



Central Monmouthshire Landscape Profile

To maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change

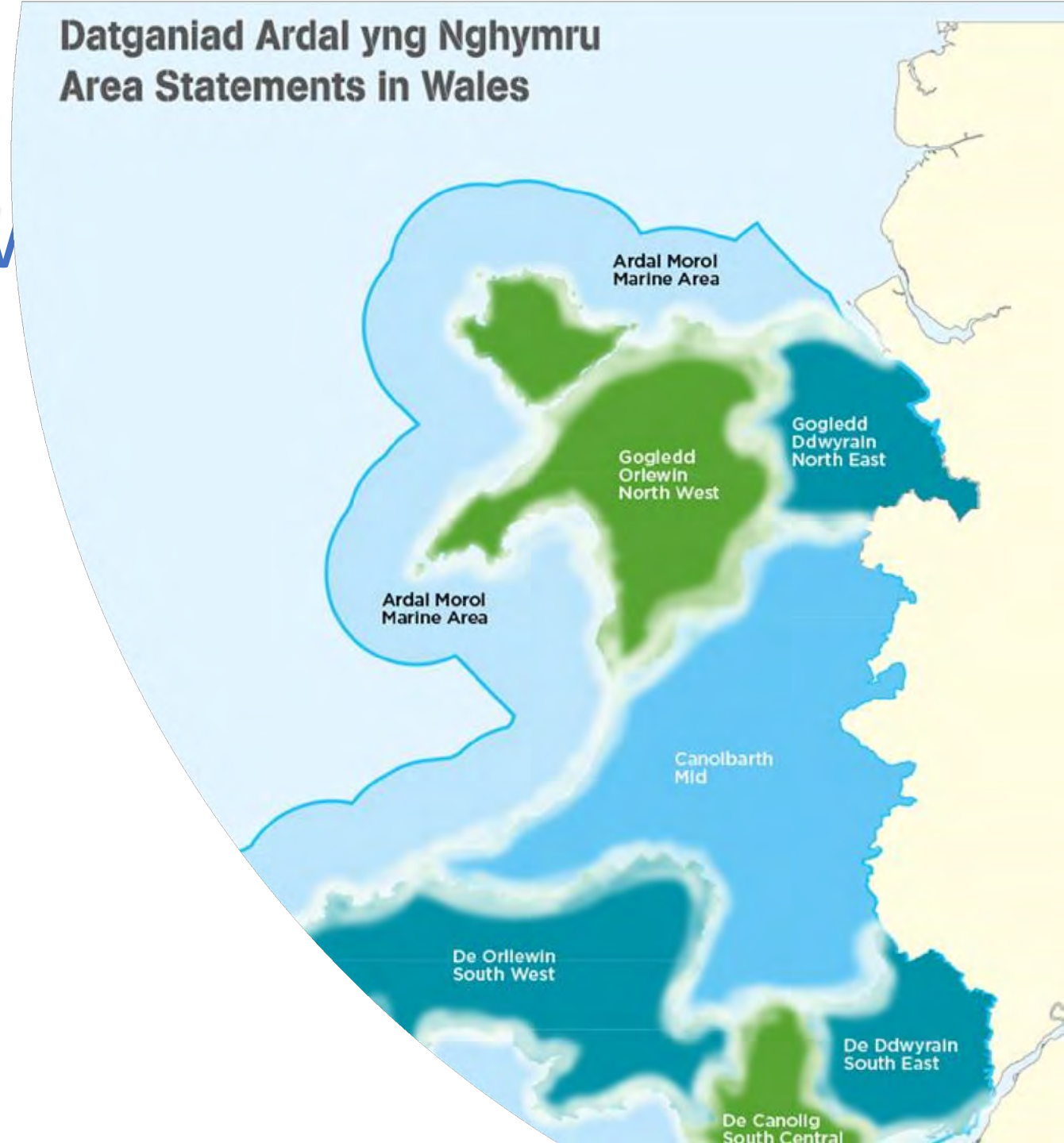
Overview

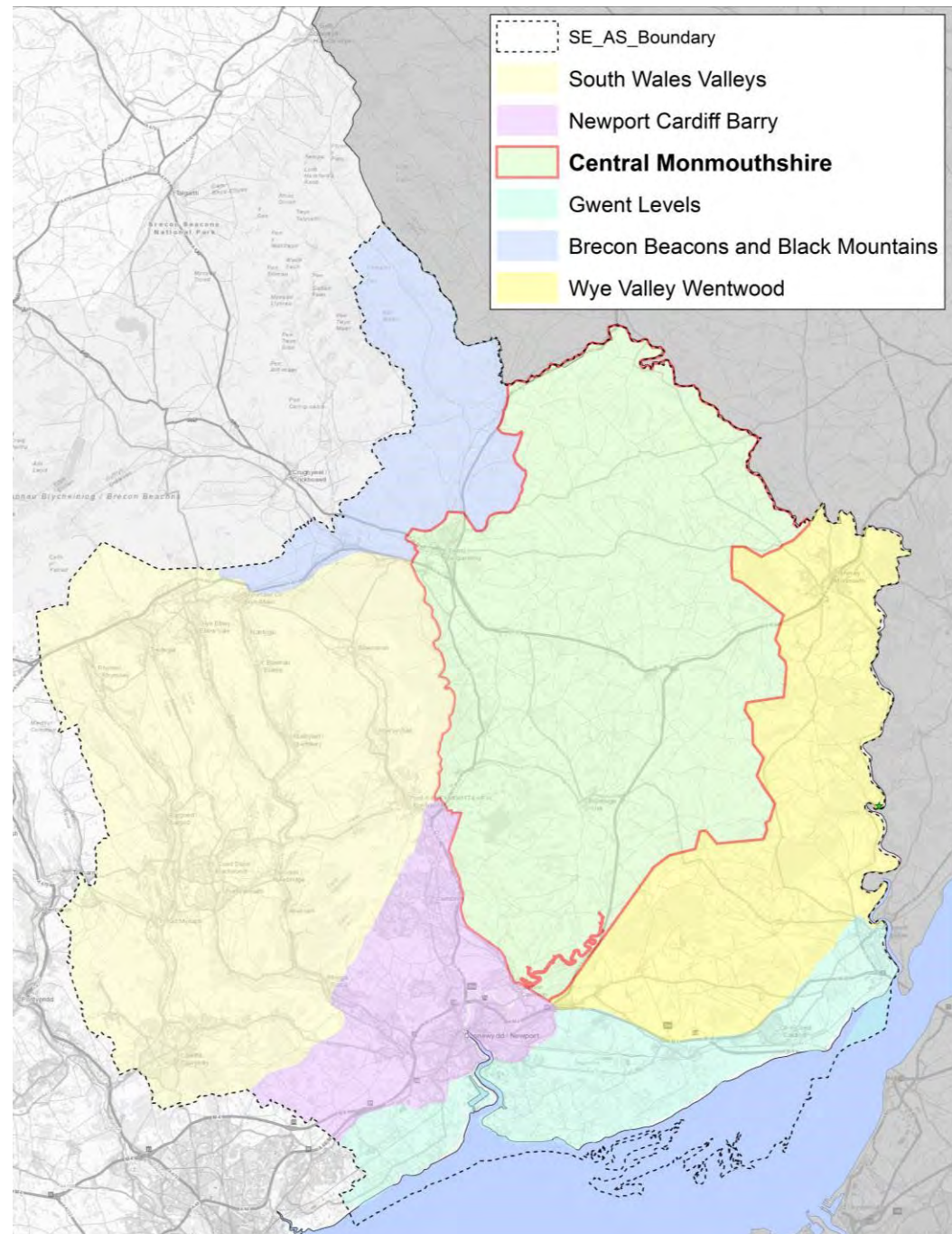
- Area Statement overview
 - South East Landscape Panels
- What is a Landscape?
- Central Monmouthshire Landscape profile
 - What is driving management?
 - Landscape characteristics?
 - What does the evidence say?
- What is Ecosystem Resilience
- Top priorities – Building Resilience
 - Agriculture and rural land management
 - Habitat Fragmentation
 - Habitat Degradation
- Opportunities to build resilience
- Evidence gaps
- Recommendations

Area Statement Overview

What are Area Statements?

- The [Environment \(Wales\) Act 2016](#) made it a duty for NRW to produce Area statements.
- Area Statements will use evidence to consider the [National Resources Policy](#) priorities in an area.
- To understand local pressures on the State of Natural Resources ([SONARR](#)) and impact on well-Being.
- To help us sustainably manage our natural resources and enhance **ecosystem resilience** so they can continue to provide social, cultural, economic and environmental benefits with the ability to adapt to change.





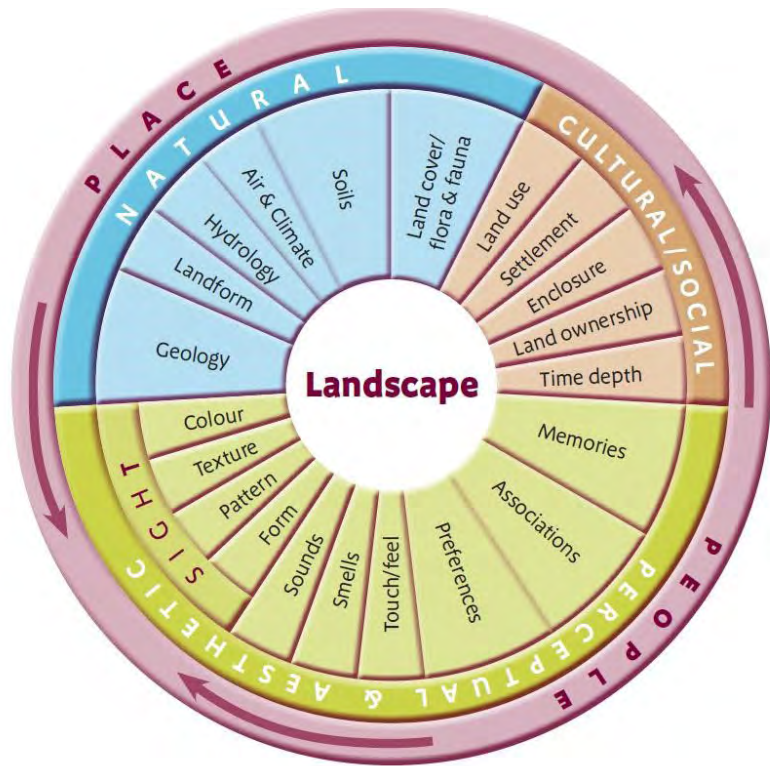
South East Area Statement

Landscape Profile areas

What is a Landscape?

“ an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors¹

- seeks to identify and explain the unique combination of elements and features (characteristics) that make landscapes distinctive.
- Aims to identify what we have and where, what pressures are impacting and what we can do to build resilience in the landscape to sustain and provide ecosystem services for people in a changing climate.





Central Monmouthshire Landscape profile

• Summary Characteristics

- Silurian mudstones and shales surrounded by Devonian Old Red Sandstone. Gently rolling hills, intervening valleys and the Usk flood plain. Morainic deposits, fertile alluvial flood plains aligning with geological faults.
- Hedge-bound fields used for sheep, dairy, arable and poultry farming.
- Semi-natural Grasslands are found in discrete blocks and scattered in the landscape.
- Woodlands and mixed plantations cover many slopes and hill tops.
- Aquatic habitats – Rivers, streams, including open waters for overwintering birds.
- The historic market town of Abergavenny sits on the banks of the Usk in the west of the area, against the striking backdrop of the Bloreng and Sugar Loaf Mountain.
- Grosmont, Skenfrith, White, Raglan and Usk castles are distinctive monuments and witnesses to the area's contested past.

ONS Broad habitats

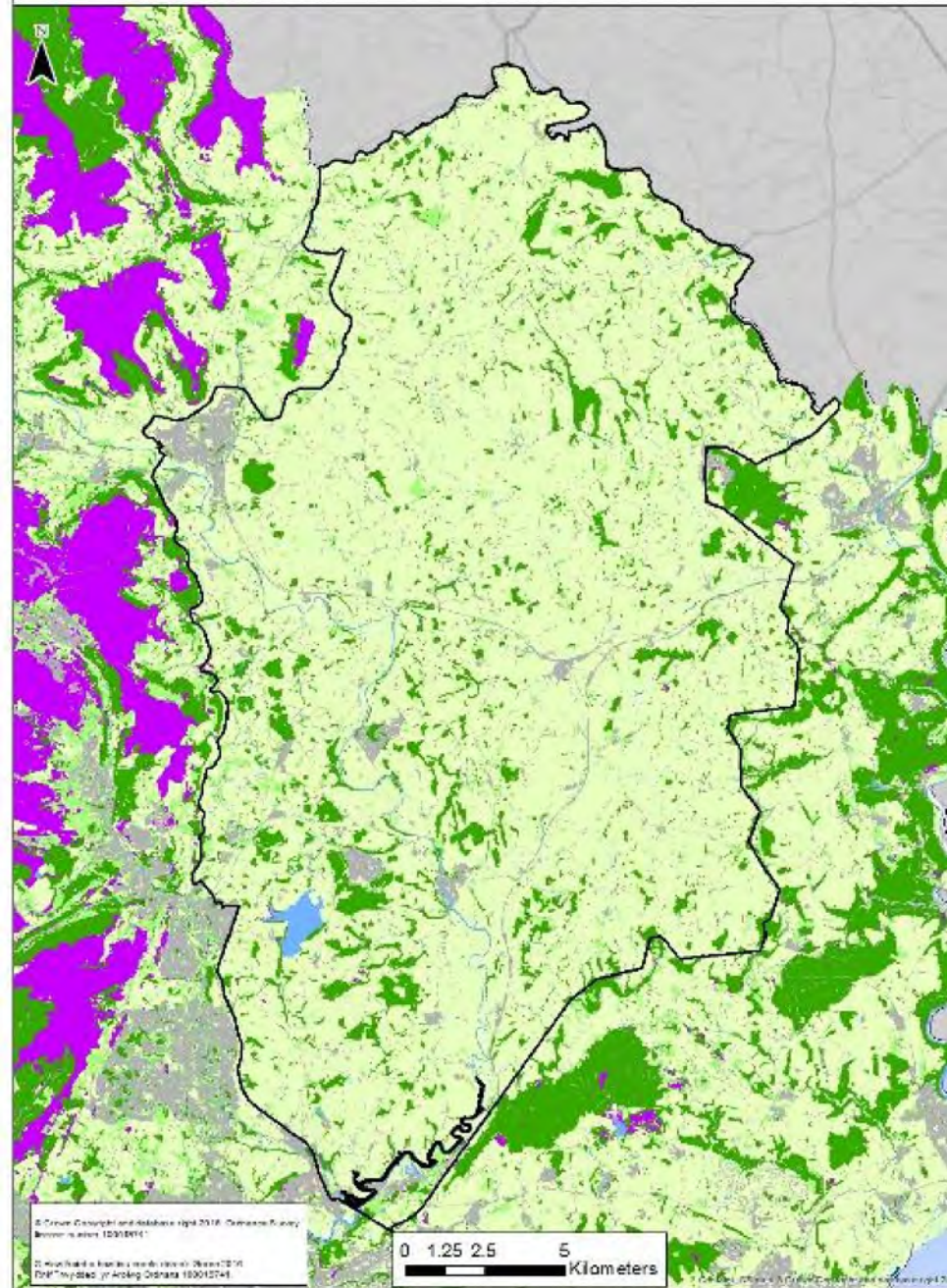
ONS_CLASS

- Woodlands
- Urban/not habitat
- Semi-natural grassland
- Open water, wetlands and floodplains
- Mountains, moorland, heath
- Marine
- Enclosed farmland
- Coastal margins

- Semi-natural habitats are represented by woodlands, hedgerows, semi-natural grassland, rivers, streams and open water.
- Much of Central Monmouthshire is enclosed farmland which is a vital habitat in the UK in terms of food production and the provision of landscape, recreation and other cultural benefits. It supports the functioning of social and economic systems in a number of ways, being a focal point for relationships within and between the rural communities throughout the landscape.

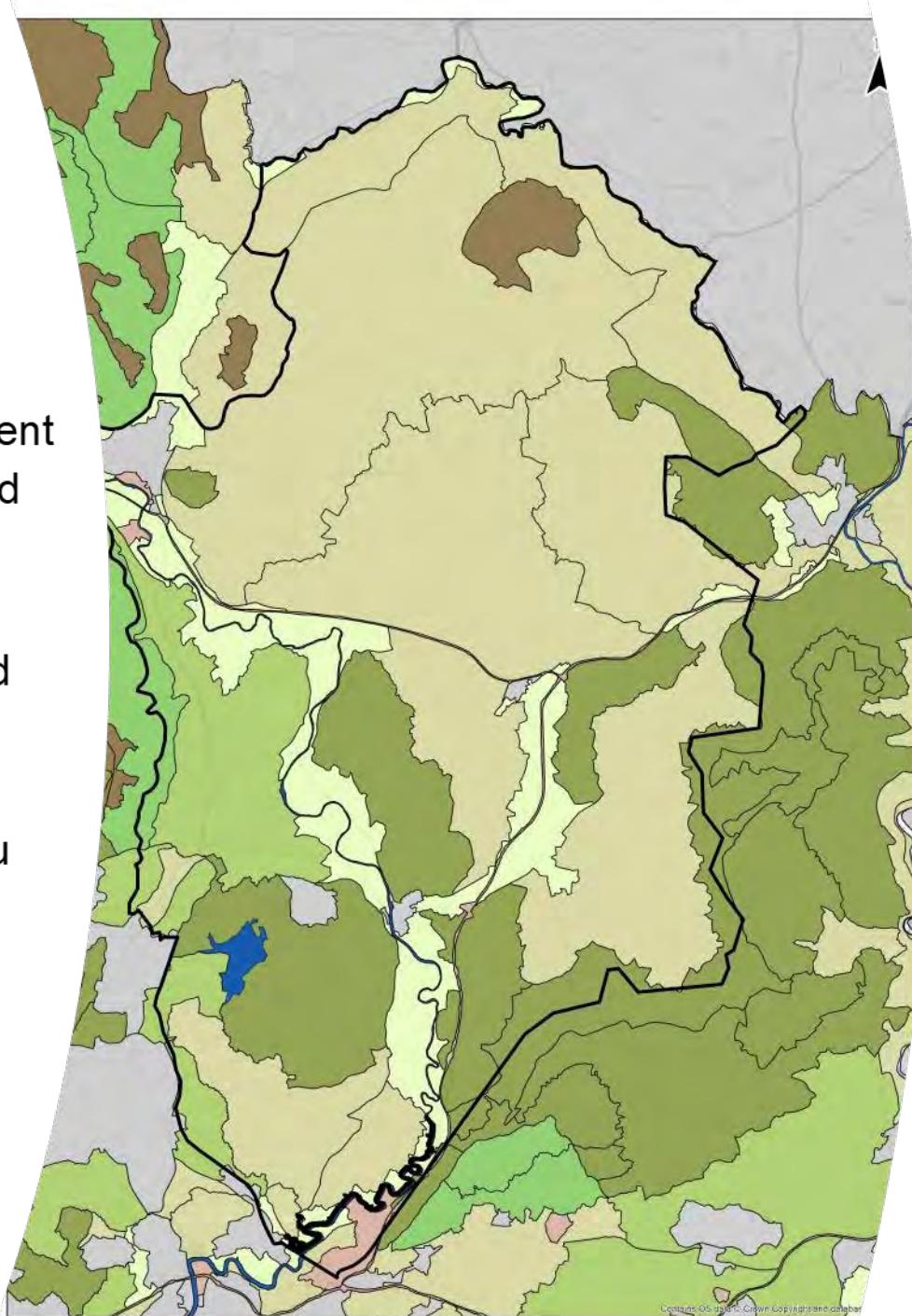
Landscape characteristics

- Habitats of principle importance



Landscape Types

- Grey Built environment
- Brown Developed land
- Light green Lowland areas
- Light tan River valleys
- Medium green Rolling lowland
- Dark green Upland valleys
- Dark olive Hill slopes
- Brown Upland plateau
- Blue Inland Water



Landscape characteristics

- Landscape types

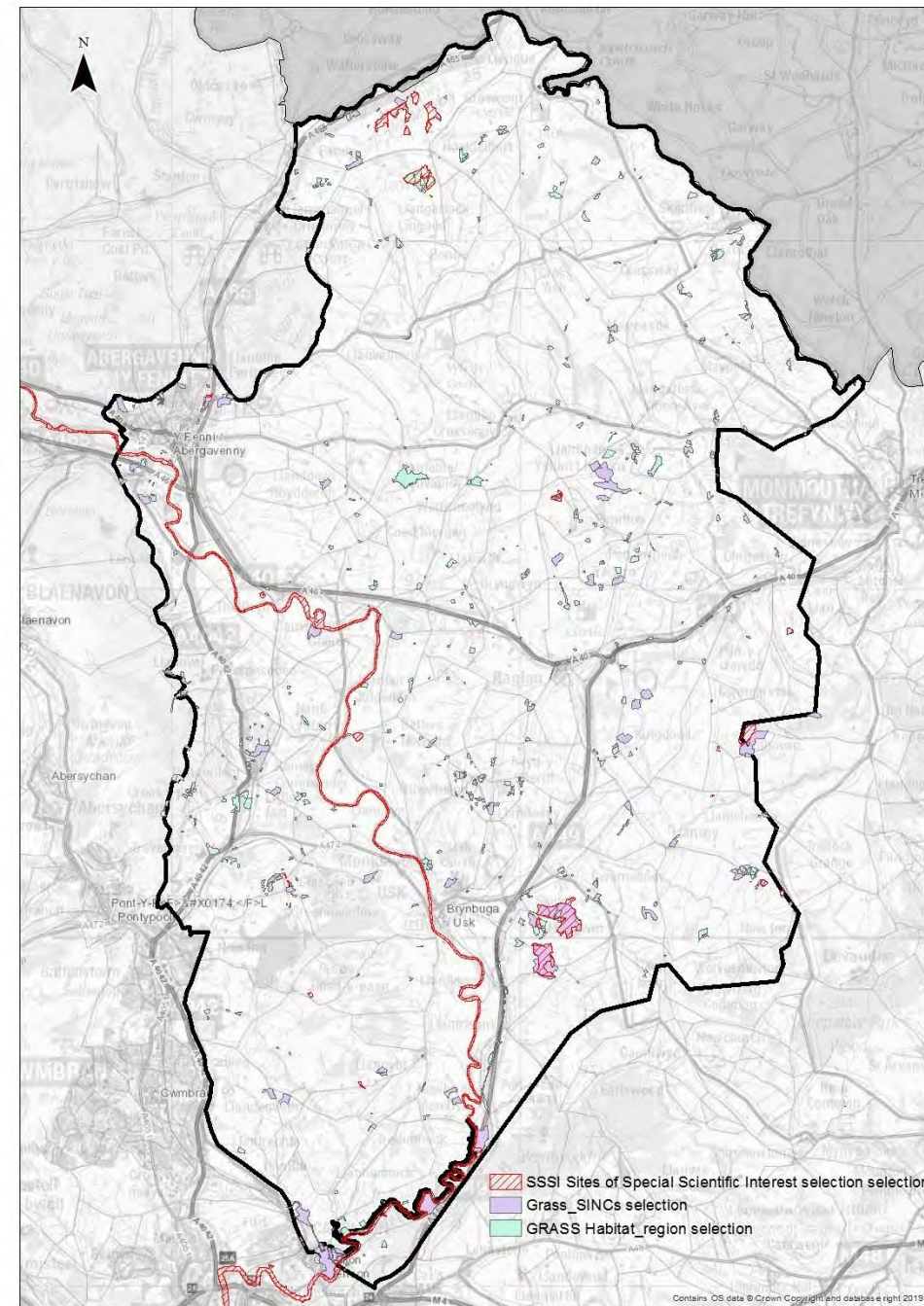
Landscape Characteristics

- Semi-natural Grasslands

- These grasslands are generally scattered as relatively small meadows, some clustered, and are several very significant areas which includes one of the largest extents (if not these largest) of neutral grassland in South East Area (Cwrt y Bela and Springdale SSSI) and ongoing restoration, conservation management and grassland connectivity in the Dingestow area.
- Gwent Wildlife Trust and other partners are working to restore relict grassland areas on a landscape scale (including matters such as adding nectar sources for wood pasture invertebrates).

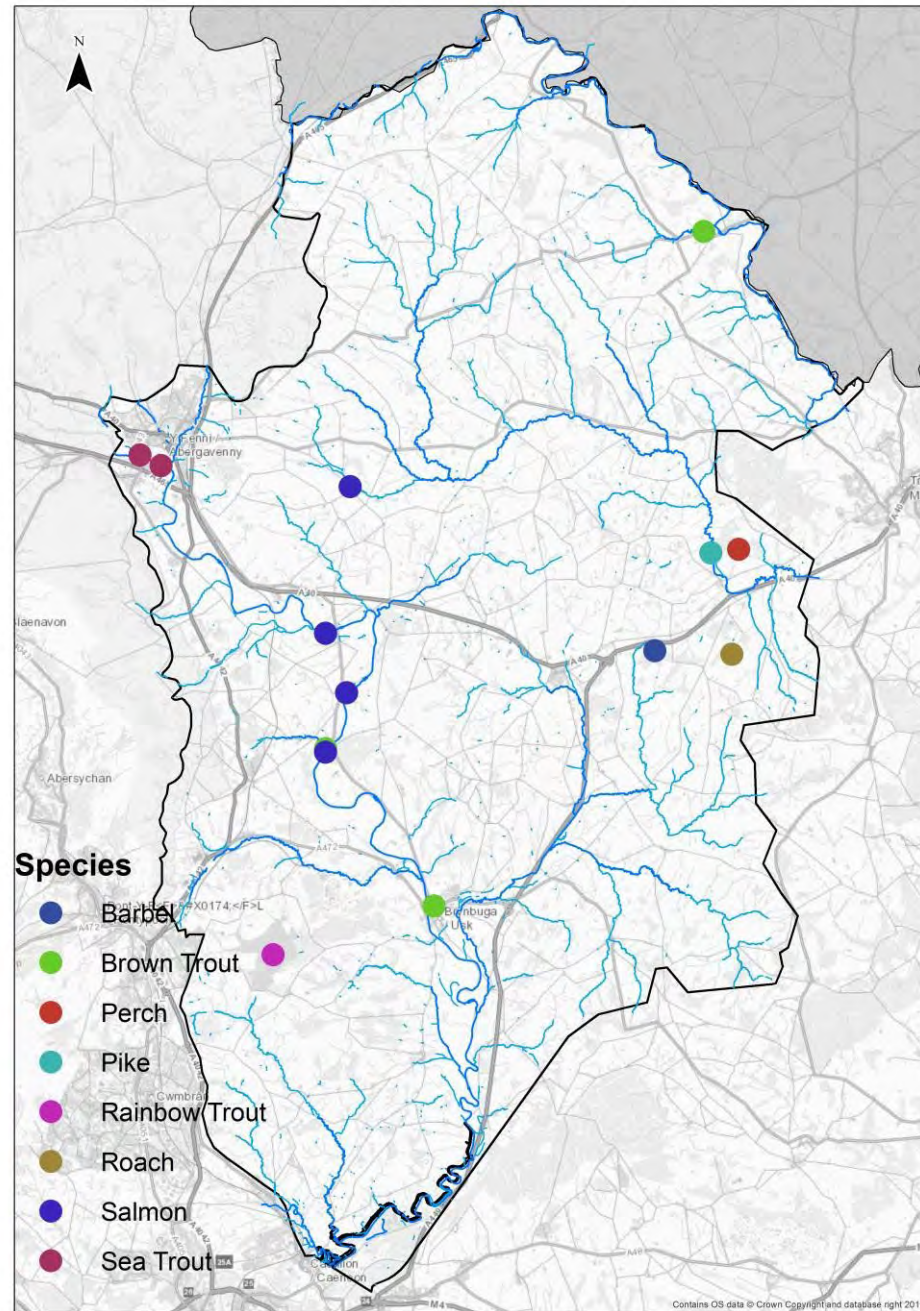
Set in a national context of massive historical decline these grasslands are of huge biological importance.

Grasslands provide a wide range of ecosystem services. These include **supporting** (e.g. soil formation), **regulating** (e.g. climate, flood, hazard, noise, and air quality regulation), and **cultural** (e.g. cultural heritage, amenity, health, recreation and tourism) services.



Landscape Characteristics

Fisheries



- The fisheries across the landscape provide social, economic and recreational benefits to Central Monmouthshire.
- Coarse and game fishing can be found across various river catchments including the Usk, Gavenny, Monnow, Trothy, Sor Brook, Norton Brook and Olway.

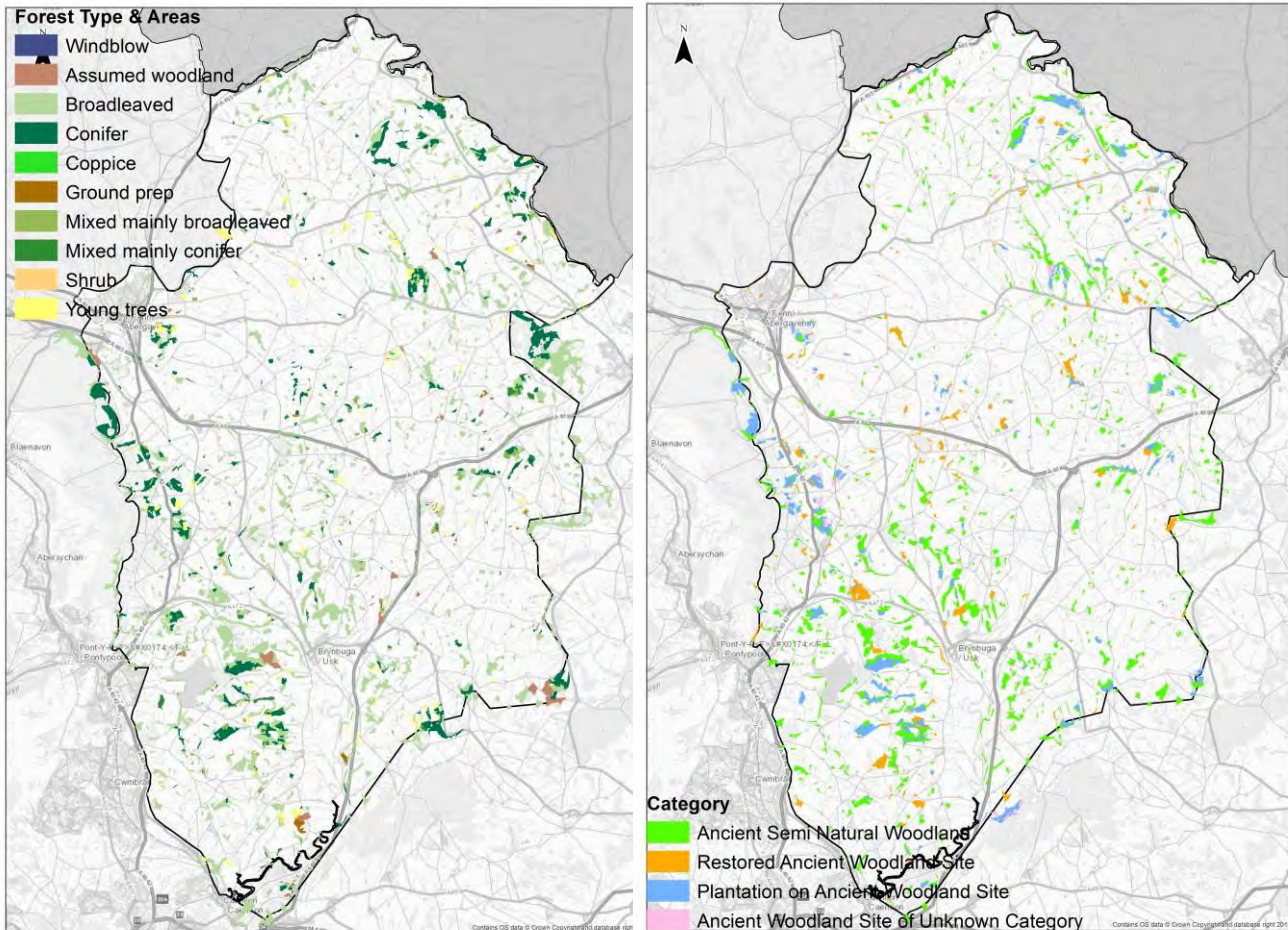
Landscape Characteristics

- Natura 2000 sites and the Habitats Directive

- **Brecon Beacons National Park**
 - Black Mountains and the Llanthony Valley.
 - Mynydd Llangattock/ Clydach Gorge – rare endemic spp' including Craig y Cilau Hawkweed, Welsh Whitebeam and Maderian Feather-moss.
- **Coed y Cerrig National Nature Reserve**
 - situated approximately 4.8km to the North of Abergavenny and is a good example of alluvial forest in southern Wales.
 - around a third of the site is covered by wet alder and willow woodland, remaining contains semi-natural woodland.
- **Cym Clydach Woodlands**
 - special interest for its stands of broadleaved woodland dominated by beech, supporting rare and scarce vascular plants including whitebeams *Sorbus* spp. and Soft-leaved Sedge *Carex montana*. There are important woodland and grassland fungi assemblages with rare species such as *Squamanita paradoxa*.
 - **Sugar loaf woodlands**
 - are the largest example of old sessile oak woods near the south-eastern fringe of the habitat's range in the UK and Europe.
- **Usk Bat sites**
 - encompasses a series of Lesser Horseshoe Bat roosts, upland habitats, woodlands and cave systems located around the valley of the River Usk near to Abergavenny.
 - Mynydd Llangatwg open moorland and bog, extensive cave systems and sinkholes, one of the largest exposures of upland limestone crag in south Wales.
- **The River Usk SAC**
 - rises in the Black Mountain range in the west of the Brecon Beacons National Park and flows east and then south, to enter the Severn Estuary at Newport
 - The site supports a range of Annex II fish species, which includes Twaite Shad, Atlantic Salmon and Bullhead and is an important site for Otters in Wales.

Landscape characteristics

- Woodlands

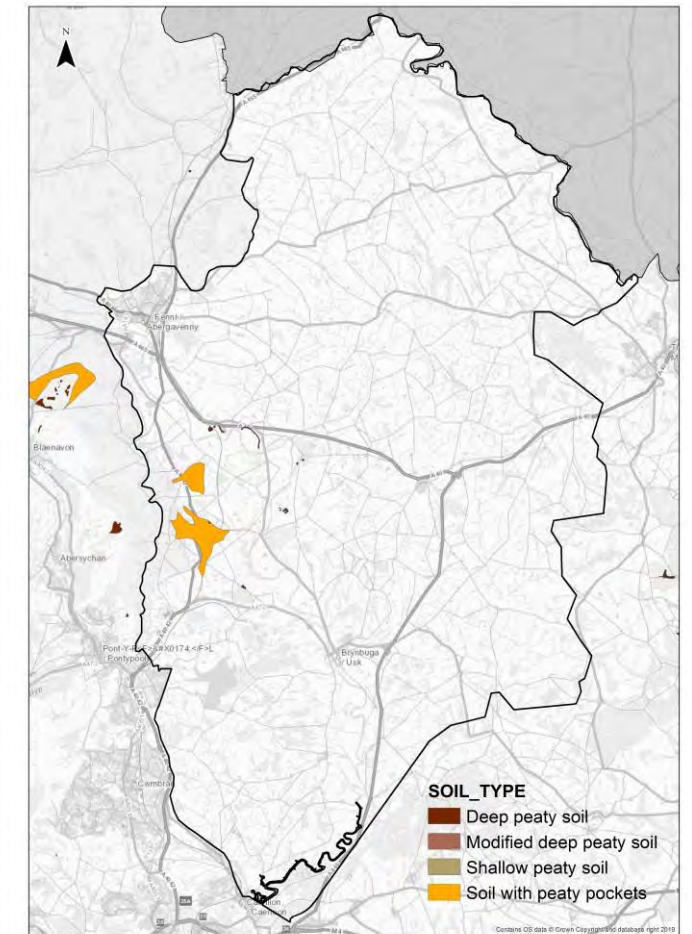
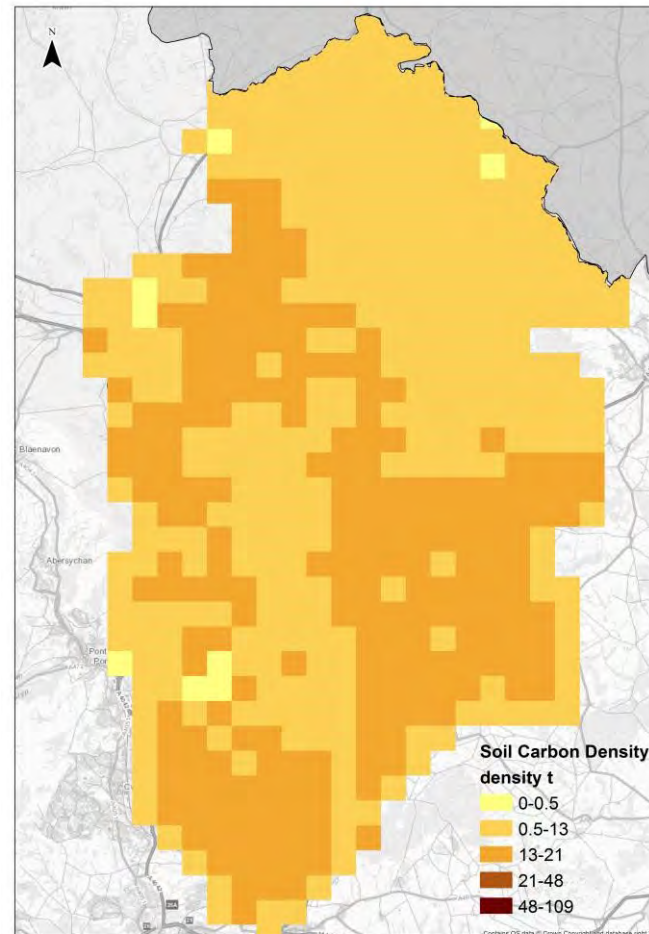


- Woodlands are probably the most widespread and largest semi-natural habitat in this area.
- They include a considerable amount of ancient semi-natural woodland (ASNW), more recent broadleaved woodland and some conifer.
- Woodlands provide a wide range of ecosystem services. These include **provisioning** (e.g. fuel and fibre), **supporting** (e.g. soil formation), **regulating** (e.g. climate, flood, hazard, noise, and air quality regulation), and **cultural** (e.g. cultural heritage, amenity, health, recreation and tourism) services.
- Great Triley Wood (north of Abergavenny) is prime example of floodplain woodland in Wales, with braided channels occurring through mature and well-structured broadleaved woodland.

Landscape characteristics

- soil biodiversity

- Central Monmouthshire's landscape is estimated at 8.9 million tonnes – around 2.17% of Wales' total (410 million tonnes).
- Macrofauna such as burrowing animals and earthworms are important factors in soil nutrient cycling, fertility and structure.
- Soils provide Wales' largest terrestrial ecosystem store of carbon.
- Soil that is lost through surface water run-off will reduce the capacity of carbon storage as well as increase the carbon loading on Central Monmouthshire's river network (see [Rivers of Carbon](#))



Landscape Characteristics

– Freshwater ecosystems

The Usk, the main watercourse, flows south from Abergavenny and eventually becomes tidal.

The River Usk is designated as a SAC due to its great ecological significance for its populations of protected fish species, otters and valuable habitats.

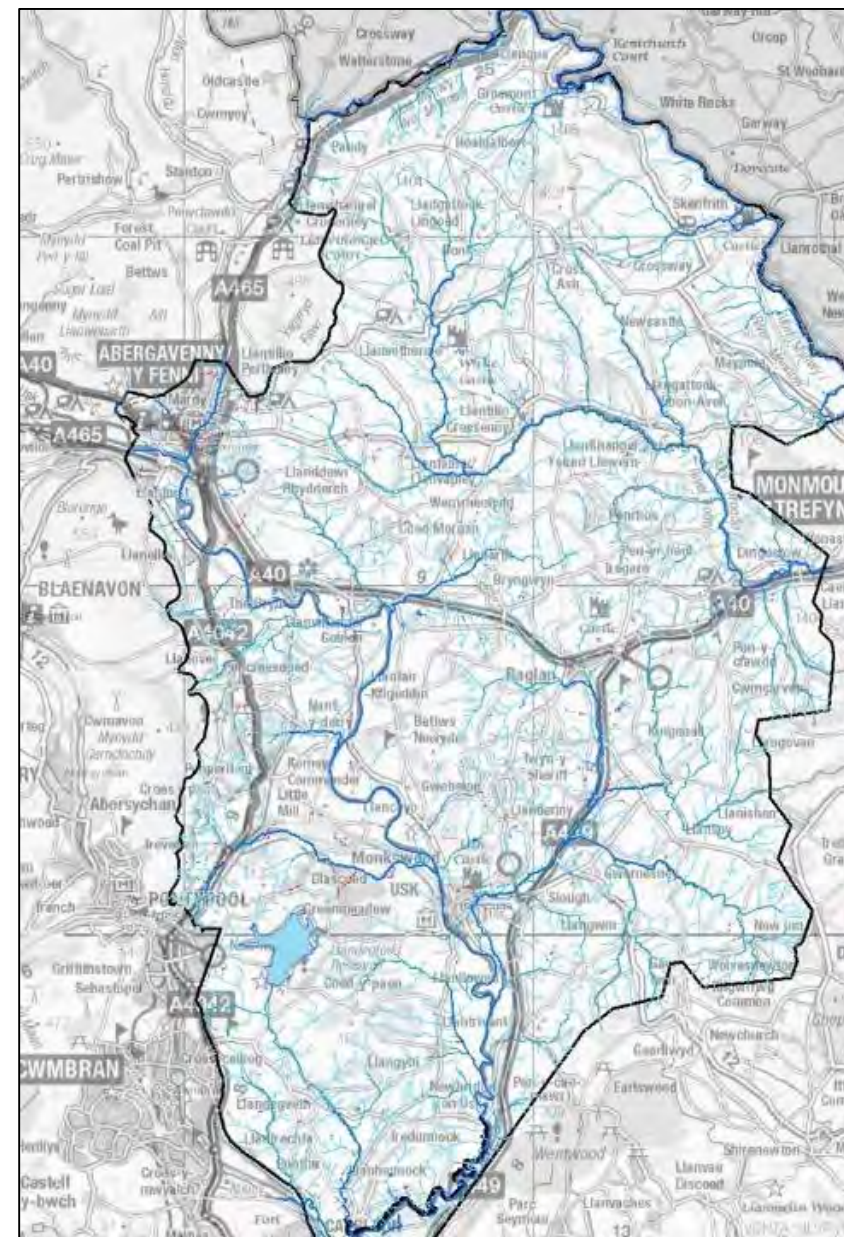
The River Usk floodplain retains a number of important geomorphological features and associated wetland habitats e.g. Llanvihangel Gobion, south of Abergavenny.

Rivers Trothy and Monnow in the north feed into the Wye in the adjacent character area to the east, whilst Brooks including the Clawdd, Olway and Pill, along with the River Gavenny flows east to west into the Usk.

Llandegfedd Reservoir SSSI is an extensive freshwater body important for wintering wildfowl as well as for drinking water supply along with Prioress Mill.

The Monmouthshire & Brecon Canal which flows south in the west is also highly valued for recreation and navigation.

Collectively, these freshwater networks are rich and diverse interconnected ecosystems offering valuable provisioning, regulating, cultural and supporting services including: water quality, food production, drinking water, waste disposal, wildlife habitats, flood regulation, recreation and culture benefiting the communities of Central Monmouthshire.



What is driving management?

- Salmon and Freshwater Fisheries

Salmon and Freshwater Fisheries Act, 1975,
Environment Act, 1995, Water Resources Act, 1991

- To protect and enhance fisheries of salmon, trout, eels, lampreys, Smelt and freshwater fish.
- Socio-economic and cultural value estimated at £600million in Wales
 - Sports participation
 - Health and Wellbeing
 - The Natural Environment
 - Community Development
 - Rural Communities and Angling Tourism

Ydychydig brithyllod anfadol a physgod bras
migratory trout and coarse licence



The Fishing
PASSPORT

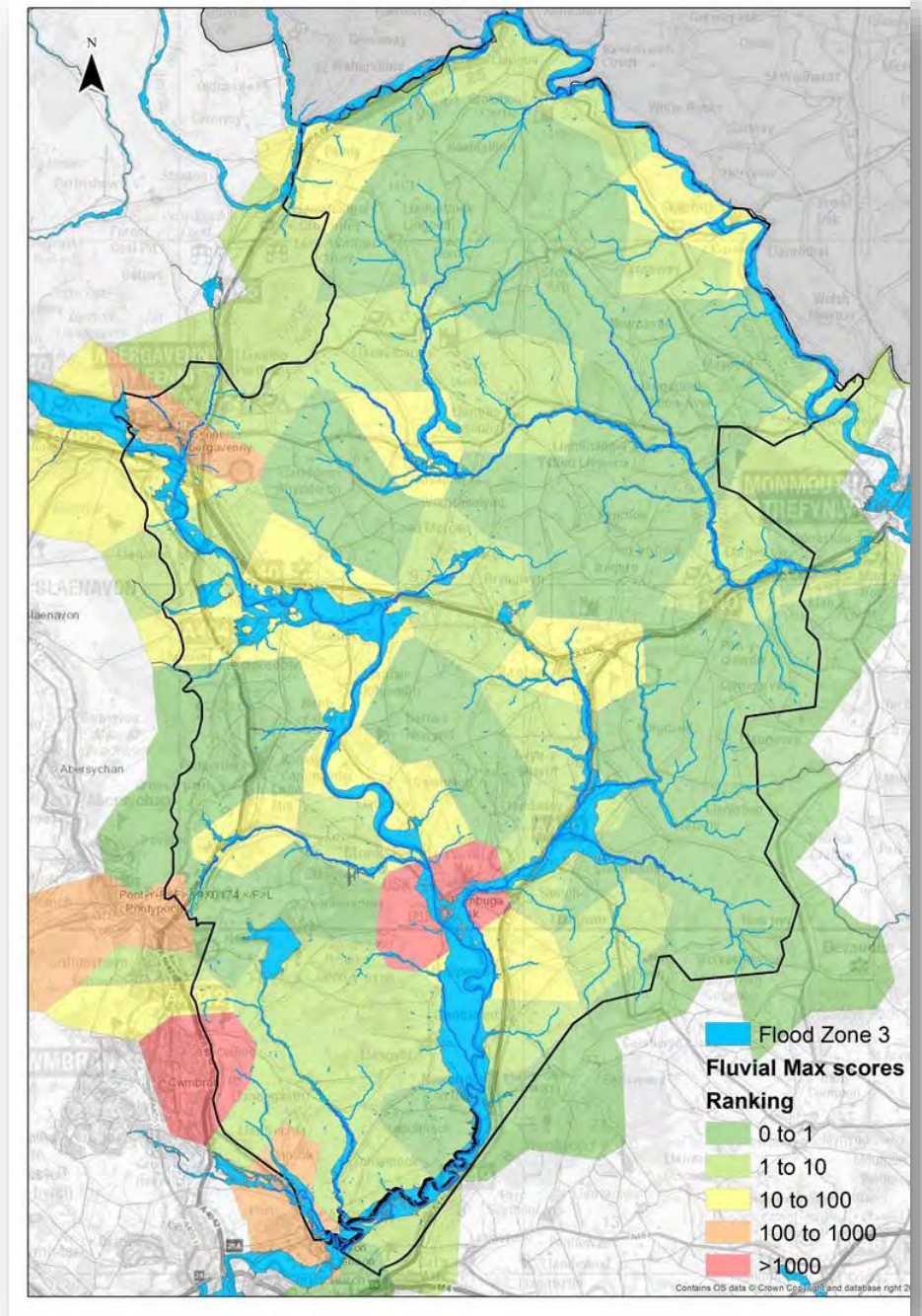
£16,500,000

The Fishing Passport's value
to the local economy

- Monmouthshire's overall flood risk score, based on the risk from river and coastal flooding is 47.6, (the second highest in Gwent), with areas of each main town at risk of river or coastal flooding.
- There are flood defences in place across the county, but climate change could put these under pressure.
- Monmouthshire's Flood Risk Management Plan data estimates that 1344 people and 292 properties are at high (1 in 30 year) or medium (1 in 100 year) risk of flooding.
- Natural Flood Management needed to reduce low and high flows - implementing natural measures to reduce flood risk by retaining water and reducing flow.

What is driving management?

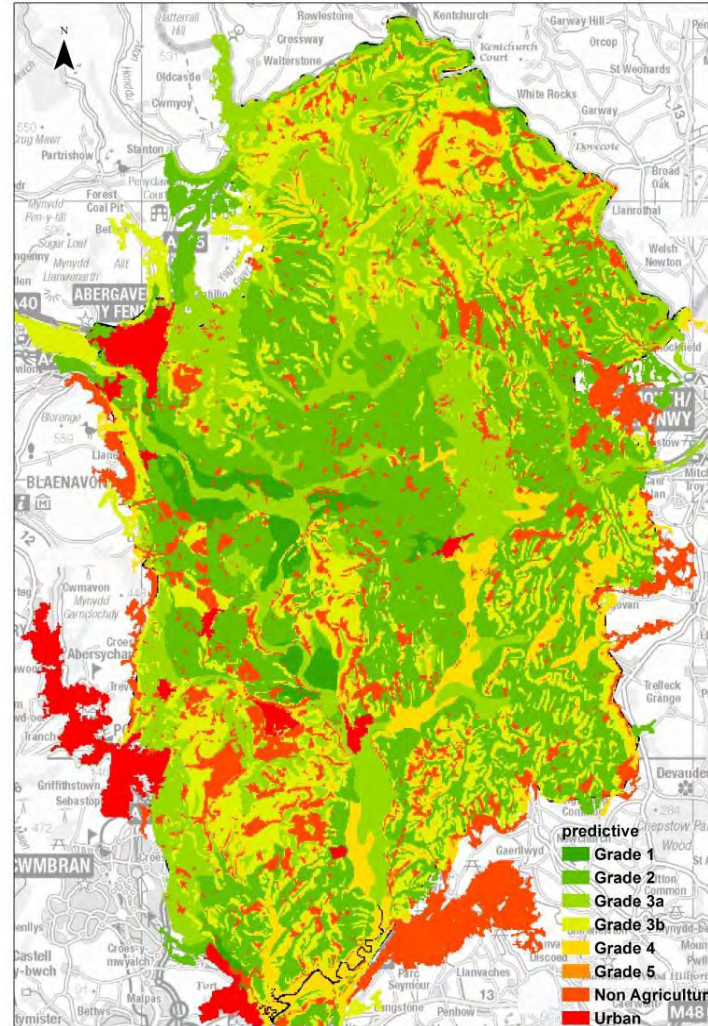
- Flood Risk Management



What is driving management

- Common **Agriculture** Policy

- **Agriculture and rural land management** is central to the landscape, playing a significant role in ecosystem service provision and climate adaptation.
- National planning policy defines the best and most versatile agricultural land as land within grades 1, 2 and 3 - good to excellent quality land which can best deliver the food and non-food crops for the future.
- A significant proportion of the agricultural land in Central Monmouthshire is **Grade 2 & 3**: very good to moderate quality agricultural land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield.



What is driving management?

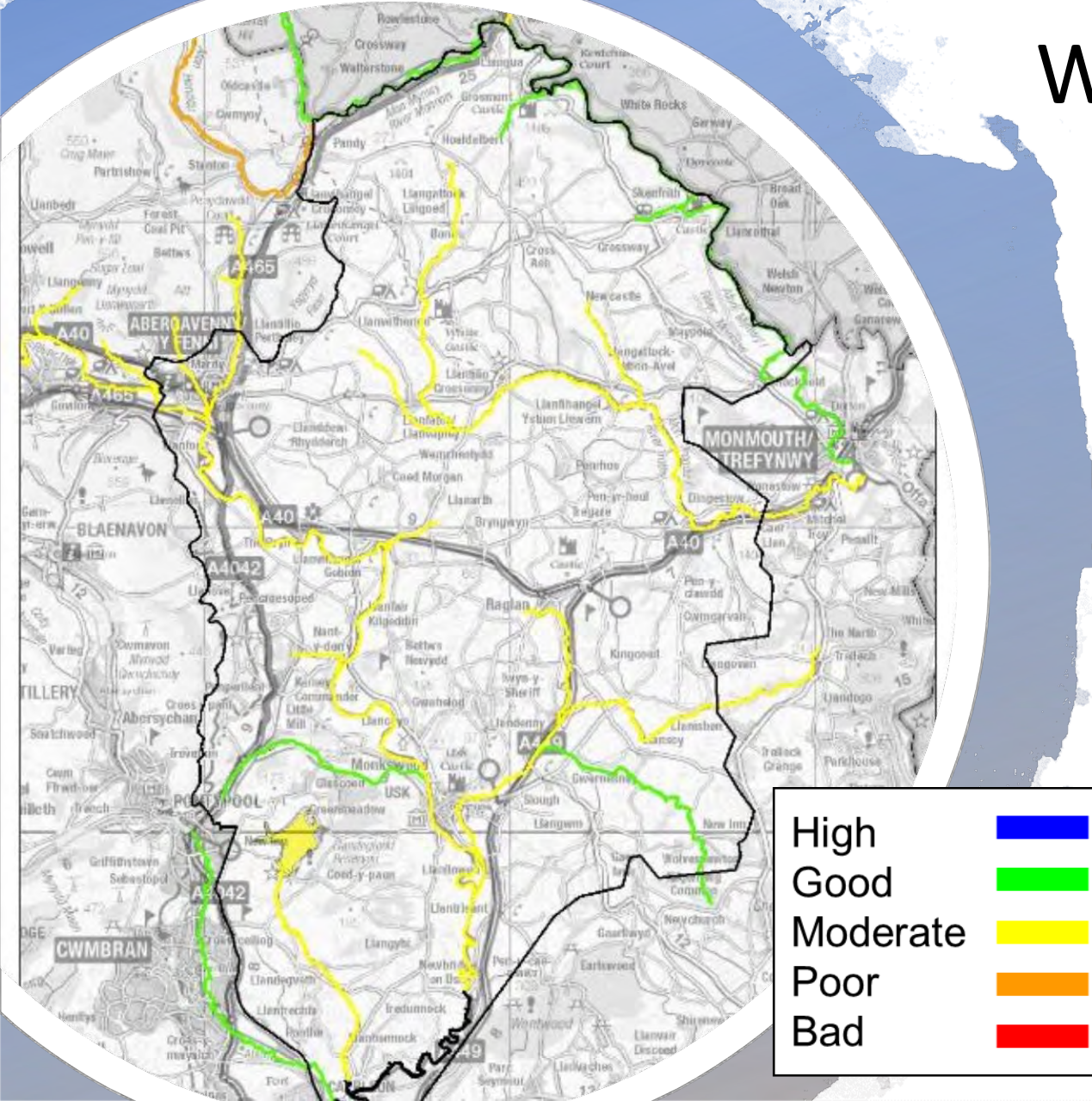
- RBMP & the WFD

WFD Monitoring includes:

- **Biological quality elements**
 - phytoplankton, macrophytes, phytobenthos, benthic invertebrate fauna and fish
- **Chemical elements**
- **Physico-chemical elements**
 - Ammonia, Dissolved Oxygen (DO), pH and Phosphate (P)
- **Supporting elements**
 - Morphology, hydrology, INNS

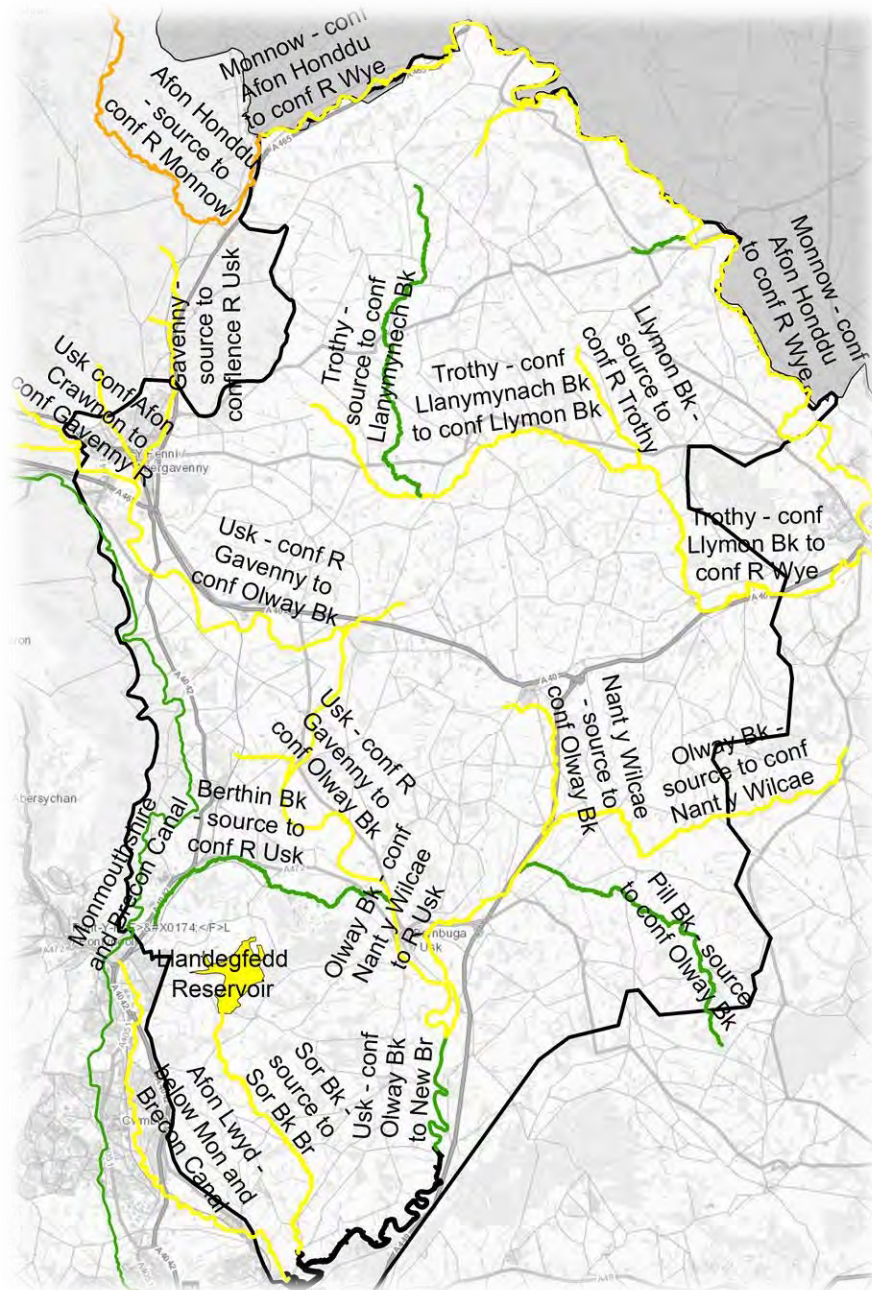
<https://waterwatchwales.naturalresourceswales.gov.uk/>

[See Central Monmouthshire Landscape Supporting Document](#)



What does the evidence say? - Surface water condition

- Of the 22 water bodies including 20 rivers, 1 lake and 1 canal that flow within the Central Monmouthshire landscape, only 6 water bodies (27%) achieve “Good” ecological status (GES) under the WFD e.g. M&B Canal, Pill Brook.
- However even where in GES, risk has been identified of further deterioration e.g. Berthin Brook.
- The remaining 16 (73%) water bodies are not achieving good ecological status.
- 15 “Moderate” (15 rivers, 1 lake)
- 1 “Poor” (River Honddu)
- Main significant water management issues are:
- Agriculture and rural land management pollution (nutrients, sediment).
- Waste water and urban drainage pollution (phosphate, sewage).
- Physical modification (weirs, channel modification).



What does the evidence say

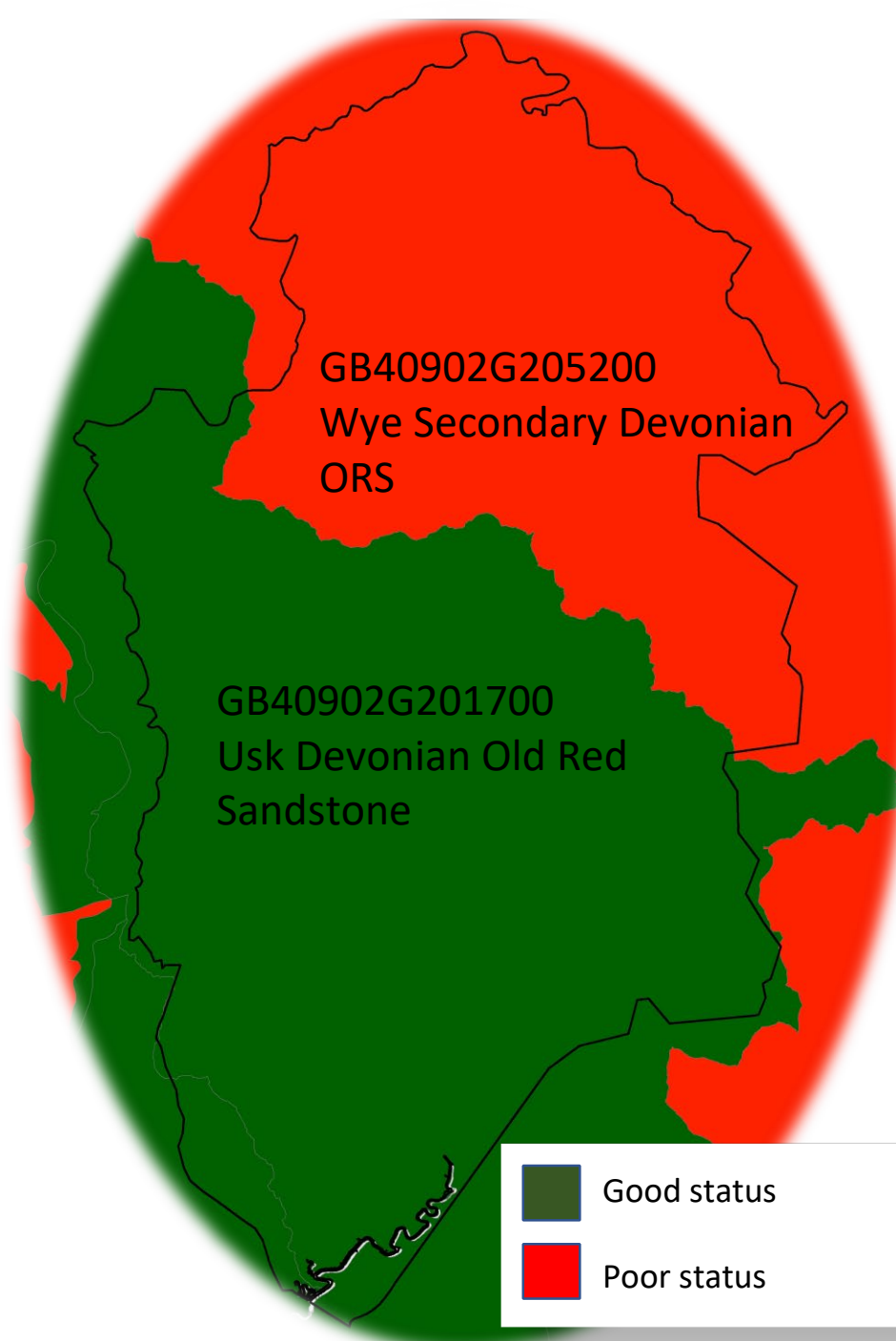
- Surface water

- Phosphate is the most common reason for not achieving good ecological status - 14 water bodies (>60%) with risk of further deterioration.
- Even in “Good” status WB’s, Phosphate remains a pressure risking deterioration below good e.g. Berthin Brook.
- Phosphate targets need to be achieved e.g. River Usk SAC has targets of 0.06 mg/l but regularly exceeds 0.1 and 0.2 mg/l in some areas.

Water body name	Overall status
Norton Bk - source to conf R Monnow	Good
Llanymynech Bk - source to conf R Trothy	Moderate
Trothy - conf Llanymynach Bk to conf Llymon Bk	Moderate
Trothy - source to conf Llanymynech Bk	Moderate
Trothy - conf Llymon Bk to conf R Wye	Moderate
Usk - conf Olway Bk to New Br	Moderate
Pill Bk - source to conf Olway Bk	Good
Olway Bk - conf Nant y Wilcae to R Usk	Moderate
Berthin Bk - source to conf R Usk	Good
Nant y Wilcae - source to conf Olway Bk	Moderate
Clawdd Bk - source to conf R Usk	Moderate
Gavenny - source to confluence R Usk	Moderate
Usk conf Afon Crawnon to conf Gavenny R	Moderate



What does the evidence say? - Groundwater condition



- Overall Water Framework Directive groundwater body status associated with the upper catchment and landscape is poor.
- Corresponds to the more rural landscape and the effects of land use practices leading to nutrient affected groundwaters and surface waters.
- Evidence suggests a causal link between groundwater pollution and land spreading.
- Water Framework Directive groundwater body status for the Usk catchment in the lower half of the landscape is good.
- But, both also have localised instances of pollution associated with discharges from sewage treatment systems, land spreading and losses from domestic heating oil tanks.
- Understanding groundwater pollution risks from sewage and trade effluent discharges to ground needed to determine pressure and impact to be able to build resilience.

What does the evidence say

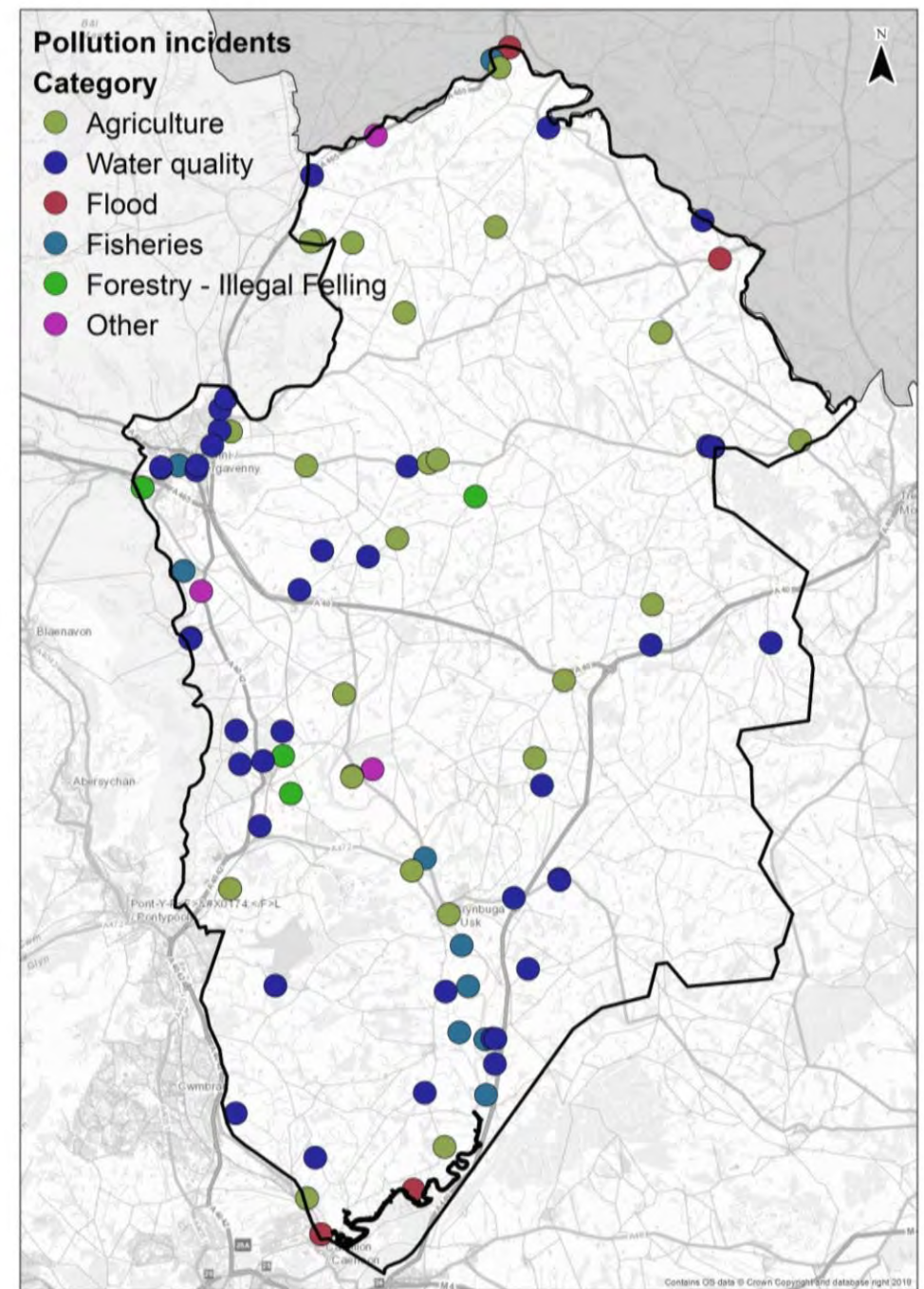
- Habitat & species condition

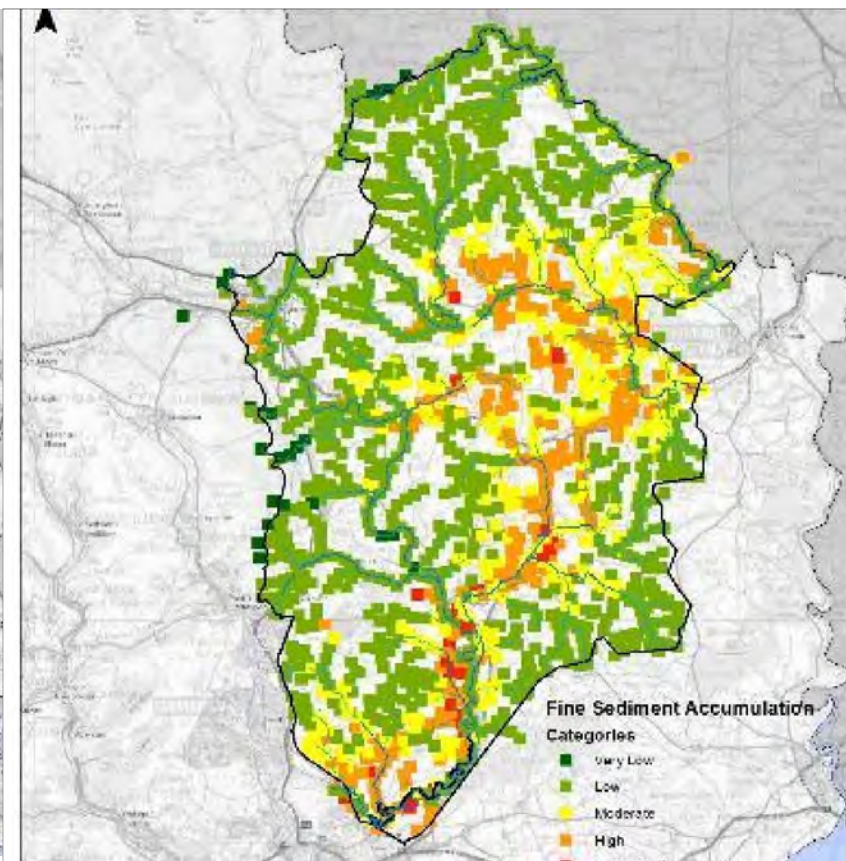
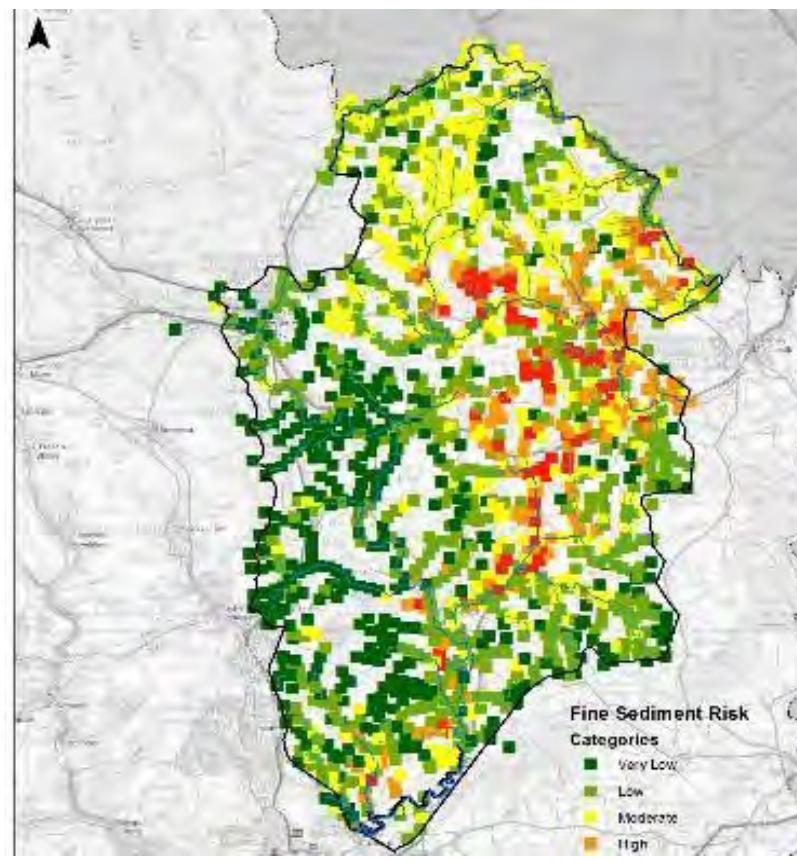
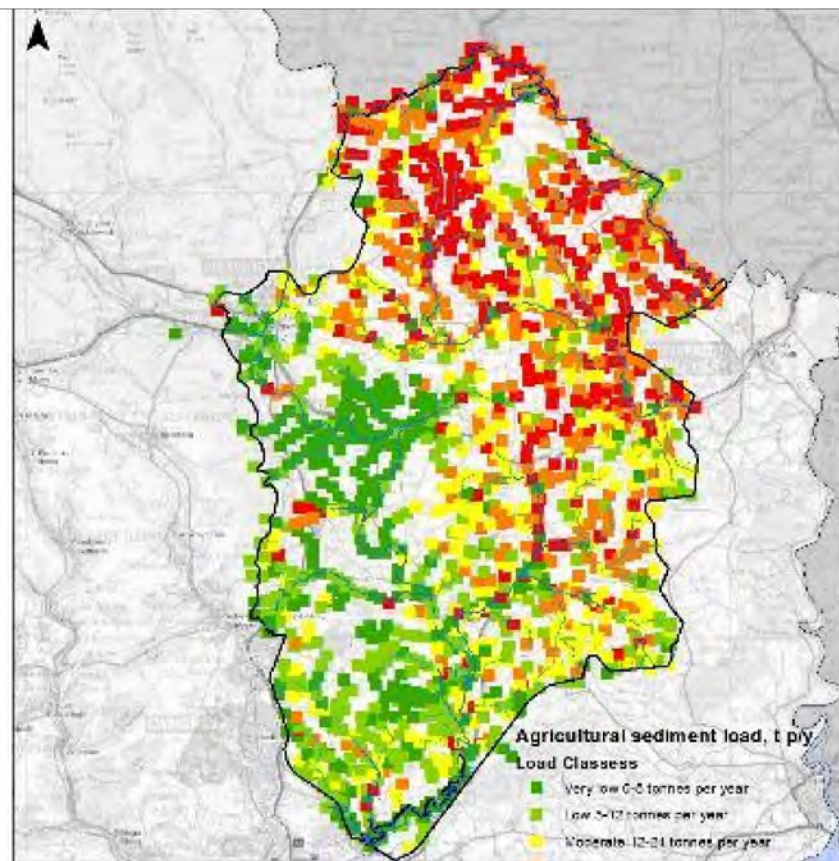
- Semi-natural Grasslands – these are either under managed or over grazed.
- Conservation status of Usk SAC features considered largely unfavourable.
- Atlantic Salmon and Bullhead
- Water courses of plain to montane levels with the Ranunculus fluitans and Callitriche-Batrachium vegetation
- Sea Lamprey
- Twaite Shad
- Otters and Brook Lamprey considered favourable but with scope for improvement.
- Sugarloaf sessile oak woodlands and blanket bog are considered unfavourable due to inappropriate grazing regime, although Lesser Horseshoe Bats and caves are in favourable condition.
- Alluvial forests of Coed y Cerrig are considered in favourable condition
- All of the Brecon Beacons features are considered to be in unfavourable condition
- Common pressures impacting on habitat and species condition includes:
 - Habitat loss & Fragmentation
 - INNS
 - Pollution (nutrient enrichment)
 - Agriculture (e.g. inappropriate grazing regimes)

What does the evidence say?

- Pollution

- Wales incident reporting system (WIRS) records the most common pollution pressures are from the agricultural and urban water quality sectors.
- Local impacts but chronic and cumulative effects on ecology and hydromorphology unknown.
- Other pressures include illegal felling and poaching which will impact on the ecosystem services they provide.
- Flooding also recorded in Abergavenny and on the lower Usk – nature based solutions e.g. NFM needed.





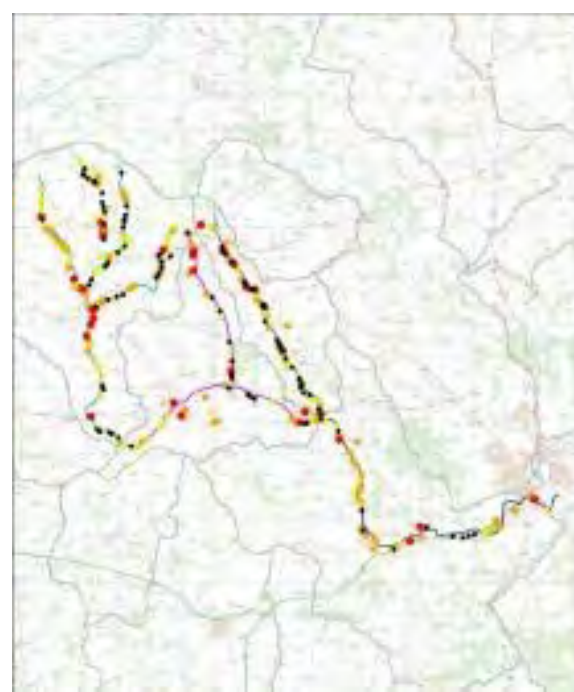
What does the evidence say?

- Diffuse agriculture and rural land management

- Fine agricultural sediment load (tonnes per year) is very high in the rural landscape (left) where it is generated.
- This is resulting in high risk to catchments such as the Trothy, Olway and eventually the Usk where it accumulates.

Diffuse agriculture and rural land management – Trothy Catchment

- Evidence that significant discharges have occurred over a long period.
- Widespread instream sediment accumulations reported throughout.
- Significant sediment accumulations impacting on salmonid nursery and spawning habitat.
- Elevated levels of fines can interfere with egg and fry survival.



Waterbody	Total number of issues recorded	Most frequently recorded issue
River Trothy - confluence Llanymynach Brook to confluence Llymon Brook	58	Livestock field (all livestock types) (36 %)
Llymon Brook - source to confluence River Trothy	55	Waterbody bank poaching (all livestock types) (47 %)
River Trothy - source to confluence Llanymynech Brook	153	Waterbody bank poaching (all livestock types) (25 %)

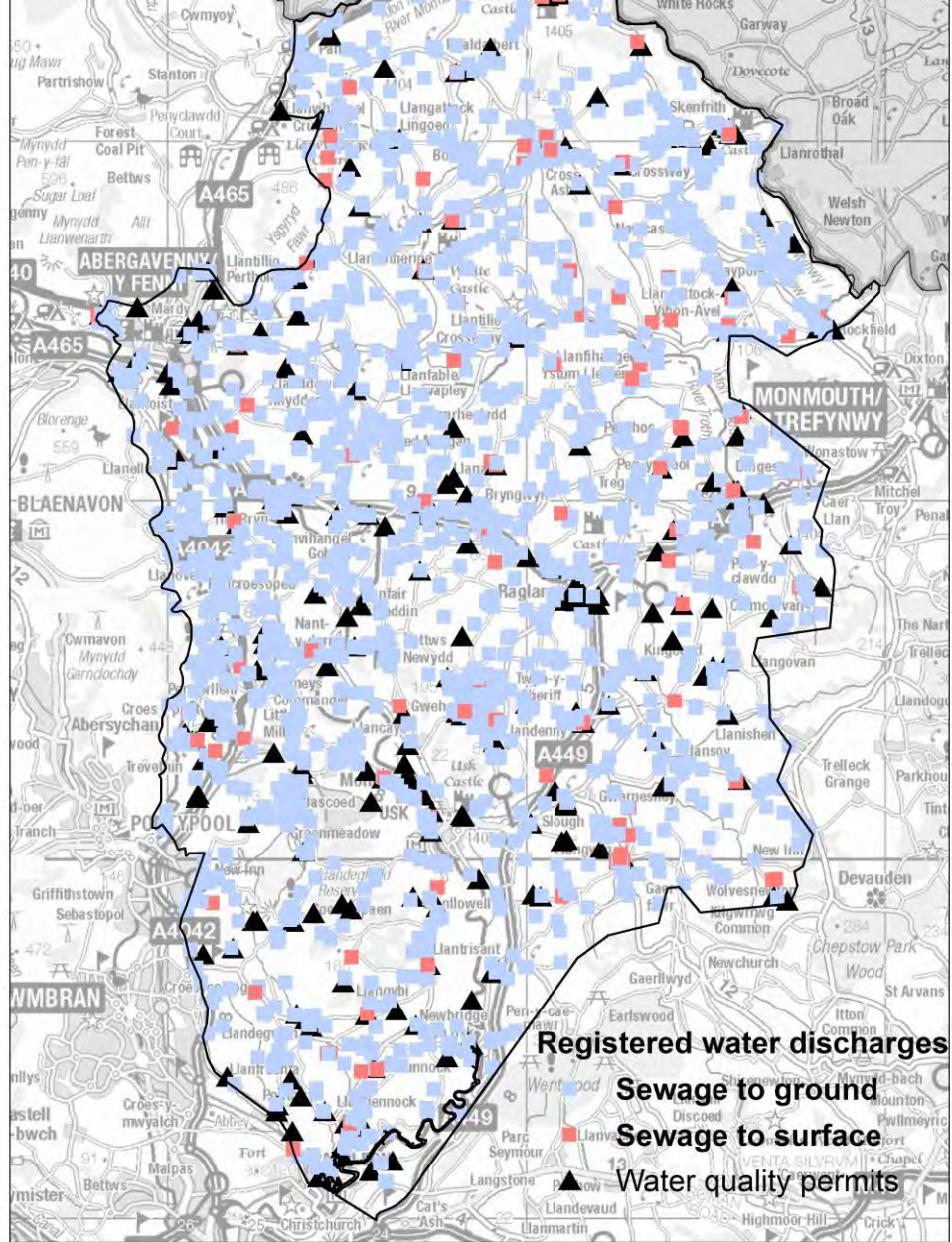


Diffuse agriculture and rural land management

- Sediment input from agriculture is a major concern for freshwater ecosystems – hydrologically connected.
- Nutrients bond to sediments contributing to phosphate failures identified under the WFD.

But,

- Carbon loss from soils and its impact on the water environment is unknown.
- **Waste water and urban drainage** also impacting on WFD phosphate failures.
- Evidence lacking on proportion of agricultural input when compared to sewage treatment systems (private/public).



What does the evidence say?

– Waste water and urban drainage

Deterioration in water quality can be found where there is a high concentration of private discharges even when the treatment systems are well operated - 2,203 exempt water discharge activities (5m^3 to surface water, 2m^3 to ground).

- 139 permitted discharges to ground and surface waters.

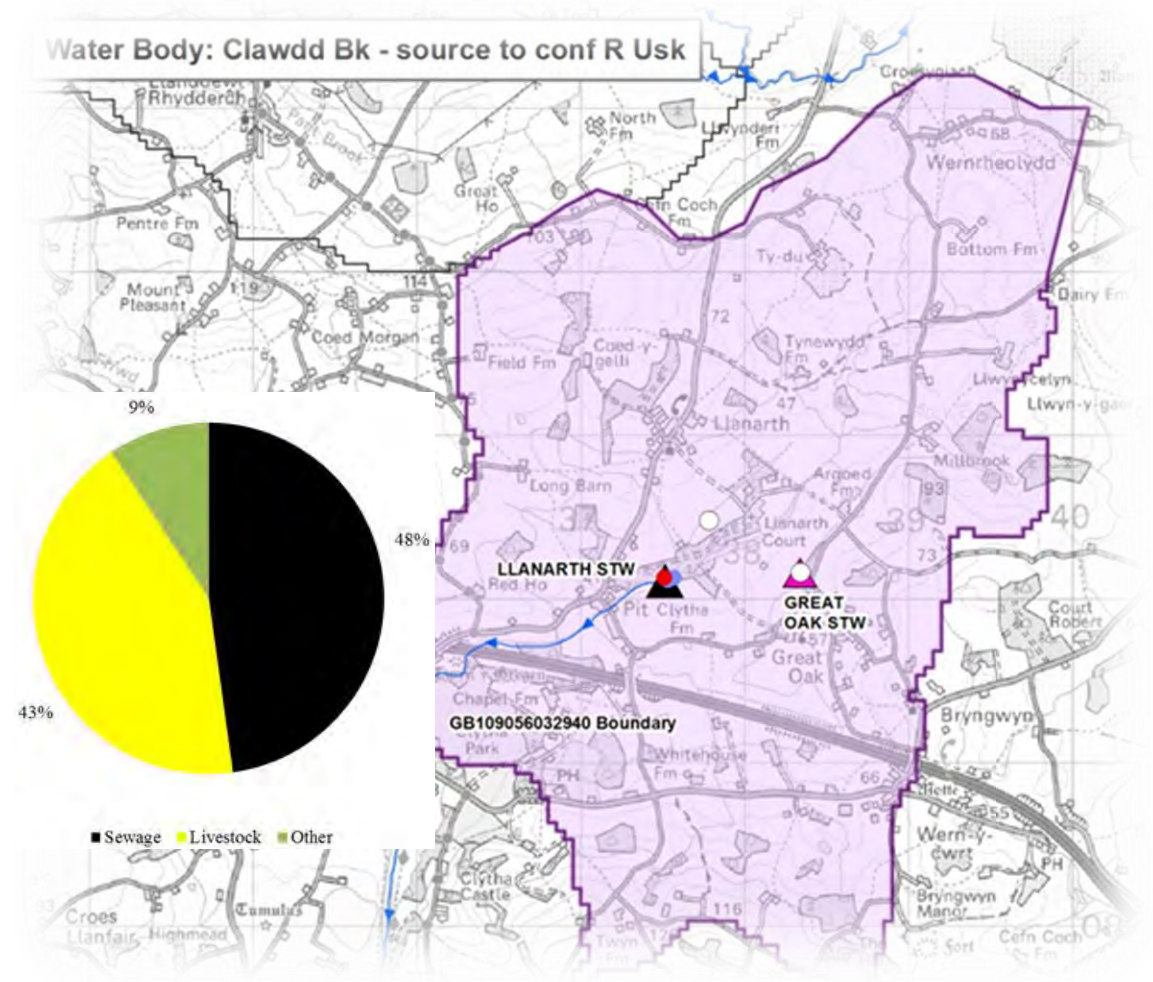
However,

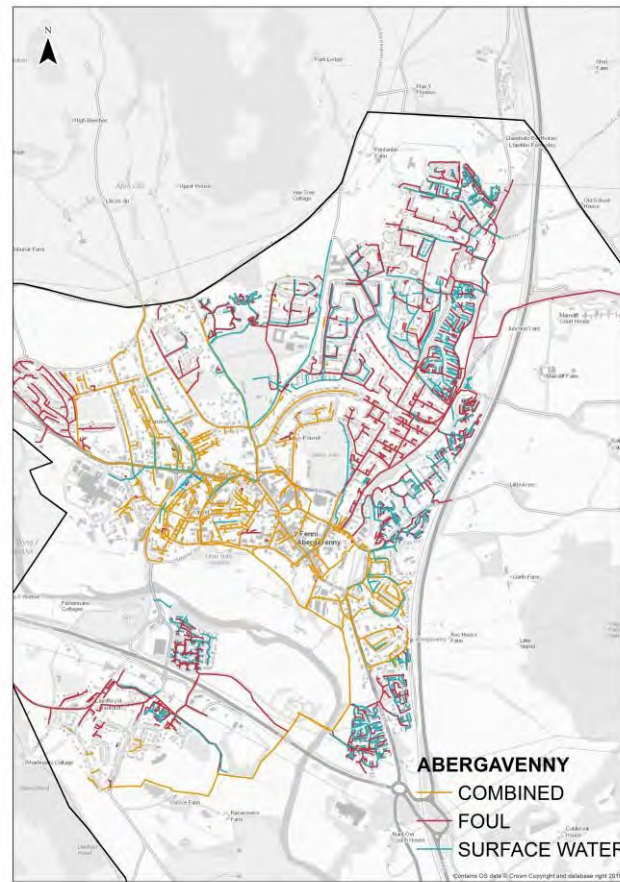
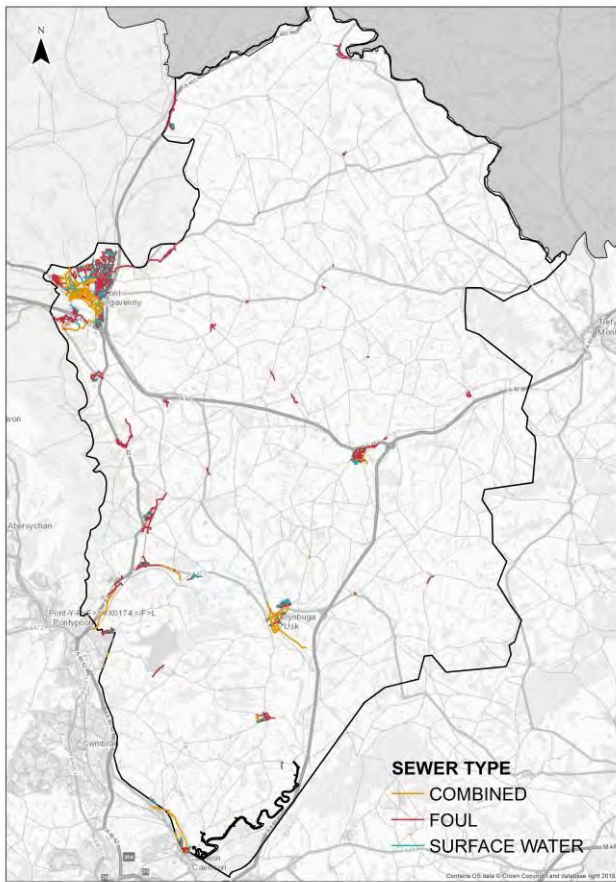
- There is uncertainty regarding how many discharges are currently unregulated i.e. 2,342 regulated (permitted + registered) discharges, but >16,000 properties across the landscape.
- These unknown discharges, with additional unknown “condition” will no doubt be contributing to the cumulative and chronic pressures on the water environment impacting on ecosystem function and resilience.
- The proportion of exempt (2,023) to permitted (139) also raises questions in how we currently regulate, particularly when higher standards are needed to protect an already fragile landscape.

What does the evidence say?

– Waste water and urban drainage

- Point source inputs from water company Waste Water discharges have been investigated throughout the landscape e.g. Raglan WwTW on the Nant y Wilcae is included in DCWWs AMP6 National Environment Programme (NEP) for a scheme to remove phosphorus (P) to 1mg/l by end of March 2020.
 - A similar scheme is proposed at Llanarth STW on the Clawdd brook (right) to remove phosphorus to 0.5mg/l in the AMP7 NEP
- However,
- Further work required on the proportion of input from private sewage treatment systems in comparison to agriculture and water company STW.





- Lack of sewer infrastructure across the landscape (far left) forcing more and more private systems to discharge effluent in to the environment (ground and surface waters).
- Where sewer infrastructure is in place numerous communities including those in Abergavenny (near left) and Usk Town are on combined (foul + surface) sewer systems, putting pressure on the amount of water entering the system causing hydraulic overload, resulting in pollution (faecal coliform, phosphate) and localised flooding as found in Abergavenny.
- Even in separate sewer network areas, pollution and hydraulic pressures continues due to wrongly connecting clean water pipes in to the foul system, further impacting on WwTWs downstream by treating unnecessary clean water.
- Misconnections (foul to surface water) found throughout urban areas of Abergavenny, Usk and Raglan.
- NRW, DCWW and the LA work together to resolve misconnections but requires a significant demand in resources. Sustainable solutions required to target root cause, not just locally but nationally through policy change and commitment.

What does the evidence say?

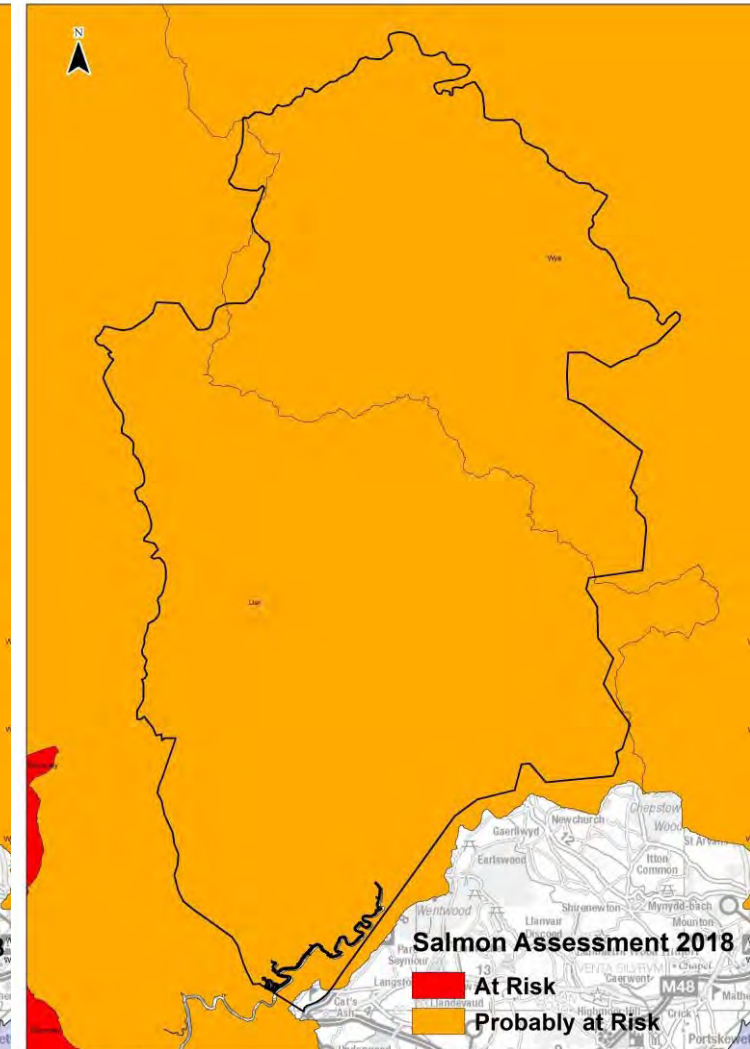
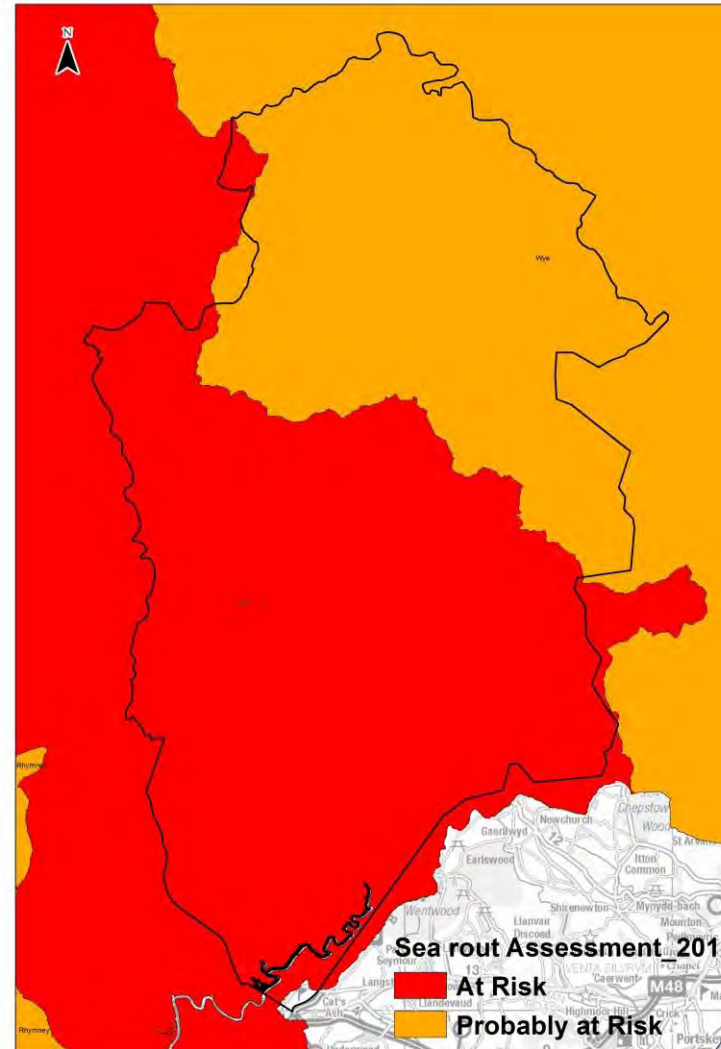
Waste water and urban drainage

What does the evidence say?

- Fisheries Stock assessments

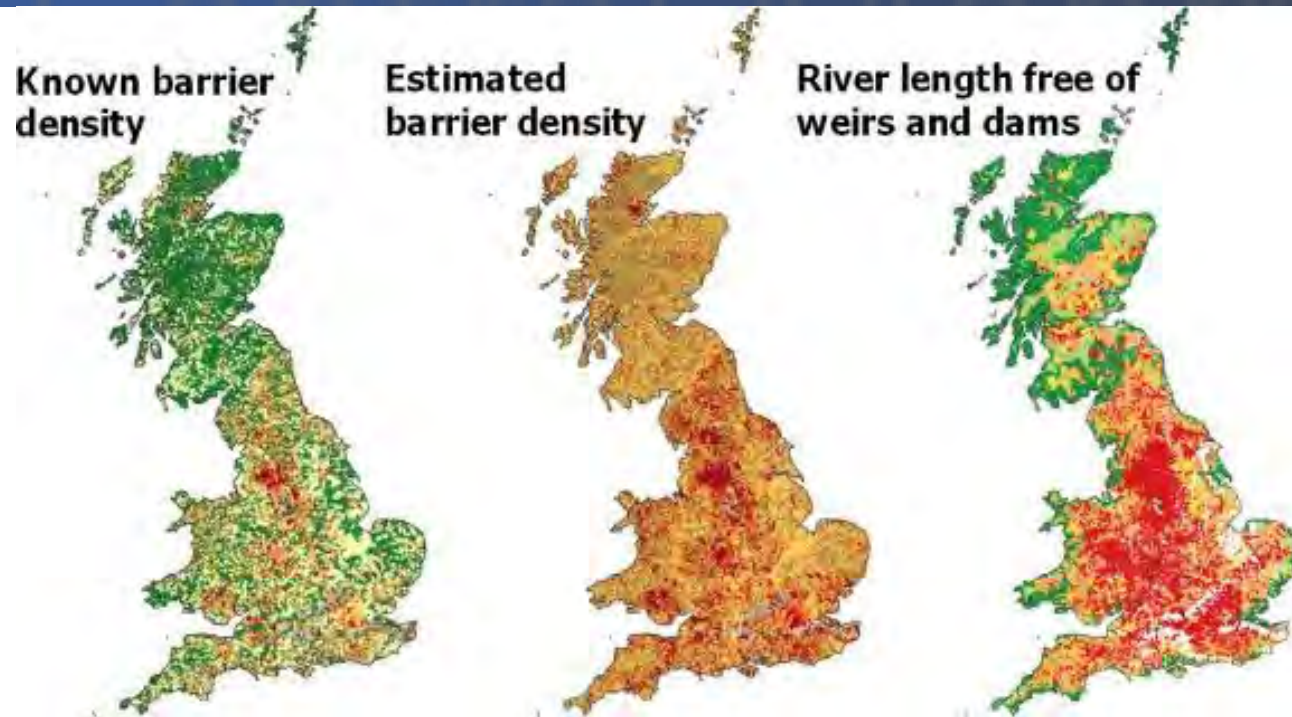
- Salmonid Stock Assessments 2018 (and predicted 2023) provides overall fishery performance which relates to socioeconomic benefits for communities.
- Sea Trout (right) is both currently and predicted to be “At Risk” for the Usk catchment -79.3% egg deficit on management targets.
- Sea Trout status identifies the requirement for additional regulatory measures in this landscape.
- Mandatory catch-and-release of all Sea Trout from rod fisheries exploiting vulnerable stocks.
- Atlantic Salmon (Far right) is currently “Probably At Risk”, with no change predicted by 2023.
- Salmonid populations performing very poorly due to environmental conditions at sea (marine mortality is highest on record) and in freshwater with pressures from agricultural pollution, habitat loss and degradation.
- Restoring rivers to natural conditions needed to maximise productivity and resilience of fish ecological diversity and abundance.
- Bylaws also currently proposed for e.g. rod fisheries needed to protect and restore stocks.

[Proposals for new fishing controls in Wales](#)



What does the evidence say ?

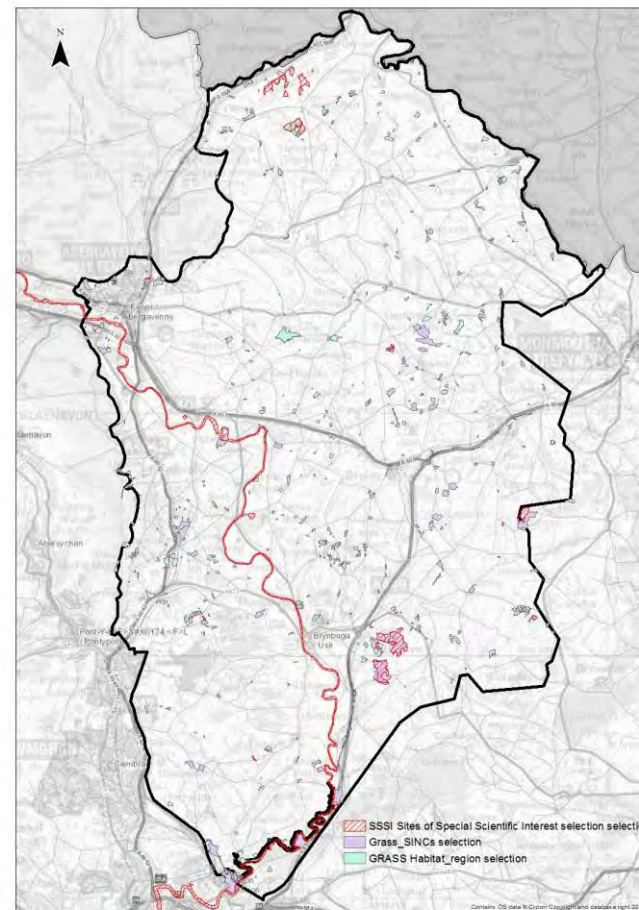
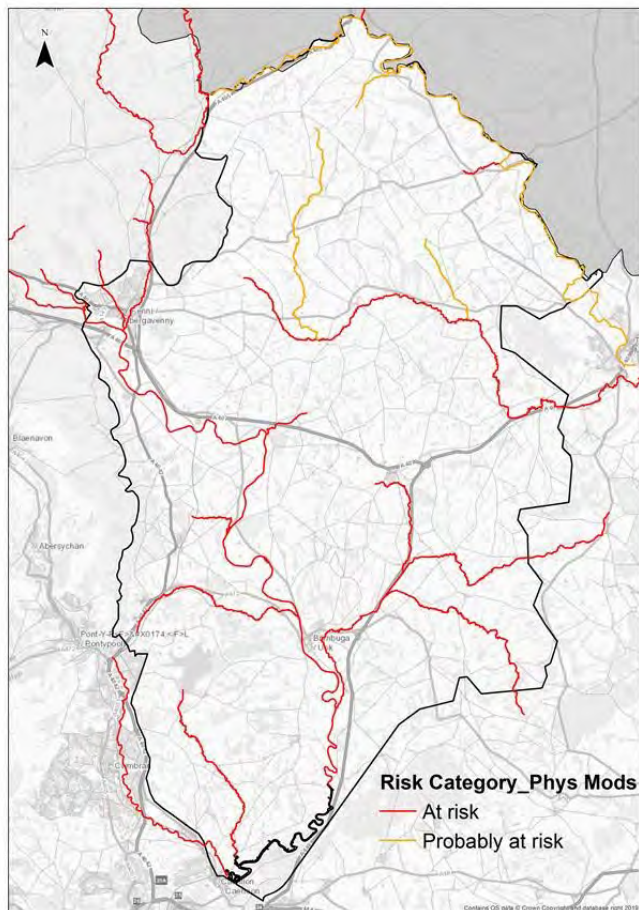
- Fragmentation



- Currently aware of 44 “known” barriers in Central Monmouthshire – 35 of which are artificial.
- Evidence suggests this is a significant under-Estimation.
- Estimations much higher, highlighting weirs under 5m are not being recorded but have a significant cumulative impact causing major river fragmentation throughout Wales – SE depicted heavily impacted (orange-red heat maps, right).

What does the evidence say?

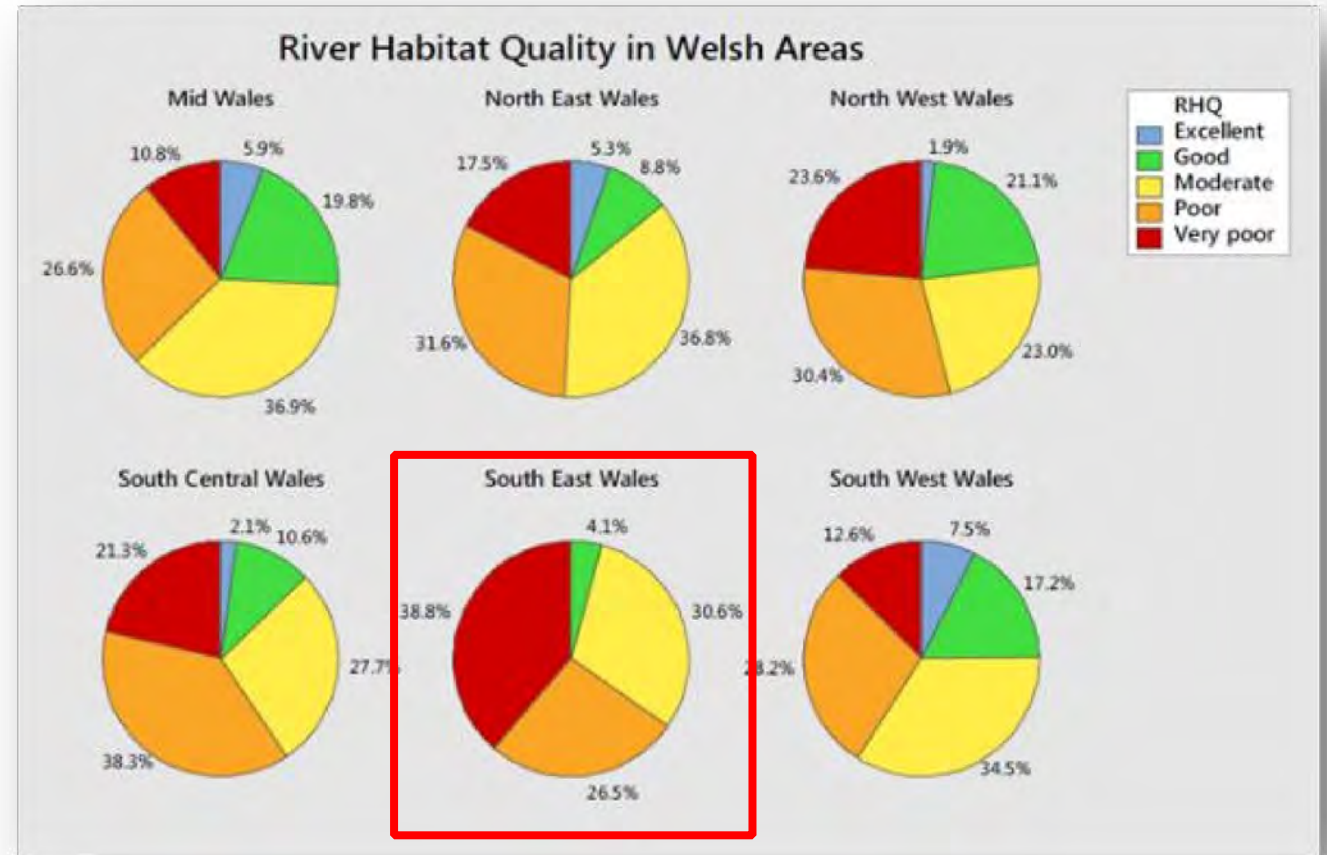
- Fragmentation

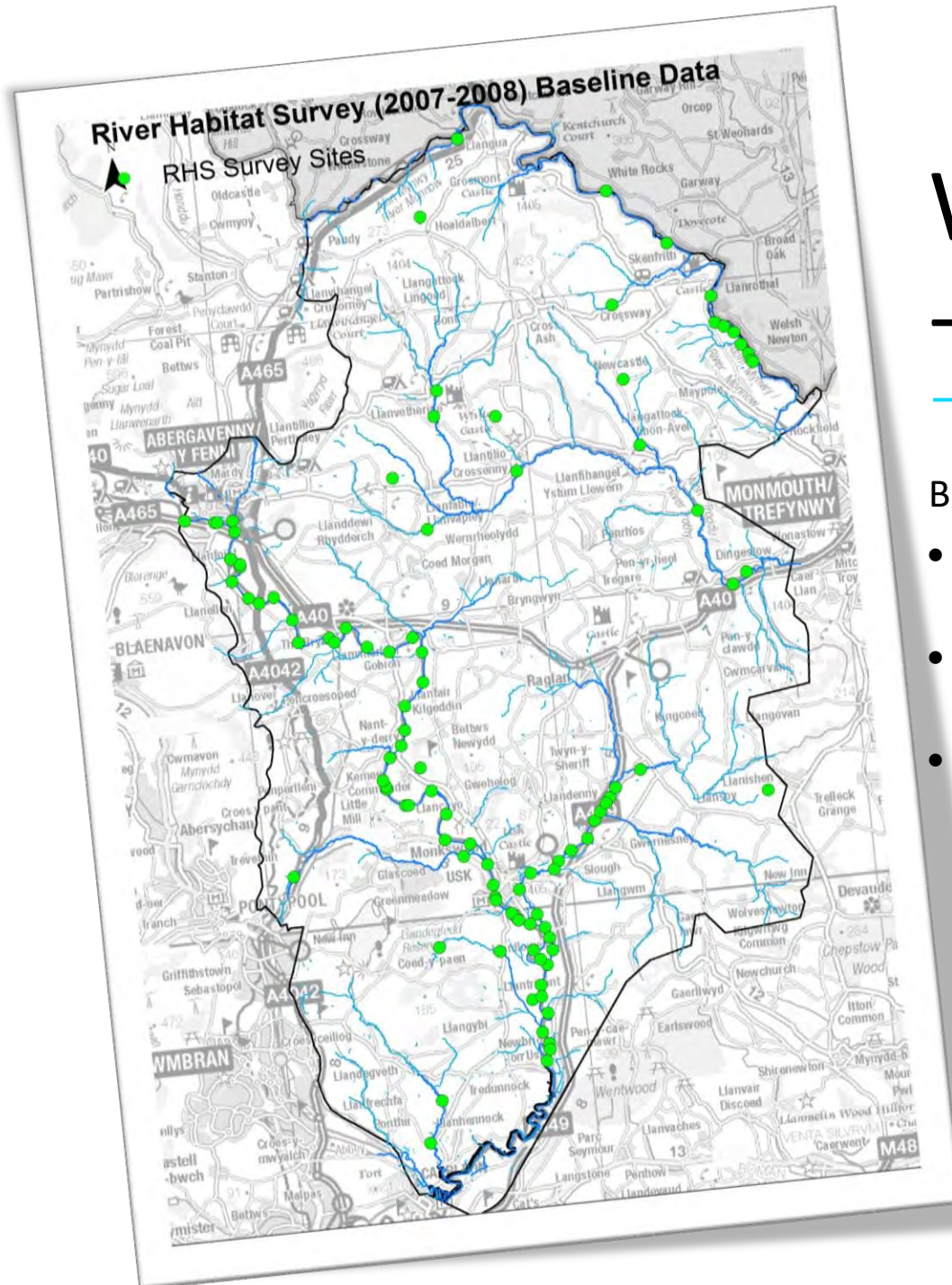


- Of the 22 rivers in Central Monmouthshire, 19 (86%) are considered as being “At Risk” for physical modification (e.g. weirs, channel alterations), whilst the remaining 3 are “Probably at Risk” (far left).
- Barriers on the e.g. River Gavenny and the Honddu prevent fish migration, affect natural hydromorphological processes and contribute to overall quality and quantity of habitat and ecology within the river system.
- Fragmented nature of grasslands is evident across the landscape (near left).
- When combined with other pressures e.g. pollution, flood risk, INNS, ecosystem function is threatened and the capacity for resilience is reduced.

What does the evidence say? - Degradation

- River Habitat Quality in SE is identified as being one of the poorest across Wales.
- poorest River Habitat Quality (38.8%)
- severely modified habitat (36.7%)
- highest overall levels of pressure
Along with having the lowest:
- occurrence of wetlands on the floodplain
- riparian habitat quality
- Naturalness
- De-culverting, re-meandering, two stage channels, green infrastructure & buffering is recommended for restoration across the AS boundary and therefore in this landscape.





What does the evidence say?

- Degradation

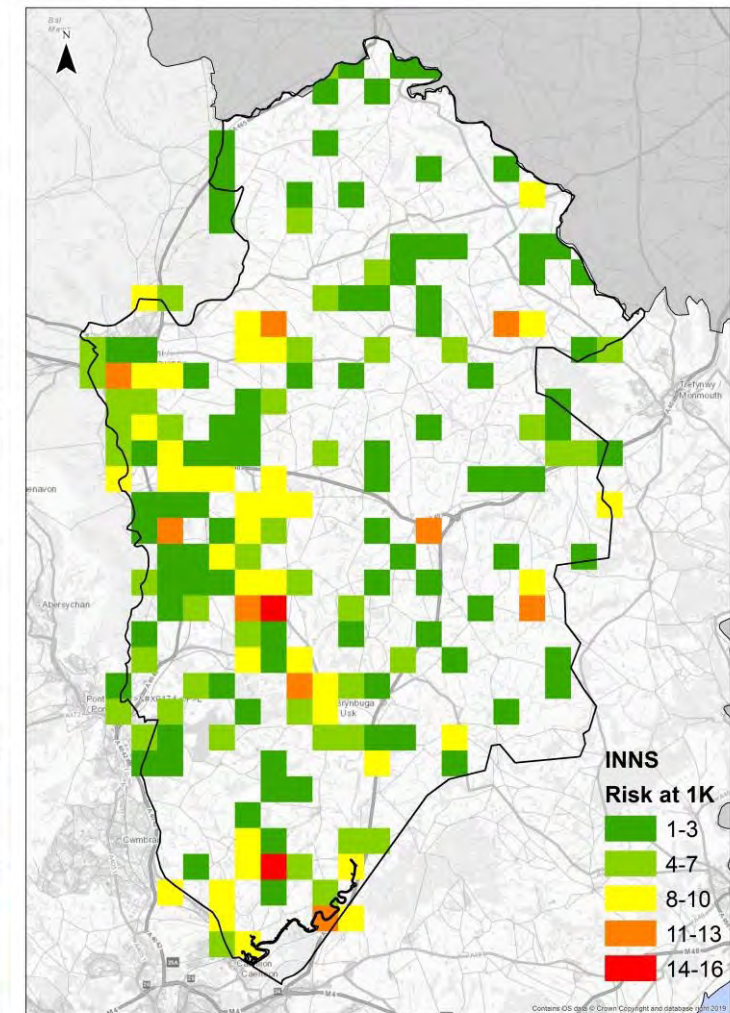
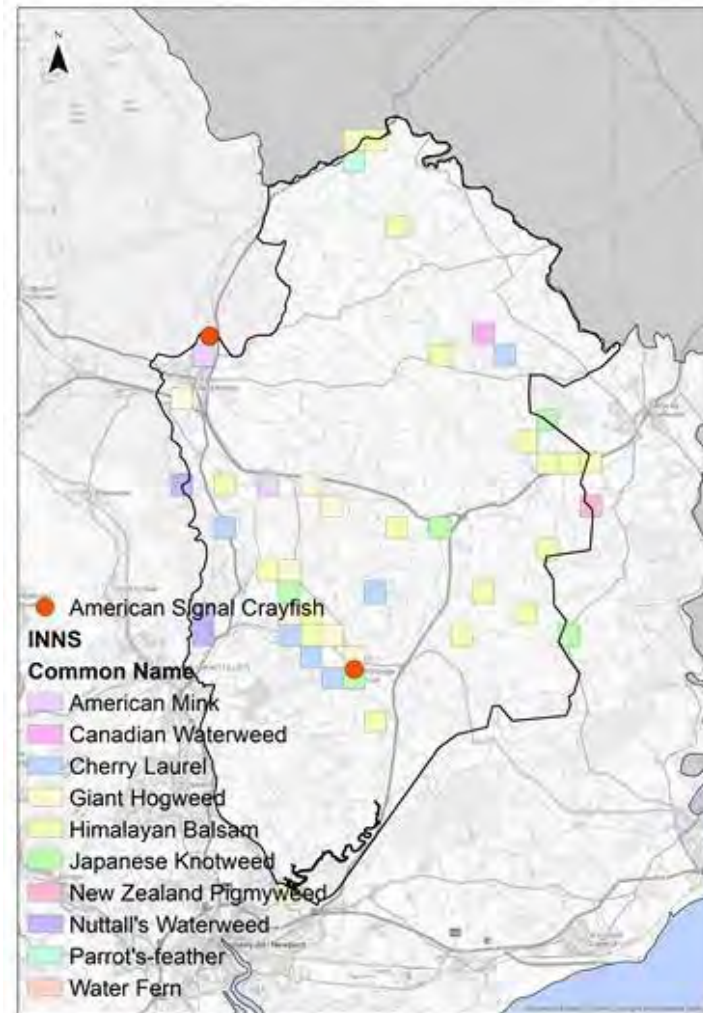
But,

- does not identify opportunities for protection, enhancement and restoration.
- analyses of pressures, impacts and environmental assets **within** each area e.g. catchment, landscape.
- Is over 10 years old, repeat RHS survey needed to assess the direction and intensity of change at the relevant spatial scales needed to inform:
 - WFD and geomorphological assessments;
 - Catchment and river hydro- and geomorphological assessments
 - River restoration planning, delivery and monitoring
 - Detailed species habitat condition assessment
 - Fine sediment management
 - Fisheries management (e.g. salmon and trout)

What does the evidence say?

- Habitat degradation

- INNS are the second greatest threat after habitat loss and fragmentation, impacting farming, water & habitat quality, recreation, fisheries and utilities.
- INNS in Central Monmouthshire is widespread.
- Signal crayfish recorded on the River Gavenny and Usk.
- Native spp' densities have been found to be negatively correlated with densities of e.g. non-native crayfish.
- High spread throughout the River Usk SAC – Giant Hogweed Project (NRW, KWT, WUF, MCC).
- Llandegfedd Reservoir contains abundance of invasive Zebra Mussel.
- Giant Hogweed, Himalayan Balsam, Japanese Knotweed and Cherry Laurel most commonly found throughout the landscape.

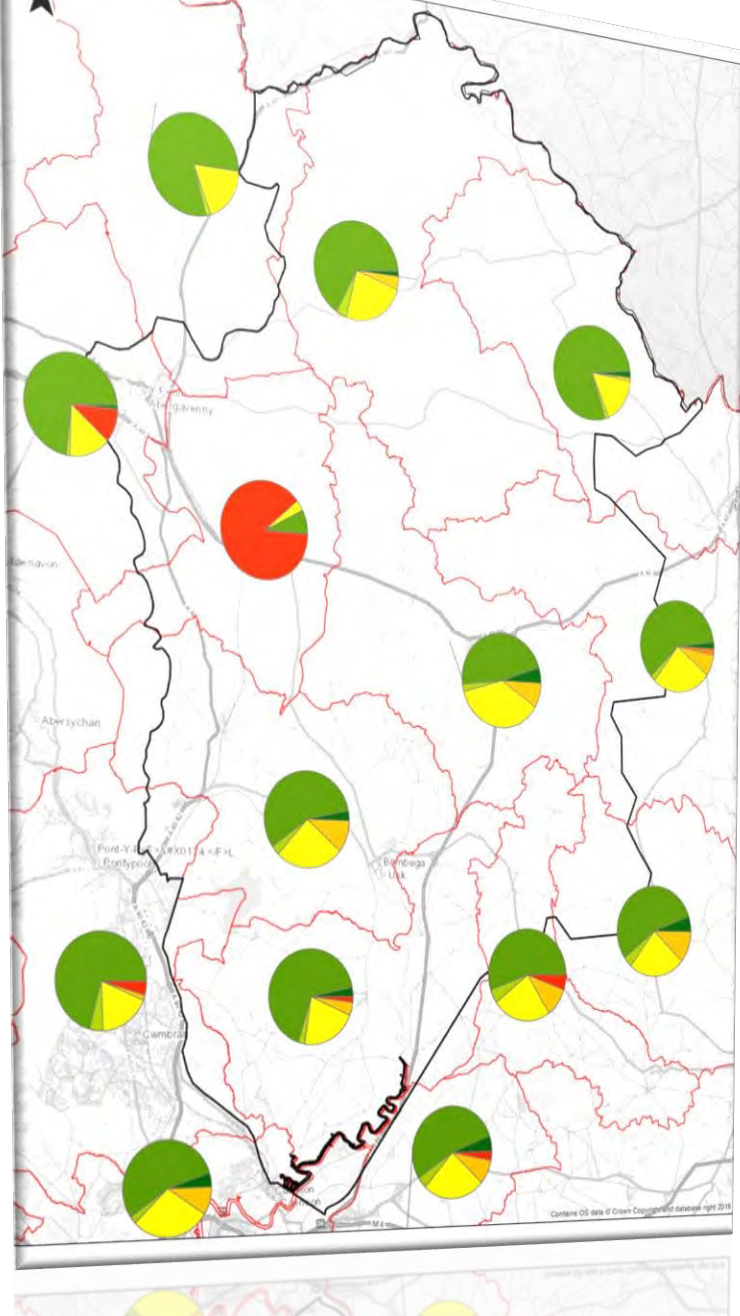


What is Ecosystem Resilience?

- **Diversity** (genes, species, habitats, landscapes) supports the complexity of ecosystem functions and the cascades of interactions that deliver services and benefits.
- The greater the **extent** of a habitat or species, the more able it will be to contain the effects of disturbance such as flood risk and drought.
- The ability to recover and respond to change depends largely on the **condition** of ecosystems.
- Ecosystem function and ability to adapt to a changing climate depends on good **connectivity** within and between systems, reduced by fragmentation (barriers, habitat loss) and degradation (pollution, INNS).
- Ecosystems need to be dynamic and have the **adaptability** in the face of future climate change.



Top priorities – Building Ecosystem Resilience



Agriculture Density



- Crops_and_horticulture
- Total_Sheep
- Beef_Breeding
- Livestock_Units
- Dairy_Breeding
- Pigs
- Poultry

1. Agriculture & rural land management

- Improvements needed

- **Better Regulation – Sustainable Farming Scheme (Proposed)**
- Nutrient management planning of the crop
- Sustainable fertiliser applications linked to the requirements of the crop.
- Protection of water from pollution related to when, where and how fertilisers are spread.
- Manure storage standards.
- **Payments for Ecosystem Services (PES)**
- **Climate-ready food production (source-and-sink targets)**
- **Catchment/Landscape collaborative partnerships**

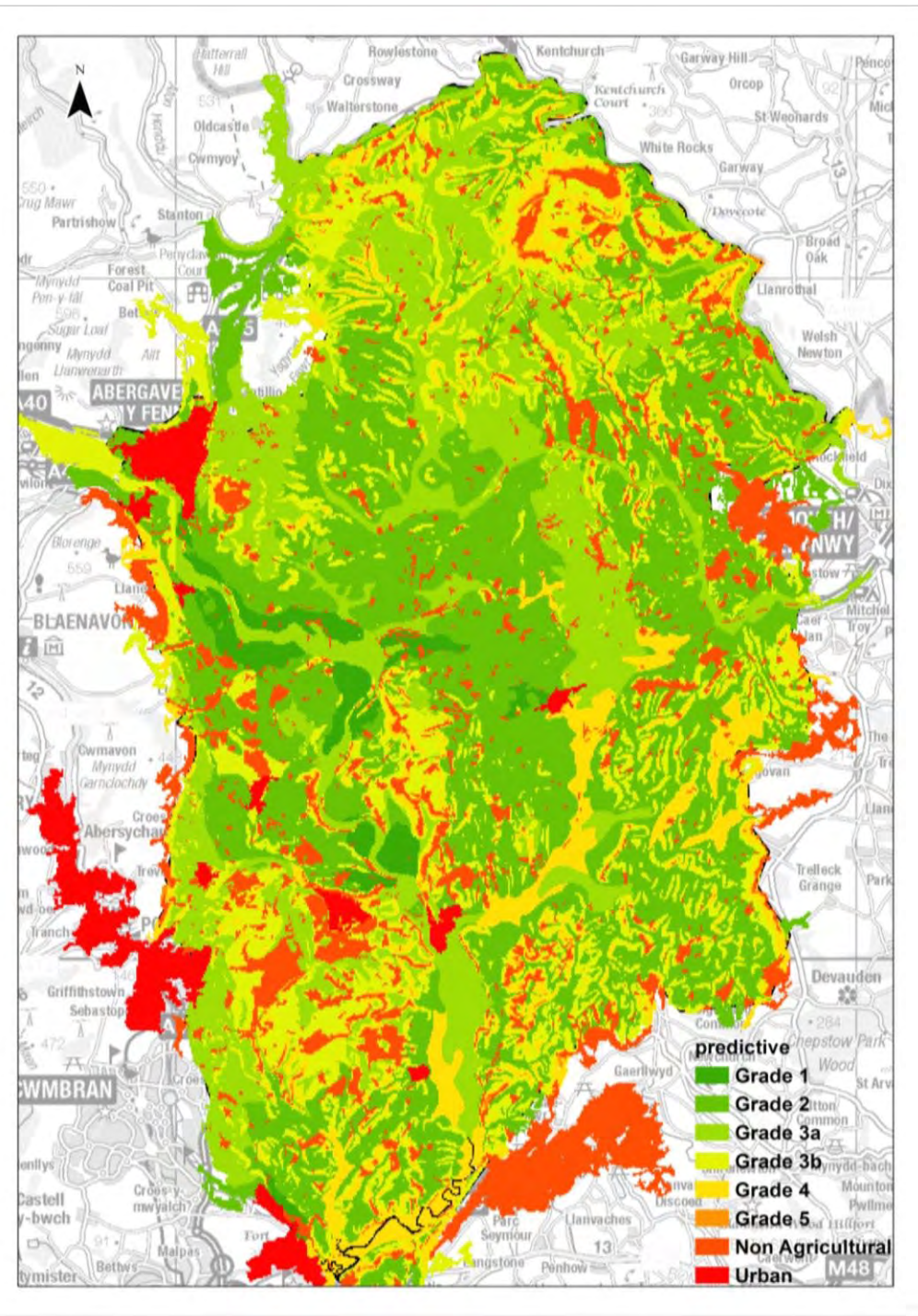
Top priorities – Building Ecosystem Resilience

1. Agriculture & rural land management

- Contribute to **climate change mitigation and adaptation**, as well as **sustainable energy**;
- Foster **sustainable development** and efficient management of **natural resources** such as water, nutrients, soil and air;
- Contribute to the **protection of biodiversity, enhance ecosystem services** and **preserve habitats and landscapes**

[Agricultural Land Classification of England and Wales](#)

[THE POST-2020 COMMON AGRICULTURAL POLICY: ENVIRONMENTAL BENEFITS AND SIMPLIFICATION](#)



2. Habitat Fragmentation

Identify areas for restoration with maximum potential to increase **connectivity**, to create habitat networks across woodland, floodplain, hedges, species rich grassland, riparian corridors and watercourses.

By restoring, recreating and reconnecting important habitats, improvements will also be made to ecosystem function and the **adaptability**.

Connectivity should be maintained or restored where necessary as a means to ensure access for the features to sufficient habitat throughout the landscape.

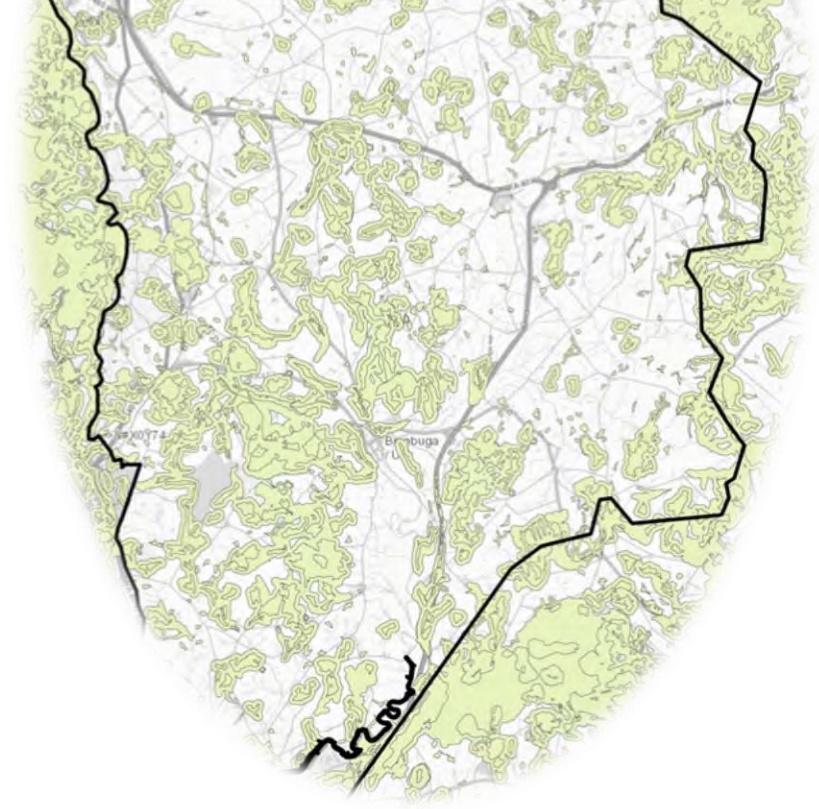
Nature based solutions e.g. NFM, SUDS and strategic habitat creation required to bring about improved habitat connectivity, enhance the **condition** and extent for wildlife, deliver benefits for water and soil quality, enrich the aesthetic quality, improve access and recreational opportunities, helping to support delivery of health and well-being benefits and improve **resilience** to climate change.

Top priorities

Building

Ecosystem

Resilience



Top priorities – Building Ecosystem Resilience

3. Habitat degradation

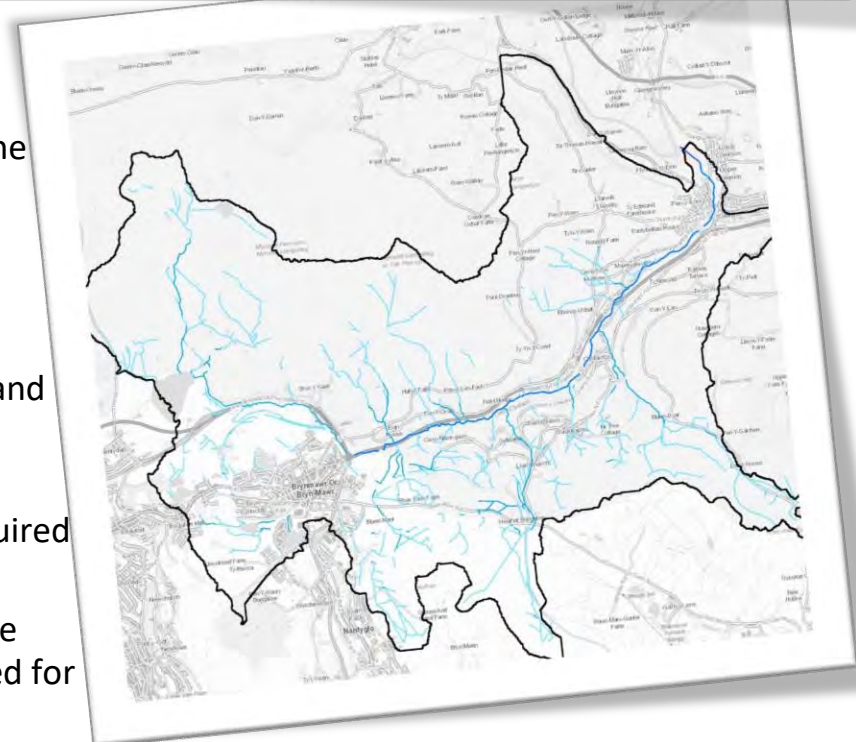
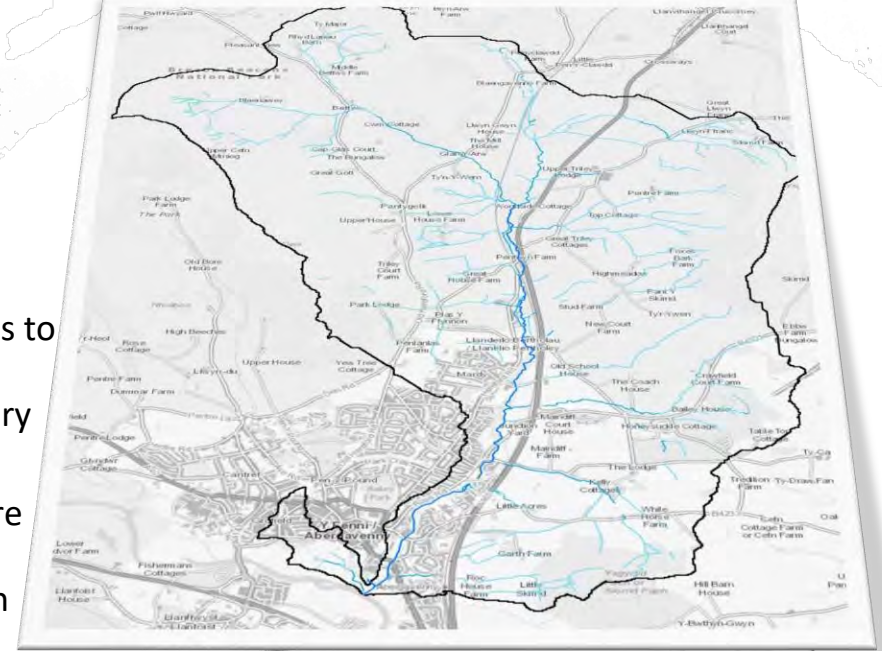


- Poor land management, development, pollution, agricultural intensification, inadequate protection and INNS - all affecting ecosystem resilience, extent, diversity, condition and adaptability to future change.
- Need to develop **sustainable nature based solutions** to restore ecosystem function, supporting ecosystem services and build resilience.
- Adapt agriculture and land management to improve water & soil quality and enhance productivity.
- River, habitat and floodplain creation, restoration and re-connection to reduce flood risk, improve water quality and quantity, and enhance biodiversity to support ecosystem function and resilience.
- Develop SUDS, Green Infrastructure, water retention measures to reduce urban pollution, sewage pollution and changes to water levels.
- Create strategic ecological networks to build resilience and adapt to a changing climate.

Opportunities to build resilience

River restoration

- River restoration aims to reinstate natural processes to restore biodiversity, providing benefits to both people and wildlife. Reintroducing natural processes can reshape rivers to provide the diversity of habitats required for a healthy river ecosystem and ensure their long-term recovery by addressing pressures and impacts on river systems.
- An example of this is in the Gavenny (right, top) and Clydach (right, bottom) catchments where river restoration plans has been commissioned to provide the evidence to determines the pressures, impacts, solutions, along with cost benefit needed to inform the decision making in achieving semi-natural conditions and resilient ecosystems.
- However, **sustainable funding** streams will be essential to deliver the restorative measures. For instance, the **Green Infrastructure Strategy** for Abergavenny includes to:
- enhance links between the River Usk, River Gavenny, A465, A4143 and railway corridors with the semi-natural habitats around Llanfoist, including Grove Farm grassland SINIC and the Monmouthshire and Brecon Canal, as well as the ancient woodlands of the Bloreng.
- strengthen and enhance links between the River Gavenny railway corridor and the woodland habitats and watercourses surrounding St Teilo's vicarage.
- **enhance connectivity** between sections of the Afon Cibi in central Abergavenny with the trees and watercourse of Bailey Park.
- Developing sustainable funding mechanisms for **collaborative partnerships** such as this will be fundamental to delivering the **restoration** on the ground and building ecosystem resilience required from local-to landscape scales.
- It is recommended that **restoration plans** are considered for all ecosystems across the landscape (freshwater, woodland, grasslands) where required as a holistic and consistent approach needed for connected ecosystems.













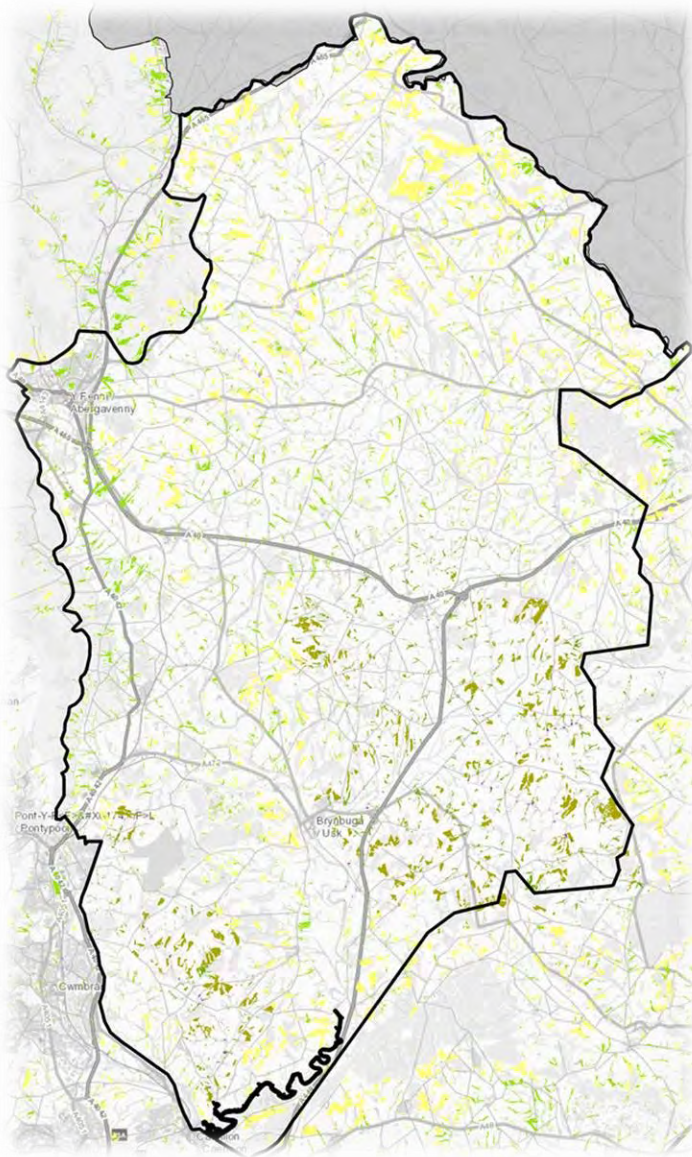
Opportunities to build resilience

– Fine sediment reduction

Opportunities to reduce fine sediment

Class

-  Opportunity for cover crops / tillage grass cover
-  Opportunity for cover crops / tillage grass cover in priority area
-  Opportunity for habitat restoration
-  Opportunity for habitat restoration in priority area
-  Opportunity for habitat restoration or riparian planting
-  Opportunity for habitat restoration or riparian planting in priority area
-  Opportunity for hedgerow planting
-  Opportunity for hedgerow planting in priority area
-  Opportunity for riparian planting
-  Opportunity for riparian planting in priority area



*Further analysis required to inform local evidence and decision making

Opportunities to build resilience

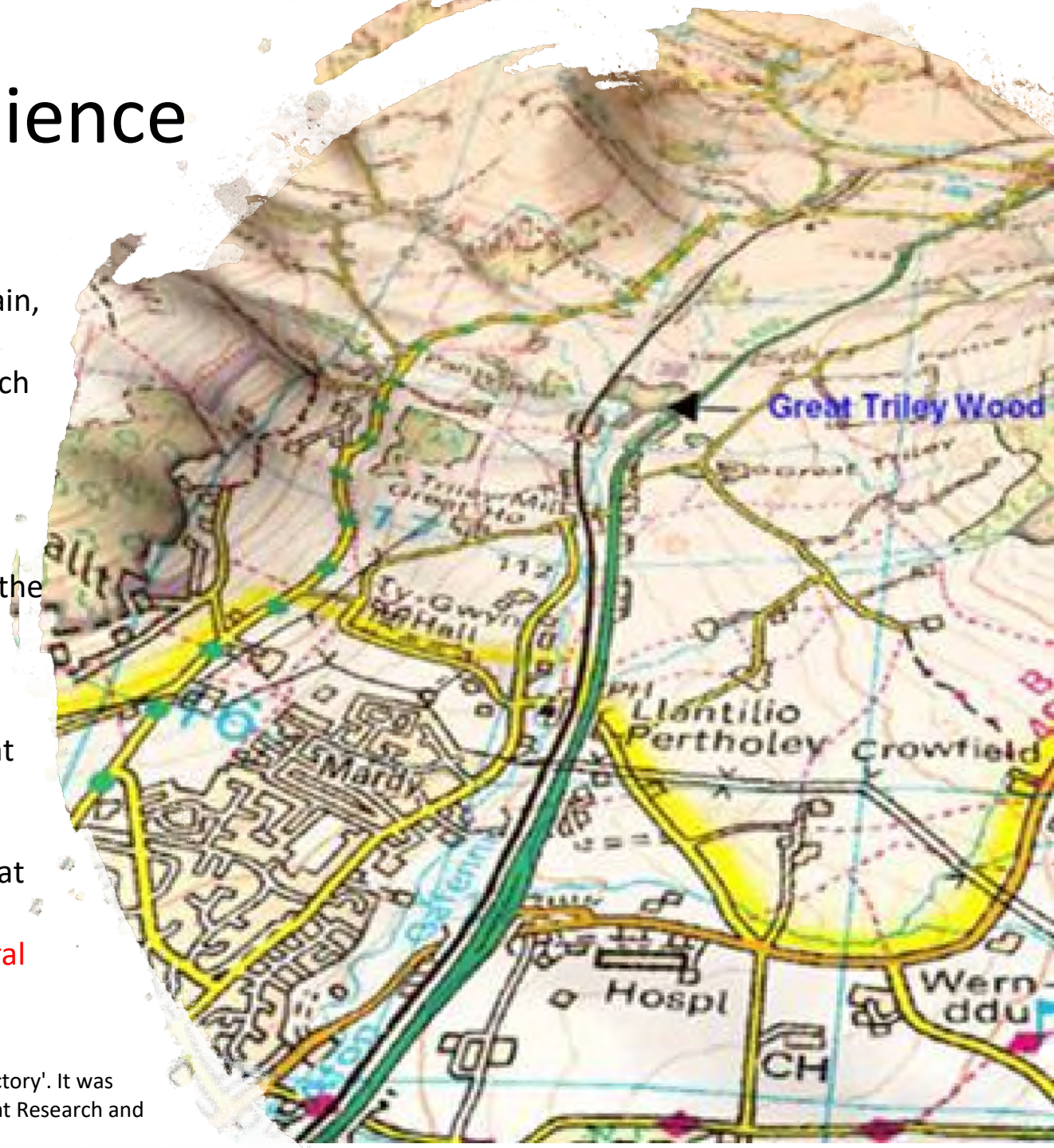
Floodplain woodlands

Fragments of floodplain woodland occur throughout the Usk floodplain, with quite extensive un-notified areas on the lower reaches and tributaries. Opportunity to **reconnect floodplain woodland** at sites such as at Great Triley Wood (Right)- occupies 6ha of the 22.9km² catchment and straddles 700m of the River Gavenny.

Past river management and removal of woody debris in the Gavenny has resulted in a relatively incised channel that is disconnected from the floodplain in many places.

Previous study on this site has shown **large woody dams** can exert a significant impact on flood flows, water quality and provide important ecological habitat for e.g. brown trout¹

Requirement to **extend and connect the floodplain woodlands** at Great Triley Wood and throughout the Central Monmouthshire landscape where suitable and with other **nature based solutions** including **natural flood management**.











¹ This case study relates to project SC150005 'Working with Natural Flood Management: Evidence Directory'. It was commissioned by Defra and the Environment Agency's Joint Flood and Coastal Erosion Risk Management Research and Development Programme.

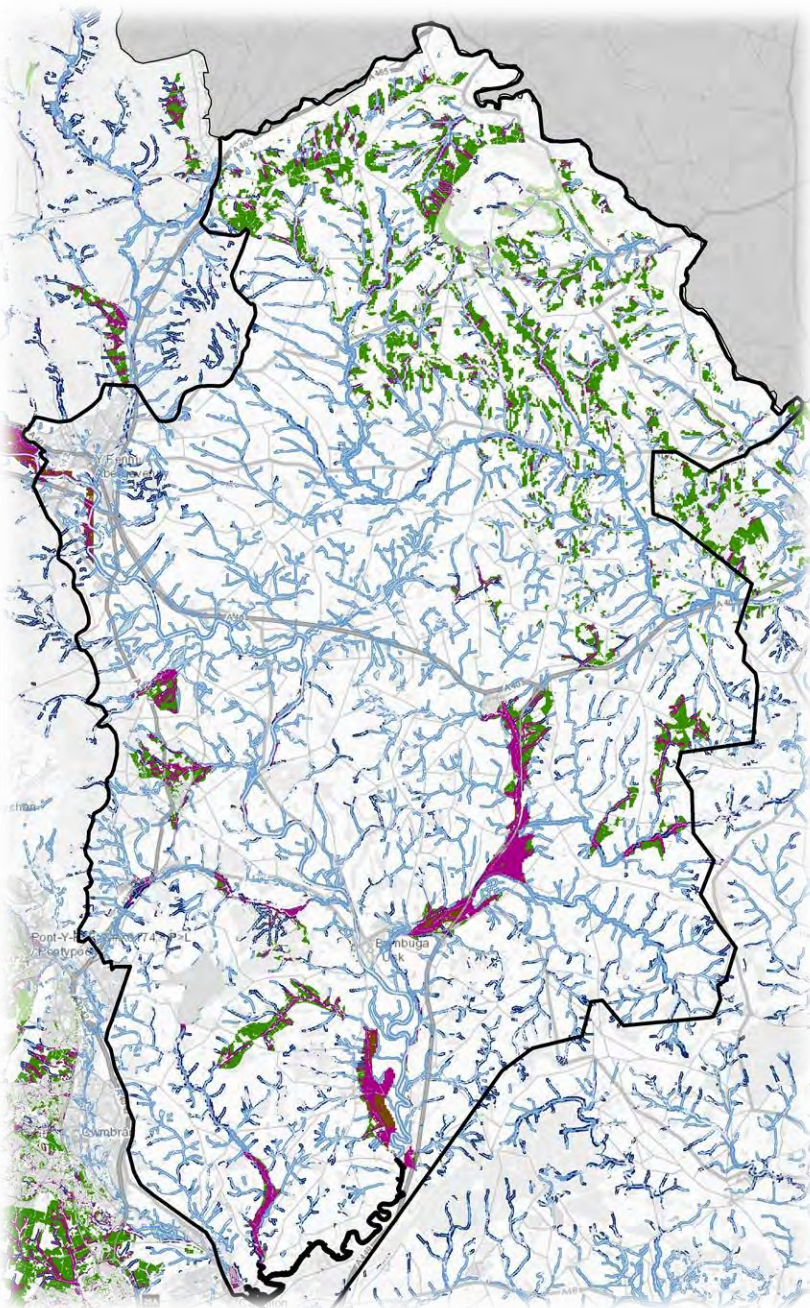
Opportunities to build resilience

- Woodland & riparian connectivity

Woodland and riparian connectivity

Class

-  Opportunity for catchment woodland
-  Opportunity for catchment woodland (sensitivity)
-  Opportunity for riparian/channel woodland
-  Opportunity for riparian/channel woodland (sensitivity)
-  Opportunity for floodplain woodland
-  Opportunity for floodplain woodland (sensitivity)
-  Opportunities for multiple types of NFM woodlands
-  Opportunities for multiple types of NFM woodlands (sensitivity)

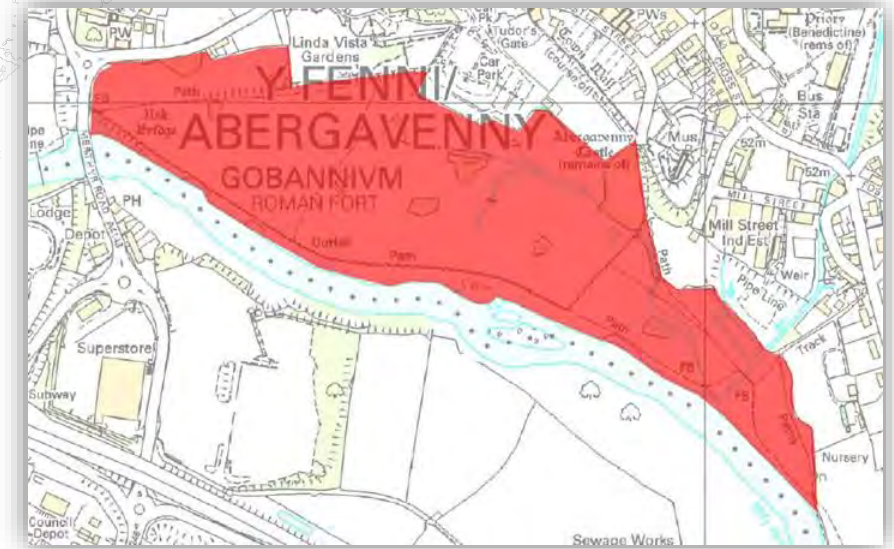


*Further analysis required to inform local evidence and decision making

Opportunities to build resilience

Floodplain meadows

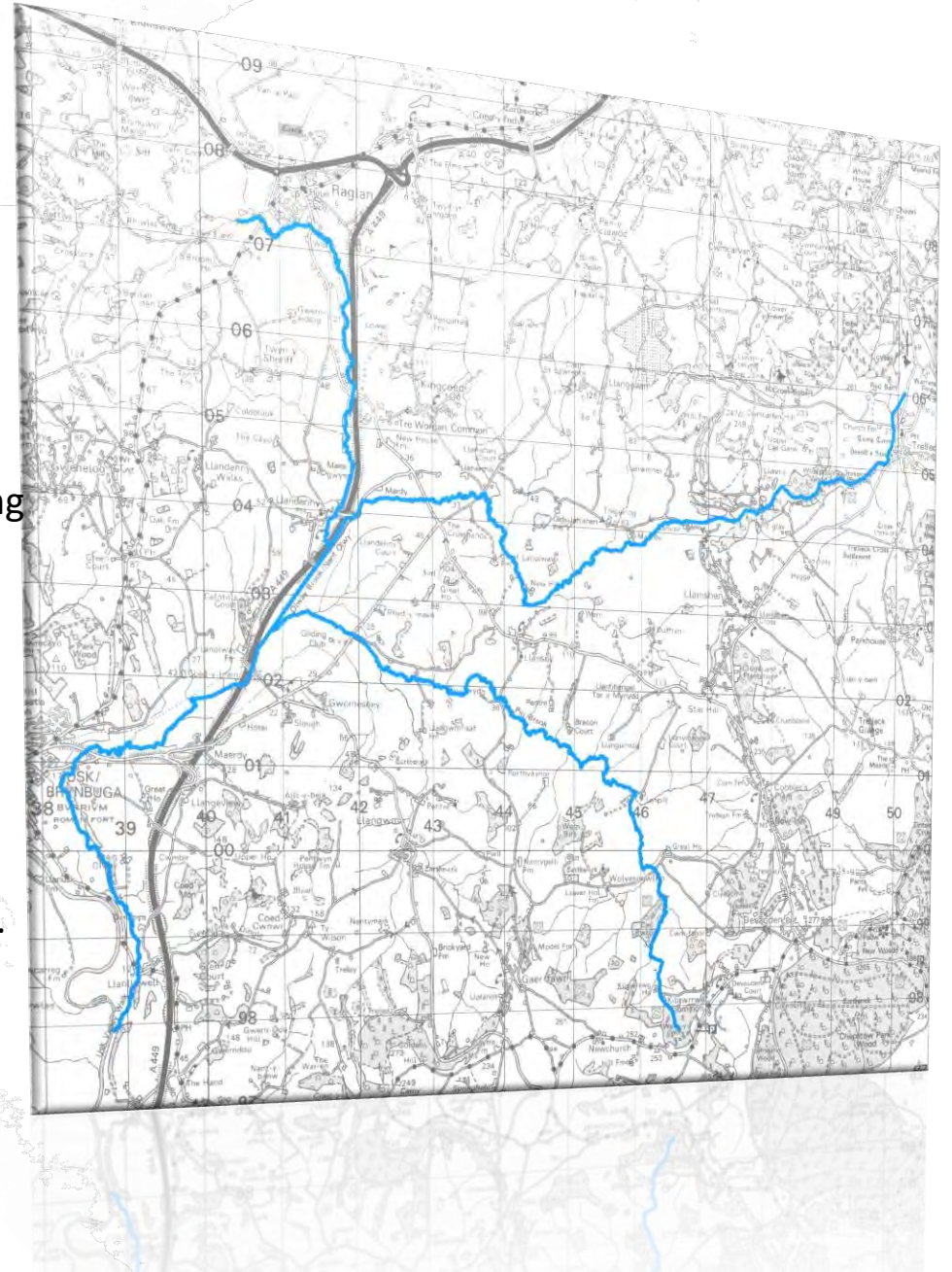
- Species-rich floodplain meadows are extremely rare in the UK and in Wales - less than 1200 ha remain, listed as priority Annex 1 habitat: (6510) Lowland Meadows.
- Fragments exist within SE Wales including in Central Monmouthshire e.g. Castle Meadows (right) - comprises of 22ha of floodplain meadows. Located in the flood plain of the River Usk SSSI and SAC beneath Abergavenny town. The Bloreng (559m) lies to the south with views across to the Sugar Loaf (596m) and Skirrid Fawr to the north.
- Thought to be one of the last surviving examples of traditionally managed Floodplain Meadow in Wales.
- Provide important ecosystem services including; storage of sediments, flood waters, nutrients, carbon, habitat for ecology including pollinating insects, birds and mammals, water quality and quantity, enhanced biodiversity and resilience.
- The associated green and blue spaces represent an important natural and cultural heritage resource, supporting community access and mental health and wellbeing.
- The grassland habitat at Castle Meadows has been identified as in need of **monitoring**, **management** and **restoration** (Open University).
- Floodplain meadows are in desperate need of restoration, creation, maintenance and management funding across the landscape to build **connectivity** and **resilience** for this rare and priority habitat from which many ecosystem services depend upon.
- It is recommended **national surveys** are undertaken to determine where we have this priority habitat, where it is suitable to create, where we need to restore and where we need to monitor and manage.



Opportunities to build resilience

Natural Flood Management

- Natural Flood Management (NFM) measures are cost effective sustainable solutions to structural flood protection. Measures such as re-meandering and the restoration of wetlands can reduce or delay the arrival of peaks downstream.
- Supports multiple benefits and ecosystem services including improving water quality and quantity, carbon storage and sequestration, preserving and creating habitats and increasing resilience to climate change.
- The Olway catchment (right) is predominantly rural bringing flows in behind River Usk (SSSI & SAC) defences which puts properties at risk for local communities including Usk Town.
- NFM assessment is underway to identify suitable measures depending on the sectors including agricultural (e.g. buffer strips, stocking density and soil compaction), hydromorphological (e.g. natural bank stabilisation, re-meandering), forestry (e.g. afforestation, coarse woody debris) and urban (e.g. swales, retention ponds, infiltration basins) where appropriate.
- Further resource, funding and collaboration needed to deliver and implement NFM options following appraisal.
- Requires a **national steer** to **incentivise** and support **local farmers** and **landowners** including **payments for ecosystem services** to be able to deliver local nature based solutions across the landscape and nationally.



Opportunities to build resilience

Nutrient/Soil Management

- The Usk SAC catchment is significantly impacted by fine sediments and nutrients/phosphate, some contributing source locations are known including parts of the Usk, Trothy, Olway, Clawdd Brook and Gavenny but the site-specific sectors and proportion are largely unknown.
- **Source-apportionment assessment** required to determine not only where in the catchment these inputs are coming from, but also how much they are contributing, allowing for targeted and prioritised action.
- **Nutrient Management Plan** (NMP) is also needed for the River Usk SAC (proposed NMP, right) – where current levels of e.g. phosphate exceed targets governed by the Directive e.g. Habitats (0.06mg/l)
- The requirement for the NMP is to:
 - a. provide evidence for Habitats Regulations Assessment (HRA) – a **current HRA is also needed** for the Usk SAC given the last one was undertaken in 2008
 - b. provide the evidence to underpin a strategy to achieve the wider targets to reverse biodiversity decline and develop sustainable and resilient ecosystems in the face of climate change

Usk Nutrient Management Plan (proposed)	
Key Measures	Develop integrated soil, water and nutrient management plans for farms
	Delivery of AMP phosphate removal schemes and where appropriate use new technologies for P removal
	Sewer misconnections rectified
	Develop Nature Based Solutions that reduce nutrients whilst promoting ecosystem connectivity, adaptability, condition, extent and diversity
	Produce an implementation plan to meet P and N reduction targets for different rural land use
	Sustainable solutions identified for combined sewer systems, with further consideration for new developments
	Monitoring and research to identify other measures
	Identify key agri-environmental schemes and measures

Central Monmouthshire Landscape – Ecosystem Resilience

Local measures and priorities

- Develop a targeted monitoring programme to determine fine sediment and nutrient pollution loading on the Usk SAC. Source-apportionment, passive sampling and modelling to acquire the **evidence-base** needed for targeted local action that delivers landscape scale resilience.
- Develop **river restoration plans** and **Natural Flood Management Plans** across the landscape to develop an evidence base needed to restore our waters back to good ecological condition and to build resilience against future change including flood risk.
- Identify where we have rare priority habitat such as **floodplain meadows** in need of restoration and creation, as well as where we can develop potential sites to build connectivity and resilience. Need to build collaborative partnerships with landowners and partners including the Floodplain Meadows Partnership, Monmouthshire County Council and others.
- Develop a **collaborative diffuse pollution group** to tackle urban misconnections, surface water drainage, livestock and land management, slurry storage and private water discharge activities.
- Develop a **Central Monmouthshire Landscape Partnership** to deliver collaborative efforts to achieve healthy functioning and resilient ecosystems for community wellbeing.
- Develop and **Usk SAC nutrient & soil management plan** that supports sustainable food production and nature based solutions that promotes resilient ecological networks, green infrastructure, water retention measures and Natural flood management.



To maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change

Central Monmouthshire Landscape – Ecosystem Resilience

National measures and priorities

- Tackle un-sustainable **agricultural and rural land management** practice e.g. soil and nutrient/management, to reverse biodiversity decline whilst promoting productive capacity and ecosystem resilience (post-CAP).
- Develop national policy, legislation and strategy to tackle e.g. **waste water and urban drainage** e.g. misconnections, currently un-regulated water quality discharges, unsustainable sewer infrastructure (combined systems), fisheries risk, poor rural and land management practices.
- Tackle **habitat fragmentation and degradation** - produce a **restoration and natural flood management strategy** pan-wales to support ecologically connected catchment-scale restoration planning, providing the evidence-base and ability to achieve good ecological and chemical status and enhance ecosystem resilience with the ability to adapt to climate change.
- Develop an **INNS Framework** as part of a sustainable collaborative strategy for Wales.
- Consider **alternative national monitoring strategies** post-Brexit using current up to date technologies and innovation (e.g. eDNA, passive monitoring, real-time data acquisition), that is more open-source allowing for robust evidence, knowledge transfer and collaborative analysis/interpretation and targeted action – supporting the principles of SMNR.
- Produce a sustainable funding mechanism which will identify funding streams and opportunities for catchment/landscape-scale partnerships to deliver restoration and resilience on the ground.
- Develop a national ecosystem services evaluation strategy that can be assessed at the necessary spatial scales.
- Develop policy that delivers payments for ecosystem services to compensate farmers and landowners needed to enable the delivery of nature based solutions (e.g. NFM) on the ground.



To maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change

Evidence gaps

- Ecological and hydromorphological impacts resulting from agricultural fine sediment inputs (e.g. Trothy, Olway) remain Unknown.
- Further work required on the proportion of input from private sewage treatment systems in comparison to agriculture and water company STW.
- Cumulative impacts of private sewer discharges on ground/surface water quality.
- Understanding chronic and cumulative effects of unregulated discharges – how many are there?
- Emerging contaminant effects on water quality, ecology and ecosystem function (e.g. Usk and Wye microplastics)
- Accurate Livestock data (currently based on a point where registered farm is located i.e. not where they are.
- Nutrient management – currently don't know where it is Spread.
- Limited information on the *current* condition of enclosed farmland habitats, floodplains, grasslands and SAC features.
- River Usk is hydrologically connected beyond the Central Monmouthshire landscape i.e. source-to-sea and therefore evidence needs have to be considered beyond the landscape *to achieve restoration and ecosystem resilience.*

<https://cyfoethnaturiolcymru.sharepoint.com/en-gb/ourorganisation/Pages/SMNR-Data-Inventory.aspx> - The inventory is a collation of over 500 spatial and non-spatial datasets that have been identified as useful towards the sustainable management of natural resources – this database should act as the central open-source database that continues to evolve to support the spatial scales ranging from place to landscape and catchment to regional and national scales.

Recommendations

A detailed consistent character assessment has not been undertaken for the landscape profile process. It is therefore recommended a methodological framework is provided to support such assessments needed to evidence the extent, condition, diversity, connectivity and adaptability to inform where and how we need to build resilience. In doing so we can then produce a more robust landscape profile for Central Monmouthshire (and elsewhere) that will:

- establish a robust evidence base linked to place
- provide baseline evidence at the appropriate scale to inform a range of decisions from the local-to landscape-scale
- present a holistic approach to the whole geographic area, rather than focusing on special or protected sites or features
- Support a decision framework of landscape characters to which different policy options, applications and decisions can be applied
- integrate the socio-cultural and natural considerations e.g. landscape and ecosystem services
- Identify pressures and impacts affecting ecosystem resilience to support decisions in delivering effective resilient solutions at the appropriate spatial scales

The panel did not have the time or resource to develop detailed landscape characteristics and evidence. This lead to gaps in; population, health and wellbeing, recreation and access, material assets (waste, energy, WGWE, infrastructure), air, geodiversity, climate change impacts/mitigation/adaptation, water resources. It is therefore recommended the panels are provided with sufficient and consistent tools and resources needed - supporting the current significant under-representation of relevant technical specialists, local expert opinion and local knowledge needed to co-produce this Landscape Profile.

