



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

Sustainable Construction Aggregates for Northern Ireland

Andrew Bloodworth



www.mineralsUK.com

MineralsUK
Centre for sustainable mineral development



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

MineralsUK

Centre for sustainable mineral development

- A global leader in the compilation, provision and analysis of mineral statistics
- The major UK national provider of spatial and statistical minerals information.
- Carries out research in areas such as metallogenesis, land-use impacts of mineral extraction, resource security and geomaterials.
- www.mineralsUK.com



Minerals and society

- Minerals are essential for development of the economy and for maintaining our lifestyle

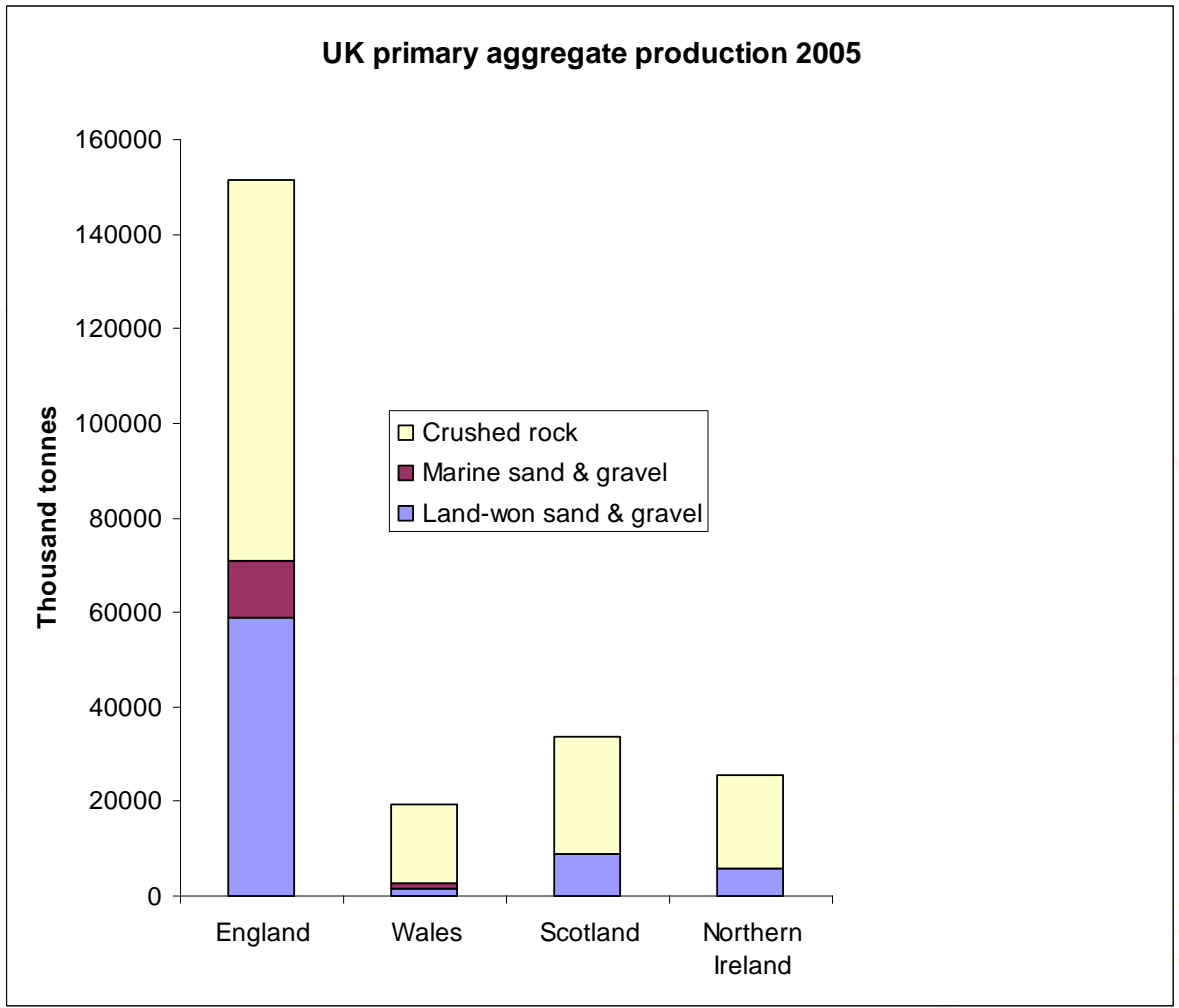
but...

- Extraction, processing and transport creates significant environmental and social impact;
- mineral operations can be very contentious;
- issues related to minerals often divisive and politically sensitive;
- debate is often ill-informed.



Primary aggregates: N Ireland in a UK context

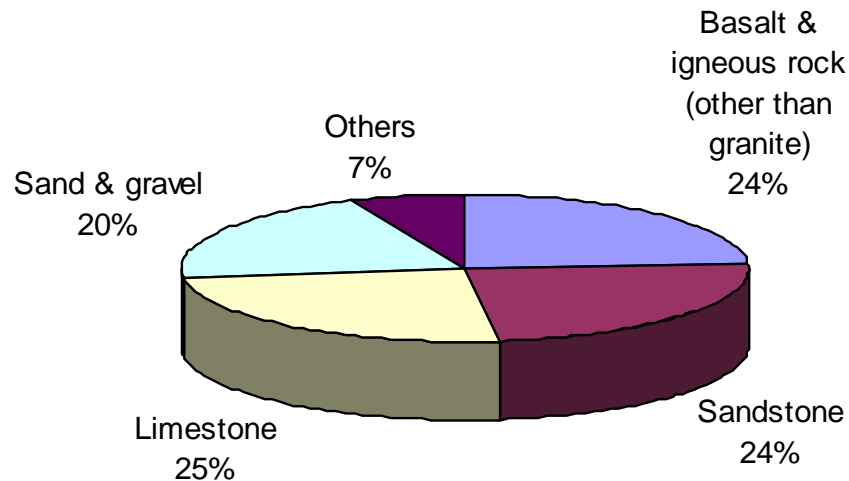
- Total UK production of primary aggregate (crushed rock and sand & gravel) was about 230 million tonnes in 2005
- Northern Ireland produced about 11% of that total





N Ireland: primary aggregate production by rock type (total production 25.5 mt)

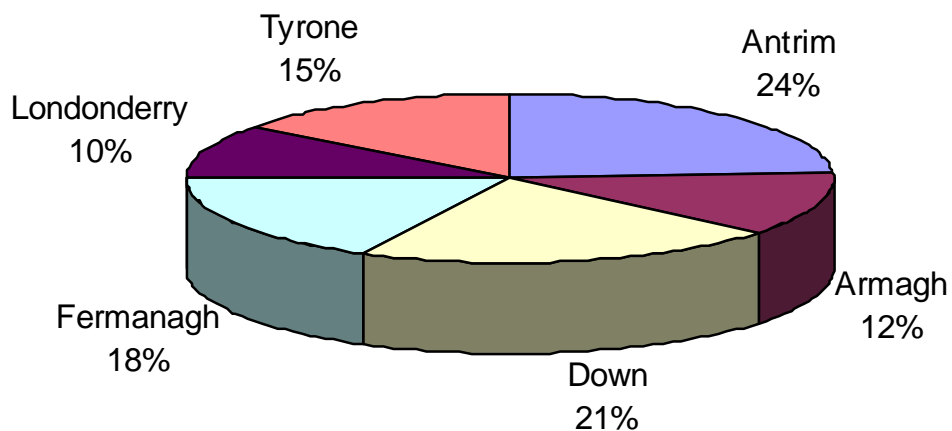
NI primary aggregate production by rock type 2006





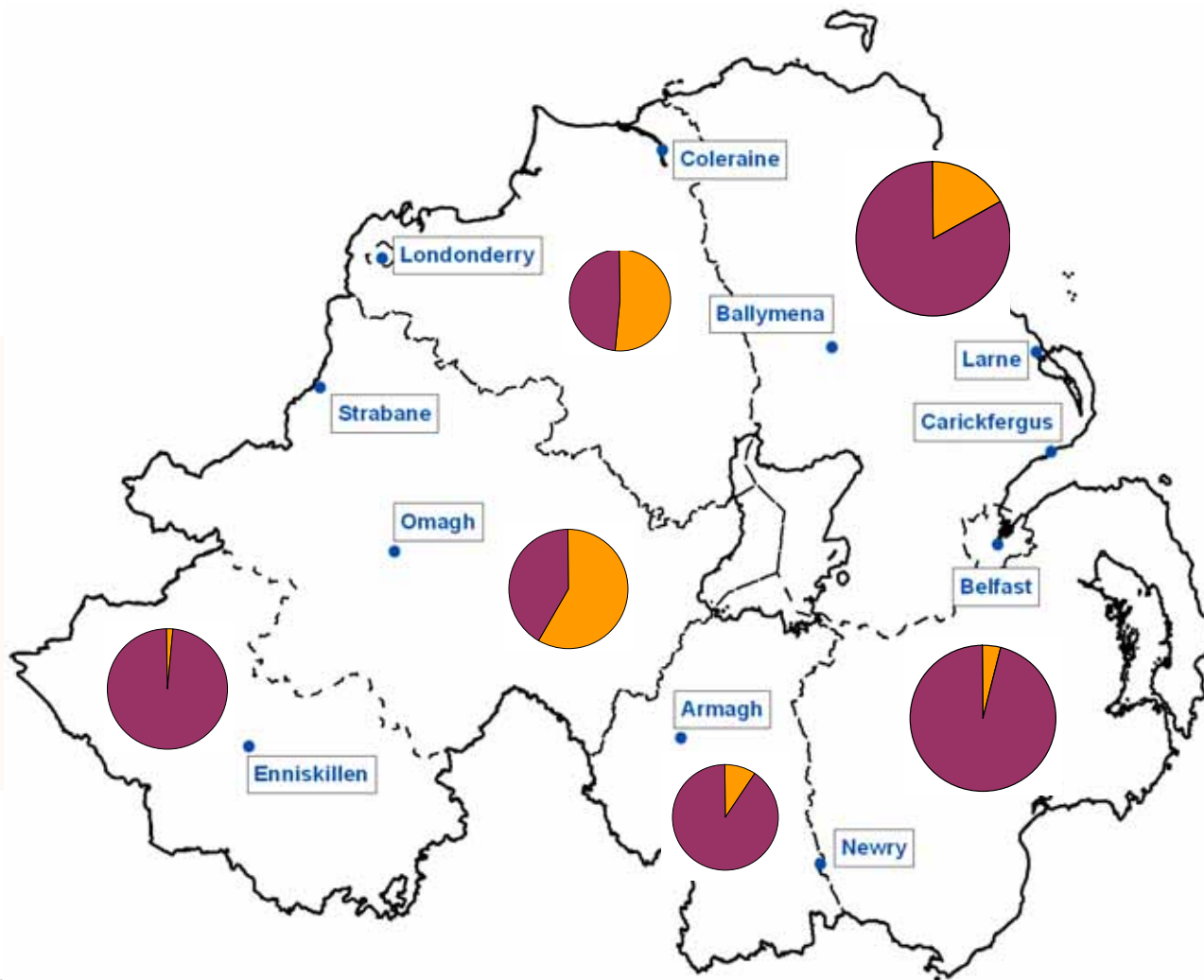
Aggregate production by area

NI primary aggregate production 2006





Aggregate production by area/ type





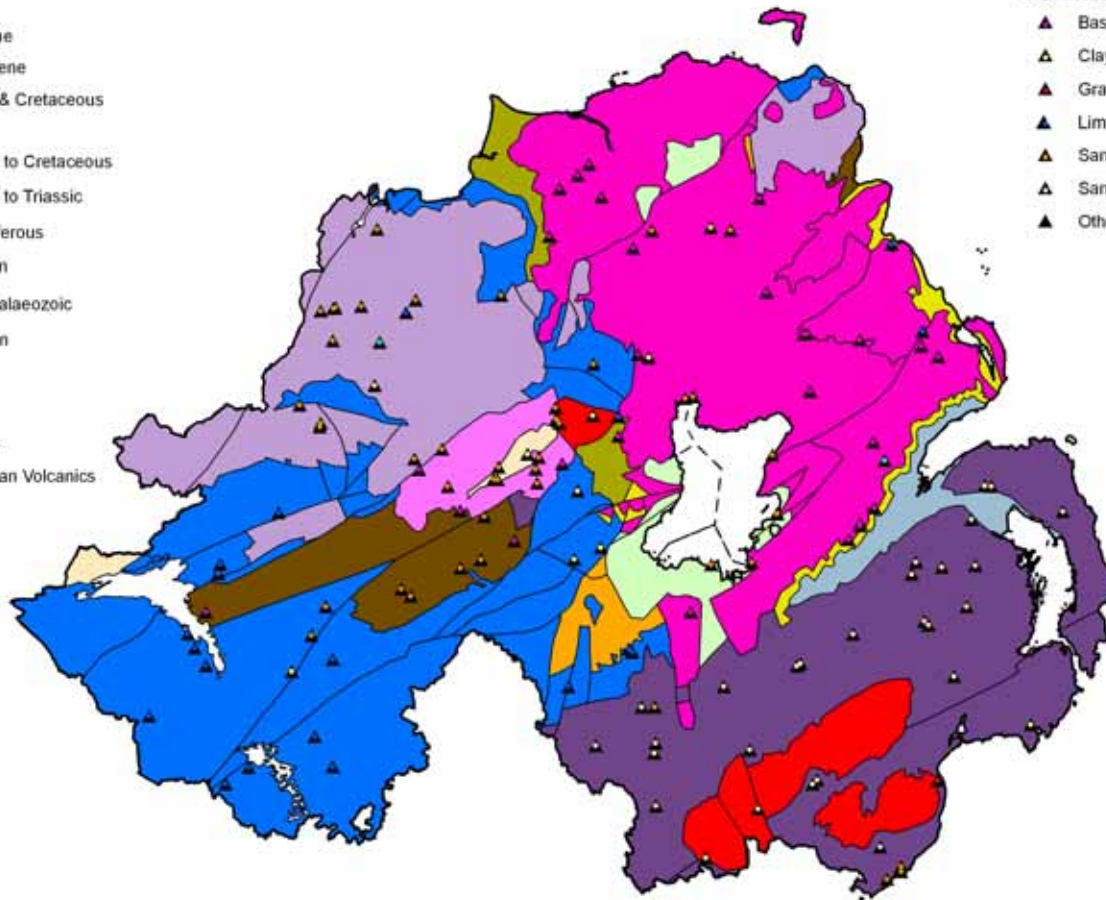
Aggregate quarries in N Ireland

Geology

- Oligocene
- Palaeocene
- Triassic & Cretaceous
- Triassic
- Permian to Cretaceous
- Permian to Triassic
- Carboniferous
- Devonian
- Lower Palaeozoic
- Dalradian
- Moinian
- Granites
- Ordovician Volcanics

Commodity

- Basalt and Igneous rocks
- Clay and Shale
- Granite
- Limestone
- Sand and Gravel
- Sandstone
- Other





Local stone for local use



- Typical pattern of supply in N Ireland is that stone is used within 25 km of the quarry
- Added-value products (such as concrete blocks) may travel further





Economic impact

- 160 quarries produce £300 million of products pa
- Underpins a construction sector worth about 12% of NI GDP
- The quarry products industry employ 5600 people in N Ireland
- Relatively high quality employment, mostly in rural areas – direct + indirect and induced in local economy





Aggregate 'exports'



- Some Lower Palaeozoic sandstones are premium quality road-surfacing materials (skid-resistant high PSV)
- N Ireland has become an important exporter of high PSV stone to England



Sustainable development?

UK objectives for sustainable development:

- Social progress which recognises the needs of everyone;
- Effective protection of the environment;
- Prudent use of natural resources; and
- Maintenance of high and stable levels of economic growth and employment.



Sustainable development?



- Our economy is minerals based
- Minerals can only be worked where they occur
- Good quality information on the spatial extent and quality of mineral resources critical in sustainable development
- Spatial information allows system to:
 - Identify extraction areas/ sites with least negative environmental impact
 - Safeguard resources for future generations by preventing unnecessary sterilisation



Towards a better planning system

A PLANNING STRATEGY FOR RURAL NORTHERN IRELAND

MINERALS

Minerals

- [Policy Min1](#) ENVIRONMENTAL PROTECTION
- [Policy Min2](#) VISUAL IMPLICATIONS
- [Policy Min3](#) AREAS OF CONSTRAINT
- [Policy Min4](#) VALUABLE MINERALS
- [Policy Min5](#) MINERAL RESERVES
- [Policy Min6](#) SAFETY AND AMENITY
- [Policy Min7](#) TRAFFIC
- [Policy Min8](#) RESTORATION

In planning legislation the definition of minerals includes 'all minerals and substances in or under land of a kind ordinarily worked for removal by underground or surface working except that it does not include turf cut for purposes other than sale'.

Minerals are an important natural resource and their exploitation makes an essential contribution to the nation's prosperity and quality of life. The mineral extraction industry provides employment often in rural areas and produces a wide range of products for a variety of purposes in construction, agriculture and industry.

In Northern Ireland the primary minerals are sand and gravel and crushed rock used mainly as aggregate in construction. In the foreseeable future, supplies of primary minerals are likely to come from traditional sources. Transport costs will continue to require workings to be in relatively close proximity to markets.

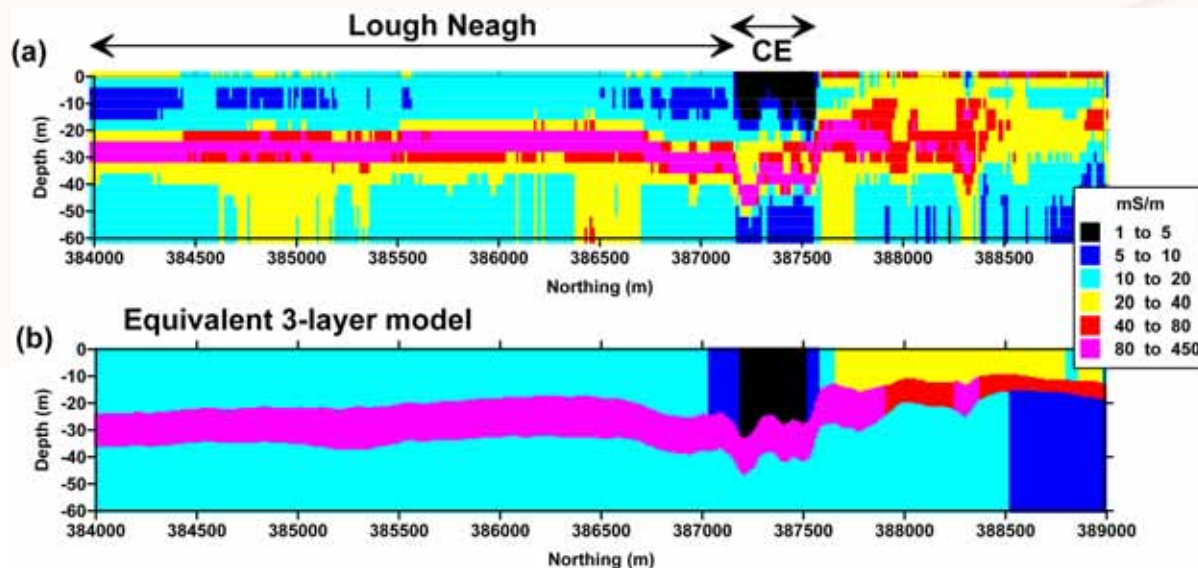
Exploration continues to take place for valuable minerals. However it should not be presumed that successful future exploration will guarantee planning permission to exploit any proven reserves since the environmental effects of specific proposals must first be considered.

- An **efficient** planning system is vital sustainable development (ie the economy and protection of the environment)
- The planning system has to **balance** the many different **pressures** on the use of land and between conservation and development
- Access to and interpretation of high **quality data and information** allows more informed debate and should lead to **balanced** judgements



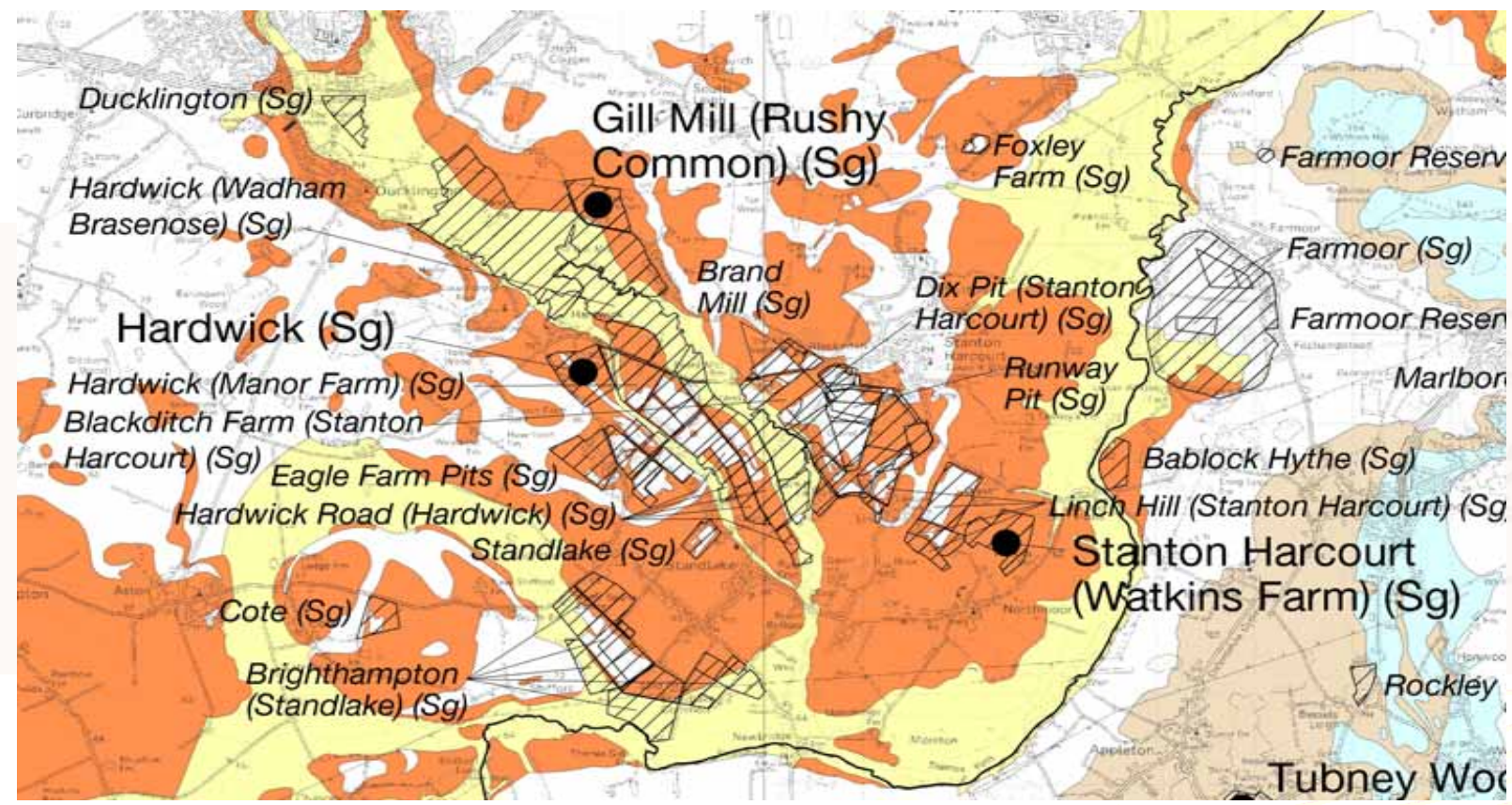
TELLUS: Better understanding of NI aggregate resources

- Conventional geological mapping forms a good basis for definition of exposed aggregate resources
- TELLUS EM data can potentially be used for rapid reconnaissance of concealed sand and gravel bodies within glacial deposits in the east of the province, although this will require investment in geological control and processing.





Mineral resource information in support of National, Regional and Local Planning





Environmental impact

- Aggregate extraction, processing and transport has impacts (-ve and +ve) on the environment.
- Baseline information is required in order to make assumptions on the significance of these impacts
- -ve impacts will require the design and implementation of mitigation strategies
- Monitoring against baseline measures success of mitigation





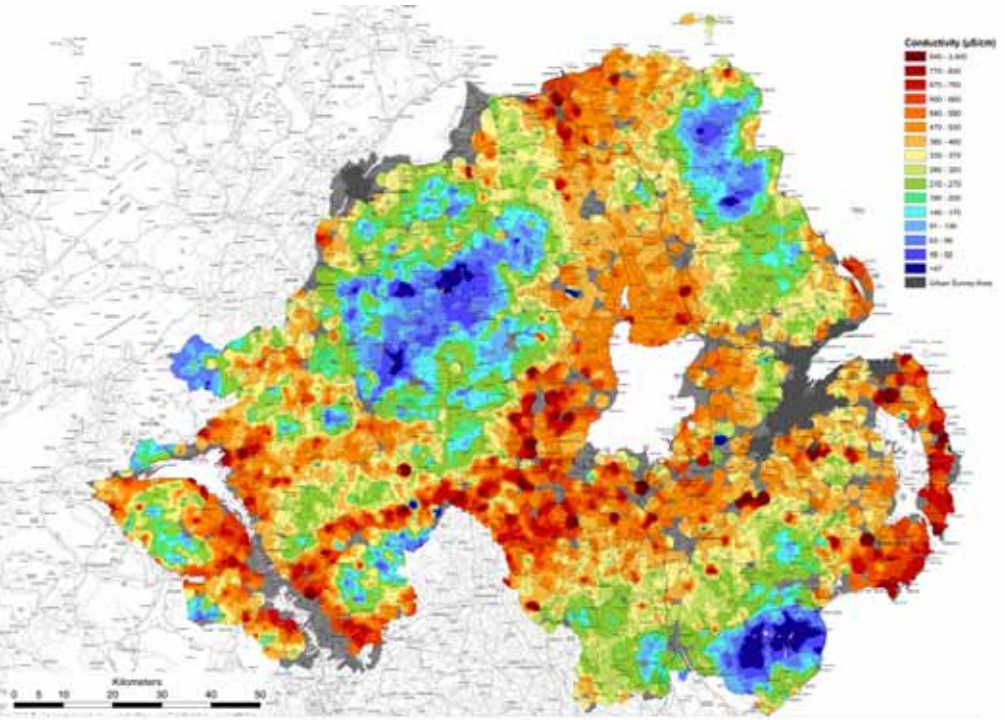
Environmental impact

- TELLUS geochemistry data provides a comprehensive and consistent baseline for some aspects of impact assessment for active and proposed quarry operations
- Relevant areas might include water chemistry & suspended solids, dust, soil conservation/management and ecology

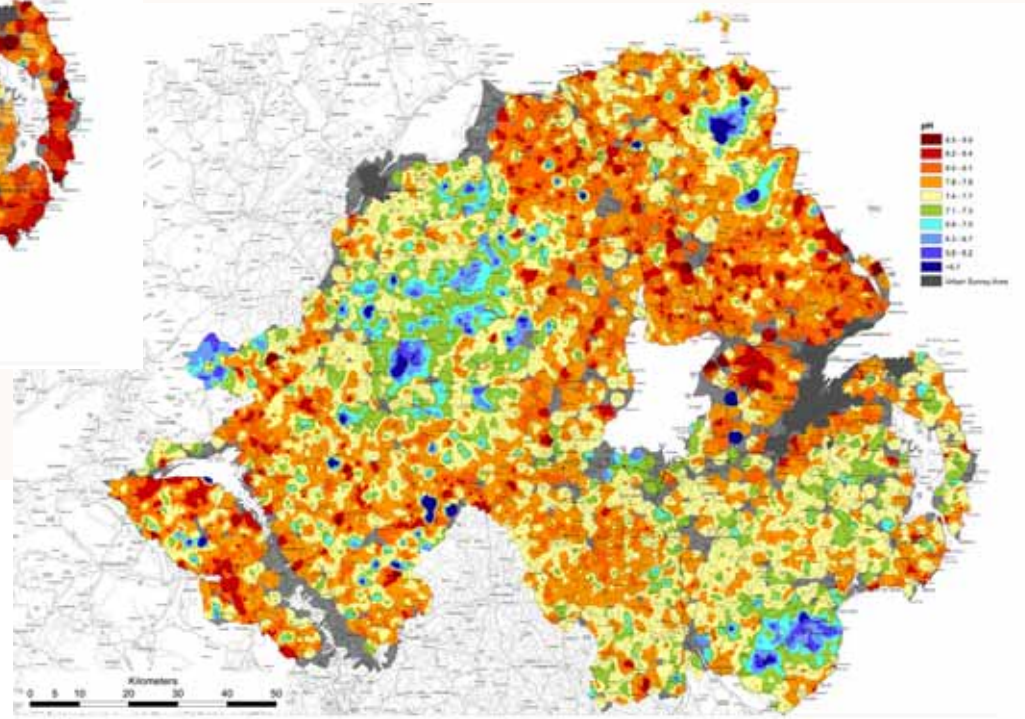




Stream water conductivity/ pH



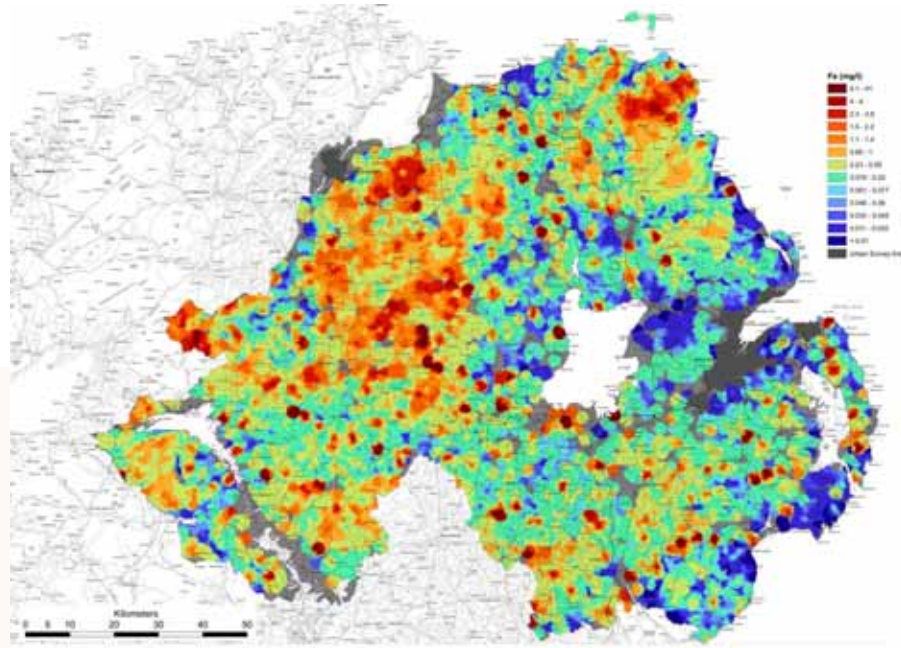
Conductivity



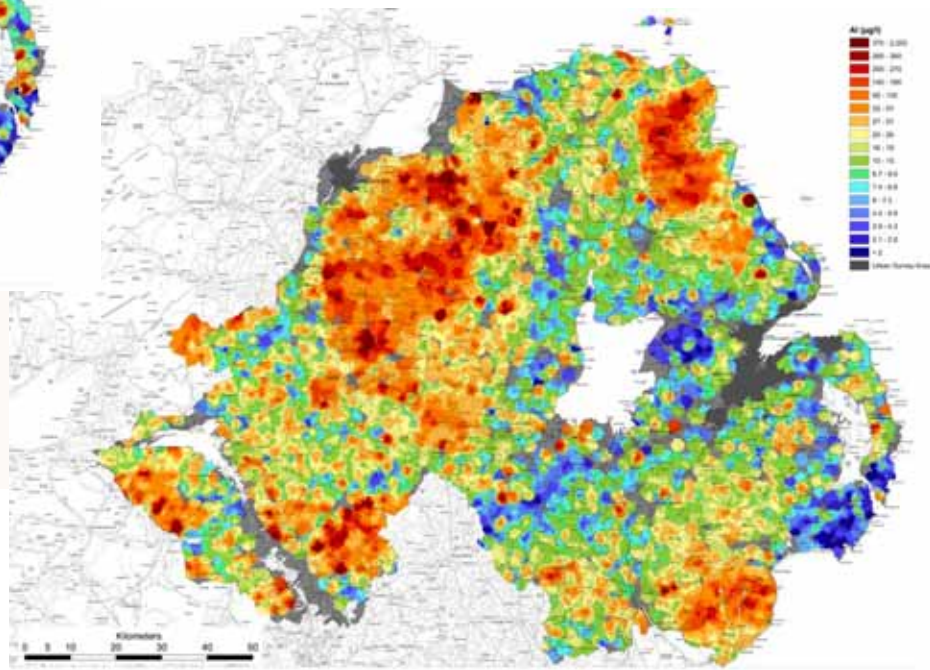
pH



Total dissolved iron/ aluminium in stream water



Fe



Al



Conclusions

Aggregates are a non-renewable resource but...

- Our economy is minerals based – ‘if you can’t grow it, you have to mine it’
- the economic and social pillars of sustainable development would collapse without aggregates
- Aggregate resources in N Ireland are relatively abundant but unevenly distributed
- If anything, it is the renewables (air/ climate, water, soil, biodiversity) that are in crisis now
- Along with effective regulation, resource maximisation, recycling, careful site management and restoration, TELLUS data can assist in mitigating the impact of extraction of non-renewables on fragile renewable resources



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



www.bgs.ac.uk

Questions?

MineralsUK

Centre for sustainable mineral development

www.mineralsUK.com