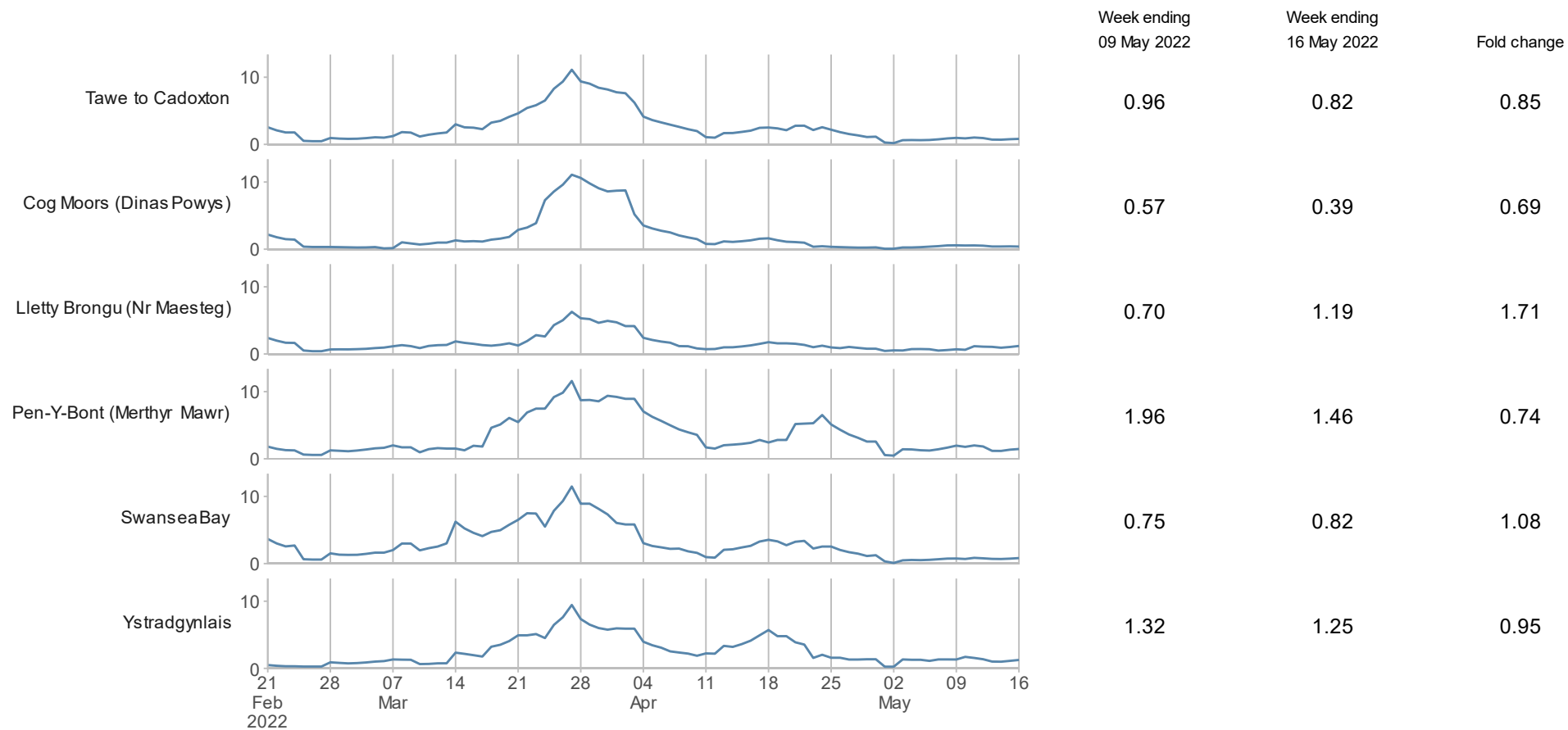


Figure 31 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 10: Teifi and North Ceredigion

This section is relevant for: Hywel Dda University Health Board

Ceredigion County Council
Pembrokeshire County Council
Carmarthen County Council

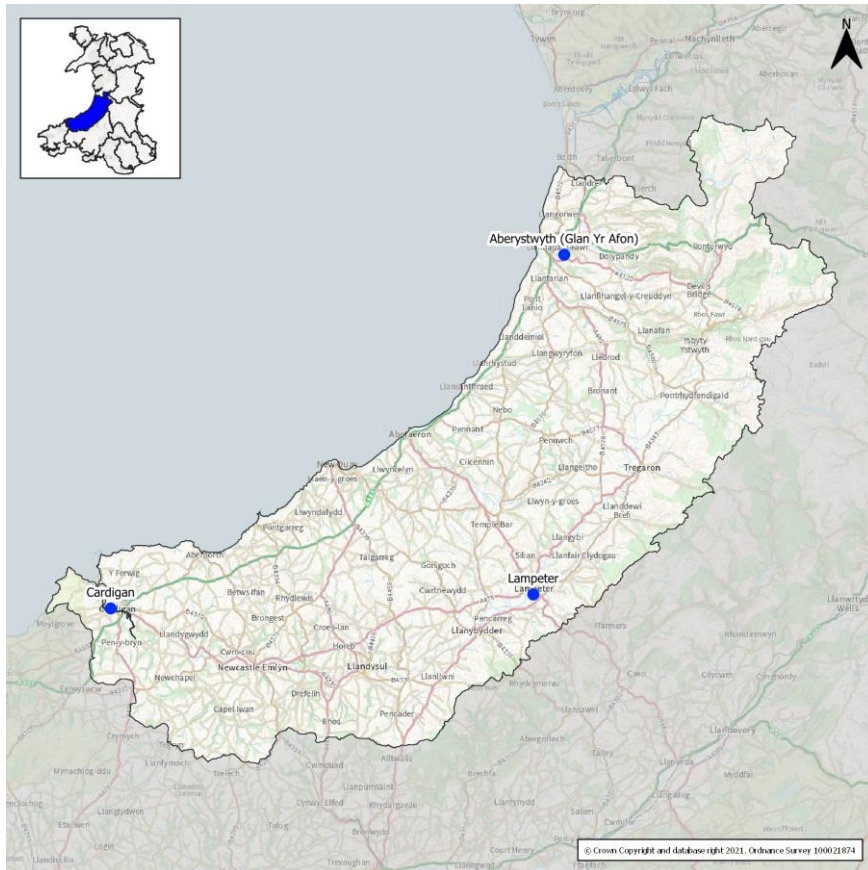


Figure 32 - Region 10 Map

Region 10 situation report:

- Wastewater signal in the region has decreased in the last four weeks.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Lampeter.
- No indicators were triggered during the last reporting period.
- There was one sample from Lampeter with SARS-CoV-2 concentration below the LOD. A further sample from each of Cardigan and Lampeter were missing.

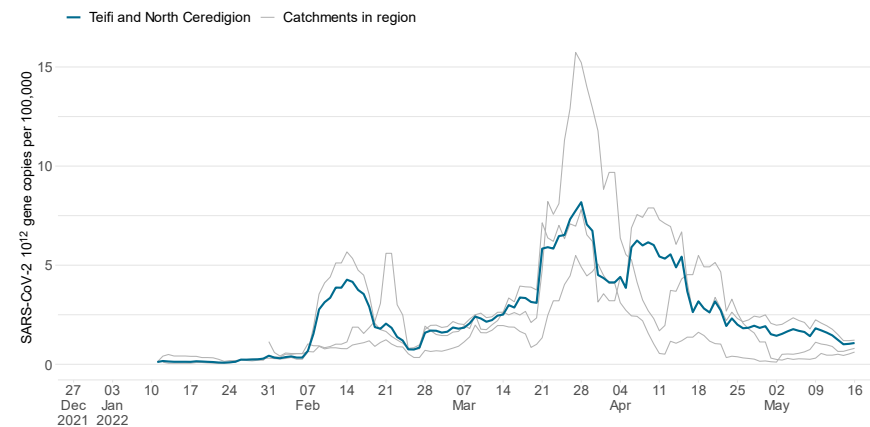


Figure 33 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

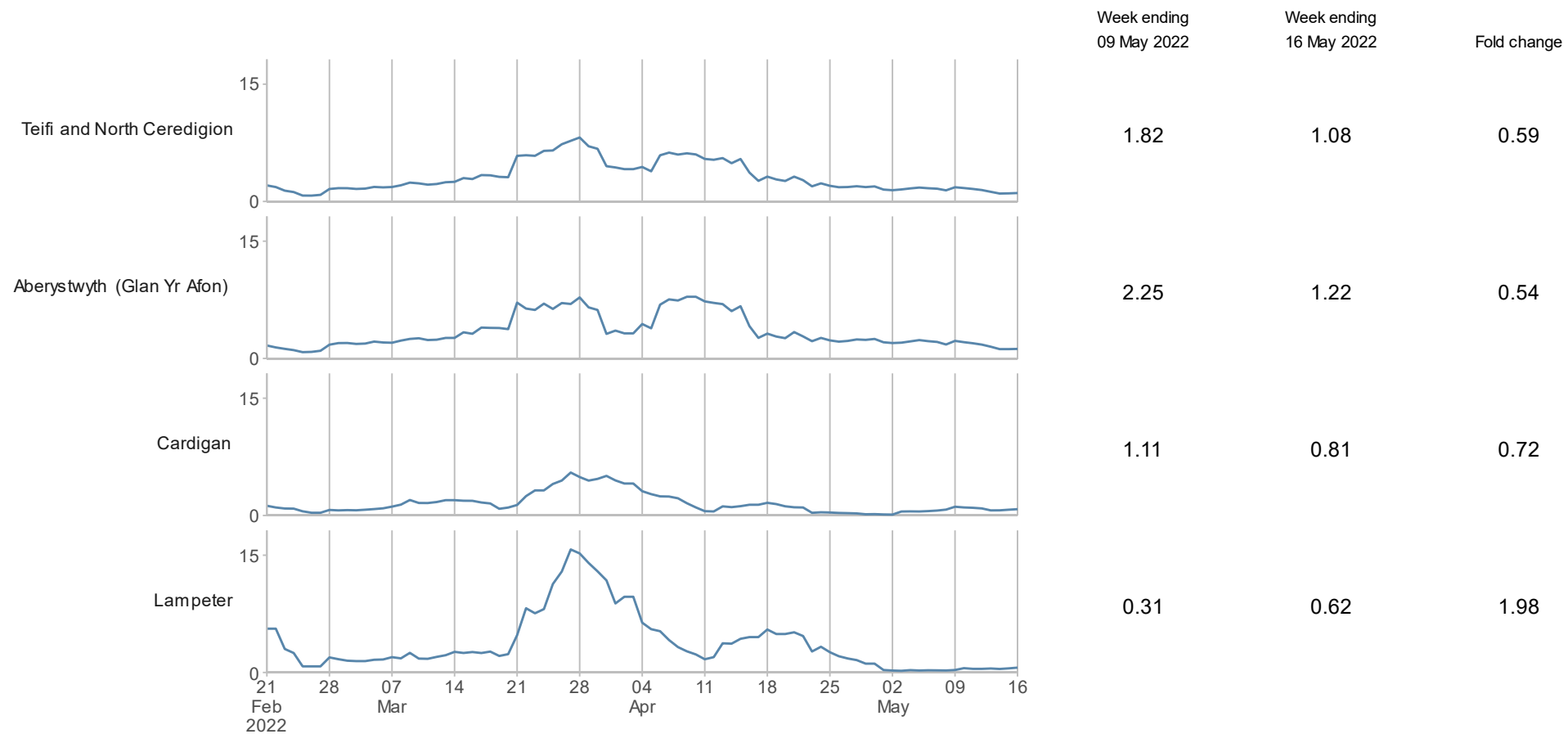


Figure 34 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 11: Usk

This section is relevant for:

Aneurin Bevan University Health Board
Cwm Taf University Health Board

Newport
Monmouthshire

Torfaen
Powys County Council

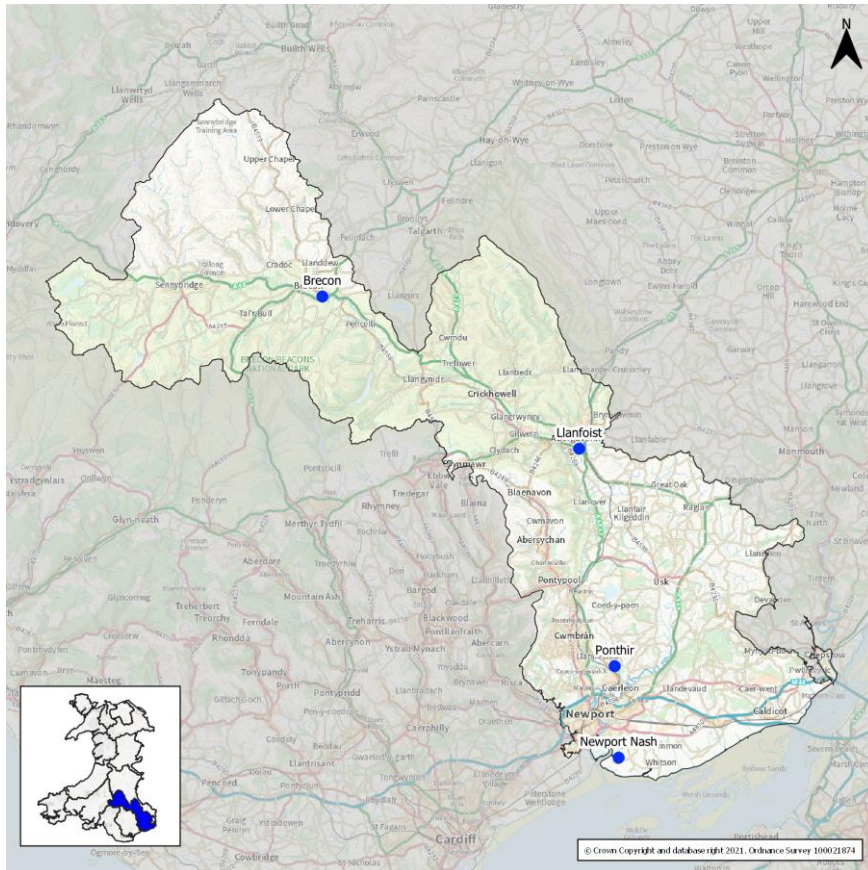


Figure 35 - Region 11 Map

Region 11 situation report:

- Wastewater signal in the region has been unstable, with both increases and decreases over the last four weeks. However, the overall change over that period is a decrease.
- Compared with last week, the signal has decreased across the region. However, the signal increased at Llanfoist.
- No indicators were triggered during the last reporting period.
- There was one sample from Newport Nash with SARS-CoV-2 concentration below the LOD. A further one sample from each of the sites in the region was missing.

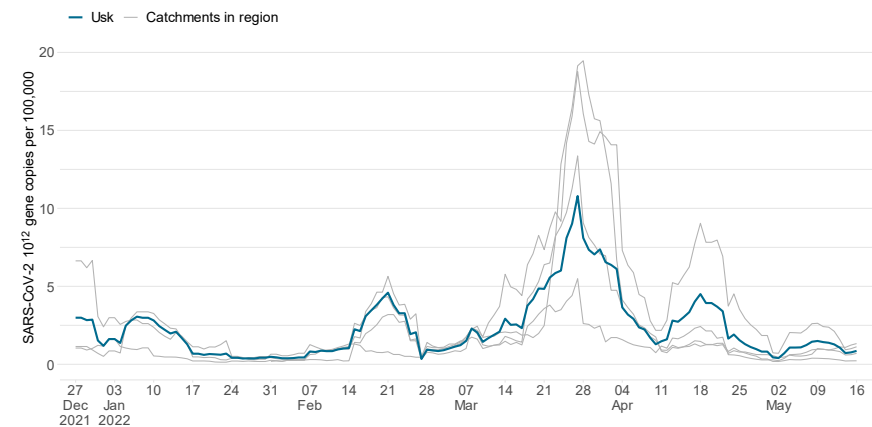


Figure 36 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

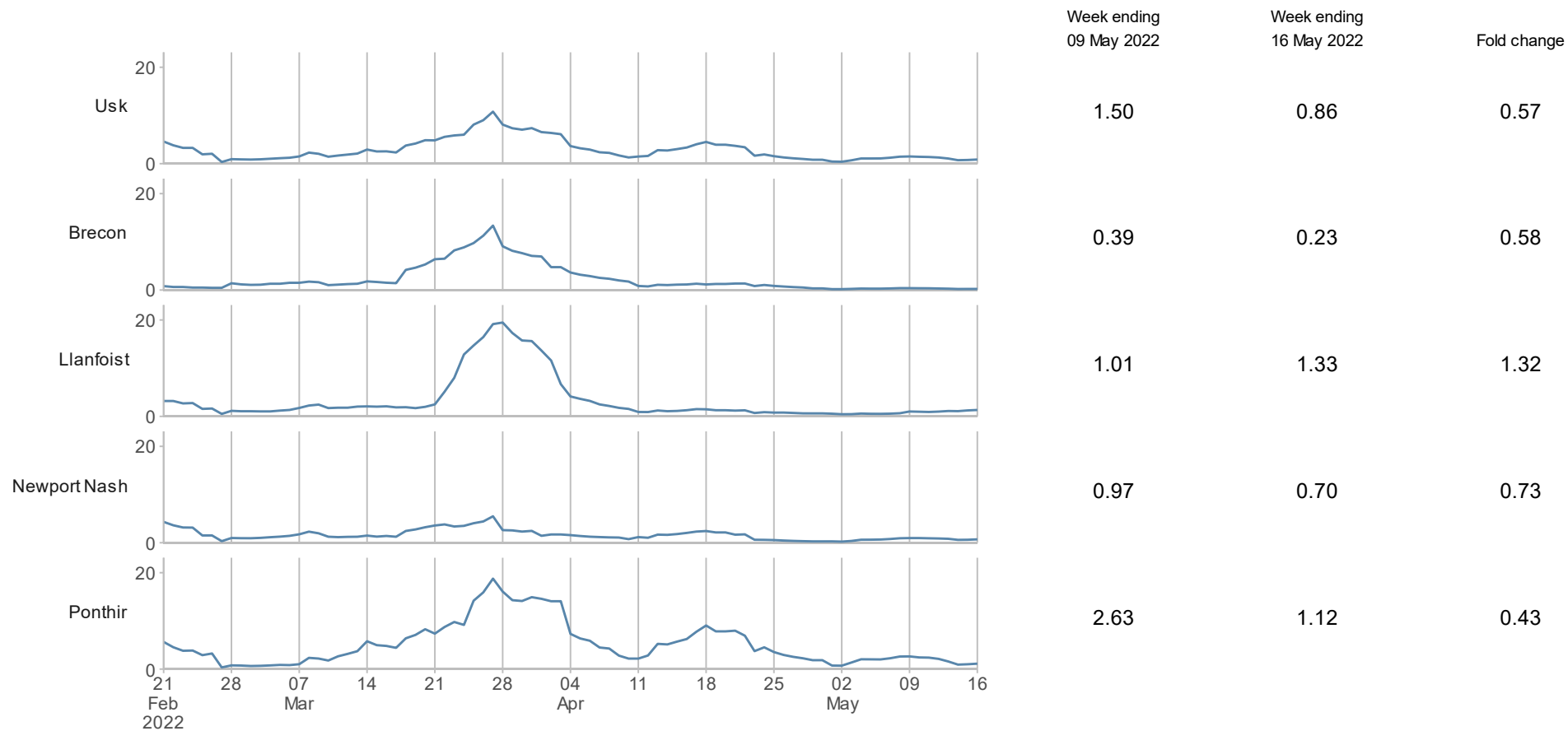


Figure 37 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 12: Wye

This section is relevant for:

Powys Teaching Health Board
Aneurin Bevan University Health Board

Monmouthshire
Powys

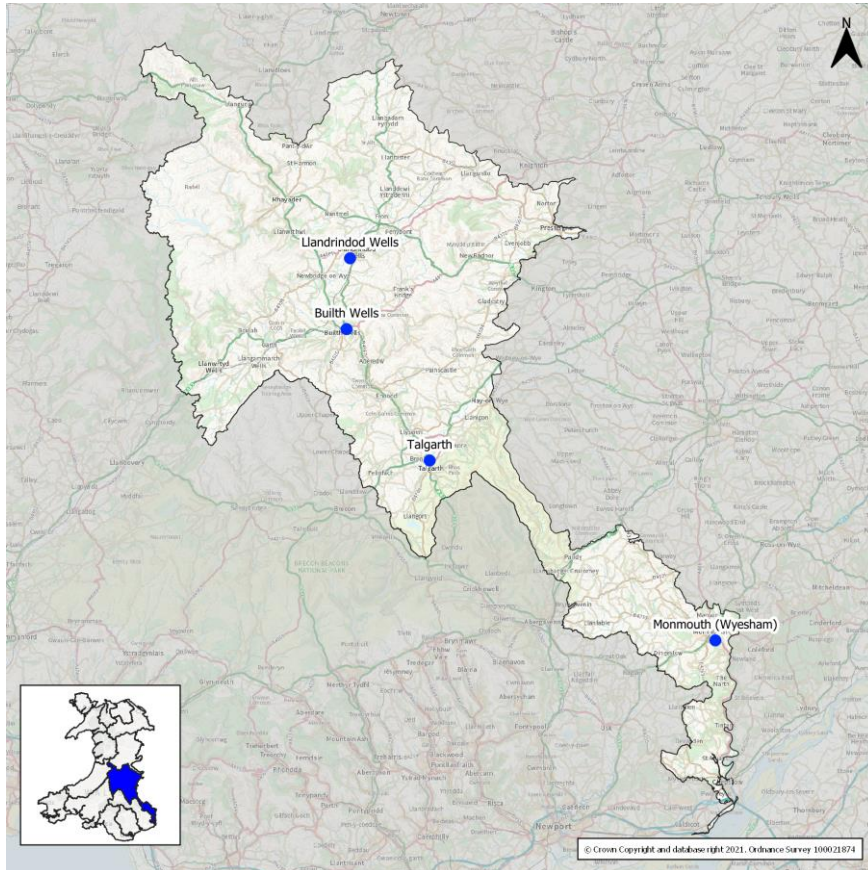


Figure 38 - Region 12 Map

Region 12 situation report:

- Wastewater signal in the region has been unstable, with both increases and decreases over the last four weeks. However, the overall change over that period is a decrease.
- Compared with last week, the signal increased across the region. However, the signal decreased at Builth Wells, Llandrindod Wells and Talgarth.
- The rapid increase indicator was triggered at Monmouth (Wyesham).
- There were two samples from each of Llandrindod Wells and Talgarth, and one sample from each of Builth Wells and Monmouth (Wyesham) missing.

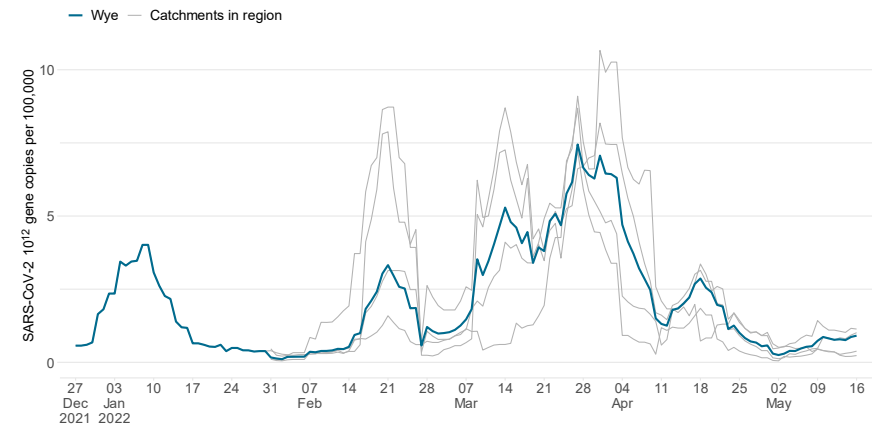


Figure 39 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

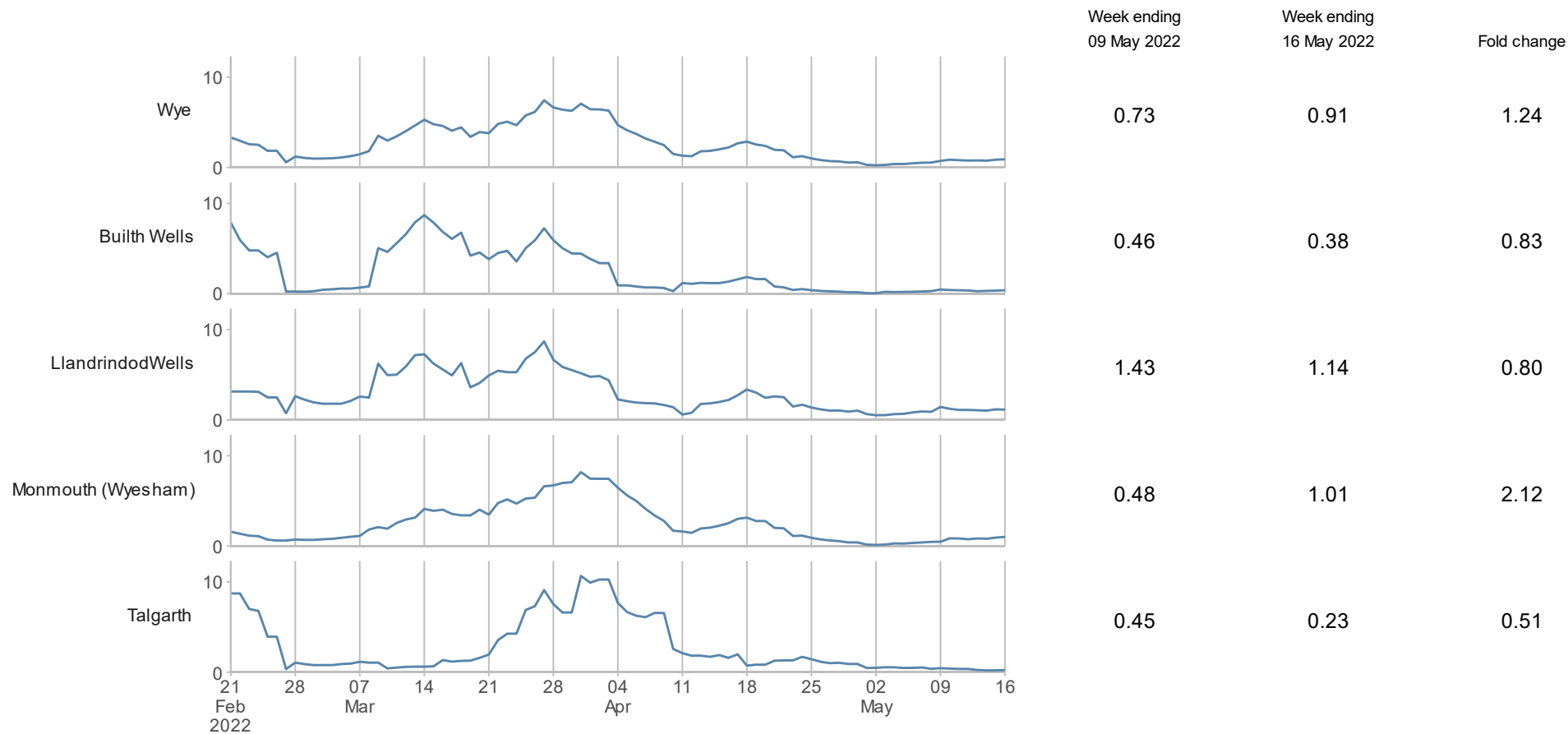


Figure 40 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 13: Ynys Môn

This section is relevant for:

Betsi Cadwaladr University Health Board

Isle of Anglesey Council

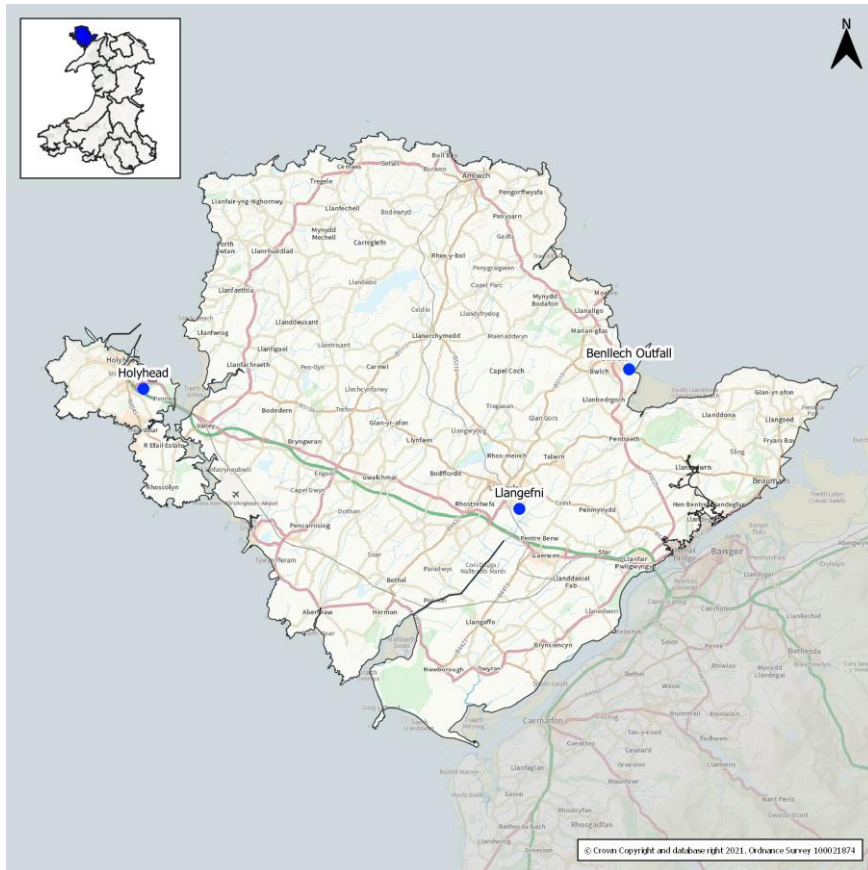


Figure 41 - Region 13 Map

Region 13 situation report:

- Wastewater signal in the region has been unstable, with both increases and decreases over the last four weeks. However, the overall change over that period is a decrease.
- Compared with last week, the signal decreased across the region. However, the signal remained level at Holyhead.
- No indicators were triggered during the last reporting period.
- There were no sampling issues in the last reporting period.

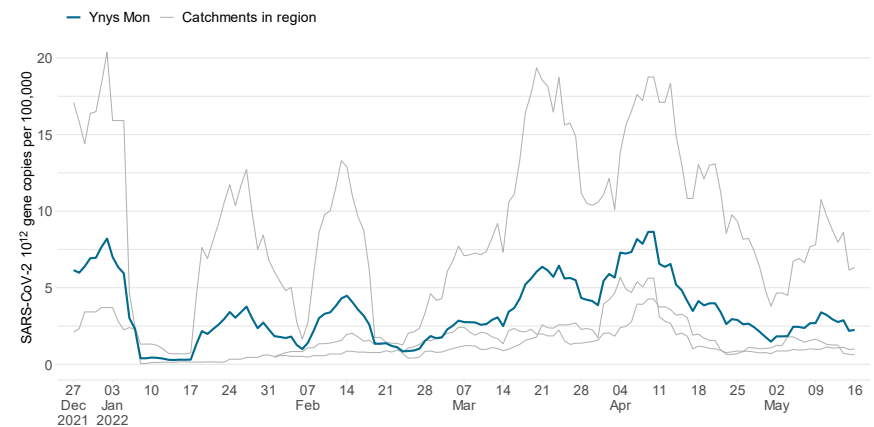


Figure 42 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

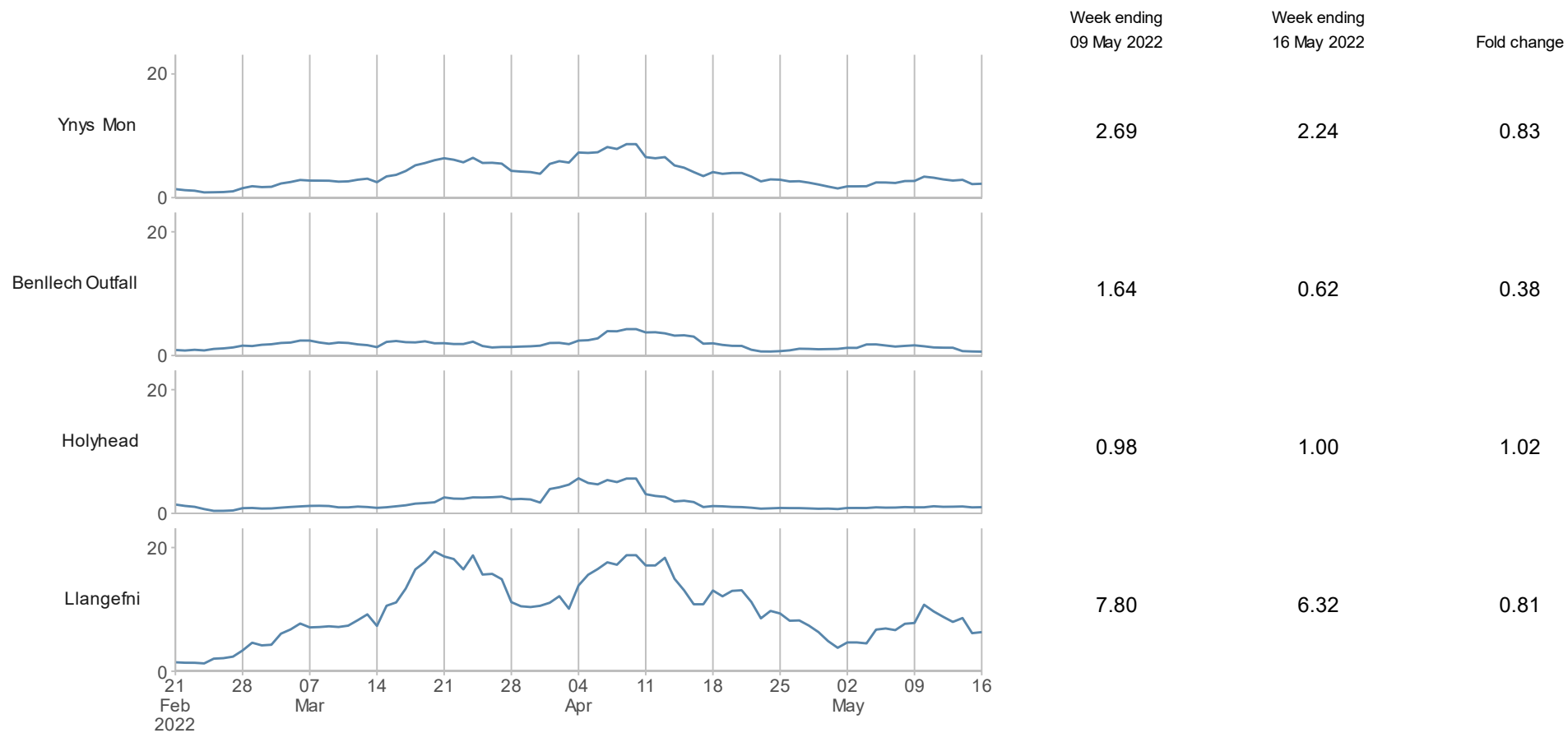


Figure 43 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Region 14: Hafren Dyfrdwy

This section is relevant for:

Powys Teaching Health Board

Powys County Council

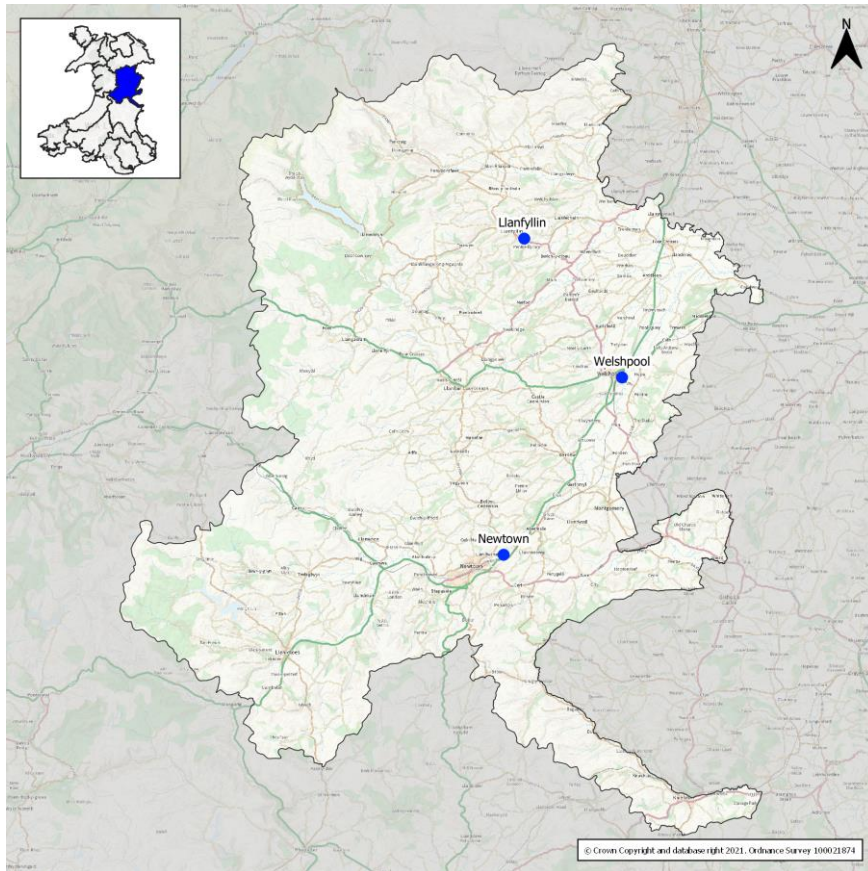


Figure 44 - Region 14 Map

Region 14 situation report:

- Wastewater signal in the region has decreased in the last four weeks.
- Compared with last week, the signal has decreased across the region.
- No indicators were triggered during the last reporting period.
- There were two samples from Welshpool missing.

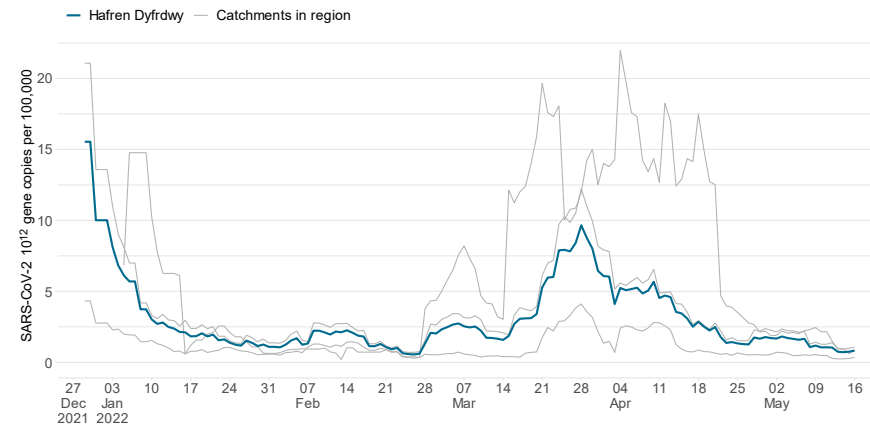


Figure 45 - Regional mean (blue lines) Site mean (grey lines) SARS-CoV-2 gc/day per 100k

Wastewater Monitoring in Wales – Weekly Report

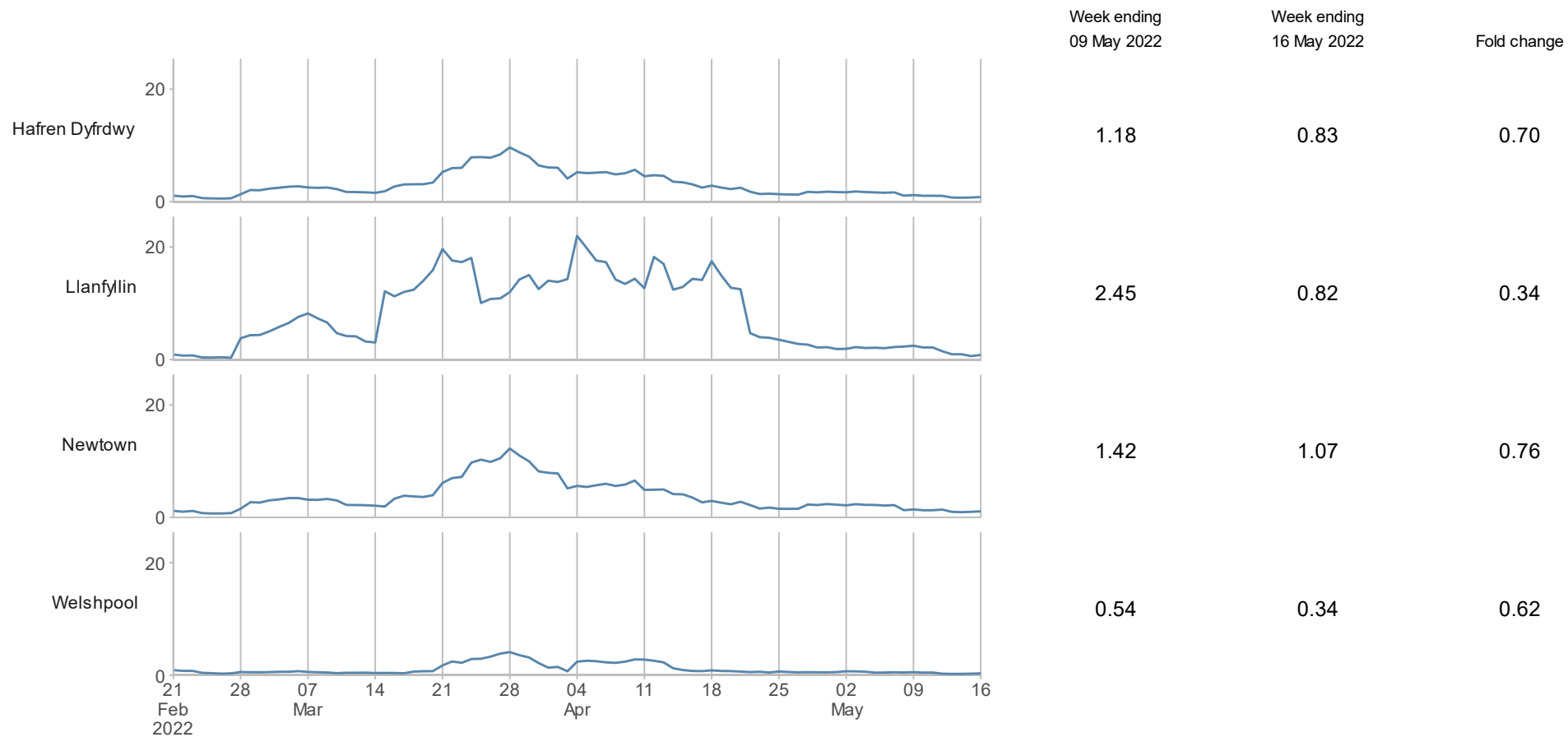


Figure 46 - Regional & Catchment trends and fold change. SARS-CoV-2 gc/day per 100k

Appendix A – Data and Indicators

Site Level Indicators

The following table provides site level detail on the catchment populations, indicators, normalised signal mean for the week relevant for this report and the type of sampling being undertaken (Composite, Spot or Mixed). Sites not currently monitored will have no data.

Table 2 - Site Level Indicators

| Site Name | Region | Catchment Population | High Signal Level | Rapid Increase | Increasing Signal Level | SARS-CoV-2 weekly mean, gc/day per 100k | Sampling Type | Successful Samples (Number / Total Samples) |
|------------------------|--|----------------------|-------------------|----------------|-------------------------|---|---------------|---|
| Garnswllt | Carmarthen Bay and the Gower | 28151 | 0 | 0 | 0 | 0.52 | Composite | 4/5 |
| Gowerton | Carmarthen Bay and the Gower | 52162 | 0 | 0 | - | 1.11 | Composite | 4/5 |
| Llanelli Coastal | Carmarthen Bay and the Gower | 52059 | 0 | 0 | 0 | 0.99 | Mixed | 3/5 |
| Parc-Y-Splott | Carmarthen Bay and the Gower | 17308 | 0 | 0 | 0 | 1.25 | Mixed | 2/5 |
| Fishguard | Cleddau and Pembrokeshire Coastal Rivers | 5499 | 0 | 0 | 0 | 0.36 | Mixed | 3/5 |
| Merlins Bridge | Cleddau and Pembrokeshire Coastal Rivers | 15366 | 0 | 0 | 0 | 2.02 | Composite | 4/5 |
| Pembroke Dock | Cleddau and Pembrokeshire Coastal Rivers | 16726 | 0 | 0 | 0 | 0.46 | Mixed | 3/5 |
| Tenby | Cleddau and Pembrokeshire Coastal Rivers | 9727 | 0 | 0 | 0 | 1.63 | Mixed | 4/5 |
| Kinmel Bay | Clwyd | 48234 | 0 | 0 | 0 | 0.78 | Composite | 5/5 |
| Ruthin | Clwyd | 5041 | 0 | 0 | 0 | 0.34 | Composite | 5/5 |
| Betws-Y-Coed | Conwy | 419 | 0 | 1 | 0 | 3.52 | Composite | 4/5 |
| Ganol | Conwy | 67101 | 0 | 0 | 0 | 1.49 | Composite | 5/5 |
| Bala | Dee | 2054 | 0 | 0 | 0 | 1.28 | Composite | 5/5 |
| Five Fords (Wrexham) | Dee | 93434 | 0 | 0 | 0 | 0.74 | Composite | 5/5 |
| Llanasa (Nr Prestatyn) | Dee | 22066 | 0 | 0 | 0 | 0.87 | Composite | 5/5 |

| Site Name | Region | Catchment Population | High Signal Level | Rapid Increase | Increasing Signal Level | SARS-CoV-2 weekly mean, gc/day per 100k | Sampling Type | Successful Samples (Number / Total Samples) |
|----------------------------|----------------------------|----------------------|-------------------|----------------|-------------------------|---|---------------|---|
| Queensferry | Dee | 29503 | 0 | 0 | 0 | 0.29 | Composite | 5/5 |
| Bangor Treborth | Llyn and Eryri | 25945 | 0 | 1 | 0 | 0.95 | Composite | 5/5 |
| Bethesda | Llyn and Eryri | 4721 | 0 | 0 | 0 | 0.7 | Composite | 5/5 |
| Porthmadog | Llyn and Eryri | 2908 | 0 | 0 | 0 | 1.16 | Composite | 4/5 |
| Pwllheli | Llyn and Eryri | 4714 | 0 | 0 | 0 | 0.52 | Composite | 5/5 |
| Dolgellau | Meirionnydd | 2431 | 0 | 0 | 0 | 0.84 | Composite | 5/5 |
| Machynlleth | Meirionnydd | 2158 | 0 | 0 | 0 | 1.7 | Composite | 5/5 |
| Tywyn | Meirionnydd | 3363 | 0 | 0 | 0 | 1.55 | Composite | 5/5 |
| Cardiff Bay | South East Valleys | 612002 | 0 | 0 | 0 | 0.43 | Composite | 4/5 |
| Cilfynydd | South East Valleys | 61721 | 0 | 1 | 0 | 1.96 | Composite | 4/5 |
| Cog Moors (Dinas Powys) | Tawe to Cadoxton | 204292 | 0 | 0 | 0 | 0.39 | Composite | 4/5 |
| Lletty Brongu (Nr Maesteg) | Tawe to Cadoxton | 19375 | 0 | 0 | 0 | 1.19 | Composite | 4/5 |
| Pen-Y-Bont (Merthyr Mawr) | Tawe to Cadoxton | 118106 | 0 | 0 | 0 | 1.46 | Composite | 4/5 |
| Swansea Bay | Tawe to Cadoxton | 168225 | 0 | 0 | 0 | 0.82 | Composite | 4/5 |
| Ystradgynlais | Tawe to Cadoxton | 10532 | 0 | 0 | 0 | 1.25 | Composite | 4/5 |
| Aberystwyth (Glan Yr Afon) | Teifi and North Ceredigion | 18026 | 0 | 0 | 0 | 1.22 | Composite | 5/5 |
| Cardigan | Teifi and North Ceredigion | 4509 | 0 | 0 | 0 | 0.81 | Composite | 4/5 |
| Lampeter | Teifi and North Ceredigion | 3046 | 0 | 0 | 0 | 0.62 | Composite | 3/5 |
| Brecon | Usk | 8172 | 0 | 0 | 0 | 0.23 | Composite | 4/5 |
| Llanfoist | Usk | 14830 | 0 | 0 | 0 | 1.33 | Composite | 4/5 |

| Site Name | Region | Catchment Population | High Signal Level | Rapid Increase | Increasing Signal Level | SARS-CoV-2 weekly mean, gc/day per 100k | Sampling Type | Successful Samples (Number / Total Samples) |
|--------------------|----------------|----------------------|-------------------|----------------|-------------------------|---|---------------|---|
| Newport Nash | Usk | 164985 | 0 | 0 | 0 | 0.7 | Composite | 2/5 |
| Ponthir | Usk | 91460 | 0 | 0 | 0 | 1.12 | Mixed | 4/5 |
| Builth Wells | Wye | 2554 | 0 | 0 | 0 | 0.38 | Composite | 4/5 |
| Llandrindod Wells | Wye | 5650 | 0 | 0 | 0 | 1.14 | Composite | 3/5 |
| Monmouth (Wyesham) | Wye | 10817 | 0 | 1 | 0 | 1.01 | Composite | 4/5 |
| Talgarth | Wye | 1508 | 0 | 0 | 0 | 0.23 | Composite | 3/5 |
| Benllech Outfall | Ynys Mon | 2605 | 0 | 0 | 0 | 0.62 | Composite | 5/5 |
| Holyhead | Ynys Mon | 15719 | 0 | 0 | 0 | 1 | Composite | 5/5 |
| Llangefni | Ynys Mon | 5824 | 0 | 0 | 0 | 6.32 | Composite | 5/5 |
| Llanfyllin | Hafren Dyfrdwy | 629 | 0 | 0 | 0 | 0.82 | Composite | 5/5 |
| Newtown | Hafren Dyfrdwy | 10184 | 0 | 0 | 0 | 1.07 | Composite | 5/5 |
| Welshpool | Hafren Dyfrdwy | 5022 | 0 | 0 | 0 | 0.34 | Composite | 3/5 |

“-“ Indicates where no data is available. This could be as a result of no samples being taken or missing metadata.

“Mixed” is used to indicate the weekly mean is made up of both spot and composite samples.

Appendix B – ONS COVID-19 Infection Survey

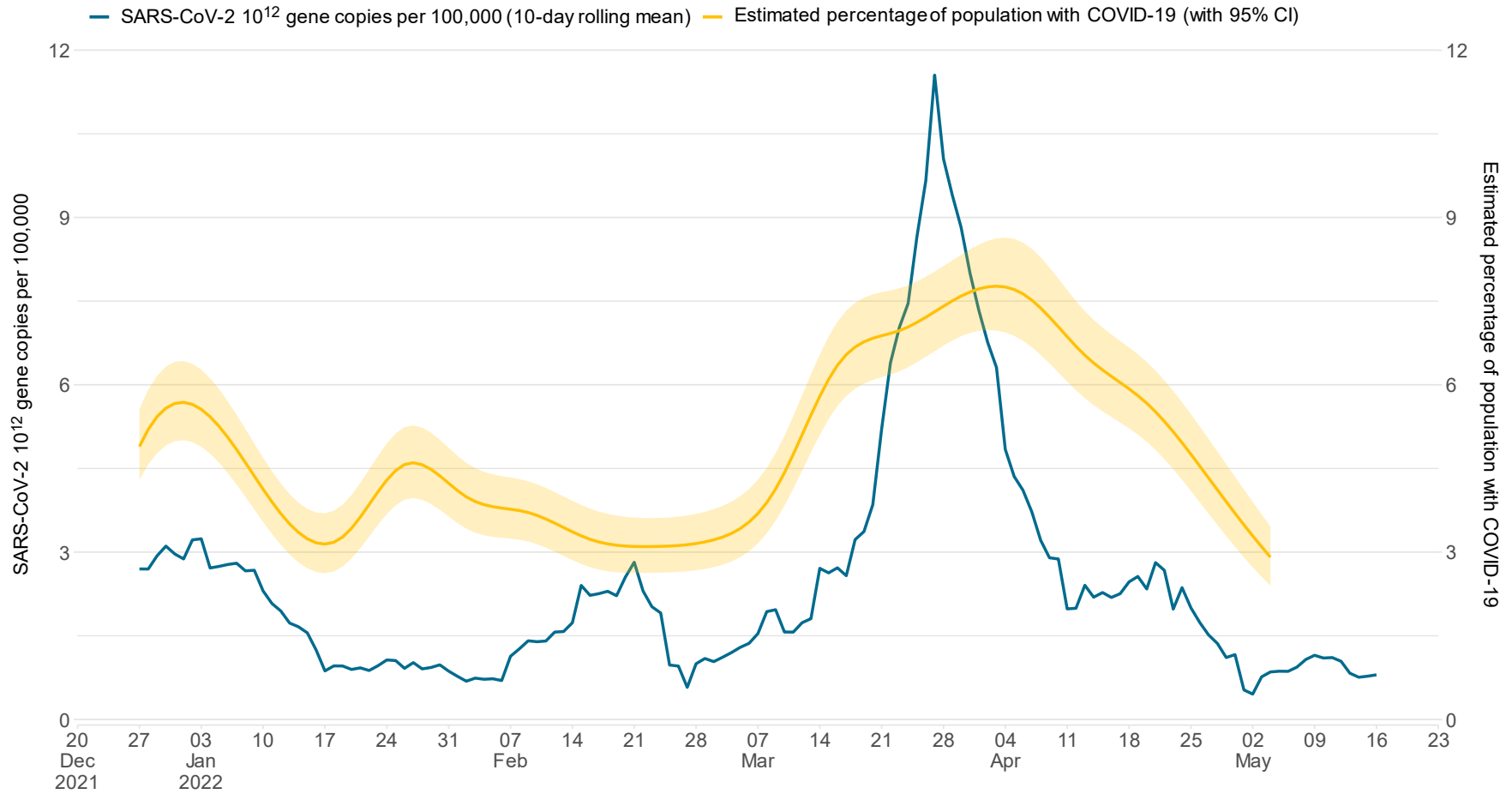
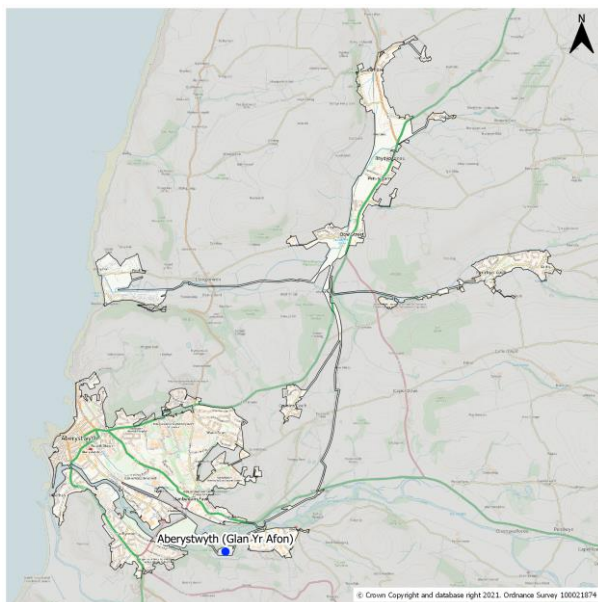


Figure 47 – ONS CIS vs Wastewater National Mean (SARS-CoV-2 gc/day per 100k)

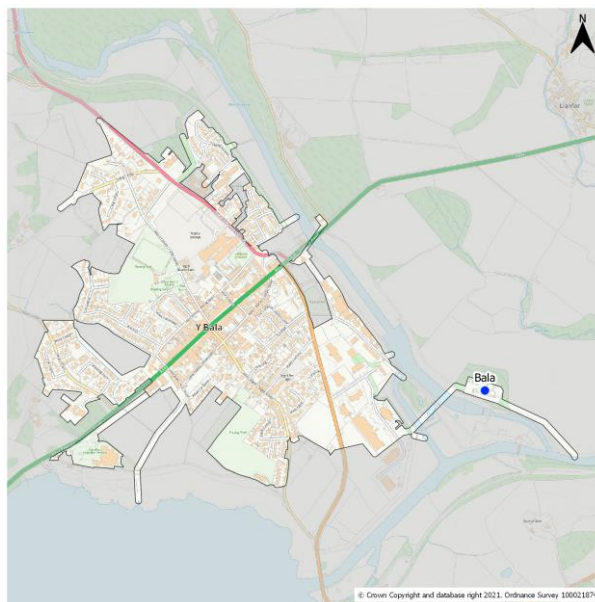
Appendix C – Sewer Catchment Maps

The maps featured in this report may not be used or reproduced without permission from our relevant partners, Dŵr Cymru and Hafren Dyfrdwy.

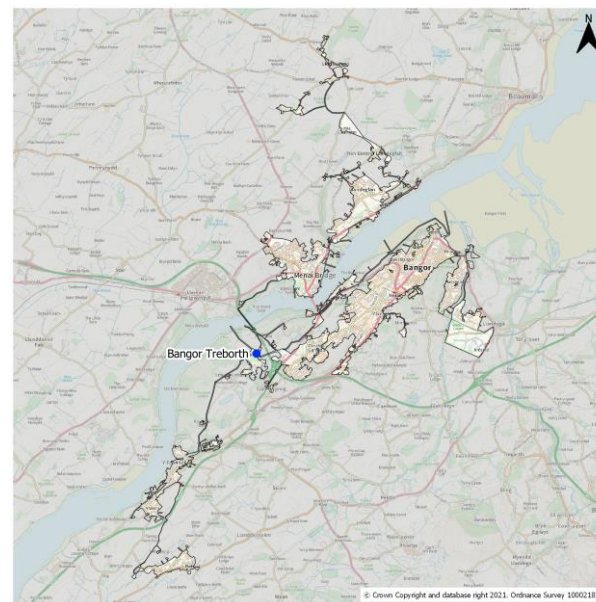
Maps are reproduced in alphabetical order and have been provided to give context to the physical sewer areas of the monitored wastewater catchments used in this report.



Aberystwyth (Glan Yr Afon)



Bala

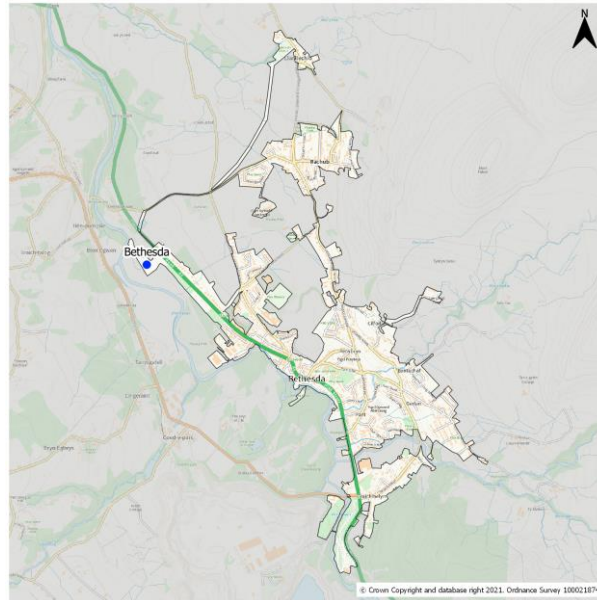


Bangor Treborth

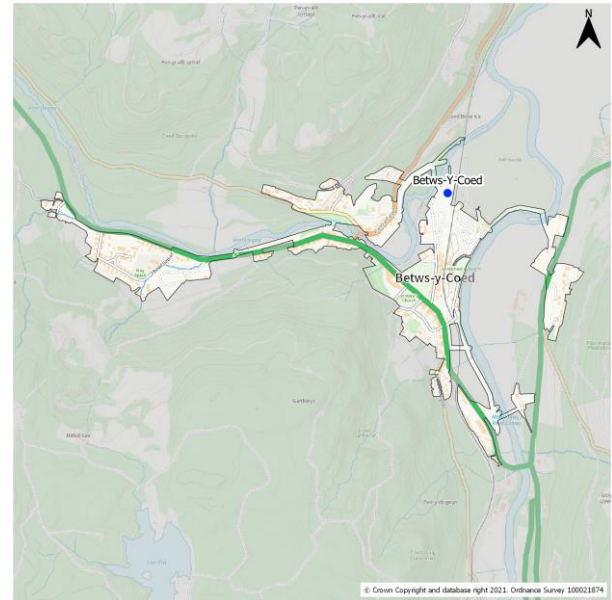
Wastewater Monitoring in Wales – Weekly Report



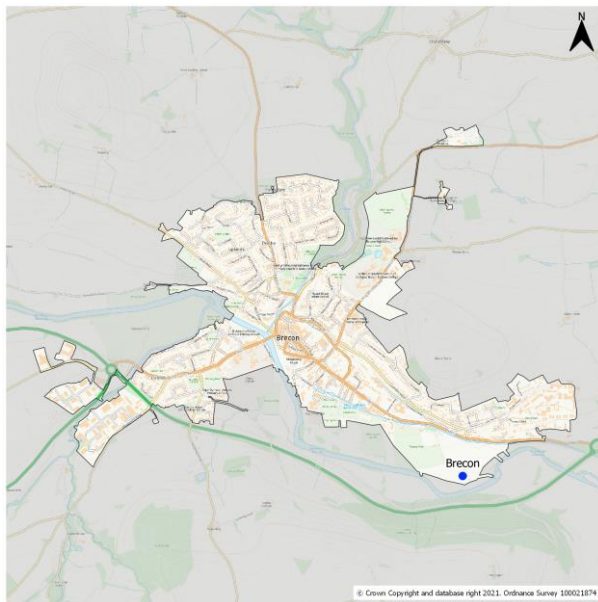
Benllech Outfall



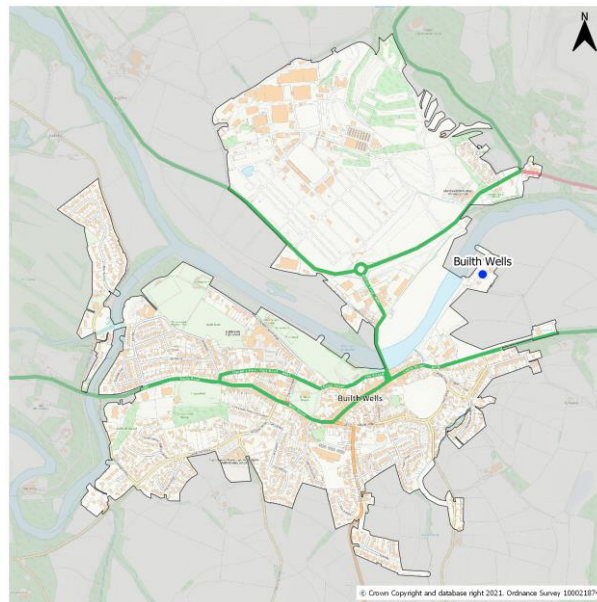
Bethesda



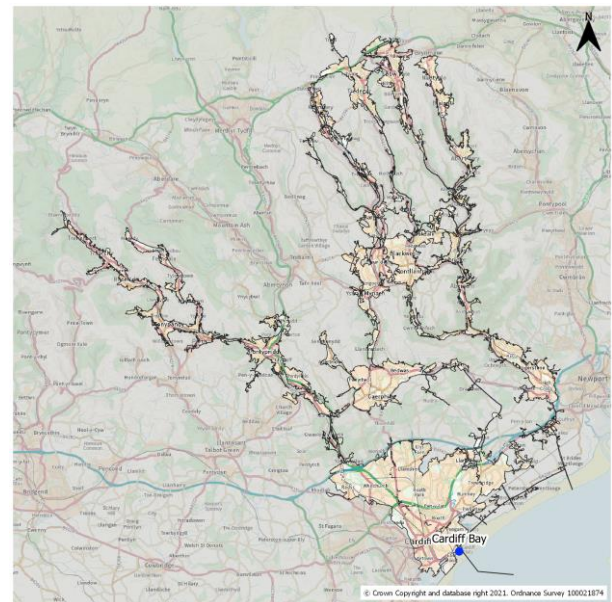
Betws-Y-Coed



Brecon

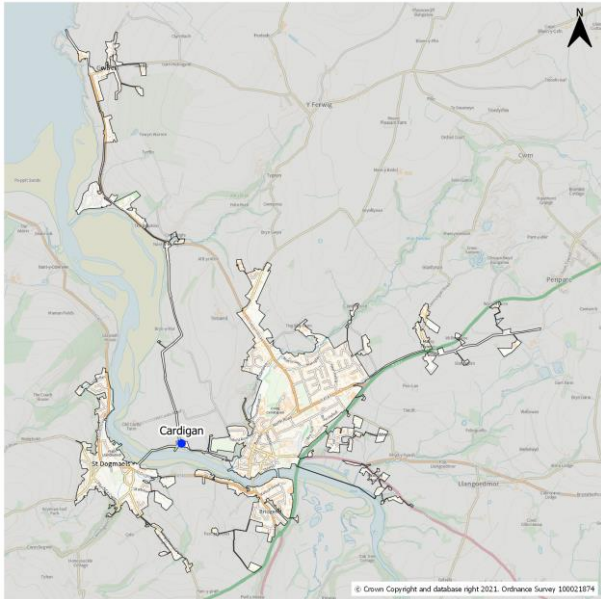


Builth Wells

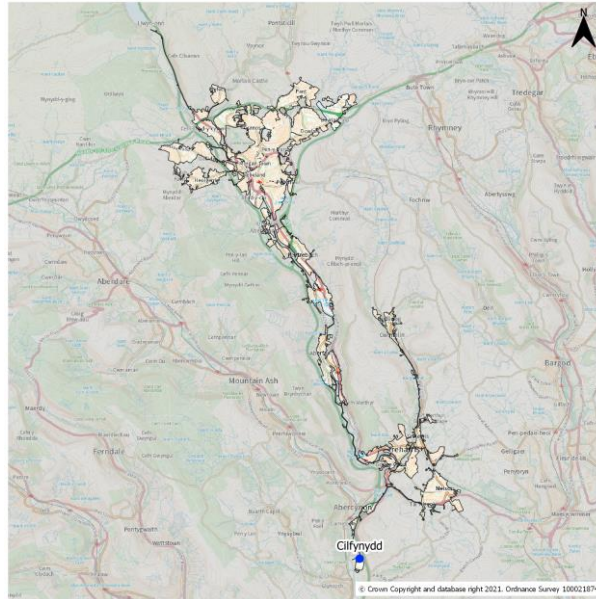


Cardiff Bay

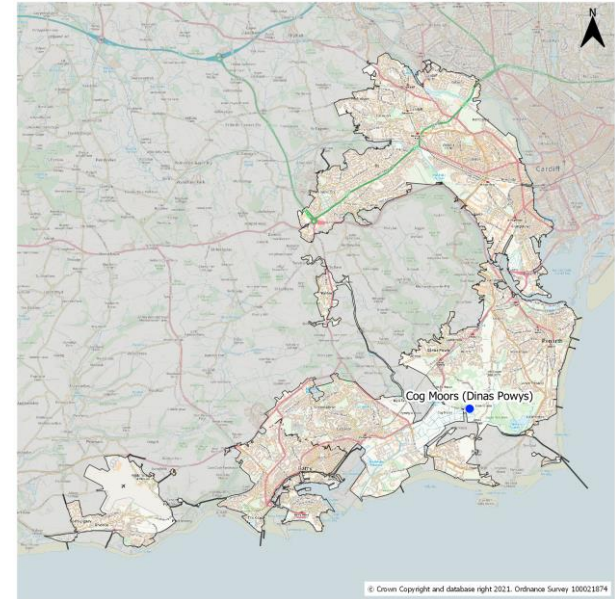
Wastewater Monitoring in Wales – Weekly Report



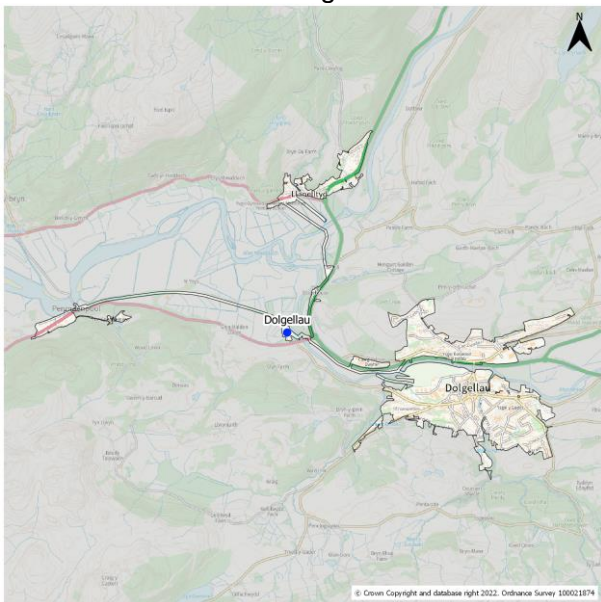
Cardigan



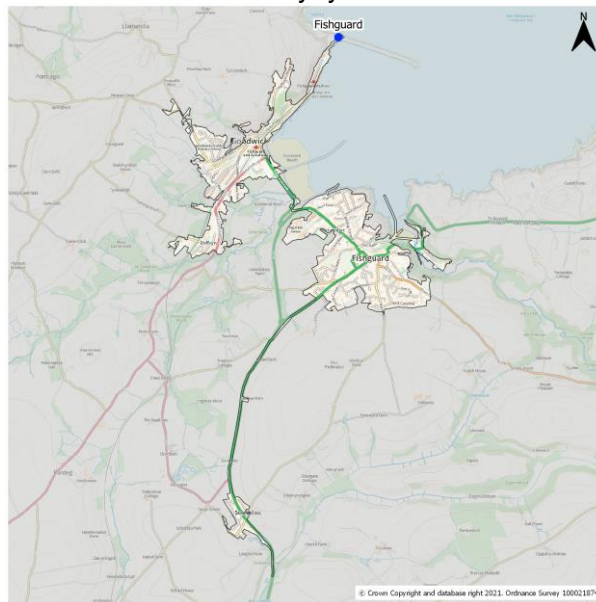
Cilfynydd



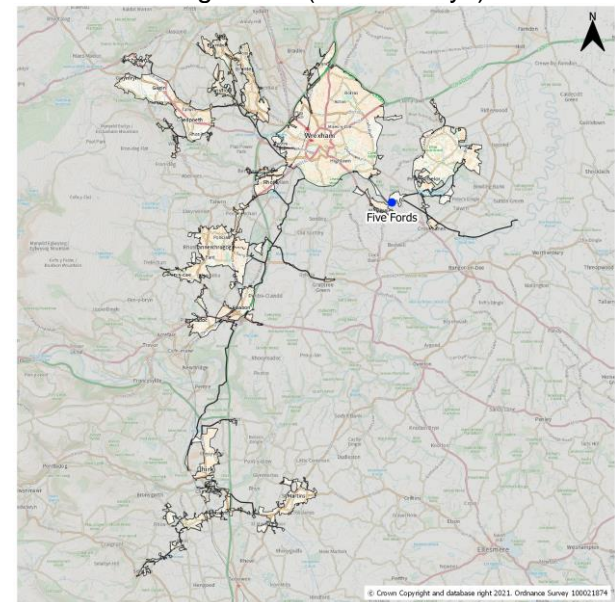
Cog Moors (Dinas Powys)



Dolgellau

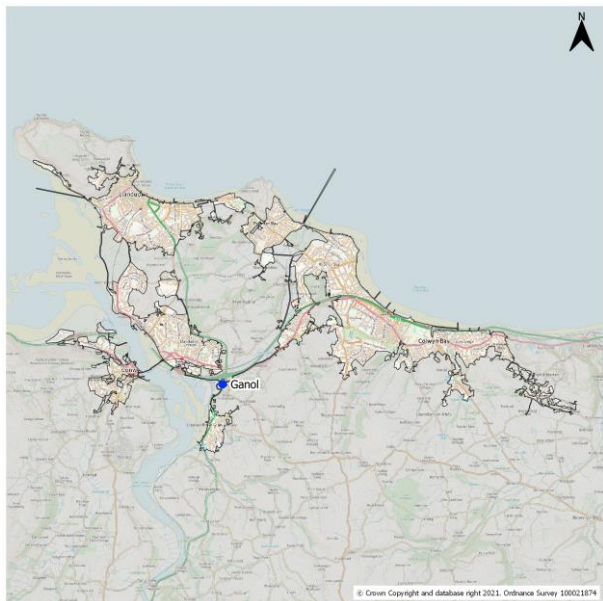


Fishguard

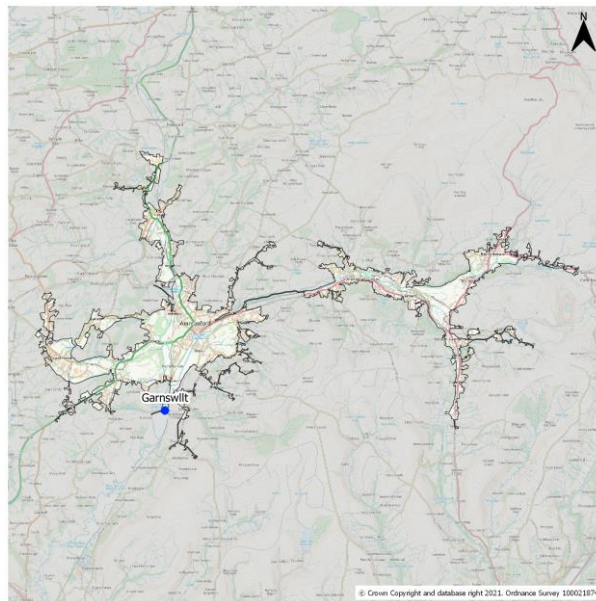


Five Fords (Wrexham)

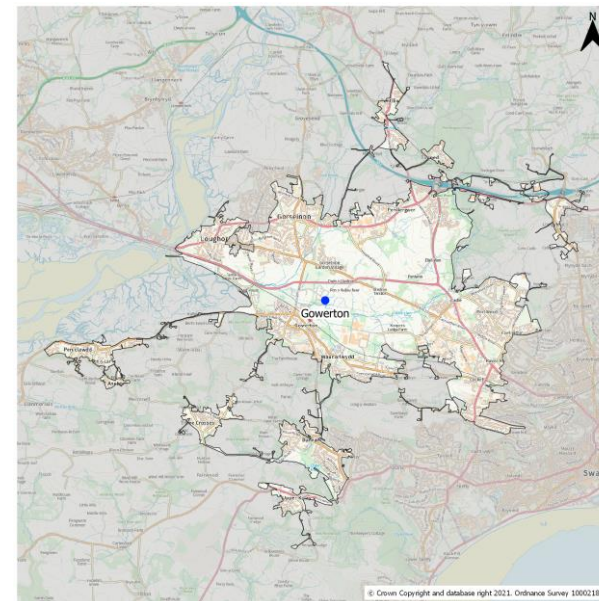
Wastewater Monitoring in Wales – Weekly Report



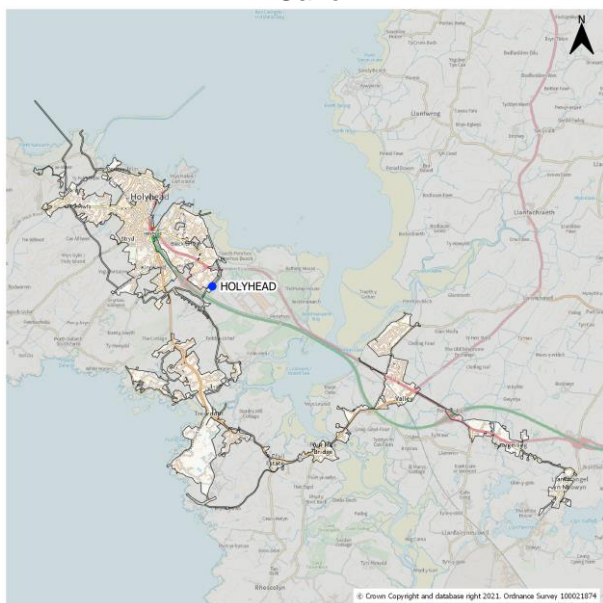
Ganol



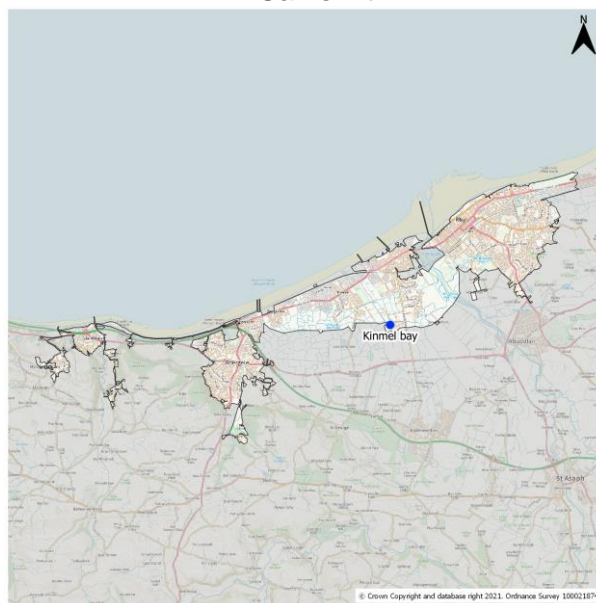
Garnswilt



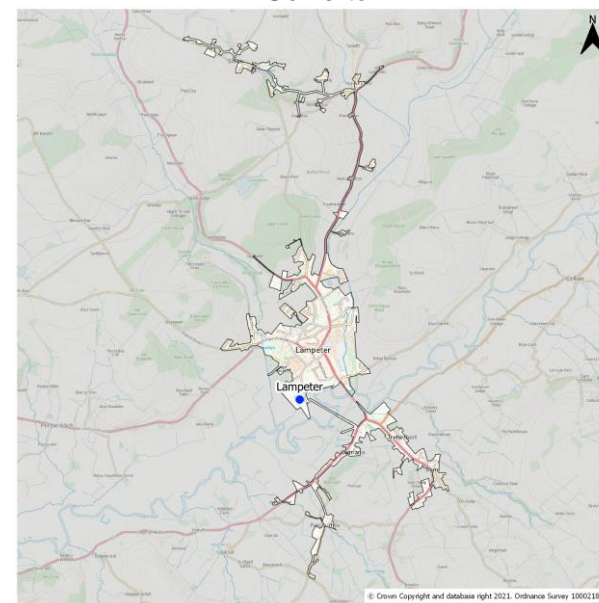
Gowerton



Holyhead

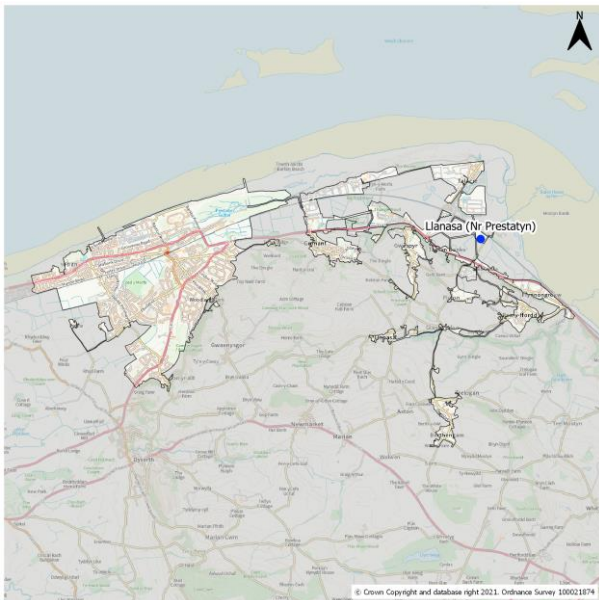


Kinmel Bay

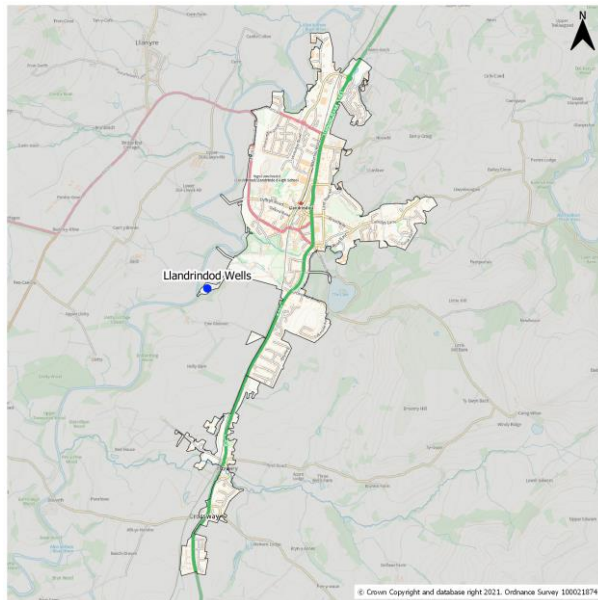


Lampeter

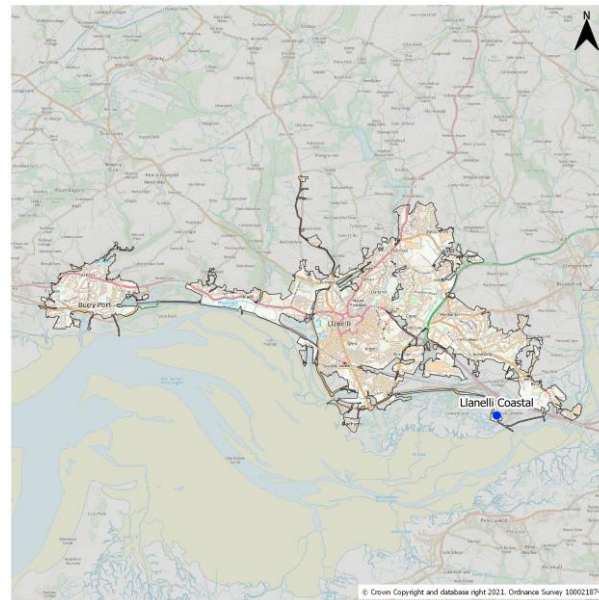
Wastewater Monitoring in Wales – Weekly Report



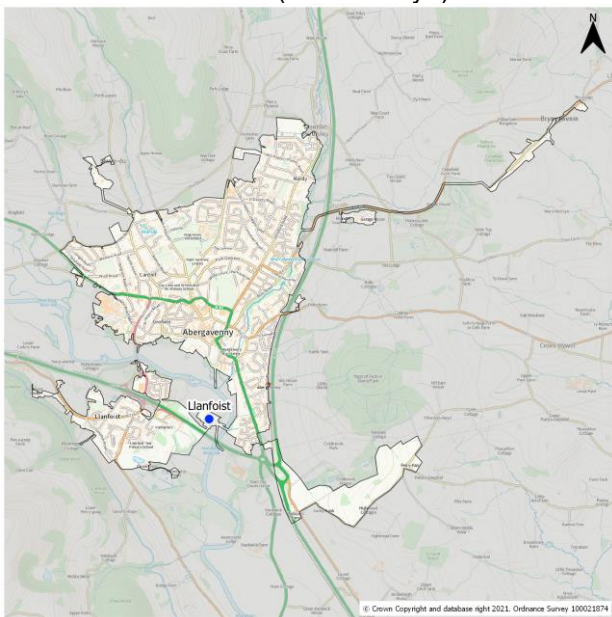
Llanasa (Nr Prestatyn)



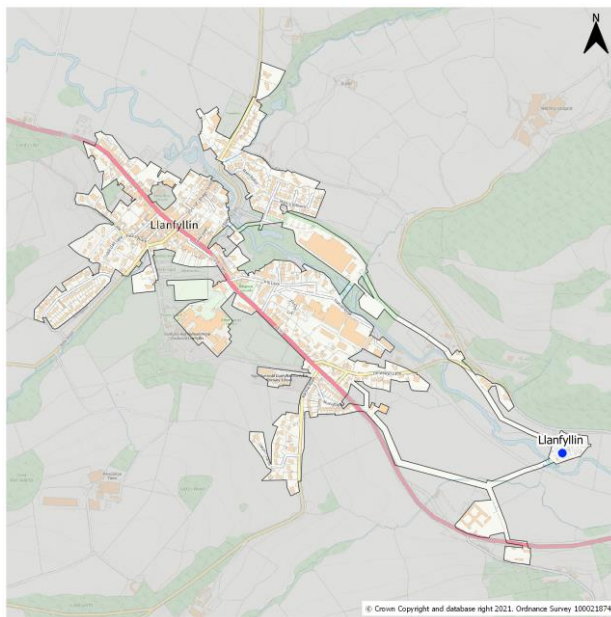
Llandrindod Wells



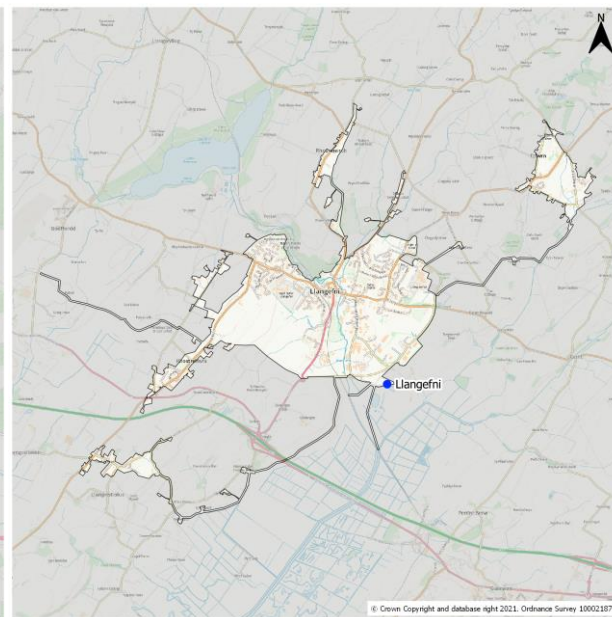
Llanelli Coastal



Llanfoist

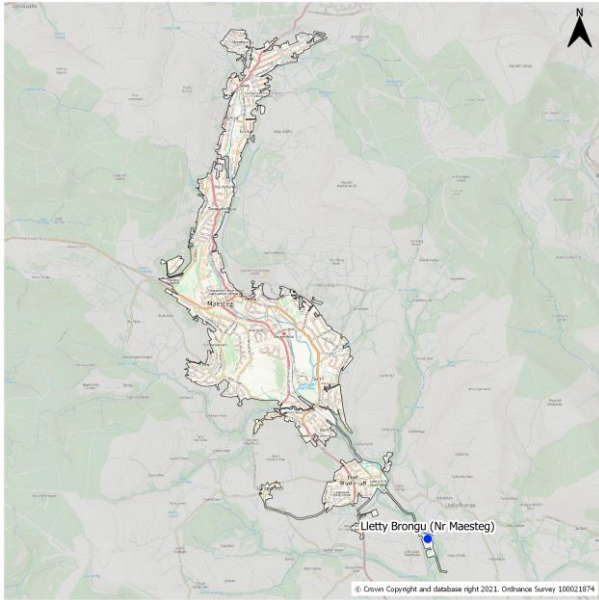


Llanfyllin

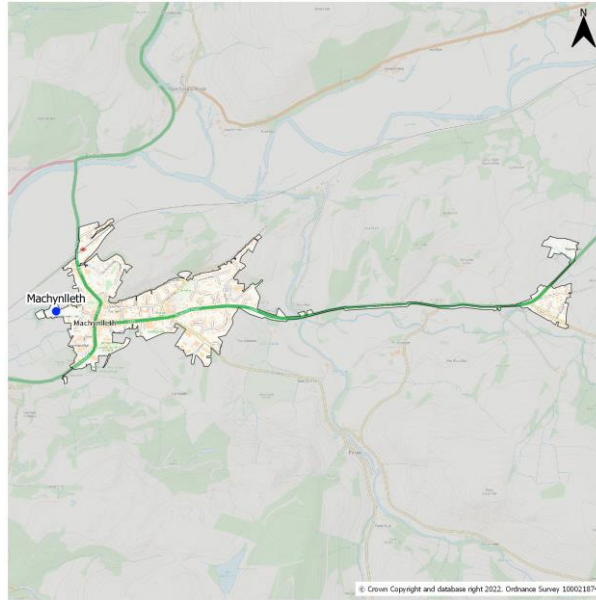


Llangefni

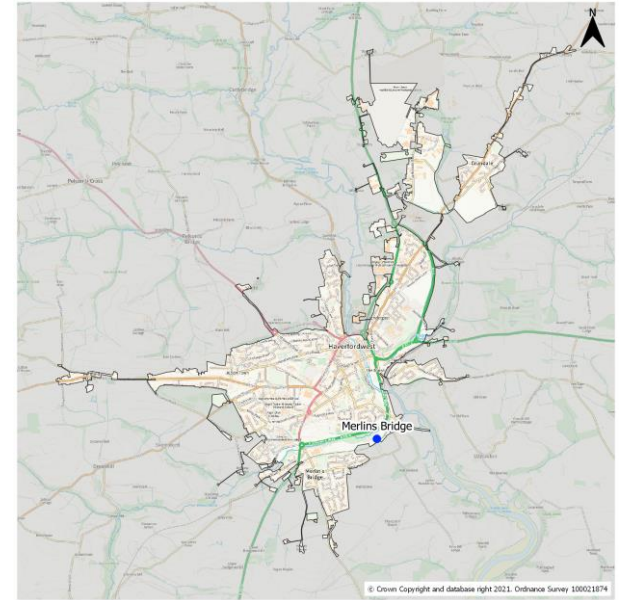
Wastewater Monitoring in Wales – Weekly Report



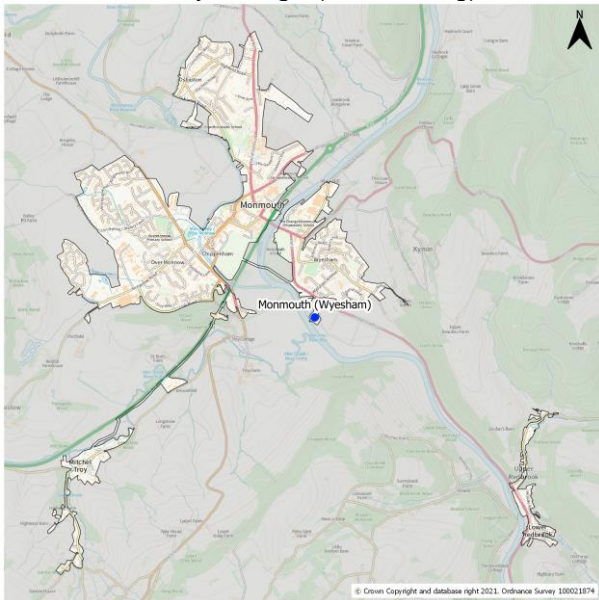
Lletty Brongu (Nr Maesteg)



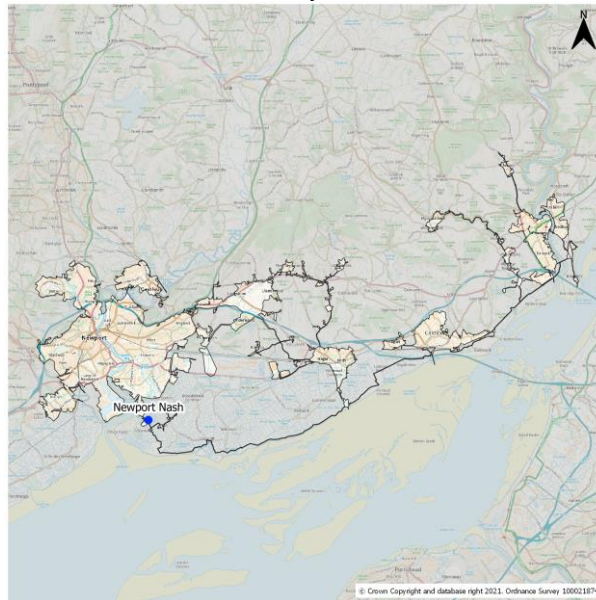
Machynlleth



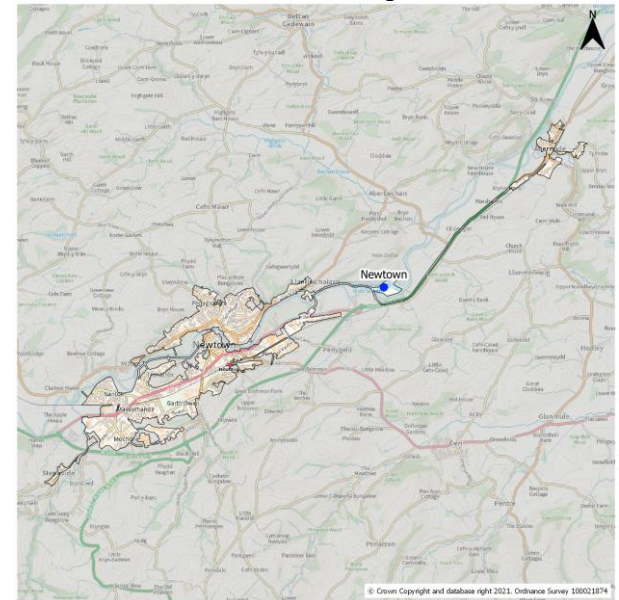
Merlins Bridge



Monmouth (Wyesham)

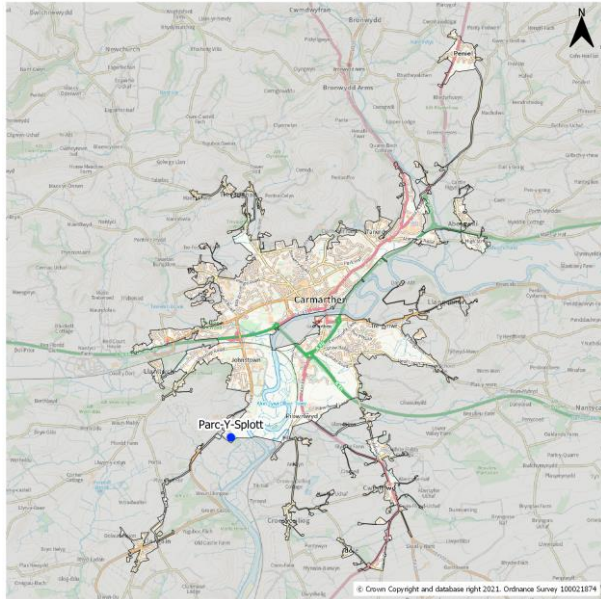


Newport Nash

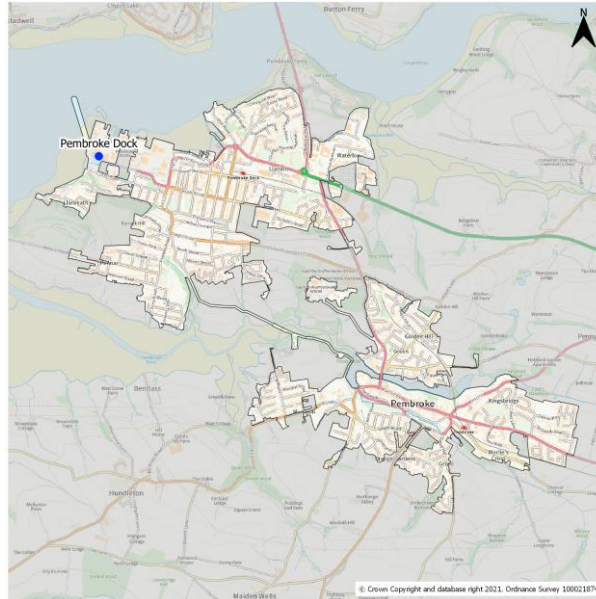


Newtown

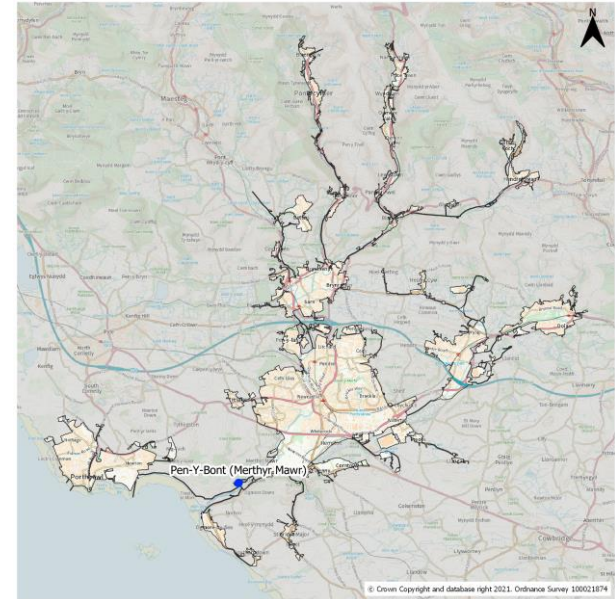
Wastewater Monitoring in Wales – Weekly Report



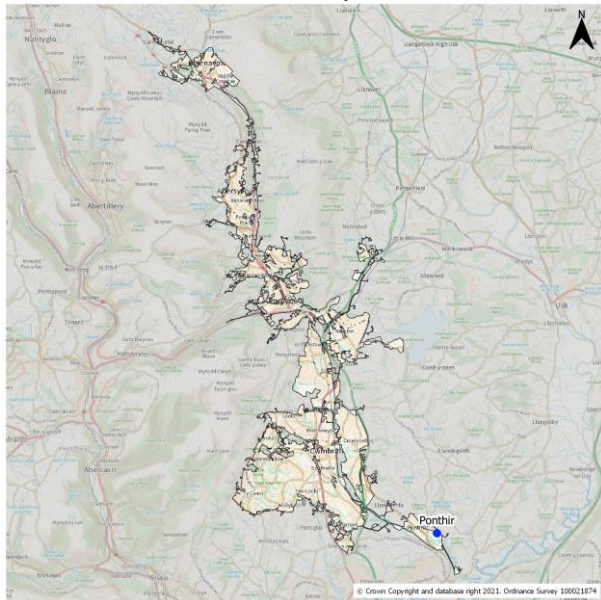
Parc-Y-Splott



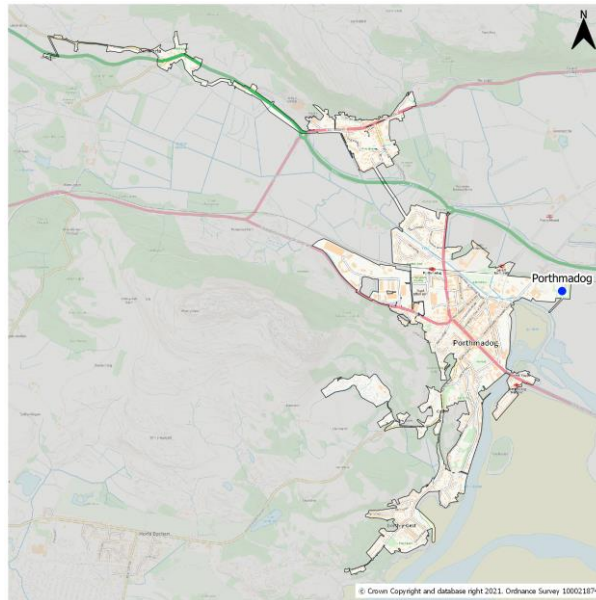
Pembroke Dock



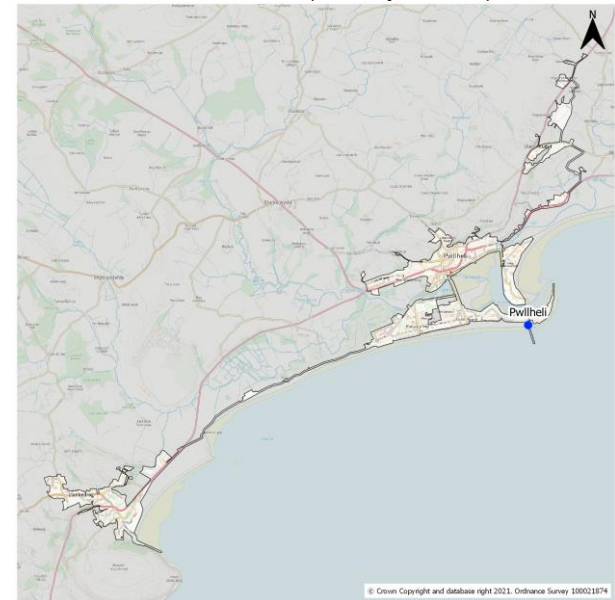
Pen-Y-Bont (Merthyr Mawr)



Ponthir

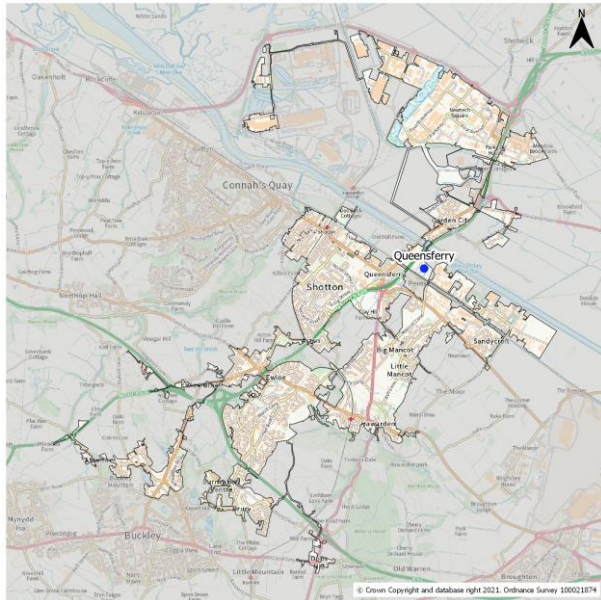


Porthmadog

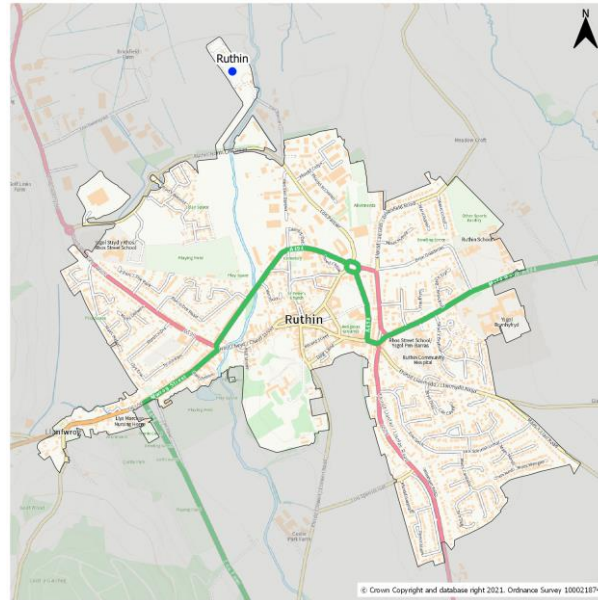


Pwllheli

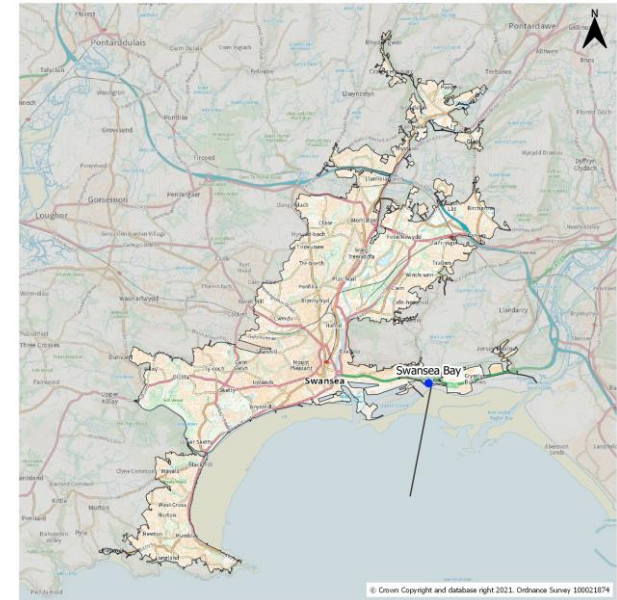
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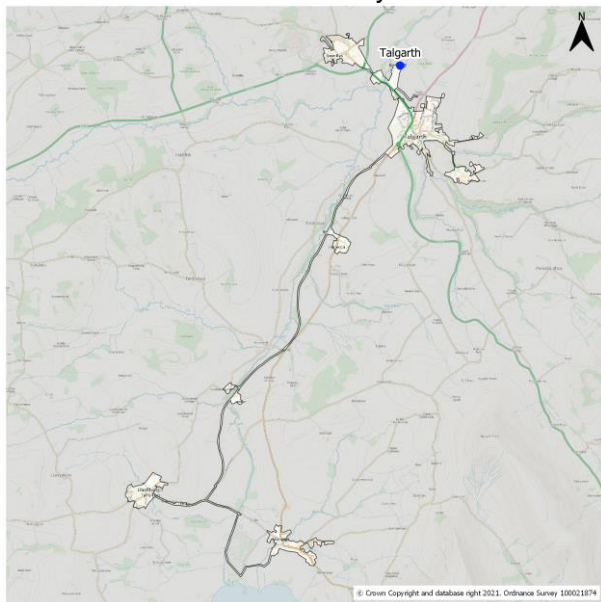
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Ruthin



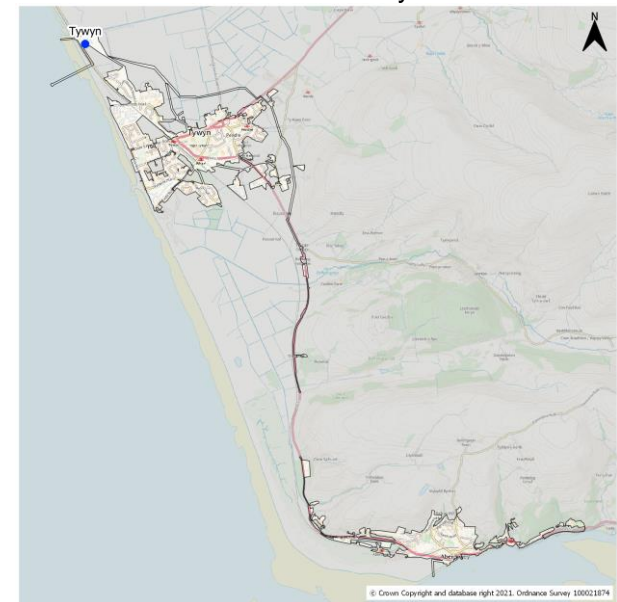
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Talgarth

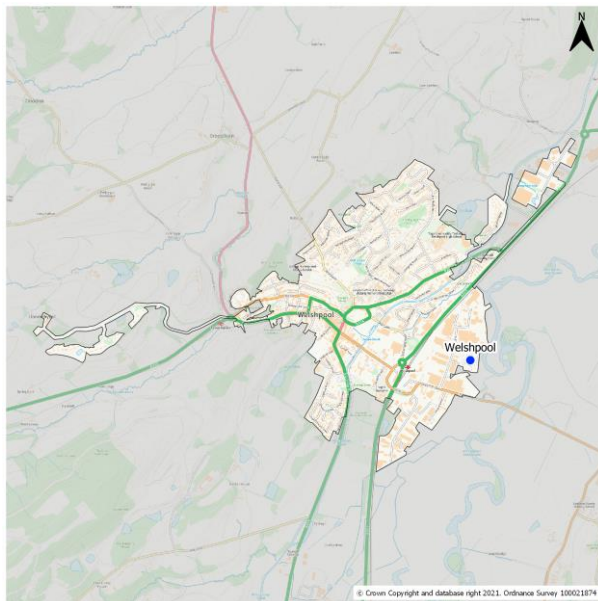


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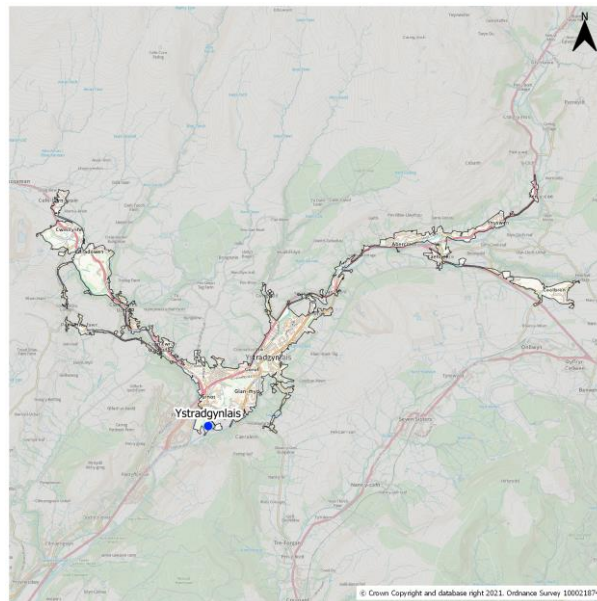


Tywyn

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Welshpool



Ystradgynlais

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