

Highlights and Summary

Online Event
24 September 2021

Pam Whitham opened the event and welcomed attendees as Chair of AGI Cymru. The event was again online this year. AGI Cymru looks forward to welcoming our community in person next year. Pam thanked the sponsors who facilitate the **premier geospatial thought leadership and knowledge sharing event in Wales**.

The below summary is written from an attendee perspective to benefit those unable to join the approximately 50 attendees on the day.

Highlights

Green Recovery from the Pandemic

The existing policy framework in Wales is progressive and supports a green recovery. Organisations are responding:

- Technology has enabled our remote working world and we have seen to Active Travel modes.
- Spatial data infrastructures are at least as important as road infrastructures.
- DataMapWales is established as a “federated” collaboration-ready tool for public and private sectors.
- The value of data is leveraged using AI tools for integration and visualisation.
- Geospatial data will enable the green revolution through the next evolution of human-machine fusion – augmented reality.
- Modelling climate change impacts allows us to spatially plan crop locations and agricultural infrastructure.
- Spatial data are informing evidence-driven peat restoration and climate mitigation measures.
- The green recovery will be financed by growing spatial finance initiatives. Stakeholders are urged to allocate the green credit to benefit local people and businesses.

Panel Discussions

The speakers fielded questions during two panel discussions, highlighting:

- Wales needs a hub approach to holistic transport planning (John Cook)
- Geospatial companies need to be transparent about the environmental costs of the data lifecycle (Tom Timms)
- Wales is modelled to see similar rainfall in future but with more intense and localised rainfall (Gemma Bell and Sharolyn Parham)
- The Green Finance hubs will provide pathways into the financial sector with Leeds as the technology centre and London as the spatial finance centre (Matthew Kelly)
- There is strong collaboration and knowledge sharing on Active Travel between the DfT and Welsh Government (Pascal Coulon)

Sponsor Introductions

CGI – David Pegg

CGI are a major technology provider to the UK public sector. A current project is integrating ESRI into Microsoft at VOA.

1Spatial – David Eagle

1Spatial are now global system integrators. Their UK focus is on customers in government, utilities, transport and engineering. 1Spatial and Ordnance Survey formed a strategic partnership this year to deliver innovative solutions for utilities, such as an ambitious National Energy Systems Map.

Ordnance Survey – James Wardroper

Ordnance Survey serves the public sector in Wales with data, services and support through the Public Sector Geospatial Agreement. Data APIs and downloads are available via the OS Data Hub.

Geomni – Tom Timms

Geomni provides market-leading products with UKBuildings – a national database of building characteristics, and UKLand – a national database of land-use. Geomni was established in 1998 in Cambridge as the GeoInformation Group and acquired by Verisk in 2016.

Environment Systems – Gemma Bell

Environment Systems are a specialist technical environmental consultancy based in Wales. They focus on the environmental and agricultural sectors with customers around the world. Environment Systems use earth observation, modelling and analytics to deliver business intelligence and environmental monitoring for customers.

On a personal note, I was fortunate to contribute through my master's dissertation to the Environment Systems work on quantifying habitats in Anguilla using earth observation.

ESRI UK – Charlotte Leigh

ESRI was founded as a non-profit and currently directs one-third of revenue into development. Their ArcGIS tool and suite of managed cloud services are widely used in industry. ESRI have a broad UK customer base including 137 universities, local and central government.

Informed Solutions

Informed Solutions are a digital and technology solutions provider to public and private sectors with a global customer base and UK offices in England and Scotland.

David Eagle (1Spatial)

Data Integration – Doing more with less and emerging from a pandemic

Good use of data to improve the recovery will be a positive outcome from the pandemic. We need positive change because the cost of the government pandemic spending was estimated at £370 billion in September 2021.

Green Recovery: a proposed package of environmental, regulatory and fiscal reforms with broad support from many sectors.

Progressive Welsh Policy

Welsh Government recently published updated Active Travel Act Guidance (2021), building on the Active Travel (Wales) Act 2013. The focus is on walking and cycling, putting these highway users first. We see similar changes in the Highway Code. The Well-being of Future Generations (Wales) Act 2015 is also supporting embedding sustainable futures into planning.

Agile Working

Changes: A more connected workplace reduces commuting. David gave a personal example of very long travel for a short meeting we would now do virtually. We have a blended day with working around family. How does the value of a new road scheme now compare to rural broadband rollout?

Enablers: Cloud services, VOIP and video conferencing, virtual machines, VPNs, APIs and web services. Online web mapping services became essential as users could no longer access their desktop machines. Greater access levelled the playing field, e.g., training, travel, hotel costs.

Transport Modal Switch

Changes: People were forced out of cars and into local journeys. A new generation of online shoppers replaces physical "high street" shoppers. "Last-mile" solutions boomed – scooters, bike rental.

Enablers: Real time data for fleet management, rental schemes, shopping stock, routing, delivery, big data analysis.

Visible Communities – caring for the vulnerable

Changes: Care home crisis. Shielding raised awareness of the vulnerable.

Enablers: Open data publication, data sharing agreements, data accessible via APIs and web services, unique identifiers like UPRN.

Case Study: Barnsley Council are using UPRN to better understand their citizens. They are moving from a deprivation index to a vulnerability index to proactively respond to risk before citizens ask for help. The trial has already helped hundreds of families.

Conclusions

- Informed solutions must be underpinned by data.
- Spatial data infrastructures are at least as important as road infrastructure.

John Cook (Welsh Government)

Electric Vehicle Charging and DataMapWales – tackling range anxiety through geospatial data

New sales of combustion engines are set to be banned by 2030. The electric vehicle (EV) charging network is like a digital infrastructure network. Here John undertook to map charging stations to help overcome the key adoption barrier of range anxiety.

Barriers to Adoption: lack of chargers and range anxiety. The cost of EVs.

Mapping the Charging Infrastructure

John used DataMapWales as the tool to load, visualise and analyse various datasets:

- Road and Transport networks.
- Energy networks and infrastructure; Wind Turbines.
- Current and planned EV charging stations; drive distance by time (isochrones).
- Administrative Boundaries.
- Population statistics – census data, DVLA licencing, deprivation indices.
- Future land use for charging infrastructure – government owned land, tourism, private sector.

The project in [DataMapWales](#) allows a Welsh overview and more detailed site-specific analyses. The tool is collaboration ready for public and private sector.

Results: Much of rural Wales is only accessible by vehicle. John cites a failure to think holistically with transport network planning and how we live our lives.

Tom Timms (Geomni)

The challenges of delivering more than just data for the Green Recovery

Data is important - four of the government DCMS's recent [Ten Tech Priorities](#) relate to data:

- Rolling out world-class digital infrastructure nationwide.
- Unlocking the power of data.
- Unleashing the transformational power of tech and AI.
- Using digital innovation to reach Net Zero.

There is lots of data - sensors, phones, internet of things, imagery, satellite, smart energy meters.

- We have no public dataset of public rights of way, yet commercial companies like Strava collect our movement data.

Data is widely available – over 50,000 datasets on data.gov.

Data Tools - A.I. is tagging all our data.

- Volumes of data now available allow training for machine learning
- Modelling work by Verisk Maplecroft showed varying predicted temperature changes by 2050 for northern hemisphere cities. Some cities are dramatically affected, others less so.

Challenges

Many challenges - Data volumes, data quality, knowledge and understanding of data, integration of different data sources, skills and tools, data visualisation.

Examples

- Pavement width – novel use of existing data. Collaboration with 1Spatial allowed calculation of minimum pavement widths across London to inform pedestrian flow potential during social distancing.
- Land use – data integration and standardised outputs are challenging due to different data source standards and quality.
- Fire risk – models trained on data from one geographic region cannot always be applied to another region due to, in this example, differences in building design.
- Data integration and visualisation – Tom recommended [Our World in Data](#) as a tool to visualise global scale change with supporting methodologies and sources.

Gemma Bell (Environment Systems)

Assessing Land Capability and Suitability under Climate Change Scenarios to assist a Green Recovery

Environment Systems have modelled a changing climate on crop suitability. Can agriculture adapt to significant climate change expected over the next 30 years and 60 years? They evaluated environmental changes under three climate scenarios and modelled the impact on 118 different crops.

Data and Methods

Agricultural Land Classification. These data classify land into grades suitable for agriculture, based on soil characteristics, such as climate, wetness, drought, depth, slope, stoniness and rock. The highest grades of 1, 2 and 3a are the “best and most versatile land”.

Crop data – Potato example. Characterising the crop’s individual biophysical characteristics and tolerance allows modelling. Any one unsuitable factor makes the overall crop viability unsuitable. The model was validated against existing crop locations as well as with expert workshops.

Results

Agricultural Land Classification: Soil quality degrades over time. Increased soil drought is a key factor driving the degradation. Frost event duration and intensity are modelled to decrease over time.

Potato: While much of Wales is currently suitable for potato, large areas of land become unsuitable by 2080 under the medium climate scenario. They model a range contraction in potato suitability, primarily constrained by soil drought. This is despite the climate factor modelled to become more suitable for potato.

Blanket Bog: The area of overall suitability for blanket bog becomes less suitable. The key constraint is a modelled decrease in average annual rainfall.

Conclusions

- Climate change will have a major impact on UK agriculture and forestry.
- Where are we going to grow our crops? The location and extent of the best and most versatile land is changing.
- Suitable agricultural land contracts over time and will face competition from other land uses, such as urban growth and protected areas, particularly along upland margins.
- Studies can inform the location of crop supporting infrastructure such as sawmills and factories.

Pascal Coulon (CGI)

Fusing GI and IT to support the green recovery

Data analytics is the “geospatial 2.0”. Dashboards allowed understanding of many complex data sources during the pandemic.

Technology Democratisation. We can now access data anywhere. Data must be real time and move beyond GIS and mapping data. Advanced visualisation is needed to communicate complex and critical data.

Technology Opportunities - Pandemics drive Adoption

- 1918 influenza pandemic = cars
- 2020 coronavirus pandemic = remote working and more!

Mobile mapping, augmented reality, indoor mapping, UAV scanning and robotics are in demand.

Data sharing unlocks these opportunities.

Collaboration through federation

- We must stop replicating data and start sharing through true data federation.

- The [Johns Hopkins map](#) became famous during the pandemic and is an example of this data collaboration.

Indoor Mapping

- How can we improve crowd movements and decrease crowded environments both indoors and in traffic?
- Real-time transit guidance can guide people and vehicles in transit.

Augmented Reality

- We moved from input via mouse and keyboard > smart screens > spoken > intuitive interactions where devices respond to cues.
- Thus, mobile is moving to wearable. Augmented reality will next accelerate the fusion of people and their devices and give people an understanding of place.
- Geospatial is key to this platform that will drive the green recovery.

DataMapWales and Active Travel

- England have announced funding of £338 million for their Active Travel, incorporating prioritisation of walking and cycling into the Highway Code, cycle lane infrastructure and walking schemes.
- 2020 saw “cycling rise more than in the previous 20 years put together, with the number of miles cycled on British roads rocketing by 45.7% to 5 billion”. ([gov.uk](#))
- [DataMapWales](#) is already a single federated data source driving Active Travel adoption across the 22 Welsh Local Authorities. Data are always up to date and ready for analysis.

Matthew Kelly (Welsh Government)

Spatial Finance – Geo-Fintech and Green Finance

Matthew is a social researcher undertaking his PhD at Swansea University.
The green recovery requires financial flows:

- £1,400 billion estimated over the next 30 years to deliver UK Net Zero.
- \$5,000 billion needed worldwide each year from 2030 onwards.
- £100 billion promised for the COP26 climate fund – looks rather small.

UK Green Finance

Green Finance has developed since the 2016 Paris Climate Agreement into a UK Government Green Finance Strategy (2019) to facilitate an “orderly” low-carbon transition.

The idea behind the Task Force on Climate-Related Financial Disclosures (TCFD) is to provide increased information disclosure to allow markets to allocate capital for the transition (assuming the efficient markets hypothesis).

Regulatory change is driven by government, the Bank of England, the City of London, the regulators and the markets:

- **Monetary and prudential policy:** the Bank of England sets macro-economic policy through interest rates, quantitative easing and liquidity requirements.
- **Disclosure and information policy:** bodies like the Financial Conduct Authority set reporting requirements, public information disclosures and research and innovation agendas.

Spatial Finance

Spatial Finance is driven by the fintech industry and aims to provide insights relevant to “environmental, social and governance” (ESG). The novelty is that accounting and forecasting valuations and screening processes are now informed by data platforms with spatially linked asset and observational data.

New stakeholders are bringing geospatial data and data platforms: WWF, ratings agencies, earth observation firms, consultancies, civil society, government, exchanges.

Trends: Vertical integration, commercialisation, open data, increased regulatory interest.

Considerations

Consultancies

- Which spatial finance model are you best placed to serve?
- Make links with the Spatial Finance Initiative.
- Engagement: engage with specific sector conferences; alternative data teams, include finance teams in existing government and corporate projects.
- Business model: resell the value of a platform – revenue making versus asset making.

Practitioners

- Raise awareness of Green Loans and Green Bonds.
- Ensure your finance team are aware of your data governance, strategies and metrics. Align your data with compliance frameworks for capital and insurance.
- Wider facilitation to help others through participatory GIS and community platforms.

Government

- Knowledge transfer and development of DataMapWales for policy teams, treasury and banking, finance and accounting teams.
- Develop strategies for asset data and information disclosure. Which sectors to expose to market forces? Consider privacy requirements along with data linking and reporting.
- Fund research and innovation to help companies in Wales with new markets.

Conclusions

- Financial institutions are playing a greater role in funding land economies and spatial data infrastructures.
- Government and NGO data assets are opening for commercialisation.
- Ration the “green” credit to allocate correctly to local individuals, SMEs and landowners.

Sharolyn Parnham (National Trust)

Green recovery at the National Trust, playing our part

The National Trust is Europe’s largest conservation charity managing 250,000 hectares of land, 780 miles of coastline, 500 houses, parks and gardens and 1 million works of art. By 2030, the National Trust will plant 20 million trees and be carbon net-zero across their supply chain.

The GIS team uses ESRI tools and has developed several bespoke data browsers.

Habitat Actions Database

This was built using Tableau on their GIS data and tracks habitat improvement across key metrics, such as better, bigger/more, high nature status and minimum standard.

Migneint Peatland Restoration

This partnership with the local community, landowners and NRW is, since 2007, restoring an internationally important blanket bog in the Conwy River catchment. Over 40,000 dams have been created and all spatial data were captured the field.

Healthy bogs provide ecosystem services including:

- Filtering and improvement of water quality
- Mitigating downstream flooding
- Improved habitat and biodiversity
- Carbon sequestration (sink)

Climate Hazards Map

This [tool](#) allows planning for the worst and was released in 2021 based on previous work by BGS, Met Office and Heritage Scotland. The tool provides baseline 2020 data and predicted 2060 data for several hazards:

- Overheating and humidity
- Storm damage
- Slope failure
- Soil heave

Wales, the SW and NW of England have high risk of storm damage. The National Trust expects to work with NRW on flooding in Wales.

A National Trust property in Snowdonia was reinforced using traditional methods for weather protection based on predicted increases in storm damage.

Futures

- Funding from Welsh Government will be used for further catchment restoration (Tir Afon).
- The Green Recovery Challenge Fund has received two successful bids – restoration of historic landscapes and of ancient woodland.
- The GIS team are moving to the cloud – ArcGIS online.

Pam Whitham (AGI Cymru Chair) Close and Summary

Pam highlighted the key themes of the conference:

- Quality of data underpins all the talks.
- DataMapWales is key collaboration tool across Wales.

Pam thanked the sponsors and the AGI Cymru team. Pam also extended thanks to the AGI volunteers from Council, Executive Team and AGI Admin support.

Attendees were encouraged to:

- get involved and [join the AGI](#)
- join the Wales Green Infrastructure Forum ([presentation](#)) ([info and email list](#))
- attend the AGI flagship event [GeoCom21](#) – Responsible Resilient Recovery (30 November & 1 December)