Galloway and Southern Ayrshire Biosphere Socio-Economic Baseline Study

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EXECUTIVE SUMMARY

The purpose of the study is to generate a clear picture of the demography of the GSA Biosphere and its associated economic activity. This will provide an evidence base for future work in the area. It was undertaken by the Crichton Institute in collaboration with academics from the University of Glasgow's School of Interdisciplinary Studies.

The primary research method was analysis of existing data and this was complemented with qualitative interviews in four discrete geographical areas. Several interrelated issues emerged through the research.

Few opportunities for quality employment

A key finding is that while employment opportunities are available across much of the GSA Biosphere, these are often poorly paid and of poor quality, with few opportunities for graduate level employment. The large numbers of businesses in resource-based industries (agriculture, forestry and fishing) do not translate into plentiful job opportunities in these sectors. Relatively large numbers of people across the GSA Biosphere are self-employed and very high proportion of businesses have nine or fewer members of staff. There are also regional differences with higher rates of unemployment in the north of the GSA Biosphere.

Transport issues and access to services

The average travel times to key services are higher than for across Scotland - both by public transport and car. Interviewees reported this as one of the key challenges of living in the area and noted that in many areas public transport become less frequent. In villages and towns where public services have closed alongside this deterioration of public transport, the problem is particularly acute. Lack of transport options makes accessing employment more difficult in the GSA Biosphere, especially for those who are dependent on public transport.

High potential for tourism development across the GSA Biosphere

Aside from a handful of popular attractions, tourism is not a major part of the local economy in the GSA Biosphere, particularly when compared with areas in the Highlands and Islands. However, there is great potential, with a consensus among interviewees that the area is scenic and offers a wide range of outdoor activities. Any potential developments must be balanced with maintaining tranquillity and should not damage the natural assets being promoted – that is, they should be authentic ecotourism. Coordination of online tourism promotion with other local and national organisations has been shown to raise the tourism potential of other Biospheres. Working with local communities to develop ecotourism potential also is a way of ensuring developments are genuinely sustainable.

Greater visibility of the GSA Biosphere

Few people are aware of the GSA Biosphere and it does not feature heavily in the local policy literature. Poor visibility is an issue the GSA Biosphere shares with other UK Biospheres and continues to hold them back from their potential for promoting sustainable development.

The quantitative data also highlighted some important findings that are not necessarily apparent at a local level. The age profile is skewed towards older people, a pattern that the policy literature suggests will increase over time. It also showed an education gap in the GSA Biosphere with fewer people with high levels of educational attainment. However, the achievements of school leavers in the area are close to the national average and young people generally go on to positive post-school destinations. Health across the GSA Biosphere is slightly worse by some measures than national figures but this may be an effect of the age distribution. There is some evidence of inward migration (from England) although the data movement in and out of the GSA Biosphere is limited.

Meanwhile interviewees across the case study areas suggested that aside from its scenic qualities, the greatest asset of the GSA Biosphere was the 'sense of community' across the areas towns, villages and hamlets. Communities are generally close-knit and individuals report a wide range of positive attributes, such as low pollution levels, lots of activities for children and new community facilities opening.

Areas for further research include: cross-disciplinary research on land-based sectors and how these could be developed sustainably; primary data collection on the existing tourism sector and the development potential for sustainable tourism; and the impacts and beneficiaries of windfarms within the GSA Biosphere.

INTRODUCTION

This study was undertaken by the Crichton Institute in collaboration with academics from the University of Glasgow's School of Interdisciplinary Studies. In doing so it draws on the research capacity and methodological expertise of both institutions to provide a socio-economic baseline for, and independent insights into, the Galloway and Southern Ayrshire Biosphere.

Regular monitoring of both ecological and human activity is a condition of Biosphere designation and as part of its agreement with UNESCO each Biosphere is required to conduct a socio-economic study every 10 years. This, the first such study of the Galloway and Southern Ayrshire (GSA) Biosphere, establishes its baseline. It brings together a range of quantitative and qualitative data to provide an evidence base of who lives in the GSA Biosphere, and its social and economic activity. It will be used to understand the social and economic challenges of the area, identify opportunities and provide a base for future work. Methods and data have been chosen that will allow for replication in a decade.

The Crichton Institute purposely exploits the synergies between research, business engagement and knowledge exchange in order to support the economic, social and cultural aspirations and regeneration of the South of Scotland and to have a transformational influence. Its work has regional, national and international applicability.

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LITERATURE REVIEW

What is a UNESCO Biosphere?

Biospheres, sometimes referred to as Biosphere Reserves, are UNESCO-designated areas comprising terrestrial, marine and coastal ecosystems. Each is established to demonstrate sustainable development, with protection for biological diversity promoted alongside social and economic development. Following reforms to the scheme in the 1980s and 1990s, the main overlapping functions of so-called 'new style' Biospheres are conservation, development and logistic support (UNESCO, 2013; UNESCO, 1995) with each one developing a program of work under these broad headings that is relevant to its local context. They can act as a catalyst for regional development with one study finding that four UK Biospheres 'generated an estimated £1.8 million from April 2014 to March 2015 through their association with UNESCO' (UK National Commission for UNESCO, 2015, p. 22).

There are currently 669 Biospheres across 120 countries (UNESCO, 2017) including six in the UK (The United Kingdom National Commission for UNESCO, 2017). Being part of a broader network allows for sharing of information and ideas between international partners who are working towards the same aims (ibid. p. 16).

A distinctive feature of Biospheres is the categorisation of territory into three complementary zones (UNESCO, 2015). Every Biosphere Reserve must include the following:

- Core area: a strictly protected ecosystem that contributes to the conservation of landscapes, ecosystems, species and genetic variation.
- Buffer zone: surrounding or adjoining the core areas this is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.
- Transition area: the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socially, culturally and ecologically sustainable (UNESCO, 2015)

For UK Biospheres, achieving designation status brings no additional planning or land use regulations (Andrian and Tufano, 2015). Instead, they utilise existing protections: each Biosphere includes a 'legally constituted core area or areas devoted to long term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives' (UNESCO, 2013, p.5). In practice, this means that to become a Biosphere, the proposed core area(s) must already be designated as a Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), National Park, or have a similar form of protection in place. This protected, core area of any Biosphere is usually relatively compact, on average making up just 11% of the total area however, the scheme does not stipulate specific sizes or ratios (Ishwaran, Persic and Hoang Tri, 2008, p. 124).

Background

UNESCO's Man and Biosphere (MAB) Programme was launched in 1971 and in this early incarnation was focussed primarily on conservation, scientific research and monitoring. While Biospheres had a development role, this was very much secondary and never clearly defined (Andrian and Tufano, 2015,

p. 107). The territory covered by these so-called 'conventional' Biospheres tended to be much smaller than the later 'new style' Biospheres and contained few, if any, human inhabitants. This meant that economic and social development were less of a consideration (ibid.).

In 1984, the Action Plan for Biosphere Reserves published by UNESCO marked a significant shift for the scheme. This document introduced the three complementary zones described previously and recommended a stronger role in sustainable development - changes which later became formalised in the 1995 Seville Strategy for Biosphere Reserves (Schultz et al., 2011; UNESCO, 1995). Any applications to UNESCO to designate an area a Biosphere made after 1995 had to conform to this new, wider remit. Meanwhile all existing Biospheres had the choice to either re-apply under the conditions of the new scheme or revoke their status. Many of those re-applying greatly expanded in size as the boundary of the 'conventional' Biosphere often became the boundary for just the core area under the 'new style' scheme (Andrian and Tufano, 2015, p. 113).

This shift paralleled broader changes in environmental thinking over this period. The key concepts for understanding human environmental impact, particularly of tourism, changed from 'carrying capacity' to 'sustainable development' (Saarinen, 2006). While the differences between these can be overstated, carrying capacity is an ecological concept focussing on how many people (or other types of impact) an area can support before an unacceptable level of environmental degradation takes place, whereas sustainability 'rests on three integrated elements: the ecological, socio- cultural, and economic' (ibid. p. 1123). The research functions of Biospheres also expanded over this time, moving from a strictly natural science approach to including more cross-disciplinary research (Habibah et al., 2013).

Factors Relating to Success in Biospheres

Effective stakeholder participation is often held up as one of the keys to success in Biospheres (Schultz et al., 2011, p. 662) and in similar organisations promoting sustainable development (Brody, 2003). In pragmatic terms, Biospheres often have relatively few full-time staff, and little legal authority over the territory covered so must collaborate with others to achieve shared aims. Ecologists often describe a highly collaborative approach to ecosystem management, with stakeholders working at different levels, as 'adaptive co-management' (Hanh et al., 2006). The wide range of potential benefits of adaptive co-management are summarized by Schultz et al. (2011., p. 662) as:

> 'increased efficiency (as people are more likely to support and implement decisions they have participated in making), improved accuracy (as a more diverse and broader knowledge base is utilized), and strengthened legitimacy (as people affected by decisions are invited into the process of making them) of management and conservation effort'

A case study of adaptive co-management in Sweden provides an example of one relatively small 'bridging organisation' that by working with a wide range of partners 'enhanced the social capacity to respond to unpredictable change' thereby creating a more resilient form of ecosystem management (Hanh et al., 2006). It is also claimed that when Biospheres become a forum for collaboration between organisations, the organisations involved also benefit from working in a more coordinated way (UK National Commission for UNESCO, 2015, p. 14). However, adaptive co-management can be challenging and is not guaranteed to lead to positive outcomes. It has been claimed that in certain circumstances high levels of stakeholder participation can 'increase conflict by: having disputing parties at the negotiating table, frustrating planners by slowing down the decision-making process,

and most importantly dilute the strength of the final [ecosystem management] agreement by having to balance competing interests' (Brody, 2003, pp. 409-410).
Rather than increasing the range of stakeholders overall, Brody's study of ecosystem planning in Florida suggests that ensuring specific stakeholders are present – namely, resource-based local industries and NGOs – is most likely to lead to better ecosystem planning outcomes (ibid, p. 413). Schultz et al. (2011) conducted a survey on adaptive co-management in Biospheres, achieving a sample of 146 responses from Biospheres in 55 countries. This study suggests that collaboration with scientists is most important for achieving conservation goals, while input from local resources users (e.g. farmers and fishermen) and inhabitants is necessary for achieving sustainable development goals (ibid., p.666). Collaboration with some groups had no effect on outcomes – for example involving politicians was not found to affect either conservation or sustainable development goals. Taken together, these two studies suggest an approach in which stakeholder engagement is central, but the stakeholders in question must be selected carefully. Involvement of those working in resource-based industries within a Biosphere should be a high priority given the evidence for positive outcomes that come from including this group.

It is a common strategy for Biospheres to partner with those working in resource-based industries, both to promote sustainable practice and create a marketing strategy for regional produce. A UK example of this practice can be found in North Devon Biosphere which runs a sub-group called the Biosphere Reserve Marine Working Group to manage the substantial marine ecosystem that makes up part of the Biosphere. The group includes fishermen, as well as conservationists and scientists. They have collaborated on a range of activities such as suggesting to DEFRA a number of sites to become Marine Conservation Zones (MCZ) (of which two were ultimately picked) and working to obtain Marine Stewardship Council accreditation for fish caught in the Biosphere (North Devon Biosphere, date unknown) helping the fishermen sell their catch while ensuring sustainable practice. North Devon Biosphere also has its own produce accreditation scheme to help consumers make the choice to shop locally and fishermen in the area have adopted this too (UK National Commission for UNESCO, 2015, p. 23).

Several Biospheres in Germany have made a success of regional branding schemes (Kullmann, 2007) with the Rhön Biosphere Reserve often held up as an exemplar (ibid.; Kremer, 2007). Collaborating with local food producers has been a central part of their work since the early 1990s and their labelling scheme promotes products as diverse as lamb, crayfish, honey, brown trout and traditional apple varieties (Kremer, 2007). The Rhön Biosphere Reserve has helped small producers continue to work in a low impact way and survey evidence show the label is well known in the region (ibid.). It has been claimed that the success of this marketing was down to a coordinated and long term commitment from staff and partners (ibid., p. 45). This example has particular relevance to the GSA Biosphere as the Rhön crosses into three provinces and the regional authorities have found a way of working together effectively to market the Rhön as a recognisable area while also highlighting the characteristics of the sub-regions.

Using the Biosphere as a way of marketing local goods does not have to be limited to food. Biosphere Reserve Entlebuch in Switzerland set up the product label Echt Entlebuch (meaning 'genuine Entlebuch') and, alongside a range of food, is also marketing a locally-sourced wood products (Knaus et al., 2016). The label has been running since 2001 and now 19% gross value added (GAV) of all forestry products from this area are labelled Echt Entlebuch amounting to 3 million US dollars a year (ibid.).

Ecotourism is another development area that is common in Biospheres (Ecological Tourism in Europe and UNESCO MaB, 2007, p. 11). This is unsurprising considering it has the potential to:

> 'generate employment and income for the local population, provide motivation and incentives for conservation, and also raise the public's awareness of the biological and cultural diversity, traditional knowledge and practices in the region' (ibid.)

thus fulfilling a number of UNESCO's aims for the scheme. Germany's well-developed network of 15 Biosphere's have been found to make a significant contribution to the national economy (Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and the Federal Agency for Nature Conservation, 2014). By working with the German National Tourist Board, the country's Biospheres are promoted together online as places where human activity and nature coexist 'in harmony' (German National Tourist Board, date unknown). The website also highlights each of the Biosphere's distinctive features and presents options for ecotourism (ibid.). This makes it easy for tourists to learn about and take advantage of the tourism opportunities in the country's Biospheres, even if they are not already familiar with the concept.

Closer to home, Brighton and Lewes Downs Biosphere has worked closely with Visit Brighton to promote the local environment to both visitors and residents (UK National Commission for UNESCO, 2015, p.25). The Biosphere is now being described as 'The Living Coast' (Brighton and Lewes Downs Biosphere, 2017) to emphasise its ecological significance despite the urban centre of Brighton and Hove. The new 'identity' was launched in 2017 and it is yet to be seen whether it will translate into greater visitor numbers or increased engagement in biodiversity projects but it appears to be an example where the positive attributes of the Biosphere are being communicated effectively. Dyfi Biosphere in Wales uses more conventional means of promotion but they have collaborated with Visit Wales to ensure there is information about the area featured on the main website (Welsh Government, 2017). By contrast, neither of Scotland's two Biospheres are promoted on the Visit Scotland website, despite the 2016 Tourism Development Framework for Scotland which states:

> 'Outdoor activities continue to be developing and diverse market with niche opportunities constantly emerging. The potential arising from the designation of the Galloway and Southern Ayrshire Biosphere Reserve and Dark Sky Park is an important example' (Visit Scotland, 2016).

There are also potential downsides to tourism. It has been claimed – although with little substantiating evidence – that tourism development in most Biospheres are an example of 'greenwashing' (Crozat, 2013). To ensure tourism does not damage the natural assets being promoted, Ecological Tourism in Europe and UNESCO MaB (2007) have developed guidance on creating a sustainable tourism management plan, an 'approved document, which should describe the possible threats and opportunities of tourism development within the Biosphere' (ibid., p. 13). They believe Biospheres are in a strong position to take the lead on tourism management plans but need to work extensively with partners and local communities to use local knowledge and ensure the process is democratic. In his review of 251 ecotourism case studies, Kruger (2005) also found that one of the main factors leading to genuine conservation (rather than promotion of natural assets without habitat protection) was community involvement.

Finally, the importance of communicating to the public what each Biosphere is and what it can offer should not be underestimated. A study by the UK National Commission for UNESCO (2015, p. 26) showed that despite the achievements of UK Biospheres, their full potential remained untapped due to having a low profile and unclear branding. To support Biospheres with this, UNESCO MAB Network

(2015) created a 'Brand and Story Toolkit' to help them communicate the concept and what they want to achieve.

Galloway and Southern Ayrshire Biosphere

Map of GSA Biosphere showing core, buffer and transition zones

The core area of Galloway and Southern Ayrshire (GSA) Biosphere is made up of three sections of land, each with special ecological properties and no human residents. These areas were originally designated in 1976. The largest is the Merrick Kells Site of Special Scientific Interest (SSSI) with Merrick itself sitting at 843 metres making it the highest peak in the south of Scotland. East of this site is Silver Flowe, also a SSSI and one of the least interrupted mire systems in Europe (UNESCO, 2002). To the south of both of these is the third core area Cairnsmore of Fleet. This National Nature Reserve features another prominent peak in the region and an extensive area of open moorland. The buffer zone fully encompasses these three sites and is characterised by tracts of commercial coniferous forestry as well as being used for recreation (Environmental Change Institute, 1998, p. 49). 86% of the buffer zone is made up of Galloway Forest Park meaning this area is mostly public land, managed by the Forestry Commission Scotland (Biosphere Reserve Nomination Form, 2010, p. 17).

Moving further out, the transition area is a wide band of territory which is more heavily populated with small towns and villages although still rural in character. The outer boundary of the GSA Biosphere is defined by river catchment areas of the Cree, Fleet, Ken-Dee, Nith, Doon, Water of Girvan and Stinchar. The full extent of the land is described as forming 'a coherent biogeographic unit influenced by underlying geology, topography and river drainage systems, with a rugged mountainous core, an extensive periphery of forest, woodland, arable land and pasture, and a varied coastline' (GSA Biosphere, 2010, p.2). This

focus on the geographical unity means that the GSA Biosphere crosses Local Authority boundaries, with most of the area sitting within Dumfries and Galloway but smaller sections to the north crossing into East and South Ayrshire. Geologically, the northern part of the GSA Biosphere sits on the Southern Uplands fault line which has resulted in Scotland's 'coal belt' of former mining towns. Dumfries, Ayr and Stranraer are each just beyond the border but due to their size inevitably have a wide-reaching influence on the Biosphere. In any case, the outer limits of any Biosphere are in fact 'fuzzy boundaries in conformity with the open-ended nature of the process of stakeholder cooperation deemed to be an essential feature of biosphere reserves' (Ishwaran, Persic and Hoang Tri, 2008, p. 124).

The extension to the 'new style' Biosphere scheme, covering this much larger territory, was awarded in 2012 following consultation with local residents (GSA Biosphere, 2010). As with all Biospheres, the main functions of GSA Biosphere are conservation, learning and development. To give a sense of the development priorities specific to the GSA Biosphere, this summary was included in the re-application to become a become a 'new style' Biosphere (ibid., p.10-11):

- Local food producers
- Environmental research establishments
- Green technology development
- Developing jobs directly linked to more sustainable management of the environment
- Promoting the development of sustainable methods for delivering public services
- Promoting the rich resources of arts and crafts and contemporary culture
- Linking heritage and the natural environment
- Cultural heritage
- Increasing community cohesion

These had been identified by Mackay Associates in 2008 when they were commissioned to study the social and economic potential of the proposed development (ibid.). As opportunities have presented themselves and sectors have changed, these areas have been refined or added to, for example, in the collaborative work to set up the Dark Sky Park and the move towards supporting adventure activity tourism. However, these priority areas are still representative of the work currently being undertaken by the GSA Biosphere (GSA Biosphere, 2016).

Local Economic and Social Policy

Each of the three Local Authorities that make up the GSA Biosphere have their own long-term economic development plans but there is a large degree of overlap in their overall aims, (Dumfries and Galloway Council, 2015, p. 8; South Ayrshire Council, 2013a, pp. 7-10; East Ayrshire Council, 2014a, p. 31) and the GSA Biosphere's early list of priorities. All advocate support for tourism and outdoor recreation; green technologies; and local food production. Tourism in particular stands out as a key development priority in all three regions. In the policy literature, specific examples of what might be done to support tourism include supporting farm-based tourism and integrating tourism better with local food and drink to expand the area's offering to visitors (ESEP, 2013). Arts and cultural heritage are important development areas in their own right but are also seen as a way of attracting tourists to these regions. All three Local Authorities have expressed a desire to take advantage of the tourism potential GSA Biosphere offers (Dumfries and Galloway Council, 2016; East Ayrshire Council, 2016; Ayrshire Economic Partnership; 2012) showing strong potential for further collaboration in this sector. However, it is harder to find mention of the GSA Biosphere in relation to Local Authority policy

objectives other than tourism, suggesting there may still be work to do communicating the full extent of its remit to local government.

Another sector that is priority for development across these policy documents is green technologies and particularly renewable energy generation. Renewable energy, most often in the form of wind energy, has the potential to bring funding to rural areas, especially if the initiative is community-owned (Brodie, 2014). However, in practice there are few community-owned wind farms in South West Scotland (ibid.) and 2012 figures show that at this time only 2200 people were employed across Scotland in onshore wind (Butler and Docherty, 2012). Proposals for new private wind farms can result in opposition from local residents, such as the recent application to site a windfarm near Straiton (MCM Associates, 2013, p.131). There can also be a conflict between developing energy infrastructure and developing outdoor tourism potential. The evidence for the impact of wind energy on tourism is mixed with a 2008 report finding many tourists, and especially foreign tourists, mostly neutral or positive about wind developments (Moffat Centre, 2008, p.8). But this was prior to some of the larger developments seen in recent years (John Muir Trust, 2015a) and there is evidence that in Germany windfarm development has had a negative impact on tourist numbers (Broekel and Alfken, 2015). Evidence from Scotland suggests that in specific circumstances, such as citing windfarms near hotels (Moffat Centre, 2008, p.9) or hill walking routes (Mountaineering Council of Scotland, 2016) tourists can be put off the area. A further potential point of contention is that areas in Scotland designated as 'Wild Lands' have been given 'a degree of protection' (John Muir Trust, 2015b, p.1) against windfarm development to ensure no adverse effects on tourism, whereas neither GSA Biosphere nor Galloway Dark Sky Park have been included in this (South Ayrshire Council, 2013b).

Community planning documents for each of the three Local Authorities (East Ayrshire Council, 2014b; Dumfries and Galloway Strategic Partnership, 2012; South Ayrshire Community Planning Partnership, 2012) contain many overlaps: they all aim to stimulate local economies, attracting investment and encouraging entrepreneurship; develop an appropriately skilled workforce and ensure adults are confident and successful in accessing employment; support children and young people to achieve the best possible educational outcomes along with promoting health and wellbeing; and support older adults, vulnerable people and their carers to live healthy, empowered lives (ibid). One notable area where the three community planning strategies differ is in their approaches to the natural environment. Dumfries and Galloway places this in a more central role – possibly because of the larger number of protected areas and the importance of the forestry sector (Steiner and Brodie, 2014). While there are specific areas of South and East Ayrshire where forest development is an important priority (e.g. for plans for North Kyle Forest see Forestry Commission, 2016), Dumfries and Galloway is one of the most wooded areas of Scotland (Steiner and Brodie, 2014).

The Local Authority community planning strategies highlight broadly similar demographic challenges with aging populations a chief concern. Rural areas of Scotland already have an older age profile than urban areas with a well-established pattern of young people leaving for educational and work opportunities while some older people chose to live in scenic locations for their retirement (Hill, 2006; Scottish Executive, 2007). This already high dependency ratio is predicted to increase further. This will have an impact on the local economy and increase the demand for health provision and care services. The issue of quality employment in these regions is intrinsically linked to these demographic issues, with lack of full-time, secure, well-paid work making it hard for these regions to attract and retain their working age populations. Rural regions' high proportion of SMEs also means that progression and workplace training are often lacking for those who do find work (Crichton Institute, 2014).

Reducing inequalities is an overarching theme throughout these local planning strategies (East Ayrshire Council, 2014b; Dumfries and Galloway Strategic Partnership, 2012; South Ayrshire Community Planning Partnership, 2012). There is evidence for long-standing inequalities across Scotland (Bell and Eiser, 2015) and while poverty is most heavily concentrated in urban areas, it is a feature of all settlement types in Scotland (Bailey, Bramley and Gannon, 2016). Poverty is more often dispersed in rural areas and there are specific challenges, such as poor transport links (Hill and Clelland, 2015), meaning a different set of strategies may be necessary for addressing inequalities in the GSA Biosphere.

Data held at Local Authority level can tell us much about Dumfries and Galloway, South Ayrshire and East Ayrshire respectively but cannot provide reliable insight into the GSA Biosphere. Any demographic or economic patterns that exist in the GSA Biosphere are effectively 'diluted' by the populations of the larger towns in these figures. Therefore, we cannot tell from the existing literature whether these socio-economic patterns are also found in the Biosphere. This socio-economic baseline study will fill this gap in knowledge and provide a starting point for tracking change over time. While is not expected that the GSA Biosphere will resolve major social and economic problems alone, as a key strategic forum for sustainable development in the area, it does have an important role in addressing them in partnership with other organisations.

METHODOLOGY

This report is the result of a research project combining qualitative and quantitative research methods. The primary method was analysis of existing data and this was complemented with qualitative interviews in four discrete geographical areas.

The purpose of the study is to generate a clear picture of the demography of the GSA Biosphere and its associated economic activity. This was a complex undertaking; the Biosphere spans three Local Authorities but does not share a boundary with any of them – thus rendering most data generated by the Authorities invalid. The boundaries do, however, follow data zone boundaries; the key geography for small area statistics in Scotland, including the Scottish Index of Multiple Deprivation (SIMD) and the Census. Each data zone contains around 500 to 1000 households and 6,976 data zones make up the whole of Scotland (Scottish Government, 2014).

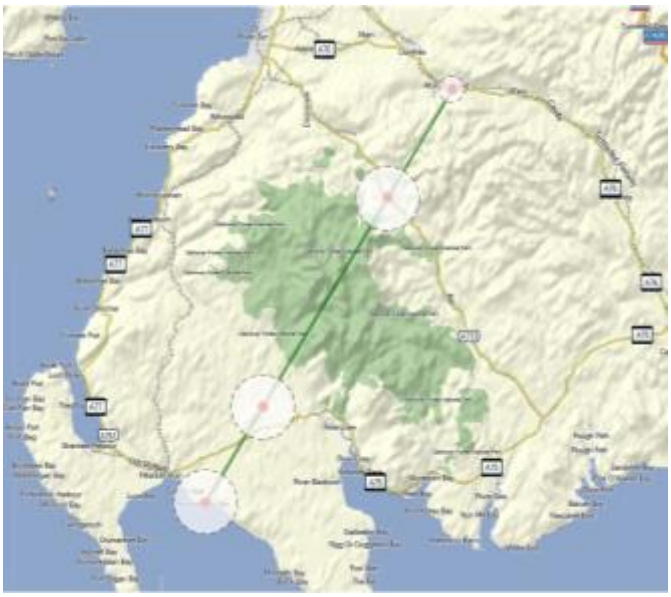
For this study a comprehensive map of the GSA Biosphere was built up by visually identifying the 131 data zones that fall within its boundary using online interactive mapping[1]. For most of the boundary, the match is perfect but in the few cases where it is not, a larger area was selected rather than missing small areas of the GSA Biosphere. For businesses, data is only available through 'intermediate zones' (Scottish Government, 2011) which, on average, comprise 5 data zones. Again, a map of the GSA Biosphere was built up but because of the larger scale of the 'building blocks', there are more points where the intermediate zones go outside of the GSA Biosphere boundary. Nonetheless, large populations that live outwith the GSA Biosphere were avoided

Most of the figures in this report originate from the 2011 Census. Other sources of data are described throughout.

By looking at a range of variables on similar topics, the researchers have built a detailed picture of who lives in the GSA Biosphere, their economic activity and how this population compares with the average figures for the whole of Scotland. The main strength of this method is that that it provides objective information on the whole of the GSA Biosphere. The main limitation is that it relies on data which has already been generated, which sometimes leaves us with gaps in knowledge. Just one example is that data on the use of environmental assets by residents was unavailable at this level. As a 'top down' method of research, these measures also do not necessarily reflect the interests, concerns or experiences of those living in the GSA Biosphere.

Qualitative interviews were conducted to complement the quantitative analysis. This involved interviews with a limited number of participants in four locations spanning the GSA Biosphere. As with most qualitative research we do not claim this sample is statistically representative of the wider population but it has ensured that the voices of those living in the GSA Biosphere are heard.

[1] Using this website: http://bit.ly/2vSgQbI



Drawing upon the natural sciences, a transect line was placed across the Biosphere. The location of the transect line and sampling locations were determined by spinning a mobile line, so that all locations within the Biosphere had a chance of being selected. The transect line landed south west in the Machars going north east through the middle of the Biosphere and up through East Ayrshire. The following interviews took place in four areas: New Cumnock (6); Carsphairn (3); a rural area of farms and hamlets west of Newton Stewart (3) and Auchenmalg and Glenluce (4). Finding interviewees willing to take part in these rural areas was at times challenging. For example, during fieldwork in Auchenmalg all households were contacted but only one person could be found who was willing to take part. Therefore the sample for this area includes Glenluce.

The topics covered in the interviews included the reasons people chose to either stay or move to their area; challenges of living there; benefits of living in the area; any developments they would like to see in the area; and awareness of the GSA Biosphere or any other local designations.

Interviews were semi-structured, covering the same topics in each but with flexibility in terms of how they were asked and any additional questions. The topics and main questions asked were intentionally broad to elicit interviewees' personal views on living in the area. Because of this approach, some of the features of the GSA Biosphere highlighted in the quantitative work are not covered in detail in the qualitative interviews. The overlaps and differences in the results of these two methods have generated interesting findings in terms of what might be considered 'objectively' important issues for the GSA Biosphere, from a statistical perspective, and what issues are more subjectively significant for those living in the area.

POPULATION

Using data from the 2011 Census, Table 1 shows that the total population of the Galloway and Southern Ayrshire (GSA) Biosphere is around 95k individuals. The gender ratio is only 1 percentage point difference from the whole of Scotland with an almost even split but marginally more females. This is normal for any developed country (United Nations, 2015). The GSA Biosphere is clearly more sparsely populated than Scotland as a whole, with Table 2 showing just 8 households per square kilometre compared with 30. Most of the housing stock is in use with just 3% vacant (2011 Census – not shown in the following tables). This is the same figure as the Scottish average.

Table 1. Total population and gender ratios, 2011 Census, all population figures include children

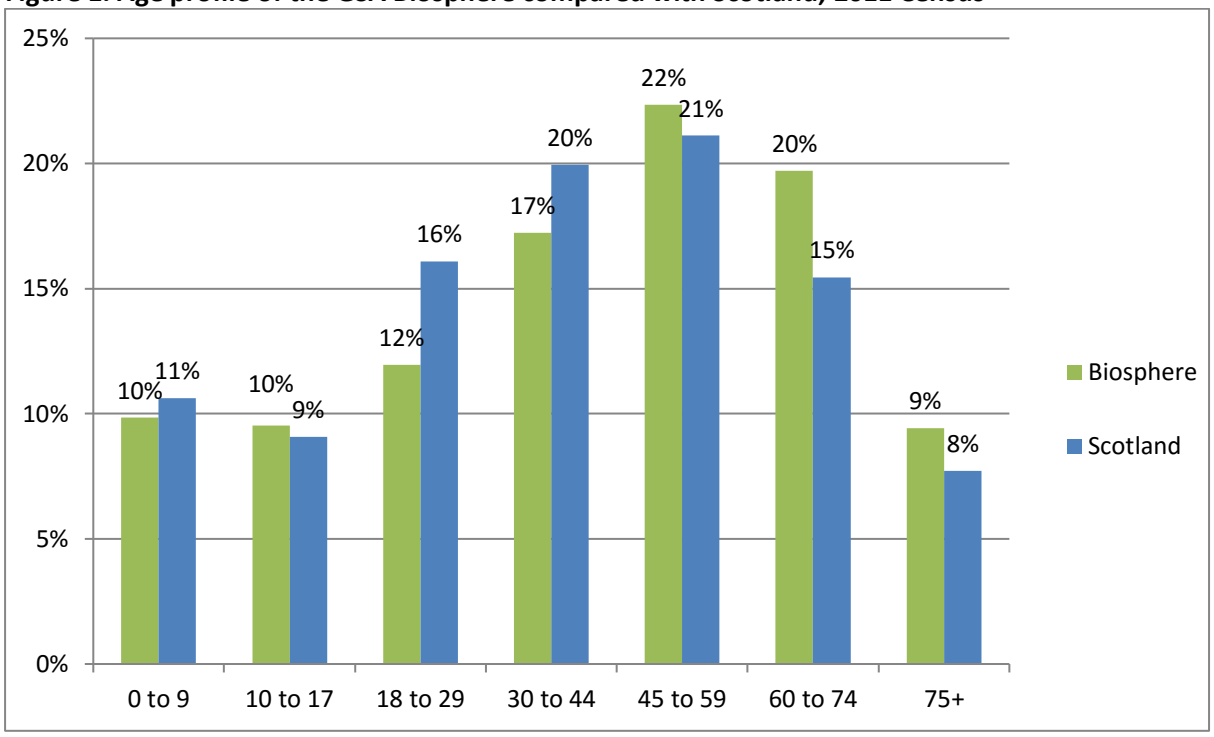
	GSA Biosphere	As % of total	Scotland	As % of total
Total population	95,698	-	5,295,403	-
Female	49,276	51%	2,727,959	52%
Male	46,422	49%	2,567,444	48%

Table 2. Population and household density, 2011 Census

	GSA Biosphere	Scotland
Square kilometres	5284	77937
People per sq. kilometre	18	68
Households per sq. kilometre	8	30

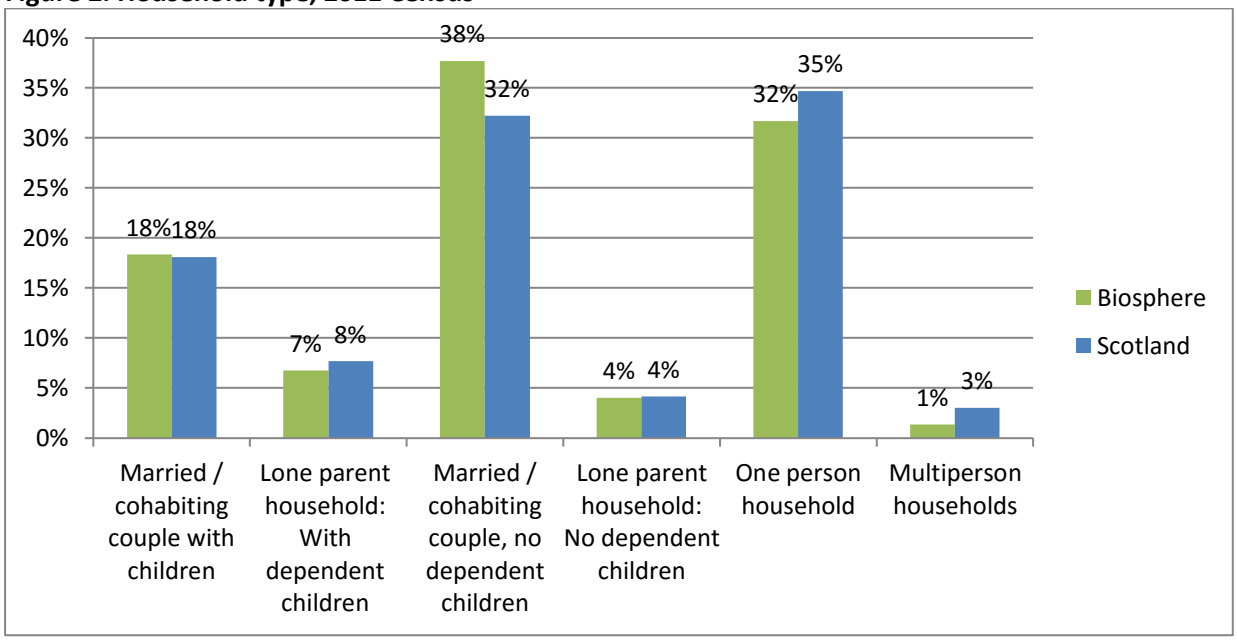
The proportions of children and young teenagers in the GSA Biosphere are close to identical to those in the whole of Scotland (see Figure 1). Moving up to the 18 to 29 age bracket though, the proportion of these young people is 12% in the GSA Biosphere but 4 percentage points higher across Scotland (at 16%). This gap is similar for the next age group. For 45 to 59 year olds there is almost the same proportion (22% in the Biosphere and 21% across Scotland). Then for the 60 to 74 year olds we see the largest age gap of any group with 20% of residents in the GSA Biosphere falling into this category, compared with 15% across Scotland. These patterns provide a statistical foundation for the anecdotal 'evidence' that young people at school leaving age migrate outwards from the GSA Biosphere for work and study, while older people at retirement stage chose to move in.

Figure 1. Age profile of the GSA Biosphere compared with Scotland, 2011 Census



The age profile of the GSA Biosphere affects other variables including household type. Figure 2 shows a slightly lower proportion of one person households than across Scotland, and fewer people in 'multiperson' households – both household types associated with younger people in urban areas.

Figure 2. Household type, 2011 Census[2]



[2] 'Married' includes those in civil partnerships (same sex marriage law was not in operation in 2011). 'No dependent children' includes household with no children and those where adult children are still living in the household

As with most rural areas of Scotland (Scottish Government, 2011) the population of the GSA Biosphere is not very ethnically diverse, with 99% of the population white (compared with 96% of the Scottish population). However, this does not indicate that it is a static population. From the figures on Table 3, it is clear that a fairly significant minority (13%) of those living in the GSA Biosphere were born in England. Unfortunately there is no data source which reveals migration from other parts of Scotland but this shows that at least some inwards migration is taking place.

Table 3. Country of birth, 2011 Census.

Birthplace	GSA Biosphere %	Scotland %
Scotland	83%	83%
England	13%	9%
Wales and N Ireland	1%	1%
All other EU countries	1%	3%
All non-EU countries	1%	4%

HEALTH AND SOCIAL CARE

NHS data on population health was unavailable for the geographic level studied in this report so analysis involved data from the 2011 Census. Figure 3 presents the proportion of those with disabilities in the GSA Biosphere and for Scotland as a whole. For all physical disabilities there are marginally higher rates in the GSA Biosphere with a difference of 1 or 2 percentage points for the first three categories in the graph. 'Other conditions' affect 22% of those in the Biosphere compared with 19% of people in Scotland. For mental health conditions and learning difficulties or disabilities, the rates across each area are the same.

The 2011 census also includes a subjective health question in which respondents were asked 'How is your health in general?' In the GSA Biosphere, 48% of people responded 'very good' compared with 52% of people across the whole of Scotland (see Figure 4).

Figure 3. Proportion of those with a disability, 2011 Census

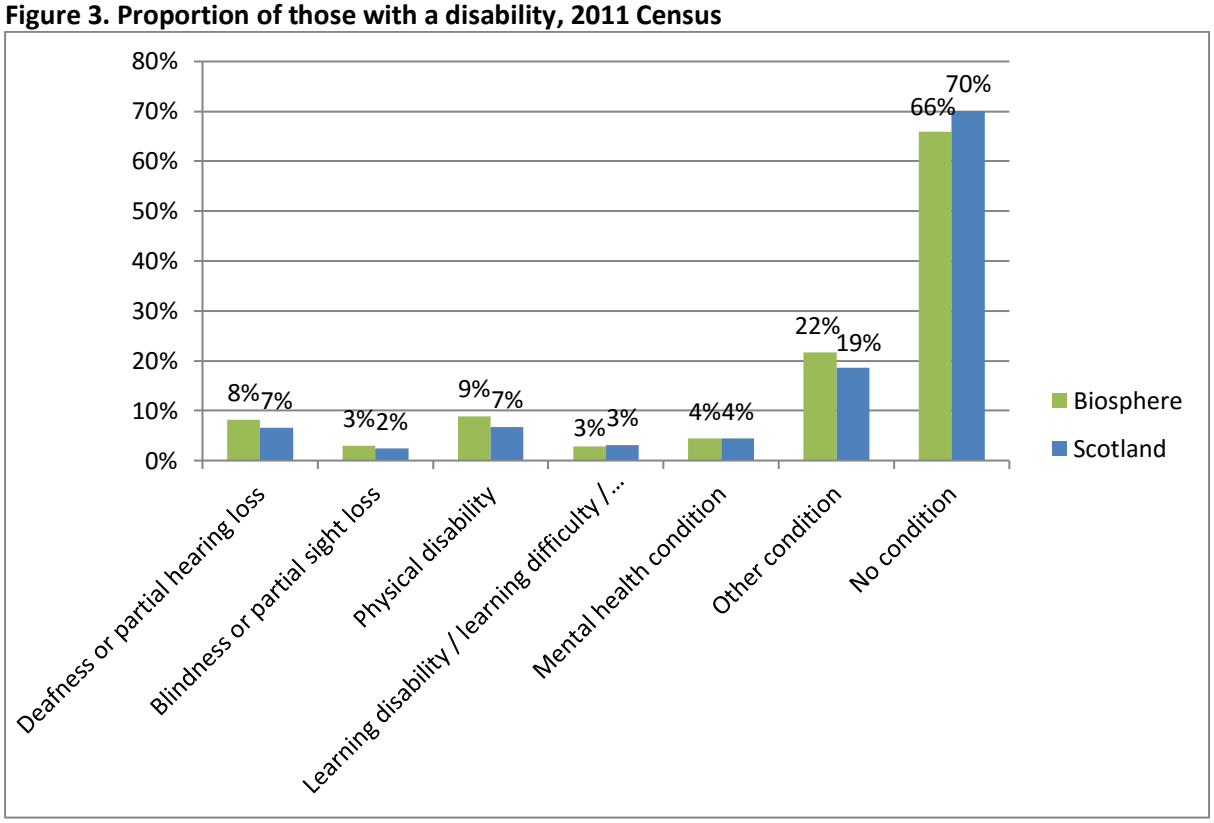
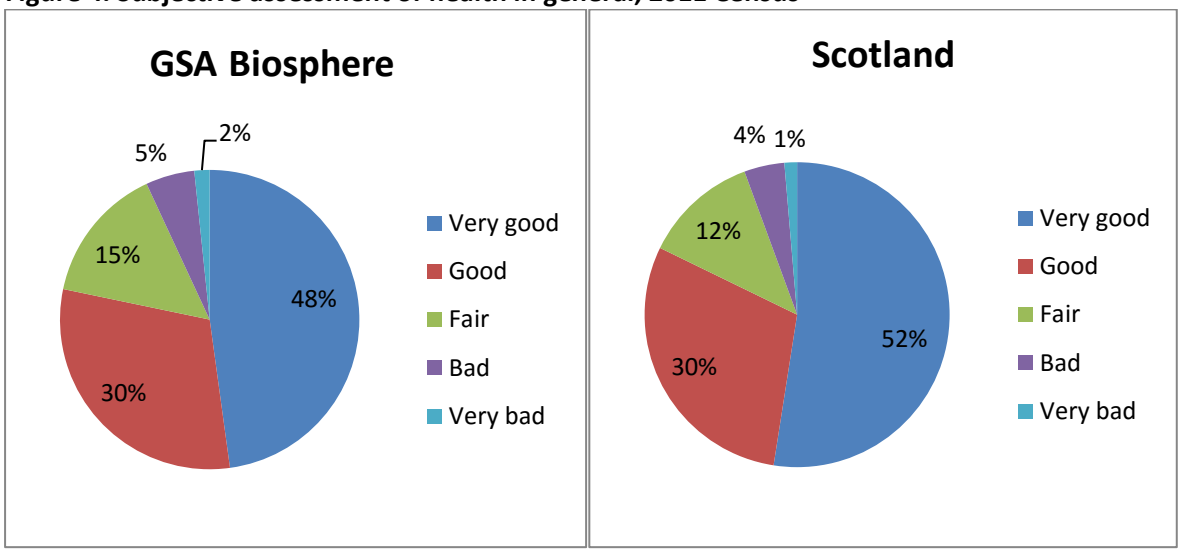


Figure 4. Subjective assessment of health in general, 2011 Census



The Census figures on those providing unpaid care responsibilities show that 11% of people in the GSA Biosphere provide at least some unpaid care each week, two percentage points higher than the figure for the whole Scotland (9%).

Table 4. Proportion of adult population providing unpaid care, 2011 Census

	GSA Biosphere %	Scotland %
Provides no unpaid care	89%	91%
20 to 49 hours a week	2%	2%
50 or more hours a week	3%	2%

Table 5. Selected types of hospital admittance, 2016 SIMD

	GSA Biosphere, per 1000 people	Scotland, per 1000 people
Hospital admittance related to alcohol	113	132
Hospital admittance related to drugs	126	126
Emergency hospital admittance	150	131

Table 5 shows the rates of hospital admittance per 1000 people in the population broken down by reason for visit. For emergency hospital visits, the rate is higher in the GSA Biosphere with 150 visits per 1000 people compared with 131 for the whole of Scotland. However, Scotland performs worse on hospital admittances related to alcohol and both areas experience the same rate of those related to drugs. From 2016 SIMD figures, we can also learn that the number of babies born with a low birth weight is the same in the GSA Biosphere as for Scotland (5%) and that those being prescribed drugs for mental health issues are roughly the same (19% in the GSA Biosphere compared with 18% across Scotland).

Taken together, the data presents a mixed picture of health in the GSA Biosphere. A few of the measures above could be interpreted as showing relatively poor health. However, we should keep in mind that firstly, the measures where health appears worse than across Scotland show a fairly small gap, and secondly, given the age profile we would in fact expect this to have an effect on health

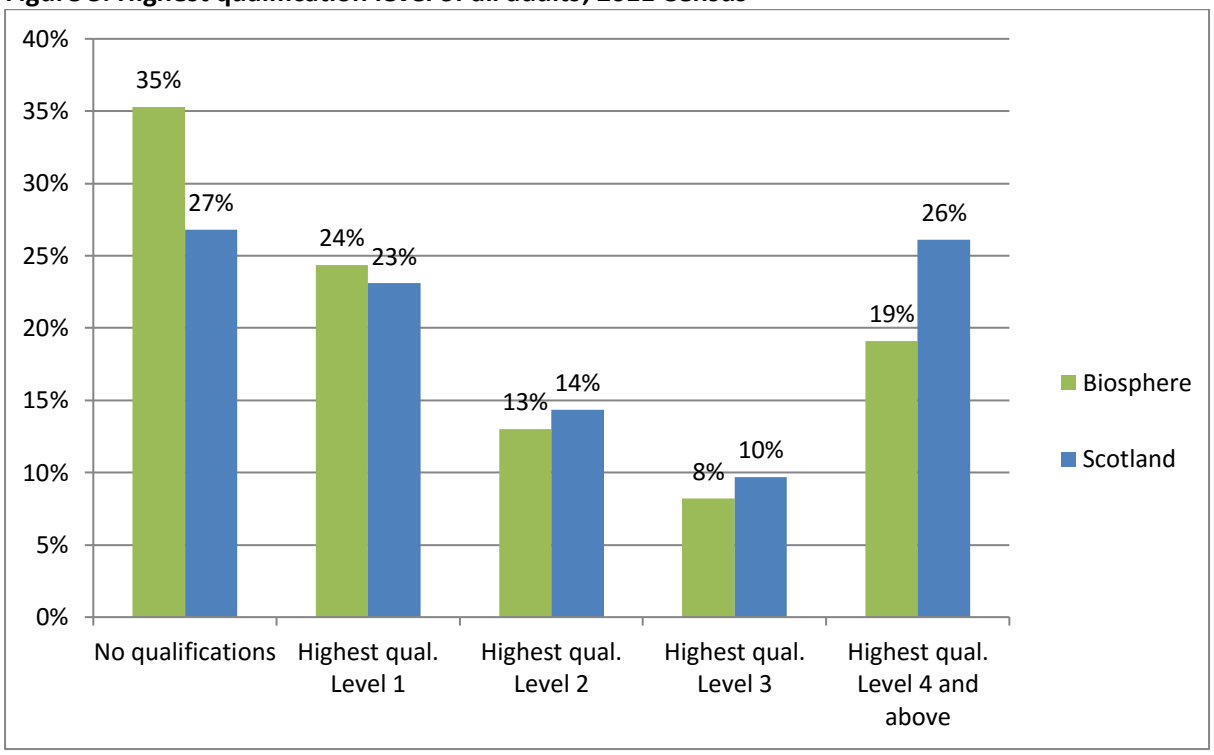
outcomes. As such, it cannot be concluded that the population is, overall, less healthy in the GSA Biosphere.

EDUCATION

Data for the educational attainment of all adults (Figure 5) shows a substantial gap in educational attainment between the GSA Biosphere and the whole of Scotland. 35% of adults in the Biosphere have no qualifications whereas this is the case for only 27% of people across Scotland. Conversely, those achieving Census Level 4 and above (those with a HND, university degree or similar) account for 19% of adults in the Biosphere and 26% of the general population.

This may also be a product of the age profile in the GSA Biosphere with changes in education policy over the last 50 years affecting the length of time people typically stay in education. A shortage of graduate employment options may also deter those with higher levels of educational attainment from moving to the area although further research would be necessary to confirm the extent to which this is the case.

Figure 5. Highest qualification level of all adults, 2011 Census



Data for those leaving school presents a different picture. The average school leaver attainment score[3] is 5.4, is just 0.1 lower than the average for Scotland. The gap for school pupil attendance is similarly marginal with 82% of pupils in the GSA Biosphere considered to have 'high attendance' compared with 84% across Scotland. Table 5 also shows that the proportion of school leavers not going in to full-time education, employment or training is the same for both the Biosphere and Scotland.

Table 6. Key measures of school pupil and school leaver attainment, 2016 SIMD

	GSA Biosphere	Scotland
Average score for attainment of school leavers	5.4	5.5
School pupils with 'high attendance'	82%	84%
Proportion of school leavers aged 16-19 not in education, employment or training	7%	7%

While the population of the GSA Biosphere may have relatively low levels of educational attainment, the achievements of school leavers are roughly in line with Scottish national average and only small minority do not go on to positive destinations after school.

[3] This is based on data from the Pupil Census. For a detailed explanation of how the score is calculated, see page 44 of the 2016 SIMD Technical Notes: http://www.gov.scot/Resource/0050/00504822.pdf

EMPLOYMENT AND DEPRIVATION

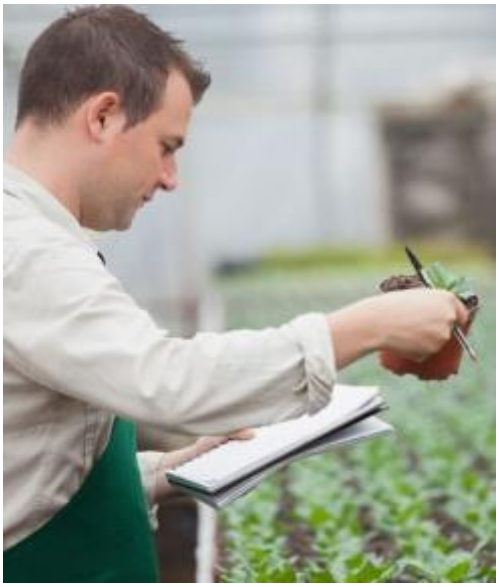


Figure 6 presents the economic status of all adults in the GSA Biosphere. The area has a higher than average number of retirees (20% compared with 15% national average) and a lower number of students (6% compared with 9%) which might be expected given that there are almost no higher or further education institutions within the boundaries of the GSA Biosphere.

The rate of unemployment mirrors the national average of 5% although the work patterns of those in employment differ; there is a lower rate of full-time employment in the Biosphere and a slightly higher rate of self-employment and part-time employment. Census data on work hours shows that fewer people in the GSA Biosphere work a full-time week of 49 hours or more – 12% compared with 16% average for Scotland. SIMD measures combining a range of variables also show that while the rate of 'employment deprivation' is the same as the Scottish average, there is a slightly higher rate of 'income deprivation'. This suggests higher levels of in-work poverty in the region (see Figure 7).

Figure 6. Economic status of all adults, 2011 Census

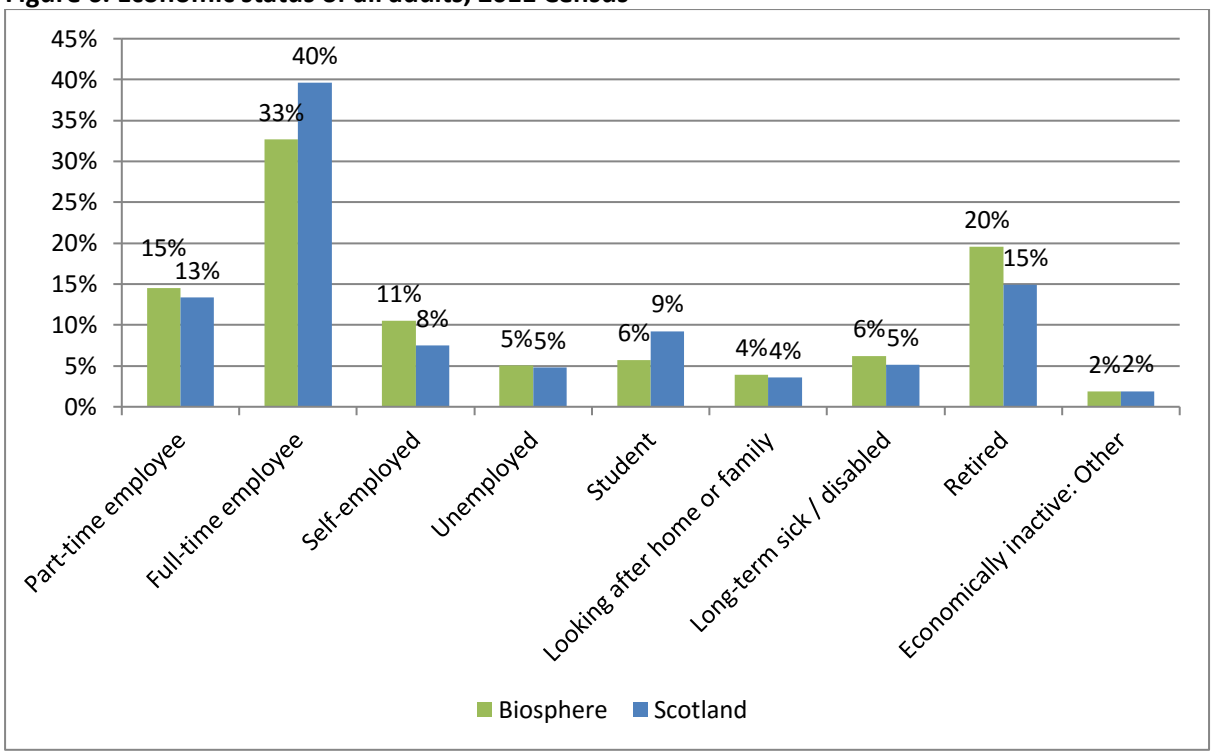
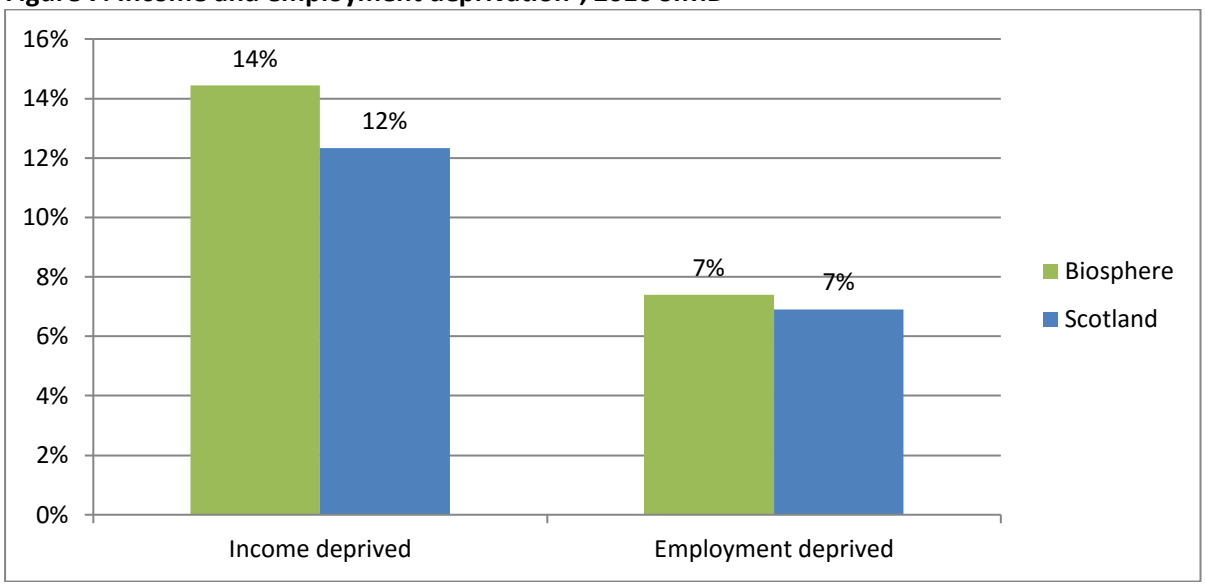


Figure 7. Income and employment deprivation[4], 2016 SIMD



While the percentages in Figure 6 and 7 imply the unemployment rate is not a particular concern in the GSA Biosphere, there are stark local differences. The following two tables present the data zones within the GSA Biosphere that are in the top 20% or bottom 20% most 'employment deprived' in Scotland. Of the 131 data zones that make the GSA Biosphere, three are in the bottom 20% (meaning they suffer the least employment deprivation) and 29 are in the top 20%. Of those in the top 20%, most are in or near former mining towns and all are within the upper half of the GSA Biosphere showing a geographic inequality.

Table 7. Data zones in the GSA Biosphere that are the among 20% least 'employment deprived' within the whole of Scotland, listed in order of data zone number, 2016 SIMD

20% Least 'Employment Deprived' data zone	Description of data zone location
S01007521	Rural area surrounding Gatehouse of Fleet
S01007539	Within Dalbeattie
S01007887	The area surrounding Mauchline

[4] The SIMD measure 'income deprivation' is the percentage of the population (adults and their dependants) in receipt of Income Support, Employment and Support Allowance, Job Seekers Allowance, Guaranteed Pension Credits, and Child and Working Tax Credits.

'Employment deprivation' is a measure of the percentage of the working age population (men aged 16-64 and women aged 16-60) who are on the claimant count, receive Incapacity Benefit, Employment and Support Allowance, or Severe Disablement Allowance

Table 8. Data zones in the GSA Biosphere that are the among 20% most 'employment deprived' within the whole of Scotland, listed in order of data zone number, 2016 SIMD[5]

20% Most 'Employment Deprived' data zone	Description of data zone location
S01007552	Area surrounding Kirkconnel and Kelloholm
S01007553	Within Kirkconnel
S01007554	Within Kelloholm
S01007871	Within Dalmellington
S01007872	Within Dalmellington
S01007874	Within Dalmellington
S01007877	Within Patna
S01007878	Within Patna
S01007879	Within Patna
S01007881	Area north east of Patna
S01007900	Within Logan, north east of Cumnock
S01007901	Crossing Lugar and Logan, north east of Cumnock
S01007905	Within New Cumnock
S01007906	Within New Cumnock
S01007907	Within New Cumnock
S01007910	Netherthird, near Cumnock
S01007912	Within Cumnock
S01007913	Within Cumnock
S01007914	Within Cumnock
S01007916	Within Cumnock
S01007918	Holmhead, near Cumnock
S01007921	Within Auchinleck
S01007922	Within Auchinleck
S01007924	Within Auchinleck
S01012425	Within Girvan
S01012426	Within Girvan
S01012427	Within Girvan
S01012435	Within Maybole
S01012436	Within Maybole

Figure 8 presents figures for the National Statistics Socio-economic Classification (NS-SEC), a standard variable in survey research which categorises all occupations by work conditions such as job security, level of autonomy and the potential for economic advancement (Office for National Statistics, 2010, p. 3). For each of the first three categories (higher managerial and professional, lower managerial and professional and intermediate) the rate of employment is 3 or 4 percentage points lower in the GSA Biosphere than the Scottish average. The reverse is true of lower supervisory and technical, semi-routine and routine employment.

[5] These tables can be viewed in map form online at: www.gov.scot/Topics/Statistics/SIMD/SIMDInteractive. Due to the small size of many data zones relative to a map of the GSA Biosphere, these online maps available cannot be successfully reproduced in print.

Figure 8. Employment by socio-economic classification, 2011 Census

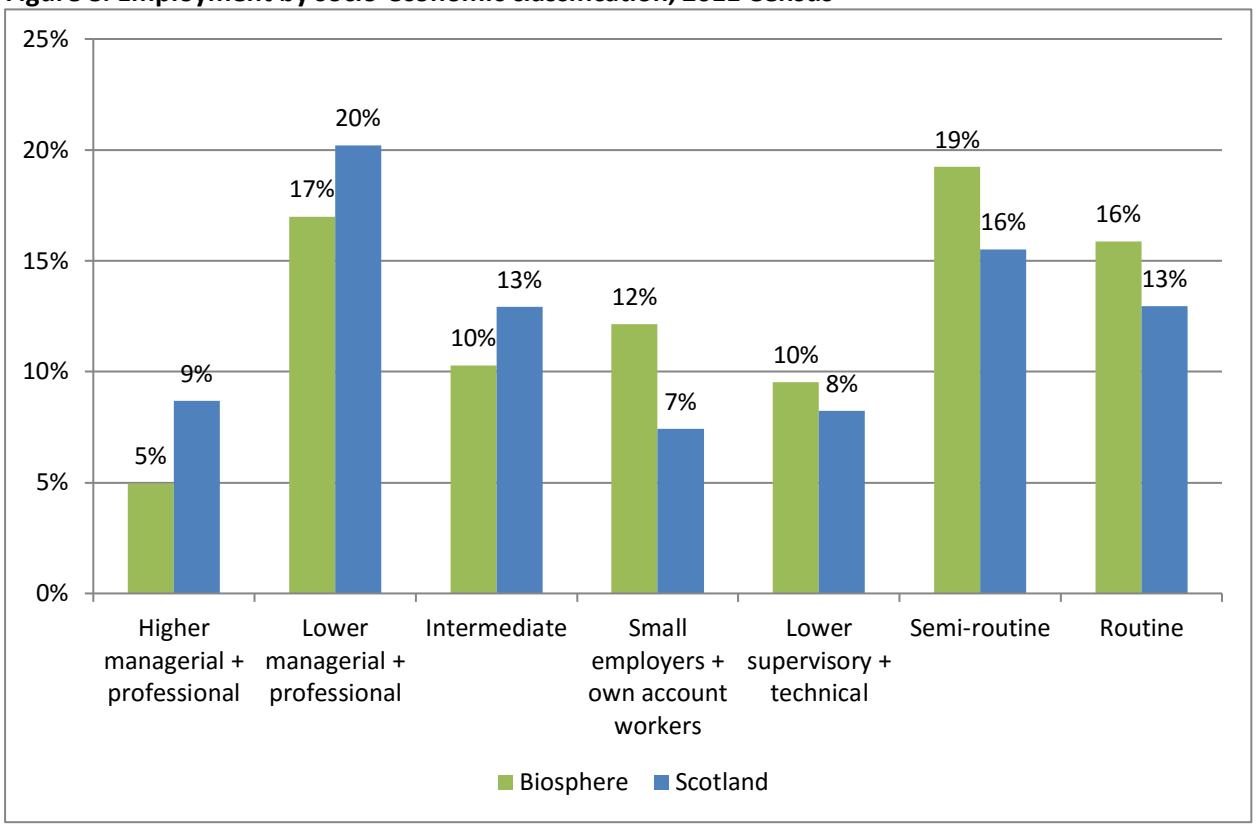


Figure 8 also reveals the importance of self-employment and employment by small businesses: 12% of those working in the Biosphere are occupied this way whereas across Scotland the equivalent figure is substantially lower at 7%. Home working, whether self-employed or not, is also significantly higher in the GSA Biosphere (see Figure 9) with 17% of adults in employment working 'from or mainly at home' compared with the national average of 11%.

As a predominantly rural area the relatively high proportion of employment in land-based sectors is not unexpected and as Figure 10 shows, 8% of all adults who live in the GSA Biosphere are employed in rural sectors (agriculture, forestry and fishing) compared with only 2% across Scotland. However, these occupations provide far lower rates of employment in the Biosphere than transport, wholesale and retail (19%); and human health and social work (18%). Just 2% are employed in mining and quarrying despite the former importance of this sector in towns such as New Cumnock and Kirkconnel, and there are fewer opportunities for employment in professional employment and, relatively well paid sectors such as information, communications and administration, and finance insurance and real estate.

Figure 9. Proportion of adults in work who mainly from home, 2011 Census

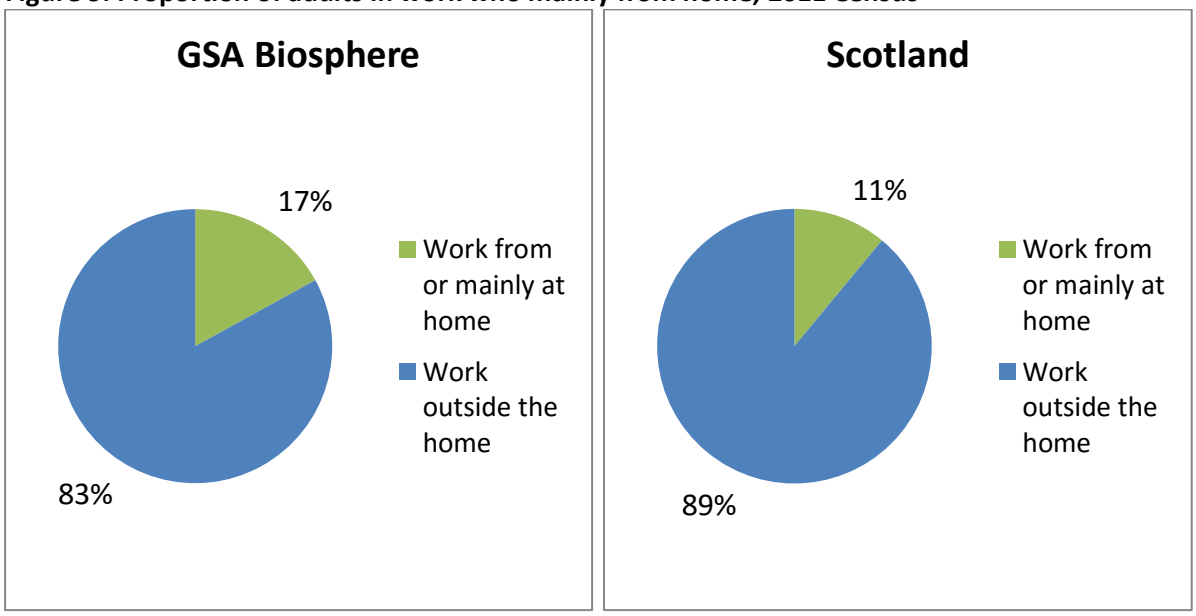
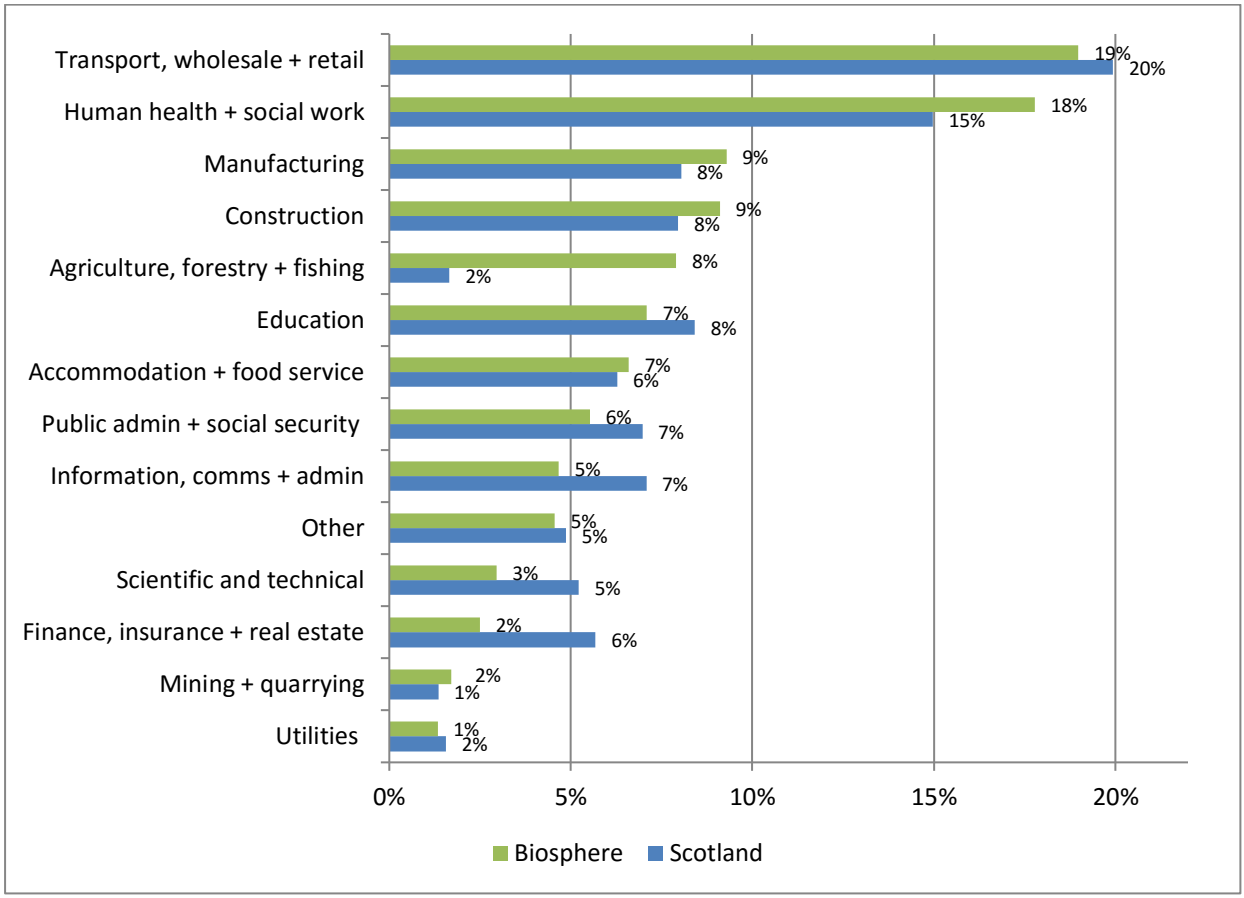


Figure 10. Employment in each sector in GSA Biosphere compared with Scotland, 2015 Official Labour Market Statistics



BUSINESS, RESOURCE-BASED SECTORS AND TOURISM

This chapter presents an overview of business activity across the GSA Biosphere and looks in more detail at resources-based sectors and tourism which are often central to supporting sustainable development in Biospheres. As Figure 10 shows, large numbers of people in the GSA Biosphere are employed in transport, wholesale and retail; and human health and social work but as Figure 11 shows, these are not the dominant industries in terms of the number of businesses. In this graph, resource-based businesses (agriculture, forestry and fishing) stand out, accounting for 38% of businesses across the Biosphere. However, it is possible that many of these businesses are very small scale for, as Figure 10 shows, the same sectors employ just 8% of all employed adults.

Figure 11. Number of businesses within each sector, 2015 Official Labour Market Statistics

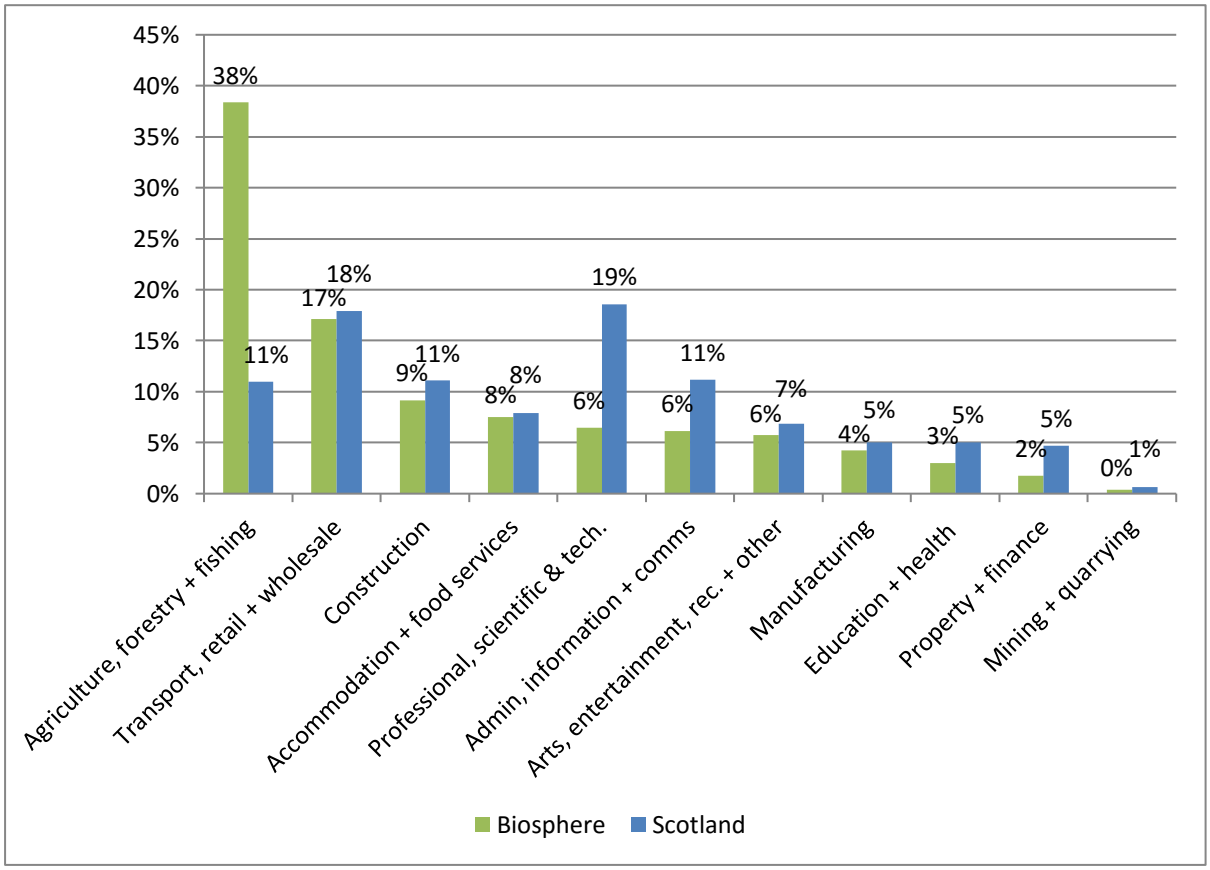


Table 9 shows that 90% of businesses in the GSA Biosphere are 'micro' businesses with 9 or fewer members of staff. This is greater than the equivalent figure (83%) for Scotland as a whole. It also shows that there are only 5 employers in the GSA Biosphere with over 250 staff. Tables 10, 11 and 12 provide more detailed information about sectors that are particularly relevant to the GSA Biosphere, including information on where they are concentrated geographically.

Table 9[6]. Number of businesses of different sizes. 2015 Official Labour Market Statistics

	GSA Biosphere		Scotland	
	Total	%	Total	%
All businesses	3,645	-	156,765	-
Micro (0 to 9)	3,290	90	136,500	87
Small (10 to 49)	320	9	16,965	11
Medium (50 to 249)	35	1	2,635	2
Large (250+)	5	<0.5	665	<0.5

Table 10. Number of businesses in agriculture, forestry and fishing by intermediate zone. Official Labour Market Statistics, 2015

Intermediate Zone Description	Local Authority	Agriculture, forestry & fishing
Maidens, Kirkoswald, Dailly, Barr, Barrhill, Colmonell, Ballantrae	S. Ayrshire	170
Carsphairn, Moniaive, Crocketford, Crossmichael, Kirkpatrick Durham	D&G	165
Port William, Kirkcowan, Glenluce, New Luce, Cairnryan	D&G	155
Whithorn, Sorbie, Wauphill, Wigtown	D&G	130
Borgue, Gatehouse, Laurieston, New Galloway, Dalry	D&G	120
Muirkirk, Sorn and land surrounding New Cumnock and Cumnock	E. Ayrshire	105
Sinclairston, Ochiltree and rural area around Mauchline (going outside the GSA Biosphere boundary)	E. Ayrshire	90
Kirkudbright, Tongland, Auchencairn (outside the GSA Biosphere boundary)	D&G	85
Straiton, Minishant, Dunure	S. Ayrshire	70
Newton Stewart, Glentrool village	D&G	60
Thornhill, Carronbridge, Closeburn, Durisdeer	D&G	60
Castle Douglas, Palnackie	D&G	55
Sanquhar, Mennock, Wanlockhead, Kirkconnel	D&G	45
Coylton, Hillhead	S. Ayrshire	35
Patna, Hollybush, Dalrymple	E. Ayrshire	15
Maybole	S. Ayrshire	10
Dalmellington	D&G	10
Most of Cumnock	E. Ayrshire	5
North Girvan	S. Ayrshire	5
New Cumnock	E. Ayrshire	0
South part of Cumnock, Netherthird, Craigens	E. Ayrshire	0
Auchinleck	E. Ayrshire	0
Drongan	E. Ayrshire	0
South Girvan	S. Ayrshire	0
Total		**1,400**

[6] Figures in tables 9, 10, 11 and 12 are rounded to the nearest 5. The website offering access to Official Labour Market Statistics (https://www.nomisweb.co.uk/) does this to business information

Table 10 shows once again the large numbers of employers in agriculture, forestry and fishing. The intermediate zones with over 100 such businesses are cover rural villages rather than towns.
Table 11 presents the number of businesses in accommodation and food services, not including businesses in the food processing industry or shops. It can be seen as an indicator for tourism, although it is not perfect as businesses such as any cafes used mostly by the resident population will also be included. Attractive rural areas in Dumfries and Galloway and settlements along the South Ayrshire coast top the list. Designated 'food town' Castle Douglas is high on the list as is Cumnock. Those intermediate zones with fewer than 10 accommodation and food service businesses are all in South or East Ayrshire.

Table 11. Number of businesses in accommodation and food services by intermediate zone. Official Labour Market Statistics, 2015

Intermediate zone Description	Local Authority	Accom. & food services
Borgue, Gatehouse, Laurieston, New Galloway, Dalry	D&G	25
Maidens, Kirkoswald, Dailly, Barr, Barrhill, Colmonell, Ballantrae	S. Ayrshire	20
North Girvan	S. Ayrshire	20
Newton Stewart, Glentrool village	D&G	20
Castle Douglas, Palnackie	D&G	20
Most of Cumnock	E. Ayrshire	15
Carsphairn, Moniaive, Crocketford, Corsock, Crossmichael, Kirkpatrick Durham	D&G	15
Kirkudbright, Tongland, Auchencairn (going outside the GSA Biosphere boundary)	D&G	15
Auchinleck	E. Ayrshire	10
Sinclairston, Ochiltree and rural area around Mauchline (going outside the GSA Biosphere boundary)	E. Ayrshire	10
Straiton, Minishant, Dunure	S. Ayrshire	10
Maybole	S. Ayrshire	10
Coylton, Hillhead	S. Ayrshire	10
Port William, Kirkcowan, Glenluce, New Luce, Cairnryan	D&G	10
Whithorn, Sorbie, Wauphill, Wigtown	D&G	10
Sanquhar, Mennock, Wanlockhead, Kirkconnel	D&G	10
Thornhill, Carronbridge, Closeburn, Durisdeer	D&G	10
Dalmellington	D&G	10
Muirkirk, Sorn and land surrounding New Cumnock and Cumnock	E. Ayrshire	5
New Cumnock	E. Ayrshire	5
Patna, Hollybush, Dalrymple	E. Ayrshire	5
Drongan	E. Ayrshire	5
South part of Cumnock, Netherthird, Craigens	E. Ayrshire	0
South Girvan	S. Ayrshire	0
Total		**275**

Another range of sectors associated with tourism is the arts, entertainment, recreation and other services and these are shown on the next page on Table 12. There is a clear geographic pattern with all the intermediate zones that contain around 15 or 20 of these kinds of businesses in the Stewartry area of Dumfries and Galloway. All those shown as having zero are in South or East Ayrshire.

Table 12. Number of businesses in arts, entertainment, recreation and other services by Intermediate zone. Official Labour Market Statistics, 2015

Intermediate zone description	Local Authority	Arts, entertain., recreation & other services
Castle Douglas, Palnackie	D&G	20
Kirkudbright, Tongland, Auchencairn (going outside the GSA Biosphere boundary)	D&G	20
Borgue, Gatehouse, Laurieston, New Galloway, Dalry	D&G	15
Carsphairn, Moniaive, Crocketford, Corsock, Crossmichael, Kirkpatrick Durham	D&G	15
Maidens, Kirkoswald, Dailly, Barr, Barrhill, Colmonell, Ballantrae	S. Ayrshire	10
North Girvan	S. Ayrshire	10
Newton Stewart, Glentrool village	D&G	10
Most of Cumnock	E. Ayrshire	10
Sinclairston, Ochiltree and rural area around Mauchline (going outside the GSA Biosphere boundary)	E. Ayrshire	10
Straiton, Minishant, Dunure	S. Ayrshire	10
Maybole	S. Ayrshire	10
Coylton, Hillhead	S. Ayrshire	10
Whithorn, Sorbie, Wauphill, Wigtown	D&G	10
Sanquhar, Mennock, Wanlockhead, Kirkconnel	D&G	10
Thornhill, Carronbridge, Closeburn, Durisdeer	D&G	10
Muirkirk, Sorn and land surrounding New Cumnock and Cumnock	E. Ayrshire	10
Auchinleck	E. Ayrshire	5
Port William, Kirkcowan, Glenluce, New Luce, Cairnryan	D&G	5
Dalmellington	D&G	5
Patna, Hollybush, Dalrymple	E. Ayrshire	5
New Cumnock	E. Ayrshire	0
Drongan	E. Ayrshire	0
South part of Cumnock, Netherthird, Craigens	E. Ayrshire	0
South Girvan	S. Ayrshire	0
Total		**210**

In addition to these business figures, visitor numbers offer insights into the extent of the tourism industry in an area. A report by Visit Scotland (2014, p.5) shows visitor numbers for some of the top attractions in the country, using data collected via the Great Britain Tourism Survey. With Galloway Forest Park standing out as by far the top attraction, these data provide some evidence that outdoor leisure pursuits are a key draw for those visiting the GSA Biosphere. However, we cannot draw definite

conclusions from these figures as data is only available for the largest attractions in Scotland. To give some comparison to similar outdoor attractions, Queen Elizabeth Forest Park received 278,109 visitors and Eglinton Country Park 335,284 (Visit Scotland, 2014, p.5). The same publication reports that the Gross Value Added figures from sustainable tourism for the Local Authorities in the GSA Biosphere are £68.9m for Dumfries and Galloway, £83.4m for South Ayrshire and £30.1m for East Ayrshire.

Table 13: Tourist numbers for all attractions in the GSA Biosphere featured in 'Tourism in Scotland's Regions' (Visit Scotland, 2014, p.5)

Top attractions in GSA Biosphere	Visitor numbers, 2014
Galloway Forest Park	441,307
Culzean Castle and Country Park	207,116
Heads of Ayr Farm Park	148,389
Cream o'Galloway	62,000

2011 Census data shows that 4% of housing stock is made up of second homes or holiday homes. This is somewhat higher than the Scottish average of just 1%. However, 2001 data from across Scotland shows that this varies greatly: 20% or more of the housing stock in some wards, mostly located in the Highlands and Islands, are second homes or holiday homes (Bevan and Rhodes, 2005). This indicates that tourism in the GSA Biosphere is far less developed than some other rural parts of Scotland.

TRANSPORT, ACCESS TO SERVICES AND INFRASTRUCTURE

Access to services is often described as a key challenge for people living in rural areas of Scotland (Citizens Advice Scotland, 2015, p. 5). Table 14 shows the average times it takes to get to a range of services by car and public transport in the GSA Biosphere compared with Scotland as a whole. The average time is longer by between 0.8 minutes and 2.7 minutes within the GSA Biosphere across all services, as are average travel times when travelling by public transport as opposed to car e.g. it takes an average 12.6 minutes to travel to a GP surgery by public transport compared to only 4.5 minutes by car.

Table 14: Average distances to key services in GSA Biosphere and whole of Scotland, 2011 Census

	GSA Biosphere (mins)	Scotland (mins)	Difference (mins)
Travel times to services by public transport			
GP surgery	12.6	10.3	2.3
Post office	9.8	8.6	0.8
Retail centre	15.4	13.5	1.9
Travel times to services by car			
GP surgery	4.5	3.4	1.1
Post office	3.5	2.7	0.8
Retail centre	6.6	5.2	1.4
Primary school	3.3	2.5	0.8
Secondary school	8.8	6.1	2.7
Petrol station	4.8	3.7	0.9

Table 15 shows the modes of travel for getting to work or education. The most common form of transport is car or van (43%) followed by 'on foot' (17%). 12% use public transport and 16% work or study from home. These data are similar to those for Scotland as a whole. There is no available data on the frequency of public transport or those who do not have access to it.

Table 15. Type of travel by those aged 4 and over who are studying or aged 16 to 74 in employment in the week before data collection, 2011 Census

Form of transport to work or study	GSA Biosphere %	Scotland %
Driving a car or van	43	41
On foot	17	18
Work or study mainly at home	16	11
Bus, minibus or coach	10	13
Passenger in a car or van	10	9
Train	1	3
Taxi or minicab	1	1
Bicycle	1	1

Other	1	1

Table 16 gives an overview of the spread of villages across the GSA Biosphere that do not have access fibre optic cables in order to access super-fact broadband. Villages within all three local authorities are included and a high number of others only have partial access.

Table 16. Selected areas where fibre optic broadband unavailable, 2017 Ofcom

Selection of exchanges in GSA Biosphere where Fibre broadband is not currently available		
Auchenmalg	Crosshill	Mochrum
Ballantrae	Dailly	Mossyard
Bargrennan	Dalleagles	Old Dailly
Barr	Dundrennan	Parton
Barrhill	Dunscore	Pinwherry
Cairnryan	Durisdeer	Straiton
Carsphain	Kirkcowan	Townhead
Colmonell	Lendalfoot	-
Corsock	Marrburn	-

Table 17 shows the patchy access to mobile phone signal across the GSA Biosphere. Of the 40 postcode areas below, only 6 have full access to all mobile services across all four mobile networks. Barr stands out as having no mobile coverage by any network.

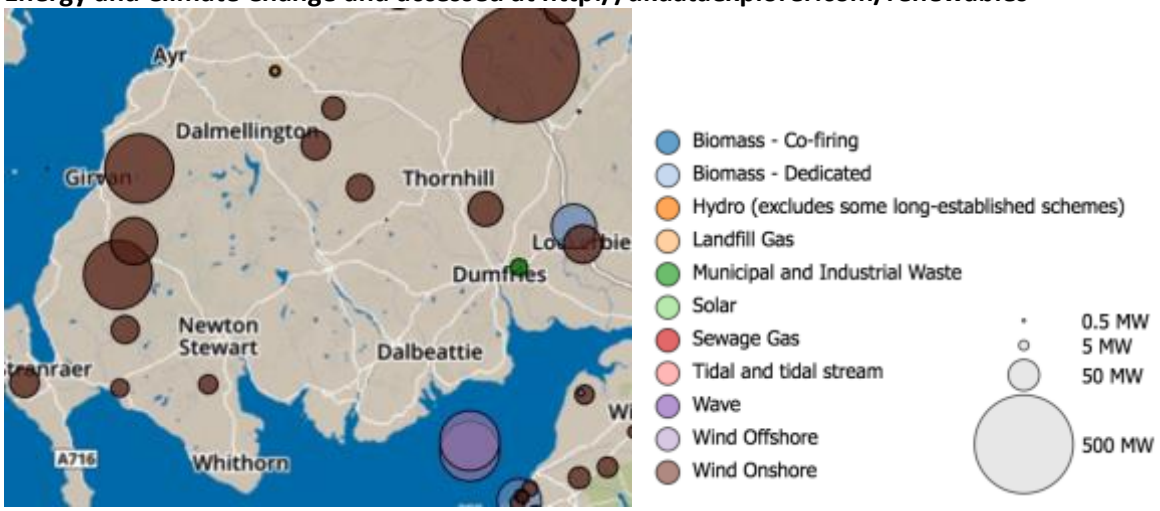
Table 17. Selected areas showing outdoor mobile coverage for a range of postcodes in the GSA Biosphere, across all four networks, 2017 Ofcom

Postcode	Location	Phone calls				3G internet				4G internet			
		EE	o2	VP	3	EE	o2	VP	3	EE	o2	VP	3
KA18 1DT	Cumnock	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	X
KA18 2HZ	Auchinleck	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	X
KA18 2PB	Ochiltree	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	X
KA18 4AZ	New Cumnock	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
KA19 7NQ	Straiton	Y	X	Y	Y	Y	X	X	Y	Y	X	X	Y
KA19 7PN	Kirkmichael	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
KA19 8ES	Minishant	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
KA26 0AG	Girvan	Y	Y	Y	Y	Y	Y	X	Y	Y	X	X	Y
KA26 0JG	Lendalfoot	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	X	X
KA26 0NH	Ballantrae	Y	Y	Y	Y	Y	X	X	Y	X	X	X	X
KA26 0RW	Pinwherry	Y	X	Y	Y	Y	X	Y	Y	X	X	X	X
KA26 0RY	Colmonell	Y	X	Y	Y	Y	X	X	Y	X	X	X	X
KA26 0TP	Pinmore	X	X	Y	X	X	X	Y	X	X	X	X	X
KA26 9RB	Old Dailly	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y
KA26 9SQ	Dailly	Y	Y	Y	Y	Y	Y	X	Y	Y	Y	X	Y
KA26 9TP	Barr	X	X	X	X	X	X	X	X	X	X	X	X
KA6 6DY	Dalrymple	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
KA6 7HE	Rankiston	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
KA6 7NA	Patna	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X

KA7 4LB	Craig Tara	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
KA7 4LF	Fisherton	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
KA7 4LF	Dunure	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DG7 3RQ	N. Galloway	X	Y	Y	Y	X	X	X	Y	X	X	X	X
DG7 3TQ	Carsphairn	X	Y	Y	X	X	X	X	X	X	X	X	X
DG7 3UP	St John's Dalry	Y	Y	Y	Y	Y	X	X	Y	X	X	X	X
DG8 0PP	Glenluce	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	X
DG8 6HD	N. Stewart	Y	Y	Y	Y	Y	X	Y	Y	Y	X	X	Y
DG8 7JS	Creetown	Y	X	Y	Y	Y	X	Y	Y	Y	X	X	X
DG8 8LR	Isle of Whithorn	X	Y	Y	X	X	X	Y	X	X	X	X	X
DG8 8PS	Whithorm	X	Y	Y	X	X	X	X	X	X	X	X	X
DG8 9AN	Kirkinner	Y	Y	Y	Y	Y	X	X	Y	Y	X	X	X
DG8 9HZ	Wigtown	Y	Y	Y	Y	Y	X	X	Y	Y	X	X	X
DG8 9SA	Port William	X	Y	Y	X	X	Y	Y	X	X	X	X	X
DG9 8PR	Dunragit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
DG9 8RF	Cairnryan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DG3 4HX	Moniaive	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
DG3 5LS	Thornhill	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
DG4 6DX	Sanquhar	Y	Y	Y	Y	Y	X	X	Y	X	X	X	X
DG7 3QF	Balmaclellan	Y	Y	Y	Y	Y	X	X	Y	X	X	X	X

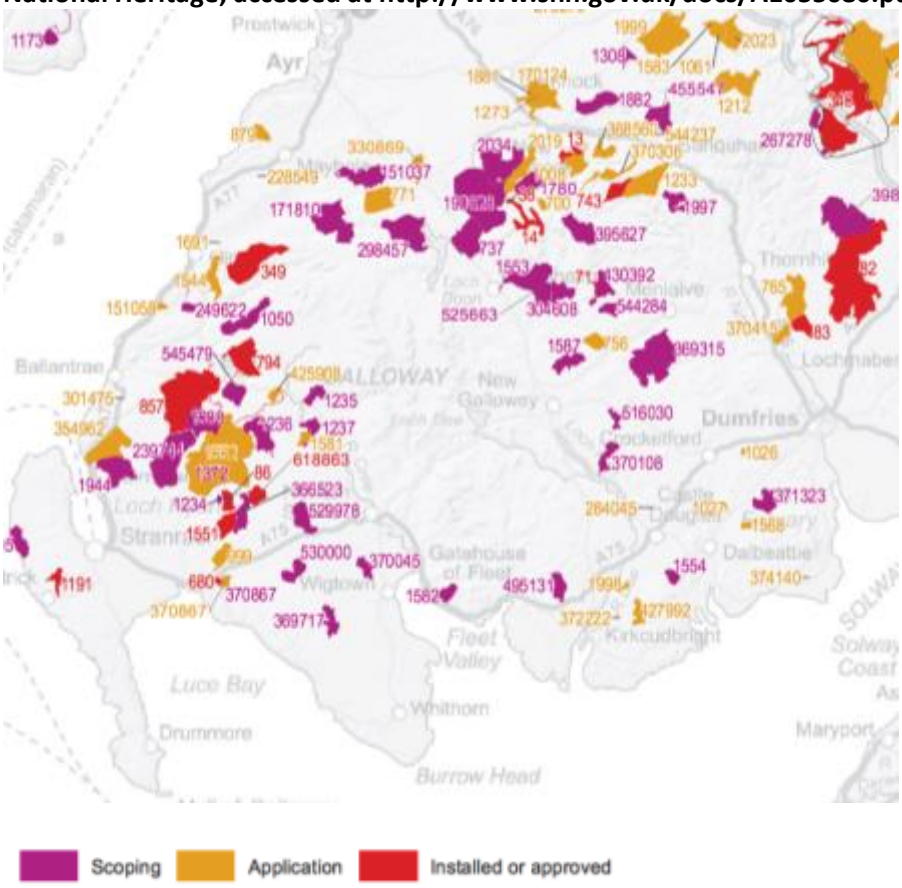
Renewable energy has been identified as an economic opportunity for rural areas but also a potentially contentious issue. The map below shows that by far the most common form of renewable energy generation in the GSA Biosphere is onshore wind.

Map 2 showing renewable energy in the GSA Biosphere, based on 2014 data from Department of Energy and Climate Change and accessed at http://ukdataexplorer.com/renewables



Map 3 also shows windfarm developments - their actual shape, applications that have been submitted and areas that have at some point been subject to 'scoping' by energy companies. This map is several years out of date but nonetheless, shows the high levels of interest in windfarm development in the GSA Biosphere, especially in the area immediately outside the buffer zone.

Map showing existing windfarms, those proposed and areas of scoping. August 2013 Scottish National Heritage, accessed at http://www.snh.gov.uk/docs/A1055080.pdf



QUALITATIVE INTERVIEWS

Thematic Analysis

As outlined in the Methodology section, 16 interviews were conducted across four case study areas: New Cumnock; Carsphairn; a rural area of hamlets and farms west of Newton Stewart; and Auchenmalg and Glenluce. The interviews were transcribed and thematic analysis used to identify the key themes common to all four areas and issues that were important to interviewees in specific areas. These findings have been compared with the quantitative data to uncover commonalities and differences as well as any implications for the development of the GSA Biosphere.

Employment

Lack of employment opportunities was highlighted as one of the key challenges of living in the GSA Biosphere. Most often the concerns related to the need to travel for work and the poor range of opportunities. Where examples of work that is available were given, jobs were relatively insecure and poorly paid.

> *'There's quite a lot of farms around about and caravan parks. There are some jobs for young people but not very much. Then you have to travel when you get employment. There is not much in the village itself.'*

> *'…there is not a lot of local employment and I think that if you chose to live fairly rurally then you have to travel for work.'*

One observation came from a woman in the Auchemalg / Glenluce area who stressed that there were jobs available but went on to describe the barriers some might face and lack of options.

> *'I have noticed that people in this area they say that there are no jobs. My daughter has just moved to the area and believe me there are jobs. You just have to want to do them. People say that is not enough money to be paid. If you want a job you will find a job. This area has a lot of employment… Loads of farming jobs doing milking and things like that. I have seen loads of them advertised. Okay you need your own car. You need to be able to work certain hours. But that is the same with everything. If you don't have a car then you have to stick to towns … There are factories in Stranraer who employee regularly. There are shops, supermarkets so there are jobs there.'*

In New Cumnock interviewees tended to be more emphatic about the overall lack of job opportunities in the town.

> *'This local area was a thriving village but Maggie Thatcher done away with all that. She closed everything and now there are no jobs for the boys. Everybody is moving away and if they do get a job they have got to have a car as there are no jobs here.'*

Another woman highlighted that lack of graduate opportunities and the fact that for young people who left the area to pursue their education, this can prevent them from returning.

'Well my son done a PhD and he had to go away or he wouldn't have got the job he got there. Most of the people that do go to the University, they are all in the same position and there is nothing here for them.'

It was also noted that even though self-employment was an option for some, in sparsely populated areas (in this case a hamlet west of Newton Stewart called Penninghame) it may not be as lucrative as in an urban area.

Transport and Local Services

As evident in the quotes above, transport is a pertinent theme, and often focussed on the poor bus service.

'The bus service is lousy through the day. If I come down from Glasgow [to Carsphairn] it takes me four hours by public transport.'

'Buses are non-existent unless you live on the A75 then buses are regular. But you have to get from here to the A75 where the buses are. Buses don't always connect.'

'I think that public transport is not great in terms of how often and frequent it runs. We have a train station which is really good but the trains don't run that frequently. Bus services can be quite a time between them and for example to travel into work if you worked further afield then that would probably take too long. It would add on quite a chunk to your day.'

Those who had lived in the area for a long time noted changes that had taken place including the development of the A75 and termination of the Dumfries to Stranraer railway line. For residents of Glenluce especially, the A75 development had a dramatic effect on the village. Previously, lorries passing through the narrow main street had been very unpleasant and potentially dangerous. This was brought to an end through traffic being re-directed along the new A75 route, but this also had a detrimental effect on businesses.

'I think there is a local economic depression because a lot of village traditional ways of lifestyles are impossible to pursue anymore and the village where we are particular have suffered enormously over the past two or three decades with economic depression… It has become, not a self-contained village anymore it has become transient village where people don't have a lifestyle within the village'

No longer having these services in Glenluce had the knock-on effect of making residents more dependent on those in Stanraer – thus making the poor bus service even more of a problem.

'[The biggest challenge is] the bus service to get into Stranraer. We only have the shop in the village and we don't have a post office or bank now, so we have to travel. We had a bank and post office.'

There is evidence that those with disabilities could be particularly affected by the combination of local services closing, lack of employment and poor public transport.

'Everything is closing. Most of the pubs and shops have gone. The bank and post office have gone.' Interviewer: 'Is that a challenge then of living somewhere like this?' 'Probably will be in later years.

It is especially for my son who is disabled. At the moment I am fine as I can still drive but I can see in a few years being difficult… The buses are becoming less and less, I would say that is mainly the worse thing.'

'My daughter has a visual impairment and she won't be able to drive so I don't envisage her future being based here, there is not enough local employment here.'

On a more positive note, some commented on new developments and community-run organisations in their towns and villages. This was especially true for New Cumnock where several projects were underway or had been completed and were warmly welcomed by residents.

'There was nothing done for years until Prince Charles has done up the town hall and now that's where the community centre is. They are landscaping it and rebuilding the swimming pool. It is going up and up! I was at 'the rural' there last week and there was a park ranger that was there and there are plans for walks round the dams and hills.'

Landscape, Tourism and the GSA Biosphere Designation

Residents from all four areas had consistently positive views on the surrounding landscape. When interviewees were asked to reflect on positive aspects of their local area they generally referred to its tranquillity, quietness, beauty and unspoilt nature.

'It is so tranquil and peaceful.'

'… the hills, trees, sheep and the colours. That is certainly appealing. When you look out the back garden and you see the view we have got, you just don't get that even where I use to stay. It is very open here and you can see quite a distance.'

Some people's descriptions of the landscape were quite general, showing an appreciation of the natural beauty without picking out specific features or preferred places to visit. Others took a keen interest in the outdoors and had visited specific sites such as Loch Trool or explored the Solway coast. Those who were born in the area were more likely to have a general appreciation of the local landscape and go on walks immediately accessed from their town or village, while incomers were more likely to take an active interest in exploring further across the region. One respondent who had moved in from an urban area commented on the health benefits of living in a remote, less polluted part of the country. For parents, accessible outdoor leisure activities made the GSA Biosphere an attractive place to live.

'My kids are now 13 and 11 and we found it really good as there is loads of woodland walk areas. We like to walk up the dam and around it on a Sunday just for pleasure.'

'There is about six playparks here. There is always something for [kids] to do. In the summer you have the river and it is quite shallow in the summer so you can go down there and splash about.'

While interviewees were not asked specifically about tourism in the area, when it came up in the conversations interviewees generally commented that they did not think of the area as 'a tourist destination'. This is despite regular reference to outdoor activities that could be attractive to tourists.

'It is not really a proper holiday area because people just don't know about it'

'… the majority of tourists that come to Scotland I believe are principally English and they bypass this corner and they continue to the well-known places of Scotland maybe like cultural places like Edinburgh and the west coast'

'There are a lot of things to do, not necessarily normal activities you would imagine. Just round the corner there is the lighthouse and loads of really nice places to be.'

'Cycling is easier as it is relatively flatter, hill walking and going along the coast. The entire coastal beach here, you could spend a lifetime. Why go anywhere else?'

'The countryside has beautiful walks… You will have heard of the bings? Well they made all that into a walk and it is a beautiful walk from here to Connel Park and right round and you come out at the castle and it is lovely. A lot of folk have planted flowers in it.'

Interviewees had very little awareness of the GSA Biosphere or any other designations in the area, although a few mentioned the Dark Sky Park. When asked about the Biosphere, some commented vaguely that the term made them think of something along the lines of the Eden Project. The only respondent who had heard of the GSA Biosphere was supportive of this type of initiative in principal, but remained unconvinced of the benefits. She had learned about the GSA Biosphere through a talk given in Carsphairn and some of her scepticism was directed more towards the proposed woodland project, rather than the GSA Biosphere. The following quote highlights the potential difficulty in communicating the concept and gaining public support.

'There was a chat about it. It is quite a big area isn't it? … Environmentally I would support it. They didn't give a great deal of detail… This woodland thing is meant to be providing jobs. How? What kind of jobs? Nobody seems to have any information on anything.'

Sense of Community

A 'sense of community' featured prominently in the interviews but is unavailable as a quantitative measure. It was often cited as a reason for staying in the area or, for those who have chosen to make it their home, a reason to move in.

'We quite like the close knit community.'

'Everyone is so friendly and you know everybody and everybody looks out for the older people. We look after them if they are in the shop and keep them right.'

'People here are very honest, hospitable, down to earth, helpful and trustworthy and that is what I find inspiring when I come here that anybody I talk to here are very forthright, trustworthy and worth talking to'

This was not quite universal though. For one interviewee from Carsphairn, the exodus of residents following severe floods as well as unrelated deaths of neighbours, had left her feeling isolated.

'Virtually everybody that I have known has gone. A lot of people have died a lot of old folk in the village and a lot of people have moved on.'

Some also weighed up the positives of living in a tranquil, close-knit community with the negatives of it being quite quiet with not much activity.

'It is not so busy which is good. It also has its drawbacks because there is nothing going on but it is a nice quite place to live and everybody knows everybody.'

When migration was mentioned, either from other parts of the UK or from abroad, none of the interviewees sampled expressed negative feelings towards incomers. New residents also reported being made to feel very welcome in their new communities.

'Everything seemed to gel together for us ... It is a rural environment, tiny village and you get to know people easily.'

Other Themes

Several other issues were raised as being important for the participants' perceptions of the area but only in one or two of the case study areas.

- Flooding was the primary issue for those residents who had experienced it in Carsphairn and New Cumnock, with respondents reporting that they or their neighbours had had to wait many months before returning to their homes
- Windfarms were a concern for a few participants in Glenluce and the area north west of Newton Stewart: this was not expressed in terms of hostility to all windfarms but a feeling that there were too many in the area
- One person (in Carsphairn) commented on the poor internet connection

DISCUSSION AND CONCLUSIONS

Discussion

Comparing the quantitative and qualitative findings, some issues consistently emerge. For example, the identification of jobs as all too often poorly paid, of poor quality and with few opportunities for graduate level employment across the GSA Biosphere. Some areas in the north of the Biosphere struggle with a general lack of job opportunities and the resulting high rates of unemployment.

For residents, issues of employment intersected with transport and the difficulties involved in having to travel for work. The transport data shows that people need to travel beyond the norm to access key services while the combination of poor public transport and local services closing can make living in the area more difficult.

The data indicates that the potential for 'GSA Biosphere tourism' is under-exploited and while there are concentrations of tourism-related businesses and a handful of popular attractions, tourism is not a major part of the local economy. Residents felt the GSA Biosphere did not attract tourists despite the consensus that it was a scenic area with a wide range of outdoor activities. Any potential developments must be balanced with maintaining the tranquillity of the area and should not damage the natural assets being promoted – that is, they should be authentic ecotourism. Increased online promotion would help raise visibility of the GSA Biosphere to tourists, especially if this could be coordinated with other Biospheres and national and local tourism bodies.

Knowledge of the GSA Biosphere was very low showing there is still work to do to promote the concept to those living there. Evidence from policy documents suggests awareness of the GSA Biosphere within the three Local Authorities is also low. The fact that the GSA Biosphere crosses regional boundaries may make this task more difficult than for other UK Biospheres but there is evidence from the Rhön Biosphere Reserve that promotion of an ecological area that crosses regional boundaries is possible.

One issue that arose in the interviews but cannot be captured through secondary data analysis is the sense of community that is so important to many of the residents of the GSA Biosphere. Along with natural assets, this was cited as one of the best features of the area.

Poor telephone and internet coverage did not emerge as major issues in the interviews despite the fact that many parts of the GSA Biosphere experience poor services for either one or both types of technology.

Key Challenges in the GSA Biosphere

- Many towns and villages, particularly in the north of the GSA Biosphere, experience high unemployment and limited options for quality employment across the Biosphere;
- Residents are poorly served by public transport and lack of access to services;
- The demography of the area, characterised by an aging population, will have increasing impact on the range of services needed, the dependency ratio and the economy;

- Opportunities to promote the area as one of natural beauty have not been utilised to best advantage;

- The GSA Biosphere is relatively unknown and further work is necessary to communicate its purpose, especially if collaboration is being sought from businesses, communities and Local Authorities

Key Opportunities in the GSA Biosphere

- Collaboration with tourism bodies and other Biospheres to better promote tourism in the area and raise awareness of the GSA Biosphere;

- Support for businesses offering ecotourism in the GSA Biosphere, given the potential for this as a growth sector and the important part that small businesses already play in the regional economy;

- Involvement of local communities in ecotourism development, where possible, as this has been found to help ensure the natural assets promoted are not then degraded

- Exploration of ways to counter the negative effects of services closing and poor public transport e.g. community-run shops, car share schemes, community bus schemes, better cycling infrastructure;

- Wind farm development's potential to bring funding, especially if community-led;

- Exploration of the potential of community development opportunities that draw on the existing sense of community in the GSA Biosphere e.g. community buy-outs or setting up Development Trusts;

- Deepening existing relationship with resource-based industries and building new ones where possible; and,

- The potential for outdoor education, given the lower levels of educational attainment in the GSA Biosphere and the issue of young people leaving the region for opportunities elsewhere.

Recommended Areas for Further Research within the GSA Biosphere

- Land-based sector characteristics across the GSA Biosphere and how these could be developed sustainably;

- Primary data collection to better understand the extent of tourism across the region;

- The development potential of sustainable tourism (of which ecotourism is one component); and,

- Perceived and actual impacts and beneficiaries of windfarms within the Biosphere.

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