A wide-angle photograph of a coastal landscape. In the foreground, there are sand dunes with distinct wind-swept ripples. To the left of the dunes is a field of green grass and low-lying shrubs. In the background, a small town or village is visible on a flat area, with the sea and distant hills under a blue sky with scattered white clouds.

The State of North Devon UNESCO World Biosphere Reserve

Co-authors: Andrew Bell, Emilie Le Helloco and Rose Stainthorp

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Abbreviations

Marine Protected Area (MPA)

Marine Conservation Zone (MCZ)

Recommended Marine OCnservation Zone :(rMCZ)

United Kingdom Committee for UNESCO Man and the Biosphere Programme (UKMAB)

Biodiversity Action Plan (BAP)

Site of Special Scientific Interest (SSSI)

British Trust for Ornithology (BTO)

Royal Society for the Protection of Birds (RSPB)

Geographic Information System (GIS)

Bird of Conservation Concern (BoCC)

Species of European Conservation Concern (SPEC)

Marine Nature Reserve (MNR)

Introduction

The North Devon Biosphere Reserve

World Biosphere Reserves are designated by the United Nations Education, Science and Culture Organisation as part of the Man and Biosphere Intergovernmental Science Programme. They serve to be world class exemplars of sustainable development on an ecosystem scale.

The “State of the Biosphere Reserve” report has been produced as part of the Periodic Review Process required every 10 years by UNESCO in the Statutory Framework for Biosphere Reserves.

The indicators in the report have been chosen through an interactive process with the Biosphere reserve's governing partnership and various researchers .

The indicators ultimately used are a result of the compromise of the optimum indicators and the best available data that can offer some trends.

Common to all the data sets, is either a lack of appropriate resolution in time or space to give a reliable trend. However since this is the first of such reports, it provides an excellent basis to start from to build a good monitoring framework.

This document should be read as a snapshot of the data for the Biosphere Reserves as it stands. The trends often mask the work done by partners in the Biosphere Reserve, these are captured in the reports on the strategy.

These indicators will be used to define the new strategy for the Biosphere Reserves from 2014.

Structure of the report

This report is a global view of the state of the biosphere reserve. The aims are to define the evolution of the area and define new projection for the future of the biosphere.

It is the global state (big part of the species and demographic, economic, resources development)

Each section is organised, first comparison with Devon and National scale where the data exist.

Explanation of the data and methodology use.

For the part of the state of the nature, the organisation was defined by habitat grouping species in link.

In each section different sectors are approached.

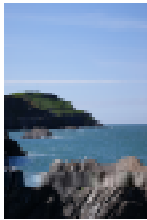
Graphics and maps are described and analysed, to define some issues.



Figure 1: The boundary of the North Devon Biosphere Reserve is shown in red with the main population centres labelled.

Marine and Coastal

Habitat status



North Devon Biosphere is

inextricably linked with the marine environment; some 147,000ha of marine area form part of the transition zone (UKMAB) and the influence of the marine environment is felt not only by those living on the coast but throughout the Taw-Torridge estuary. The river remains tidal up to Weare Giffard on the River Torridge and up to Tawstock on the River Taw (Biosphere Estuaries BAP), and much of the economy of the area is built on maritime pursuits(???)

The south-west of England has some of the richest and most diverse marine communities in the country; it lies within the zone where the cold North Atlantic Ocean meets warmer water from the south so many species that are present along this coastline are living at the limit of their distribution (Biosphere BAP).

The core area of the Biosphere Reserve is centred on the Braunton Burrows 1300 Ha dune system which is internationally recognised as one of the best examples in the northern hemisphere (UKMAB ... <http://www.ukmab.net/north-devon/>). North Devon also contains four more of Devon County's six dune systems: Croyde Bay, Instow Dunes,

Northam Burrows and Woolacombe Sands & Down (Biosphere Sand dunes BAP). This type of habitat is created through natural coastal sediment systems and the dynamic nature of the environment means that only plants able to survive the extreme conditions of salt spray exposure, water stress and typically absence of a soil layer can be found here (State of Devon's Nature 2012).

The unique plant communities that colonise these systems support an equally unusual assemblage of animal species, many of which are themselves rare or protected, such as the Sand Dune Tiger Beetle, the Amber Sandbowl Snail and the Ringed Plover (Biosphere sand dune BAP). The State of Devon's Nature report 2012 found that Saunton to Baggy Point



Braunton Burrows

was in favourable condition, but that Braunton Burrows and Northam Burrows were threatened by “scrub encroachment and coastal defence structures



Cliffs and rocky foreshore at Westward Ho!

reducing the capacity for natural coastal processes to take place”.

The coastline of northern Devon is 312km long, a large part of which has some of the most diverse rocky foreshore habitat in Britain (Biosphere Rocky Intertidal BAP). Coastal SSSIs with significant areas of rocky habitat in the Biosphere Reserve include: Westward Ho! Cliffs, Morte Point, Saunton to Baggy Point coast, Marshland to Clovelly coast, and Lundy Island.

Rocky foreshore is defined as areas of bedrock

and man-made structures, and their associated flora and fauna, that are found between mean high water and mean low water marks (Biosphere BAP). Plant and sedentary species in this habitat have to be able to withstand both daily submergence by seawater and exposure to the air, typically absence of any



Cliff tops and coastal grassland at Woody Bay

sediment, and scouring by rocks that are moved around in the surf.

The Honeycomb worm and Oystercatchers are both important species of this habitat. The cliffs and maritime slopes above the foreshore are also valuable as coastal grassland and heath habitat, wetlands and woodlands. They are very exposed; subjected to gale-force winds, salt spray, erosion and landslides. Importantly the steep slopes and ledges provide breeding ground for seabirds such as the Fulmar and Peregrine falcon. The State of Devon's Nature report 2012 assessed all of the maritime cliff and slope SSSIs and found only one in the Biosphere that was 'unfavourable declining or no change'—Marshland to Clovelly coast. The reason identified for this was cited as "scrub encroachment due to lack of appropriate grazing".

The deposition of silts and clays (mudflats) and sands (sandflats) in sheltered areas such as estuaries creates these highly productive habitats (State of Devon's Nature 2012). The Taw-Torridge estuary is the only one out of the 12 estuaries in Devon that lies within the Biosphere and it forms the buffer zone of the Reserve (Biosphere BAP). The fauna communities that thrive in the enriched sediments of these habitats include tiny pea crabs that live inside mussel shells, lugworms which burrow in the mud, and

Hydrobia snails that graze on it's surface at low-tide (UKMAB). This in turn provides feeding and resting grounds for waterfowl such as winter migrant population of Lapwings, Shelducks, Oystercatchers



Salt marsh in Branton. Courtesy of North Devon AONB

and Ringed Plovers (Biosphere BAP).

The upper portion of intertidal mudflats, under the right conditions, are colonised by salt tolerant plant species that can withstand regular immersion and thus form salt marsh. The flora forms distinct "bands" parallel to the shoreline on mature, stable salt marshes; corresponding to a salinity gradient as the upper portions of marsh will be covered by the tide for less time through the day. This results in a extremely diverse community that provides nursery areas for fish as well as feeding and breeding grounds for waders and



Sheep grazing Brauntun salt marsh. Courtesy of ND AONB

the coast of the biosphere, there are also a wide range of seabed substrates in the area, giving rise to correspondingly diverse communities on the seafloor and in the water above (Biosphere BAP). Year round residents include Harbour porpoise and Grey seals and in the summer months Sunfish and Basking sharks can also be spotted. But the charismatic mammals are not the only important species in the area, Lundy Island is home to a number of endemic species such as the Lundy Cabbage and the Lundy Beetle.

wildfowl. In the Biosphere Reserve, Isley Marsh is a designated RSPB Reserve where many rare bird species can be seen, and Northam Burrows Country Park has an area of salt marsh that is also of international significance for bird populations.

Grazing by sheep and cattle is still practiced on parts of the marsh, as it has been for over a century, which also helps to maintain conditions suitable for some wintering bird species (UKMAB). However, the State of Devon's Nature report 2012 found that the Taw-Torridge SSSI was 'unfavourable no change' due to "over-grazing of saltmarsh and adjacent roads preventing transition to an upper saltmarsh grassland".

As well as the meeting of two bodies of water off

Marine and Coastal

Key species in the Biosphere Reserve



Nationally, coastal birds

populations appear to be doing well (State of Nature, 2013), but looking at the overall trend can mask considerable variation between species, as can be seen in the key species identified in this report.

Lapwings appear to be doing well in the Biosphere Reserve (**Figure 2**), despite suffering significant declines nationally, after being identified as a 'key species for conservation' in 'The Nature of Devon' report (1998). These birds use salt marsh as breeding and feeding grounds and the Taw-Torridge estuary is well known for its extensive marsh areas, a number of which are internationally recognised reserves.

The increase in the Shelduck population of the Biosphere Reserve (**Figure 2**) mirrors the national trend, coinciding with range expansion from the 1960s (BTO (<http://www.bto.org/birdtrends2004/wcrsheld.htm>)).

The Oystercatcher was identified as a 'key species for conservation' in the 'Nature of Devon' report (1998) however the population has continued to decline since 2002 (**Figure 2**) which may reflect overexploitation of the cockle beds that it relies on for food.

Ringed Plover populations have been identified on the BTO Nest Record Scheme concern list after experiencing declines nationally and a marked increase in nest failures. Correspondingly, the population in the Biosphere has also declined (**Figure 2**), this is probably due to human use of the beaches where this species likes to breed.

Although the numbers of seabirds breeding in the UK has increased considerably since the 1960s, mainly due to reduced hunting pressure from humans and fisheries discards, this trend masks the significant variation between species. Some marine bird populations have suffered in the past decade; both nationally and in Devon declines in numbers have been attributed to changes in sandeel availability,

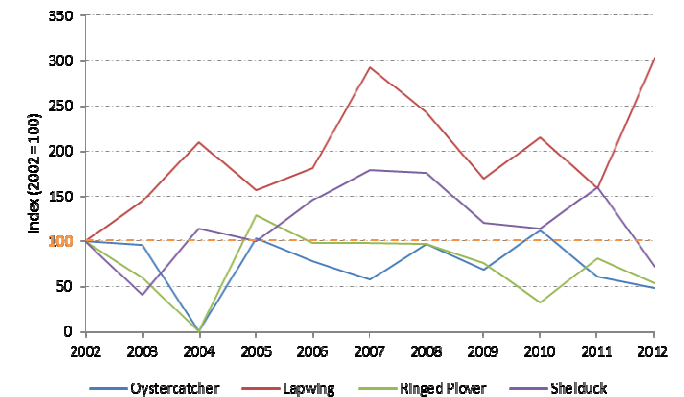


Figure 2. The population trends of the estuarine bird species are mixed. Lapwings and Shelducks have increased during the time period, whilst Oystercatchers and Ringed plover populations have shown a small decline.

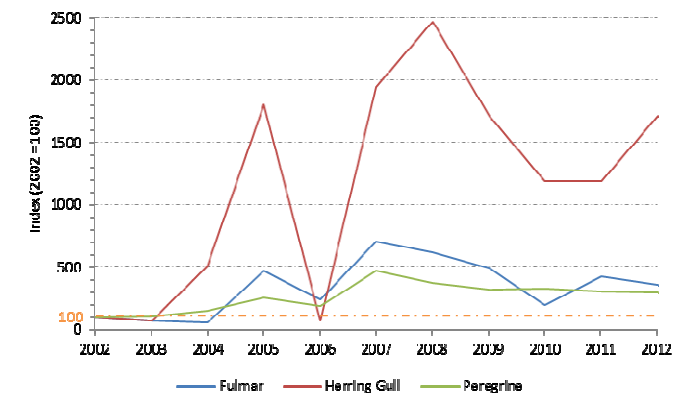


Figure 3. Overall the seacliff habitat bird species are faring well. The Fulmar and Peregrine populations both show a moderate but steady increase since 2002 whilst the Herring gulls exhibit much more variation year to year, and a much higher magnitude of change over the last 10 years.

predation of eggs and fledglings by rats, and climate change.

Herring gulls are afforded the highest conservation priority (Red status, BoCC) despite being seemingly widespread and especially common in seaside towns. The species has declined nationally by more than half within the last 40 years (State of Nature 2013) and the breeding population is confined to less than ten sites throughout the UK (RSPB). However, the population in the Biosphere Reserve has shown a marked increase over the time period

(2002-2012) (**Figure 3**). Some experts suggest that the rise reflects increasing numbers of urban gulls due to land fill sites providing easy food as well as people feeding the gulls, particularly over the summer months when the area sees a large influx of tourists.

The peregrine falcon was identified as a ‘key species for conservation’ in Devon in 1998 (‘The Nature of Devon’ report) and historically has suffered from illegal killing by game keepers and egg collecting. Since the 1970s the population nationally has been slowly recovering and it is encouraging that

the population appears to be doing well in the Biosphere Reserve (**Figure 3**).

Table 1. The key species identified in this report represent many of the marine and coastal habitats present in the Biosphere Reserve. The birds are at various levels of conservation concern and populations often include both residents and migrants.

Species	Conservation status	Resident / migrant status	Where to see them
Herring gull (<i>Larus argentatus</i>)	UK Priority BAP; Red status BoCC	Common resident; uncertain migrant status	Widespread—seaside towns and inland throughout year
Fulmar (<i>Fulmarus glacialis</i>)	Amber status BoCC	Common resident except Autumn; passage migrant	Always offshore except when breeding
Peregrine falcon (<i>Falco peregrinus</i>)	Green status BoCC	Uncommon resident; winter/passage migrant	Rocky seacliffs and uplands during breeding
Oystercatcher (<i>Haematopus ostralegus</i>)	Amber status BoCC	Rare resident; autumn/winter migrant	Almost all coasts of the UK and major estuaries
Lapwing (<i>Vanellus vanellus</i>)	UK Priority BAP; Red status BoCC; SPEC (2)	Uncommon resident; winter/passage migrant	Farmland and wetlands (estuaries)
Ringed plover (<i>Charadrius hiaticula</i>)	Amber status BoCC	Uncommon resident; winter/passage migrant	Beaches and coasts around the UK
Shelduck (<i>Tadorna tadorna</i>)	Amber status BoCC	Common resident; winter/passage migrant	Mainly coastal areas, some inland reservoirs; population swells during breeding season (winter)

Marine and Coastal

Biosphere Reserve: marine projects

The health of the marine and coastal wildlife of the reserve is dependent upon the sustainable and considerate use of the ecosystem by the community and many of the threats to marine and coastal habitats nationally arise from human activities. However, the Biosphere Reserve has numerous coastal habitat creation and enhancement schemes that aim to manage this sensitive ecosystem in a sustainable way, working with local communities so that people living in the Biosphere are not excluded from important sites but instead can be involved in their protection.

Over the last 10 years the Biosphere Reserves partnership has led a number of projects to support the marine environment. They include the following

2008 Marine pollution monitoring; a partnership project thorough LEADER funding in partnership with the Ouest Cornouaille region to formalise marine litter monitoring and encourage behaviour change in the areas that were making the most problems. This was largely local sourced pollution, where campaigns were set up to inform people about careful disposal of litter. An added bonus was working with the fishermen to reduce litter that “blinded” the fishing nets. So a responsible fishing programme was set up with the local trawlerman’s association to recover

litter from the seabed.

2001 Recreation code of conduct

2002, 2003, 2012 Saltmarsh habitat creation

2002 and onwards Dune management

2004 Support fisheries management measures for Ray Box and Responsible Fishing Scheme

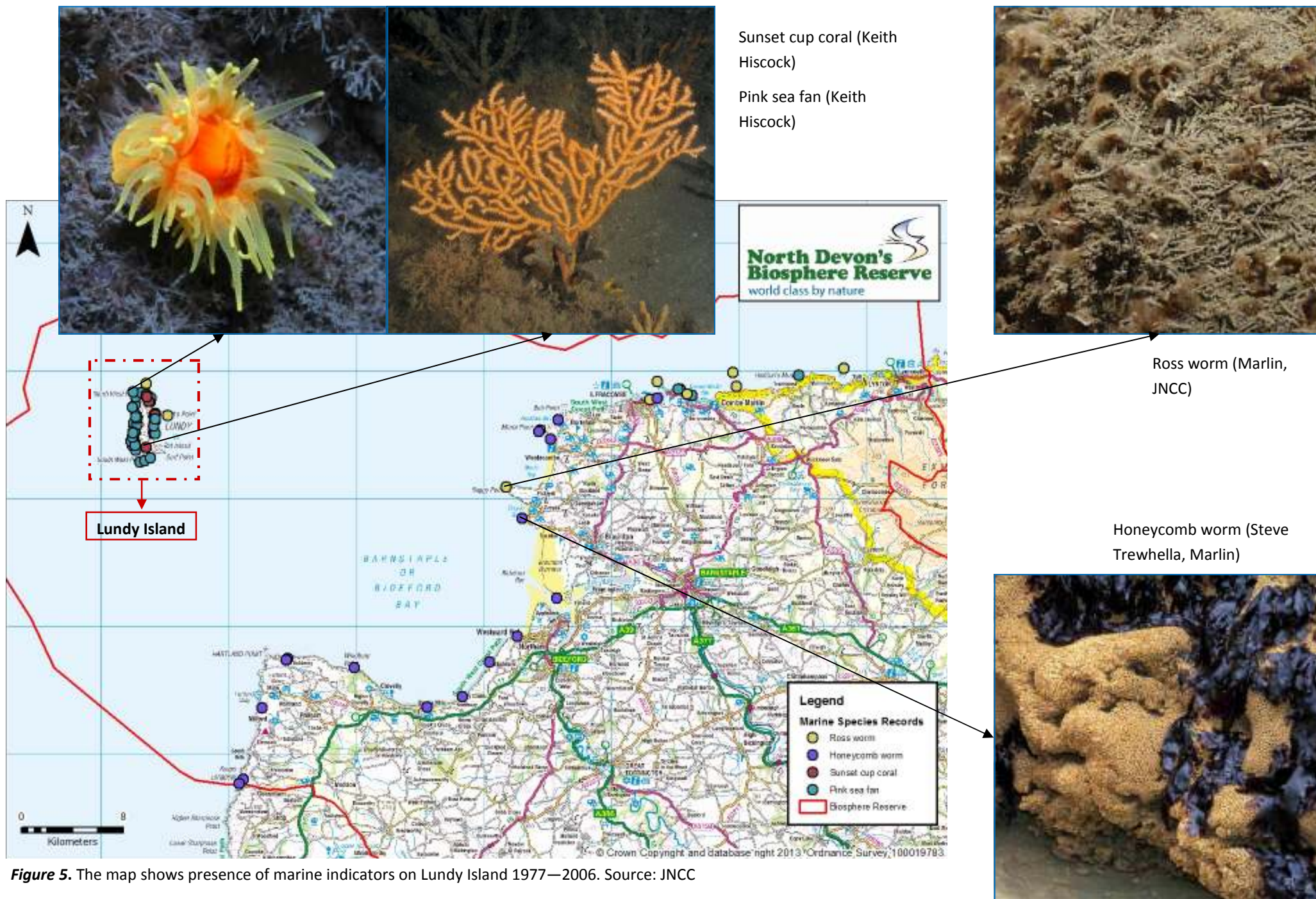
2008 Geomorphological Study of the estuary and its expected evolution over the next 100 years

2010 Coastal defence policy through Shoreline Management Plan

2010 Estuary management plan

2012 Shellfish resource assessments

2012 MCZ recommendation



Sunset cup coral (Keith Hiscock)

Pink sea fan (Keith Hiscock)

Ross worm (Marlin, JNCC)

Honeycomb worm (Steve Trehwella, Marlin)

Rivers and wetlands

Habitat status

National

River and wetland habitats cover only 3% of the UK's land surface but support 10% of all our species. They provide many ecosystem services such as protection from flooding, dispersion of pollutants, and water provision, as well as recreational and cultural value. Overexploitation of these resources threatens this habitats and it is particularly sensitive to water-extraction activities and pollution. The colourful and charismatic Kingfisher is just one example of a species that lives in this habitat, but it is very sensitive to pollution as it relies on the health of the river for its food supply and nationally the population has suffered declines in recent years.

Unfortunately, we lack reliable trends and data for many species of conservation interest, which is why reports like this are so important in providing a baseline from which future trends can be measured.

Devon

Approximately 3500km of river runs through Devon, providing an important habitat for species such as otters, bats, atlantic salmon and brown trout. 373 river water bodies were monitored and classified in the 2012 State of Devon's Nature report; they found that less than 1/3 were in good condition, 57% were in moderate condition but 24% were in poor or bad condition.

The Northern Devon Nature Improvement Area is one of twelve national landscape scale schemes piloted in 2012; led by Devon Wildlife Trust it aims to improve water quality in the Torridge catchment ecosystem in order to restore the health of the freshwater habitats in this area.

Biosphere

Coastal and floodplain grazing marsh is a UK BAP Pri-

ority Habitat as it is important for breeding and migrant waders like snipe, lapwing and curlew, as well as internationally important wintering wildfowl including swans.

The habitat functions as a buffer against flooding events and reduces the energy of advancing tides which supports man-made flood and coastal defences. However, in light of rising sea-levels, these defences can restrict the migration of the habitat inland and future foreshore management must adapt to this threat or risk losing large areas of this habitat nationally.

The Taw and Torridge rivers are the main water bodies running through the Biosphere Reserve, with many smaller tributaries feeding into them before reaching the estuary mouth and the sea. The Torridge headwater is near Hartland whilst the Taw rises on Dartmoor. The streams and rivers that run directly into the sea from Hartland to Lynton are also included in the Biosphere water catchment area.

Water banks and vegetation in the riparian zone provide a range of habitats for wildlife and create a 'corridor' through the countryside linking to other important habitats such as grassland and woodland. One particularly well-known species in the area that relies on these corridors is the otter.

The Culm grasslands are internationally important habitats and are becoming increasingly rare and scarce due to agricultural improvement, particularly in the lower Taw valley. Wet grassland on the Culm measures has decreased by 3.5% since 1998 (State of Devon's Nature 2012), largely due to abandonment of marginal land and inappropriate management. The sites where culm habitats have been preserved are in small fields networks that are characteristic of Devon's ancient landscape and on areas of common land, almost all designated as SSSIs and SACs. The current known extent of this habitat in the Biosphere Reserve is 4098ha but the Devon Wildlife Trust's Working Wetlands Project is aim-

ing to restore, recreate and reconnect 2040 ha of culm grasslands throughout the Devon area and to secure 75% of key existing semi-natural features in favourable condition by the end of the project. The total for the priority areas is approximately 65,000ha, the majority of which is in the Biosphere Reserve.

Actions Undertaken:

2007 Preparation of information Water framework Directive + Good ecological status

2008 Catchment abstraction management strategy

2008 Catchment flood management plan, defence flood risk

2010 Catchment sensitive farming initiative, communication and awareness of the diffuse water pollution next to the farmers.

2006 Agri-environment and HLS,

2008 Site status (1 SSSI, 1 Local Nature Reserve, 4 County wildlife sites with important watercourses and 8 CWS with important watercourses .

2008 –2014 Working Wetlands Programme by DWT

2012-2015 Taw River Improvement Project (TRIP) - *link to Freshwater Pearl Mussel; previous Pearl Rivers Project*

2012 –2015 Nature Improvement Area on the River Torridge Catchment

2013 Freshwater pearl mussel survey and site prep.

2013-14 Diffuse Pollution Project on the Torridge

2014 Commencement of Catchment Based Approach for good ecological status.

Rivers and wetlands

Key species in the Biosphere Reserve

Of the species included in this report, both the dipper (*Cinclus cinclus*) and the grey wagtail (*Motacilla cinerea*) are doing well. However, the kingfisher (*Alcedo atthis*) population has declined since 2002. Nationwide, both grey wagtails and kingfishers have declined in recent decades. Both species are vulnerable to harsh winters and the kingfisher is threatened by pollution and unsympathetic management. Kingfishers are a pollution-sensitive species, and with approximately 70% of the water bodies in the Biosphere classified as moderate or less, poor water quality is a likely partly responsible for this decline.

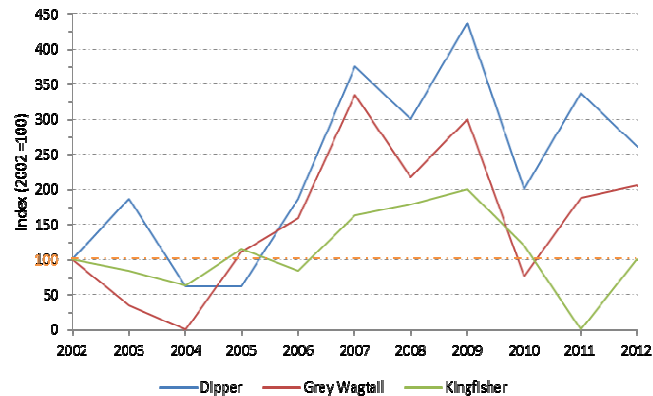


Figure 6. Freshwater birds are doing well in the Biosphere Reserve, both dipper and grey wagtail populations have increased, however, kingfisher numbers have declined over the time period.

Table 2. The key species identified in this report represent many of the river and wetland habitats present in the Biosphere Reserve. The birds are at various levels of conservation concern and populations often include both residents and migrants.

Species	Conservation status	Resident / migrant status	Where to see them
Dipper (<i>Cinclus cinclus</i>)	Green status BoCC	Locally common resident	Year round; fast flowing rivers
Grey wagtail (<i>Motacilla cinerea</i>)	Amber status BoCC	Locally common resident; passage/winter migrant	Fast flowing rivers in summer, farmyards and lowland streams in winter
Kingfisher (<i>Alcedo atthis</i>)	Amber status BoCC; SPEC (3)	Resident	Year round; still or slow moving water



Figure 7.



Figure 8.



Figure 9. Sea trout catch has declined slightly over the time period although the average weight of fish landed has remained relatively constant, lower than the average weight of adult fish.

Throughout the Taw-Torridge catchment there are a number of high quality game fisheries with the main species of interest for anglers being Atlantic salmon, sea trout and the non-migratory brown trout. Both the Atlantic salmon and the sea trout use the rivers for their reproductive and nursery phases, migrating to the marine environment for maturation to adult, completing the cycle by returning to their original hatching ground to spawn.

The Atlantic salmon is a species of European importance. Historically it was widely distributed throughout its range, which included all countries whose rivers entered the North Atlantic, however numbers have declined significantly in recent years, mainly due to man-made barriers to movement and deterioration in water quality.

As a fisheries conservation measure the Environment Agency bought out licences for salmon and trout nets early in the period and almost all took up the offer. This is reflected in the graphs, with small returns from net fishing due to low effort. The Environment Agency also imposed a catch and return policy in the latter few years of the period as a measure to try to stop immature fish being caught. However, the average weight of the trout caught varies within a fairly narrow range (0.79kg - 1.05kg) which is lower than the average weight of adult fish (2.5kg - 3kg).

The average weight of salmon caught varies between 3.3kg - 4.3kg over the time period. The average weight of a mature salmon is between 2kg - 10kg, the smaller adults being grilse which have spent only one summer at sea and the



Figure 10. Salmon catch has remained fairly stable over the time period and the average weight of fish landed represents young adults that have only spent one summer at sea.

largest adults being MSW fish that have spent multiple summers at sea. There is a positive relationship between the size of the fish and its fecundity, with MSW fish producing significantly more eggs than grilse. If there is a reduction in MSW salmon being seen in rivers in the area it implies lower egg deposition rates which affects stock recruitment and will impact the stability of the population in the future.

Currently, in North Devon, only the River Lyn is meeting the conservation limits set by the Environment Agency for Atlantic salmon; sea trout stocks are doing better but have also declined overall.

Rivers and wetlands

Case study: Freshwater pearl mussels and Otters

Case study: Freshwater pearl mussel

One important species that relies on the salmon and trout populations is the freshwater pearl mussel (*Margaritifera margaritifera*). The larvae of the mussel attach to the gills of juvenile fish in late summer, dropping off and settling on the river bed the following spring. It is threatened with extinction or is classified as highly vulnerable in every part of its range throughout Europe and north-eastern North America. This bivalve was once widespread in northern and western parts of Great Britain but is now thought to have only one recruiting population in England and Wales. Although there are still populations in the Taw, Torridge and Mole rivers, no juvenile mussels have been found in Devon for the last 40 years. However, in a recent study the Devon population was found to be genetically distinct from other colonies in northern Britain, making protection of this species and re-establishing recruitment in the Biosphere Reserve particularly important.

The main threats to this species are declines in water quality through pollution, acidification and nutrient enrichment, river engineering, and declines in salmon and trout populations. The North Devon Biosphere Service is arranging surveys of the River Mole and The River Bray as part of the Taw River Improvement Project. One of the aims of these surveys is to identify sections of the rivers where the habitat is suitable to translocate and establish populations of freshwater pearl mussel. Other sub-groups of this partnership are responsible for weir removal and fish easement projects, agricultural advice and nutrient and soil testing, all of which will benefit freshwater pearl populations.



Figure 11.



Figure 12.



Case study: Otters

Otters (*Lutra lutra*) are a top freshwater predator and therefore good indicator species for the health of rivers and wetlands. In the 1950s and 1960s the population across the UK suffered massive declines, partly due to pollution of waterways by pesticides. Conservation efforts focused on withdrawal of damaging chemicals, sympathetic habitat management and local introductions, and have resulted in a true success story, as the otter is the only freshwater species to have reclaimed most of their former range following the declines.

The map of otter presence in the Biosphere Reserve in 1978 in comparison with presence in 2009 illustrates the rejuvenation of populations in North Devon from surviving wild otters over this time period. The State of Devon's Nature (2012) reported that now viable populations of otters are found on all river catchments in Devon and the Torridge, Taw, Exe and Tamar catchments are at carrying capacity.

Grassland

Habitat status

National

Semi-natural grasslands and lowland heathland are exceptionally species-rich areas, providing open space in lowland countryside for many rare and threatened species such as the grey-long eared bat, all the UK's native reptile species, and many invertebrates. 20% of the world's heathland is found in the UK and north-west Europe's largest area of chalk grassland is Salisbury Plain in Wiltshire, however, the area of semi-natural grassland shrank by 97% between the 1930s and 1984 and lowland heathland has declined by 80% since 1800. This large-scale habitat loss has corresponded with national decline in species associated with these habitats.

Devon

Unimproved grassland that has not been altered by agriculture due to unsuitable conditions, such as steep slopes, im-

poverished soils and poor drainage, is an important refuge for wildlife in an intensively farmed landscape. Improved grassland that has been influenced by agricultural use is usually dominated by a few species whereas unimproved grassland is usually much more diverse. The Culm Measures in Mid and northwest Devon, acidic upland grassland on Dartmoor and Exmoor, maritime grasslands along the coast are all great examples of this habitat in the county. Important species that can be found here include, purple moor-grass, many butterflies including rare habitat-specialists like the marsh fritillary, and barn owls and harvest mice.

Biosphere

As mentioned in the Wetland section the Culm grassland communities are the very special features of the North Devon Biosphere Reserve. There are other examples of herb rich

pastures and hay meadows to be found scattered throughout the area. These are mainly recorded on abandoned fields, steeper land and sites within urban areas.

Grassland

Key species in the Biosphere Reserve

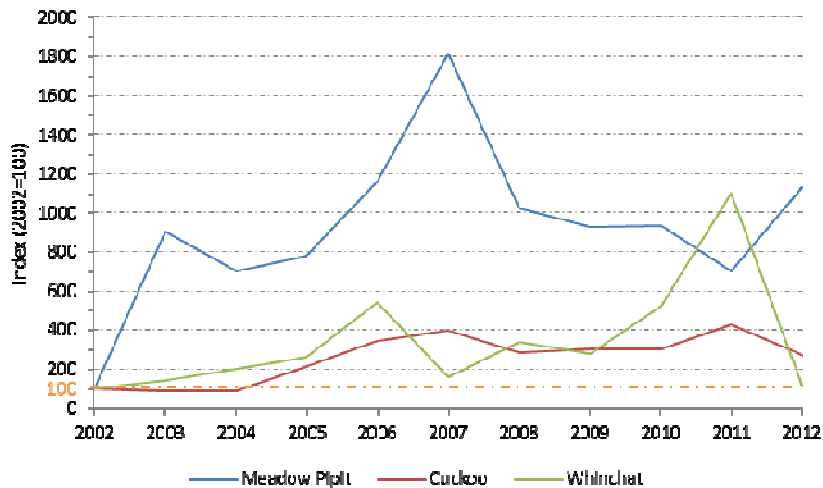


Figure 14. Lowland and moorland bird species that were surveyed have all increased over the time period.

Table 3. The key species identified in this report represent many of the grassland habitats present in the Biosphere Reserve. The birds are at various levels of conservation concern and populations often include both residents and migrants.

Species	Conservation status	Resident / migrant status	Where to see them
Meadow pipit (<i>Anthus pratensis</i>)	Amber status BoCC	Common resident; passage / winter migrant	Summer in upland areas; winter in lowland areas
Cuckoo (<i>Cuculus canorus</i>)	Red status BoCC; UK BAP	Uncommon summer visitor, passage migrant	Moorland, woodland, farmland; April—July
Whinchat (<i>Saxicola rubetra</i>)	Amber status BoCC	Locally common summer visitor, passage migrant	Moorland and heathland; April—September

The decline of semi-natural grassland has had a huge impact on whinchat population nationally, however, the overall trend in the Biosphere Reserve is positive between 2002 and 2012. The State of Devon's Nature (2012) reported that the species had increased on Dartmoor since 1979, although had declined on Exmoor between 1992 and 2008.

The meadow pipit and cuckoo have both also increased according to surveys across the Biosphere Reserve between 2002 and 2012, which is especially encouraging for the cuckoo as it is currently red listed. The State of Devon's Nature report found that cuckoo population remained stable on both Dartmoor and Exmoor up to the end of the survey period in 2008. However, the meadow pipit was reported to decrease on both moor during the same time period, which is a cause for concern as Dartmoor and Exmoor are both home to nationally important numbers of meadow pipit. The management of these areas can have significant impacts on

moorland bird community diversity, and appropriate grazing regimes must be in place to provide and maintain a range of habitats that are required by the different species.

Farmland

Habitat status

National:

40% of the UK's land area is being used as arable fields or grassland for livestock, including associated habitats such as fallow land, field margins and hedgerows. This ecosystem is often people's closest connection with wildlife, as they live in, travel through or visit farmland. Despite being arguably the most intensively managed habitat, it can still be incredibly species rich, for example a single hedgerow can support 750 species of fly alone. Changing farming practices and policies can have a significant impact on this wildlife however, and increasingly intensive use of the land is evidenced by declining populations from which there has not yet been any recovery even after conservation action.

Devon:

Despite being a very rural area, with much of the land being taken up by farming, in Devon there is relatively little data available for the state of farmland wildlife. In 2007, 773 hedgerows were surveyed and only 19% were found to be in favourable condition, the main issues identified were small size due to flailing practices, gappiness due to a lack of hedge laying or coppicing, and nutrient enrichment from the surrounding agricultural land.

Biosphere:

The Biosphere is representative of the rest of Devon in being dominated by agriculture. One of the most important habitats for species diversity in the farmland of the Biosphere are the characteristic hedgerows. They are of great importance to nature conservation in an extensively farmed environment, providing a refuge for up to 600 plant species, 1500 insects, 65 different species of bird and 20 mammals. There are approximately 32000km of hedgerows in the Reserve, which accounts for almost one eighth of the national area of the BAP habitat. It has been reported anec-

dotally that the best hedgerows are found in Devon and of those in Devon, the best are found in North Devon.

The arable field margins, land between the crop and the field boundary, are particularly important nesting and feeding sites for birds. Rare flowers also depend on the field margins but have suffered enormous national decline and are therefore key areas for conservation action. Most arable land in the BR is under intensive production with crops such as maize or for root fodder crops for livestock. Therefore what little arable land there is within the BR tends to be of poor conservation status.

The inclusion of arable margins within the recent phases of agri-environment schemes provided a viable means of improving field margins.

Traditional orchards – fruit and nut trees in low densities in permanent grassland with low intensity management, mosaic of habitats (fruit trees, scrub, hedgerows, grassland, fallen dead wood, ponds) supports wealth of wildlife. 11 sites, three monitored -> all amber. Traditional Orchard Project in England (NE, 2011) = 18% traditional orchards in Devon in excellent condition, 36% good condition, 46% poor condition.

Farmland

Key species in the Biosphere Reserve

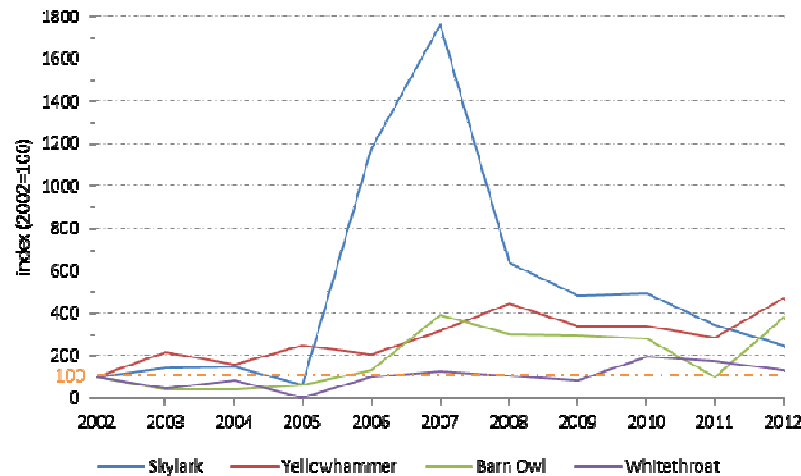


Figure 18. Farmland birds have all increased over the time period surveyed, with the exception of the whitethroat population which has nonetheless remained stable.

Farmland birds suffered rapid declines in the 1970s and 80s and by the early 2000s the numbers had halved, since then very few species have shown any recovery. Both skylarks and yellowhammer are red listed due to recent dramatic population declines nationally, however, in the reserve these two species have shown the greatest increase during the survey period. In the case of the skylark, experts believe the most likely cause is the increase in winter sowing of cereals which restricts the birds' opportunities for late season nesting attempts. The yellowhammer decline is most likely due to removal of hedgerows and increased use of pesticides.

Barn owls have experienced many years of decline due to unsympathetic farming practices such as the destruction of hedgerows, meadowland and field headlands, which led to the loss of habitat for its prey species. By the year 2000 there were less than 4000 breeding pairs left in Britain and although changing farming methods has in some places halted or reversed this decline, rising numbers of traffic deaths have kept Barn Owls at Amber status.

Table 4. The key species identified in this report represent many of the grassland habitats present in the Biosphere Reserve. The birds are at various levels of conservation concern and populations often include both residents and migrants.

Species	Conservation status	Resident / migrant status	Where to see them
Skylark (<i>Alauda arvensis</i>)	Red status BoCC; SPEC (3); UK BAP	Common resident; passage migrant and winter visitor	Everywhere in the UK, open countryside
Yellowhammer (<i>Emberiza citrinella</i>)	Red status BoCC; UK BAP	Fairly common resident; passage migrant	Widely distributed on all farmland types
Barn owl (<i>Tyto alba</i>)	Amber status BoCC; SPEC (3); Devon BAP	Common resident	Open country, field edges, river banks, roadside verges
Whitethroat (<i>Sylvia communis</i>)	Amber status BoCC	Fairly common summer visitor and passage migrant	Most of the UK, scrub habitats

Woodland

Habitat status

Once the dominant habitat across Britain, woodland now covers only 12% of the land area.

Reforestation since 1945 has led to a doubling of woodland area but this mainly consists of non-native and coniferous species for timber production. Such plantations can cover large areas of many hectares but are often monocultures with none of the associated diversity of a native broadleaf or mixed woodland.

Devon picture: six UK BAP priority habitats identified as key in Devon. 29 SSSIs contain lowland broadleaved, mixed and yew woodland (1288 ha); 58% in favourable condition, main reason for sites being unfavourable = rhododendron invasion. 25 SSSIs contain upland broadleaved, mixed and yew woodland (2584 ha); 65% of area is in favourable condition, unfavourable/no change/declining = Exmoor Coastal Heaths, West Exmoor Coast and Woods and Watersmeet -> lack of regeneration, too much shade due to excessive beech sycamore and rhododendron. CWS = county wildlife site; 958 CWS contain broadleaved mixed and yew woodland, 197 sites have been monitored since 2009 -> 34% assessed as green, issues = grazing by livestock, dominance of invasive species, heavy shading from species such as holly.

Upland oakwood – Dartmoor and Exmoor, internationally important, sessile oak and birch with varying amounts of holly rowan and hazel in the understory, important for ferns mosses liverworts and lichens, distinctive breeding bird assemblage (redstarts, wood warblers, pied flycatchers). 3174ha, assessment by DBRC of 400 random points from aerial photographs (1998 and 2006) indicated no statistically



Source: Explorethesouthwestcoastpath.com

significant decrease in area, (n=84 sites, of 9 monitored 4 are green and 5 amber.)

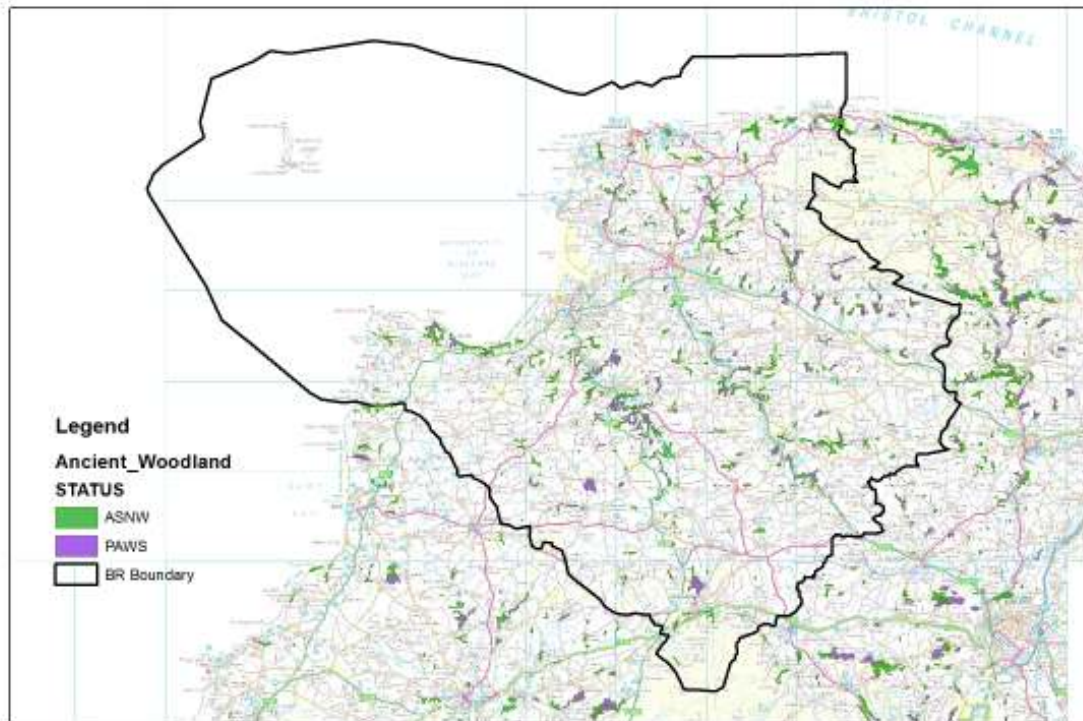
Upland mixed ashwoods – base-rich soils, ash dominant (locally oak, birch, elm, small-leaved lime, hazel may be most abundant), among the richest habitats for wildlife in the uplands (rare flowers, rich invertebrate fauna, bluebells and primrose). 24 sites, non monitored.

Lowland mixed deciduous woodland – full range of soil conditions, most semi-natural woodlands across Devon lowlands, many are ancient woodlands, historically managed by coppicing, leading to great variety in species composition of canopy layer and ground flora. An assessment by DBRC of 400 random points from aerial photographs (1998 and 2006) indicated no statistically significant decrease in area. (n=740

sites, 179 sites monitored for condition. The results were, 72 green, 100 amber, 7 red.)

Wet woodlands – wet or waterlogged soils in isolated patches generally river valleys and ground surrounding bogs or mires, scarce on a national scale but moist climate and heavy soils of Devon -> wet woodland is characteristic feature of the landscape esp. mid and north-west Devon and Blackdown Hills. (n=215 sites, 101 monitored condition assessment results were 37 green, 62 amber, 2 red.

Wood pasture and parkland – product of historic grazing systems, structure of large trees (often pollards) at various densities in matrix of grassland or heathland, often of national historic cultural and landscape importance, noted for important fungi lichen and invertebrate communities associated with veteran / ancient trees. (n=28 sites, one monitored – in good condition)



Broadleaved woodland is defined as woodland primarily made up of native broadleaved species. For the local BAP they are defined as Oak woodland, ash woodland and wet woodland are the features of interest. *“Oak woodland is predominantly found in North Devon and Torridge on the more acid/ base-poor sites of the high valley ground, ash woodland on the richer brown earth soils of the lower valleys grading to wet woodland on the water-logged soils”*. The woodlands are representative of the climax vegetation in the south west before large scale clearances by humans would have dominated the vegetation types in Britain. Source of timber for fuel and building for many years. However, oak woodland is dominating due to the management practices and historic species choice (coppicing, timber choice) .

for their characteristics mosses and lichens (including the Golden Hair Lichen) and have a large range of plants, birds, animals and insects.

Wet woodland = poorly drainage or seasonally wet soils = alder, willows and birch and Oak, ash and beech drier area. It combined element of many other ecosystems and taxa. High humidity in the area favours bryophyte growth and lichens and **good sites (cover and breeding) for the otters.**

Issues:

Non-native species (rhododendron and laurel); ash dieback (fungus called Chalara) spreading through UK since first found in feb 2012, sudden oak death (pathogen called *Phytophthora ramorum*) first identified on Japanese larch trees in 2009 in Somerset, Devon and Cornwall, deer populations

There are 5501 Ha of Ancient Woodland in the Biosphere Reserves of which 2583 are superimposed with plantations. Direct connectivity between the sites is weak but secondary woodland is providing some improved connectivity. Oak woodland is the most common broadleaved woodland in the North Devon (sessile Oak, pedunculate Oak, rowan, hazel and holly. Great interest

continuing to increase in range and number and excessive browsing disrupts normal dynamics of woodland ecosystem. Other issues: lack of management (-> increased shade and structural simplification), soil pollution from agriculture (-> impoverished woodland flora), squirrel damage and deer damage incl loss of hazel regeneration, replanting with conifers.

Successes:

- English Woodland Grant Scheme > support for land-owners wanting to create new woodland and carry out sustainable woodland management, 2012 = 6382 EWGS schemes in Devon.
- South West Forest Project was set up to invigorate the woodland economy of the area, in doing so it stimulated new planting across the whole area, Most of the SWF project area was in the Biosphere Reserve. Whilst there was no particular emphasis on native woodlands it did create an incentive to bring woodlands into management.
- Ancient Woodland Projects on Dartmoor and Exmoor > worked with land owners to restore, enhance and link Ancient Woodlands. Working our Woodlands (2009-2011) help bring small and neglected woodlands in Blackdown Hills AONB back into management. A new project by the Woodland Trust has recently been launched for the North Devon and Exmoor area
- The Devon Ward Forester Project aims to bring small woodland owners together to improve management and productivity of small woodlands.
- The Devon Ancient Tree Forum > promoting management of veteran trees.

Woodland

Key species in the Biosphere Reserve

Woodland bird populations appear to be thriving in the Biosphere Reserve with all five species surveyed increasing since 2002.

Nuthatches, buzzards and blackcaps are all not of conservation concern and nationally have stable populations giving them Green status. In the Biosphere Reserve all three populations are flourishing.

Pied flycatchers have Amber status nationally

Table 5. The key species identified in this report represent many of the woodland habitats present in the Biosphere Reserve. The birds are at various levels of conservation concern and populations often include both residents and migrants.

Species	Conservation status	Resident / migrant status	Where to see them
Pied flycatcher (<i>Ficedula hypoleuca</i>)	Amber status BoCC	Locally common summer visitor and passage migrant	Mature woodlands; late April to September
Nuthatch (<i>Sitta europea</i>)	Green status BoCC	Common resident	Mature woodlands and established parkland; year round
Buzzard (<i>Buteo buteo</i>)	Green status BoCC	Common resident, rare passage migrant	Most habitats, particularly woodland and moorland; year round
Blackcap (<i>Sylvia atricapilla</i>)	Green status BoCC	Common summer visitor and passage migrant	Woodlands and parks and gardens with plenty of trees; April to October
Marsh tit (<i>Poecile palustris</i>)	Red status BoCC; SPEC (3); UK BAP	Fairly common resident	Broadleaf woodland; year round

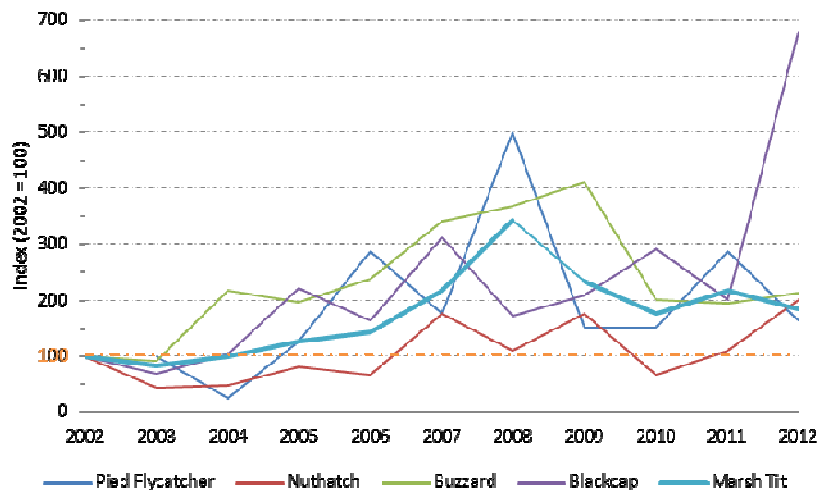


Figure 19. All woodland bird populations surveyed have increased over the time period.

Society

Population change

In 2001, the population of the Biosphere Reserves area was in the order of 157,000 and in the 2011 census this had increased to 169,500. The increase is in line with national trend of 7% as shown in table 6.

However the growth was not uniform across the entire reserve. This will be attributed to the development of homes in certain areas, and the economic impact and lifestyle changes that have led to a trend of rural depopulation.

The data, not surprisingly, indicate an aging population, due to immigration of older people and longer life expectancy.

Table 6 . Population change (ONS Census 2001/2011)

	2001	2011	Change	%
National population	58789194	63300000	4510806	7%
Devon population	704493	746399	41906	6%
Biosphere Reserve population	157253	169665	12412	7%

The 2011 Census data was apportioned to LLSOA level using GIS to produce **Figure 20**. The population has increased across most of the study area during the time period 2001-2011. The largest increases are seen on the outskirts of Bideford, Barnstaple, Okehampton and South Molton; mirroring a national trend of increasing urbanisation. Correspondingly, the areas of population decline are mainly rural areas. The large blue area in the south of the Biosphere Reserves is largely due to Okehampton.

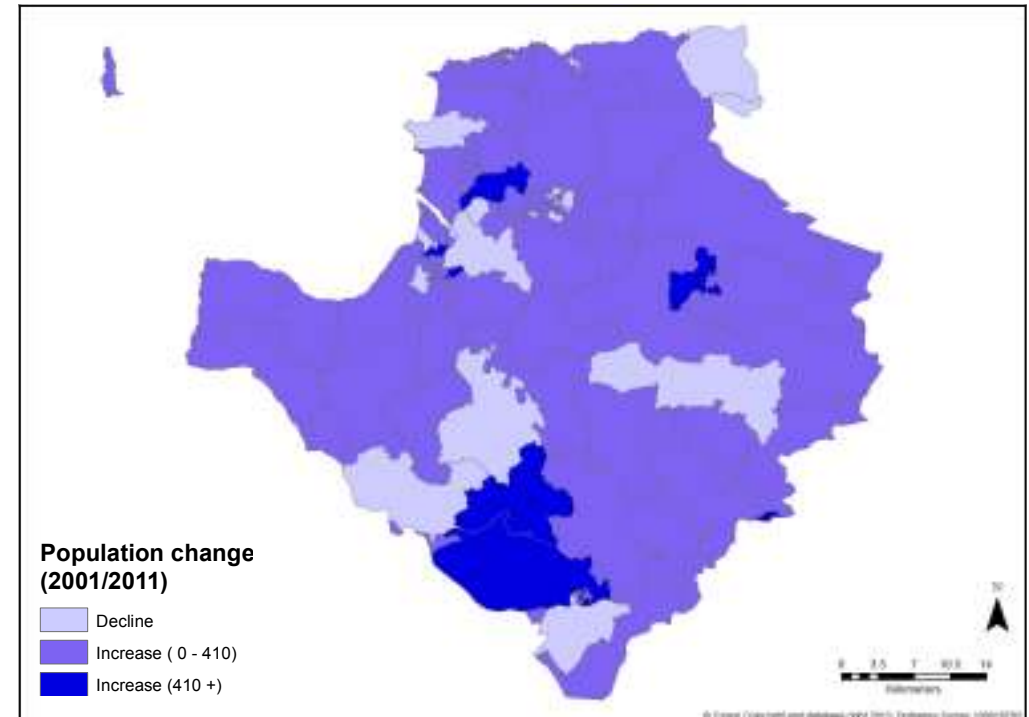


Figure 20 The Population change from 2001 to 2011 for each LLSOA in the Biosphere Reserve. (Source: ONS Census 2001/2011)

Society

Age structure

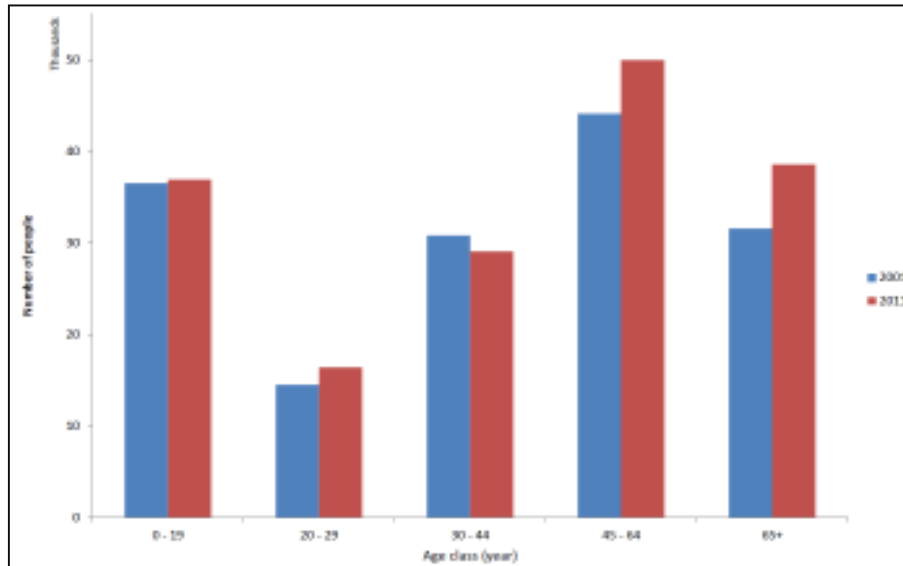


Figure 21. Age structure evolution (2001/2011), Source: ONS)

The **figure 21** show the age structure within the Biosphere Reserve. Mainly the age class, between 2001 and 2011 increase except the 30-44 age class which decrease. The distribution of age structure show the main group is the age class 45-64 years old. The main increase between 2001 and 2011 is in the age class 65+.

The **figure 22** show the distribution in 2011 of the median age within the Biosphere Reserve. Barnstaple shows a variation of the median age between 29 and 58 years old. Mainly the low median class is localised in the towns, due to care provision and access to services. The higher median classes are show near Bideford, Braunton and near between the estuary and Barnstaple centre.

The distribution shows the main median age is between 44 and 58 years old it is in link with the main group age (45-64 years old) (**Figure 22**)

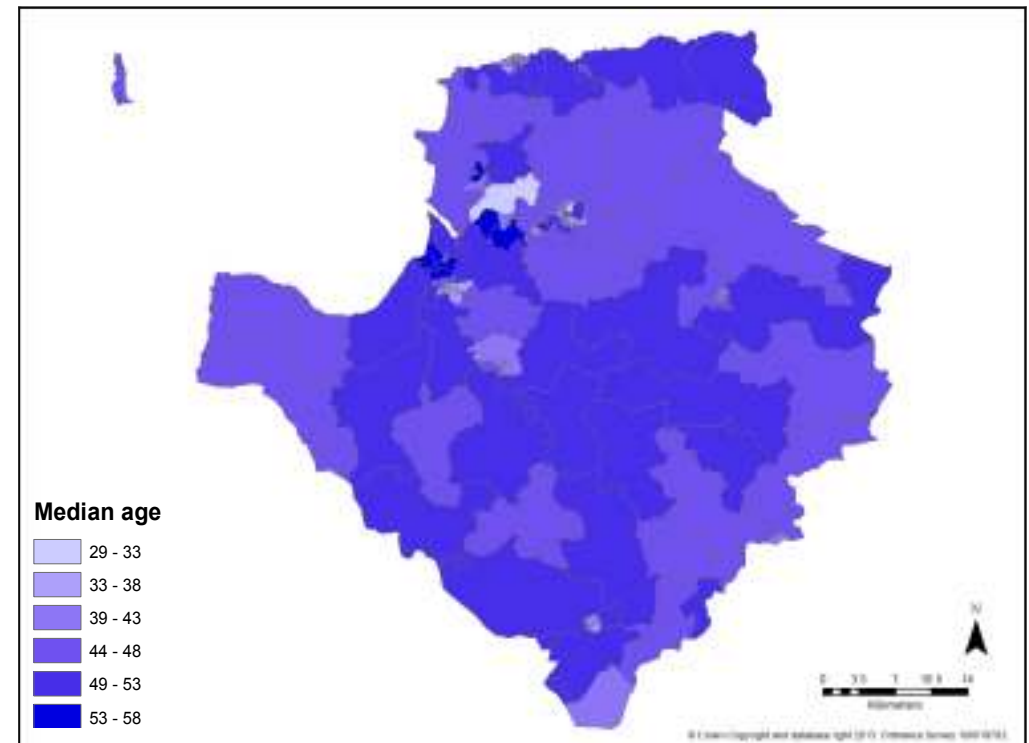


Figure 22. Current repartition of the age structure in the Biosphere Reserve.

(Source: ONS census 2011)

Society

Age Structure

Population projections for 2035 compared to 2010 within the Biosphere Reserve are broken down by age-band (*figure 23*).

The population projections show increases over 25 years.

The *figure 24* show the percentage of change population between 2010 and 2035.

These two figures (? and ?) shows the increase trend after 60 years old. The increase is about 150% change compare to 2010. another part of the population will increase but in lesser measure is the age group between 0 and 19 years old., ~17%. At the opposite the age group 35 to 64 years old decrease and show negative percentages, ~-10%.

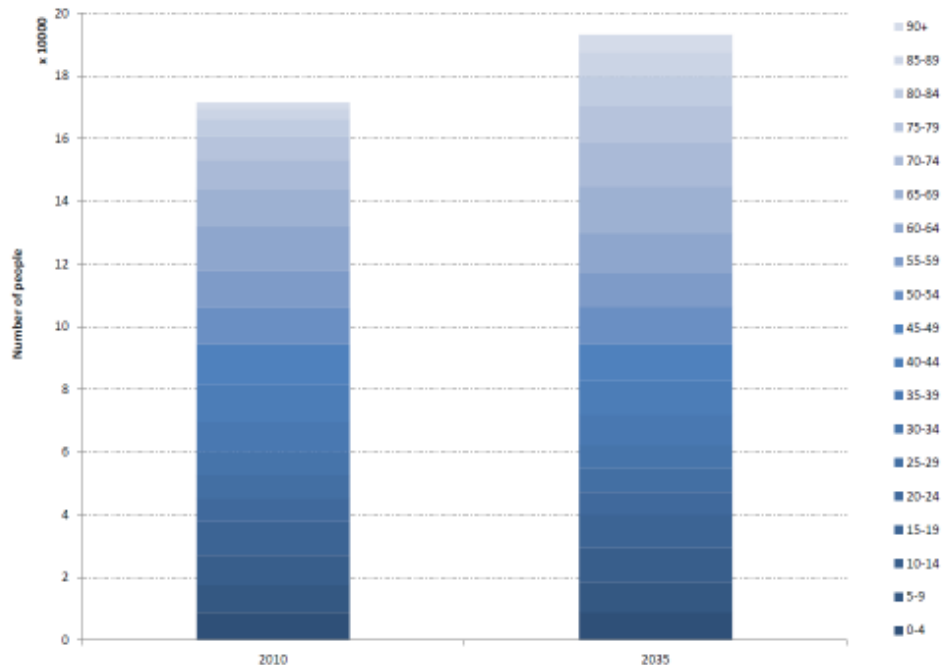


Figure 23. Population projections within the Biosphere Reserve 2010/2035. (Source:

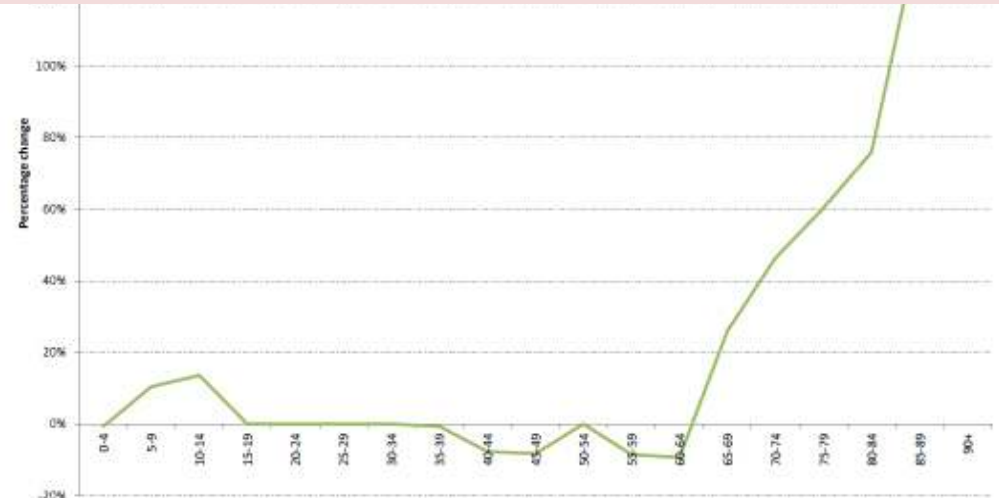


Figure 24. Population change projections 2010/2035. (Source: ONS)

Currently the main group of population is 45-64 years old. The evolution since 10 years, is important for the 2 last age class (45 + years old). The Biosphere reserve follows the same trend that the national and district level. The elderly population is increasing. For the future the trend stays the same. The age class 45-64 years old, over 25 years, ageing and take part at the 150% of increase of the elderly population.

The most noticeable trends are :

- Ageing population: In 2010 those over 65 years of age accounted for 1 in 5 of the population, by 2035 this will rise to 1 in 3 and
- Rural Depopulation

Society

Ethnicity

The figure 25 shows the evolution of the number of people according to their ethnicity and the percentage of white and other ethnicities total. The number in the both categories increases but the percentage change over the 10 years has also altered. In 2011, the white ethnic origin population was 96% with 98% in 2001.

The overall national percentage of white ethnic origin is 86%. The census enables further examination of the breakdown of ethnicity within the pop-

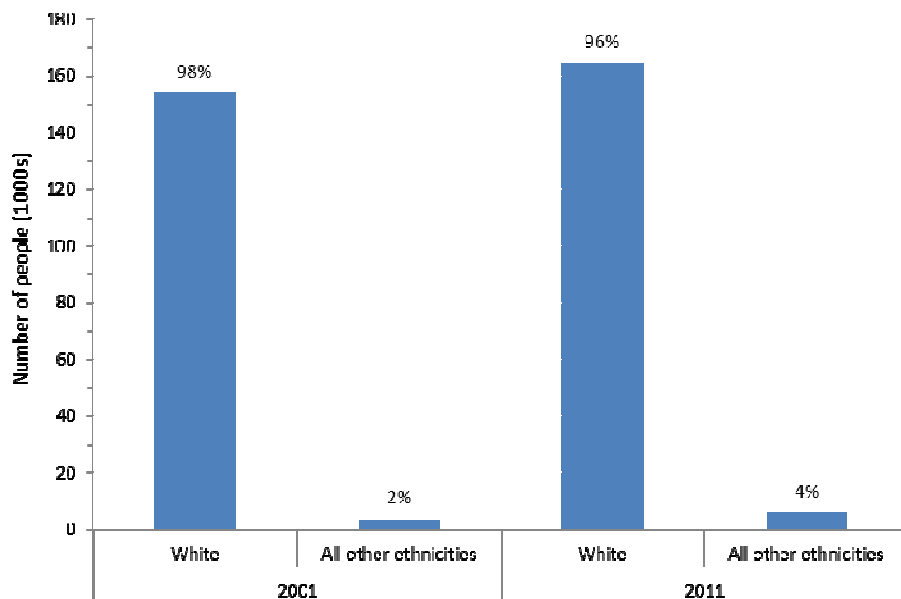


Figure 25. Main ethnicity group change between 2001/2011(Source: ONS)

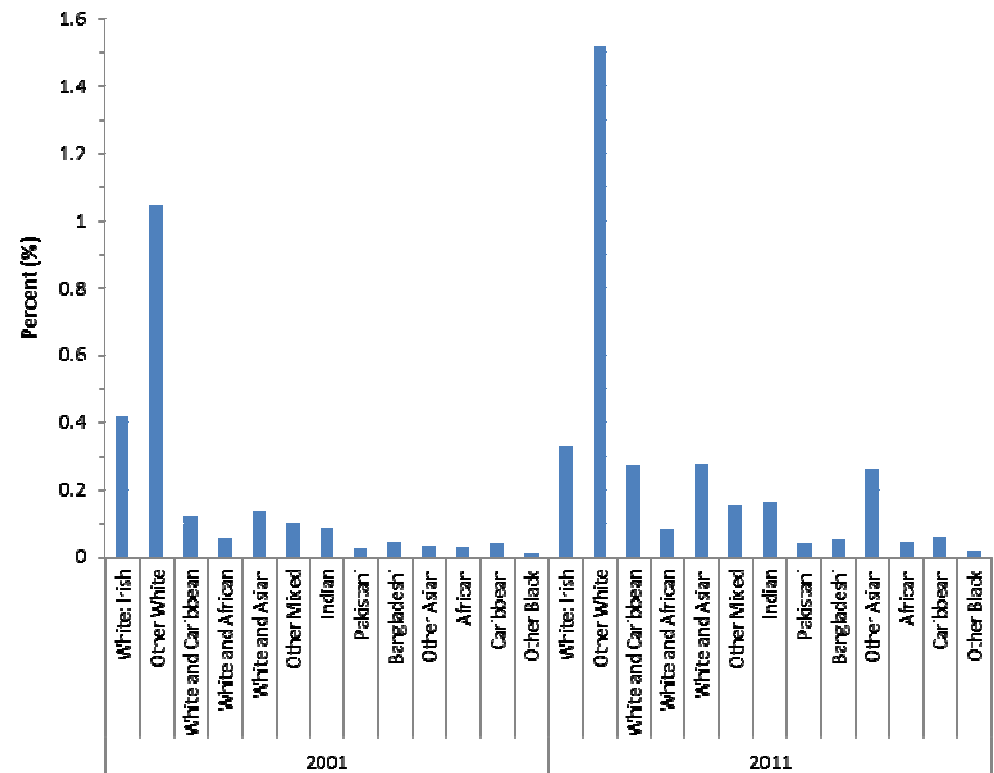


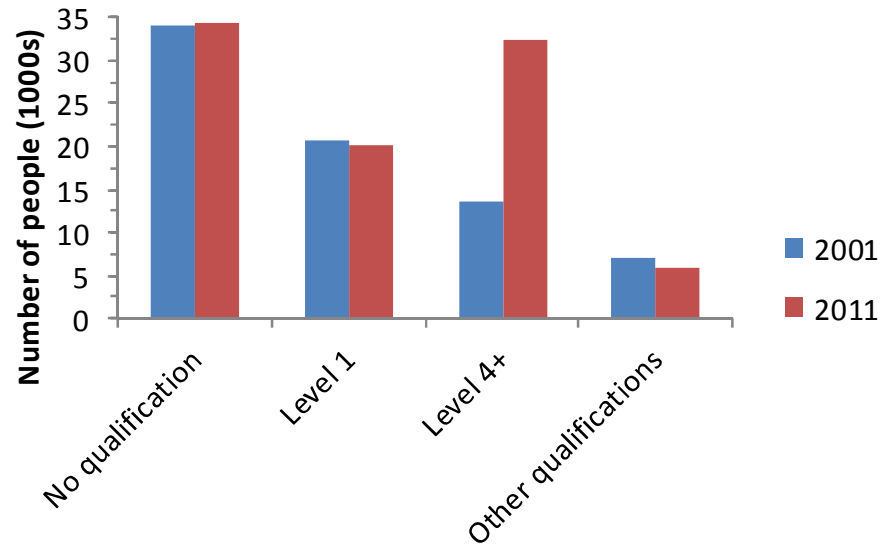
Figure 26. Minority ethnicity group change between 2001/2011(Source: ONS)

The figure 26 shows the evolution of the percentage of people belonging at different ethnic origin. The percentages in 2011 are higher than 2001. It is in link with the first graphic (the population number and the percentage of other ethnic origin increase).

The trend of the percentage of the ethnic group within the Biosphere Reserve follows the national change and this is largely due to the expansion of the EU.

Society

Formal Education



No qualifications cover: no formal qualification *

Level 1 qualifications cover: 1+ 'O' level passes; 1+ CSE/GCSE any grades; NVQ level 1; or Foundation level GNVQ.*

Level 4/5 qualifications cover: Degree (BA, BSc), Higher Degree (MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Professional Qualifications (Teaching, Nursing, Accountancy).*

Other qualifications cover: Vocational/Work-related Qualifications, Foreign Qualifications (Not stated/level unknown).*

*people aged between 16 and 74 years old

Figure 27. Level of qualification change over 10 years (Source: ONS)

The figure 27 shows the change over time of the number of people with or without qualification in the Biosphere Reserve. The number remains nearly constant with the exception of the level 4 or higher qualification. This number has doubled over the 10 years.

This trend follows the same change at the national level (~60% of increase in this level of qualification, ONS).

This has largely been due to successive government policies to improve access to university level education, including expansion of colleges within rural areas.

Society

Unemployment

There are various data sources for un-employment that have been used. However the consistency of approach makes it difficult to track over a 10 year period. For this section the Census data have been used. Figure 28 show distribution of the percentage of unemployment in the Biosphere Reserve at the lower super output area LSOA level.

At face value this indicates the stability of employment is lower in urban areas, with rural areas being more stable. However this must be taken in the context of depopulation and aging within the rural areas.

- Urban area = increase of the unemployment
- Rural area = stable unemployment
- Compare to the national unemployment figures, the unemployment level in the Biosphere Reserves are generally lower than the national level.

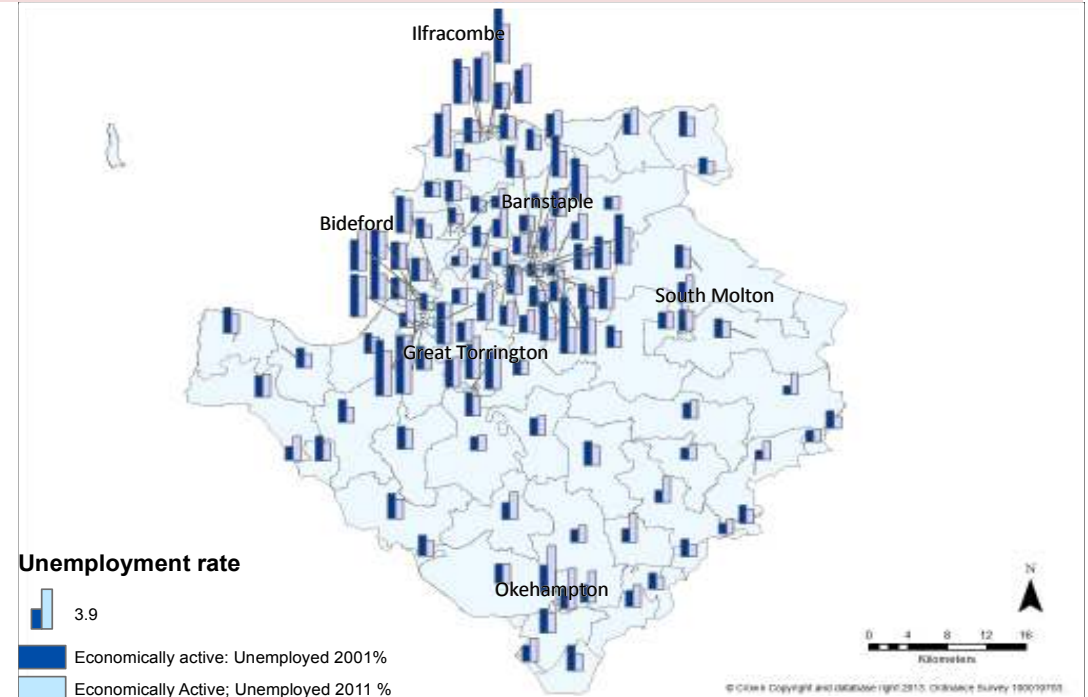


Figure 28. Percentage of unemployment in the Biosphere Reserve (2001/2010) (source; ONS)

Society

Transport

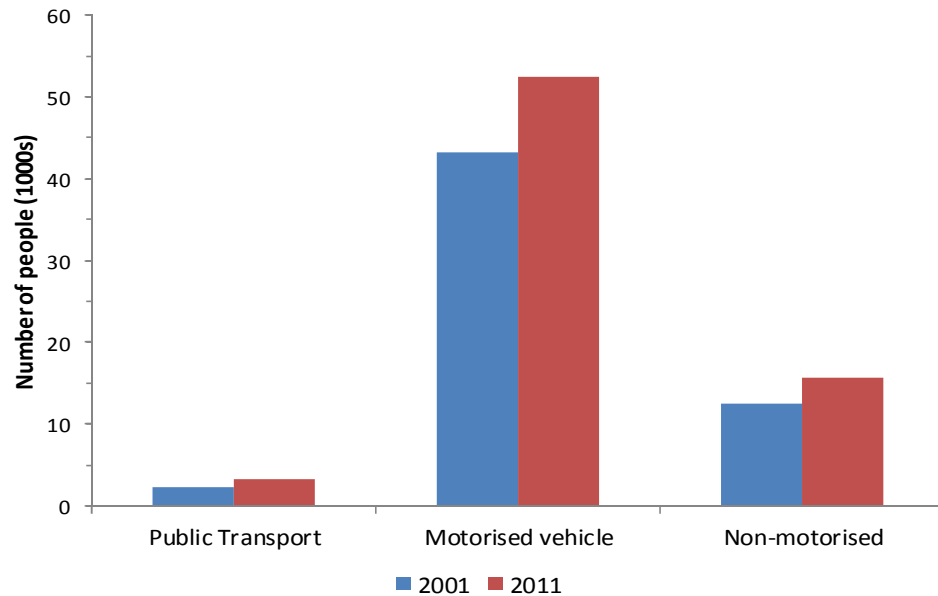


Figure 29. Number of person using different transport in the area(2001/2010) (source; ONS)

Public Transport: All usual residents in the area at the time of the 2011 Census aged 16 to 74 in employment in the week before the census who mainly travelled to work by underground, metro, light rail or tram. The method of travel to work is for the longest part, by distance, of the usual journey to work. Train, Bus, minibus or coach'. 'Taxi or minicab'.

Motorised vehicle: All people aged 16 to 74, who were usually resident in the area at the time of the 2001 Census, and travelled to work by 'Driving a car or van'. 'Passenger in a car or van'. 'Motorcycle, scooter or moped'.

Non-motorised: All people aged 16 to 74, who were usually resident in the area at the time of the 2001 Census, and travelled to work by 'Bicycle'. 'On foot'.

Definition of the public transport / motorized transport and non motorized transport.

The figure 29 show increase for all the transport use. The biggest part of the transport use is for the motorized vehicle (more than 40000 people use the motorized vehicle in the Biosphere in 2001 and more than 50 000 in 2011).

Public transport are the less using in the Biosphere area = bad access at the public transport = rural area so more difficult to serve.

The next figure show the large part of the household having one car or 2 (**Figure 30**).

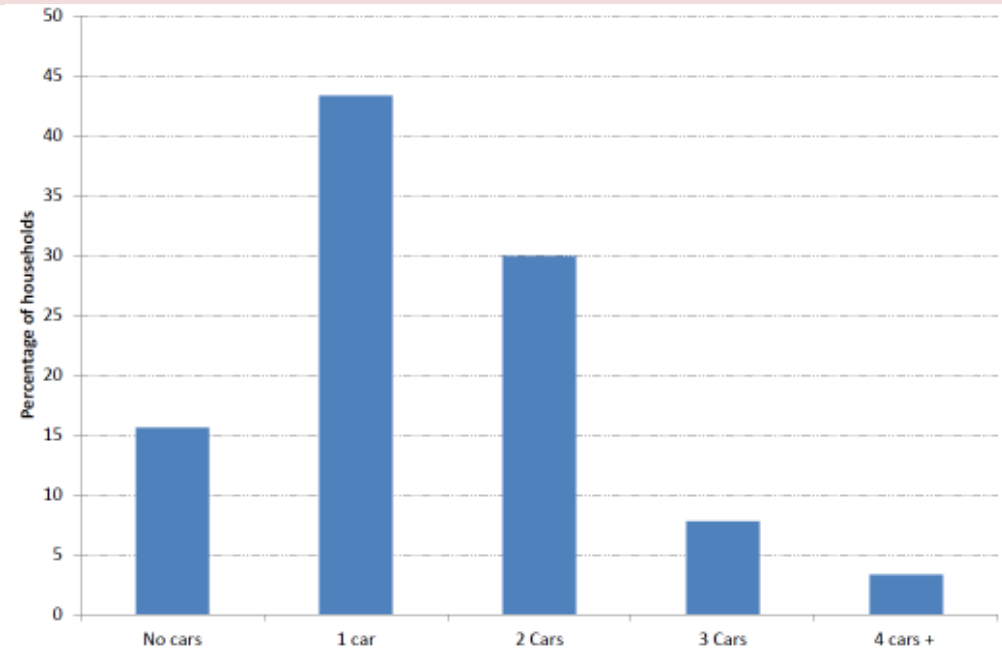


Figure 30. Number of cars per household in the Biosphere Reserves Energy Plan Area

Society

Transport

Using the map in the appendix of the energy plan, at least than one car and the method to travel to work.

There is a very high proportion of households with at least one car throughout the Biosphere area. In the town centres the proportion is often less but still between 60-70%.

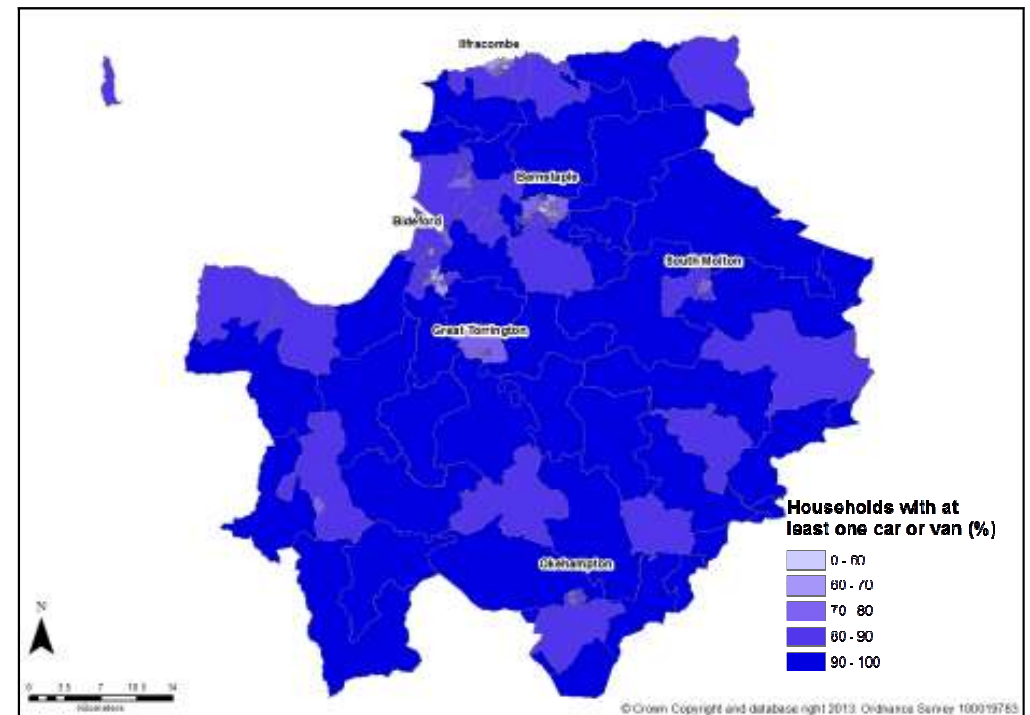
The rural areas have the highest proportion of people working from home, which includes those people working in an agricultural setting (i.e. family-run farming business) or those for which the remote transport routes promote this type of work.

The main bike users are in and around Barnstaple, whilst buses are used between the major urban centres of Barnstaple, Bideford and Great Torrington, but not in the rural areas—highlighting the need for more connected public transport routes.

National Trends

At the end of 2011 there were 34.2 million vehicles licensed for use on the roads in Great Britain, of which 28.5 million were cars. In 2001= 23.9M cars have been recorded in UK and 27 294 656 cars. ~3000000 cars more.

Between 2001 and 2011 the number of person using bus increase to 201 799 person instead the number for driving car increased to 213 998.



Percentage of households with more than 1 car

Society

Cultural Participation

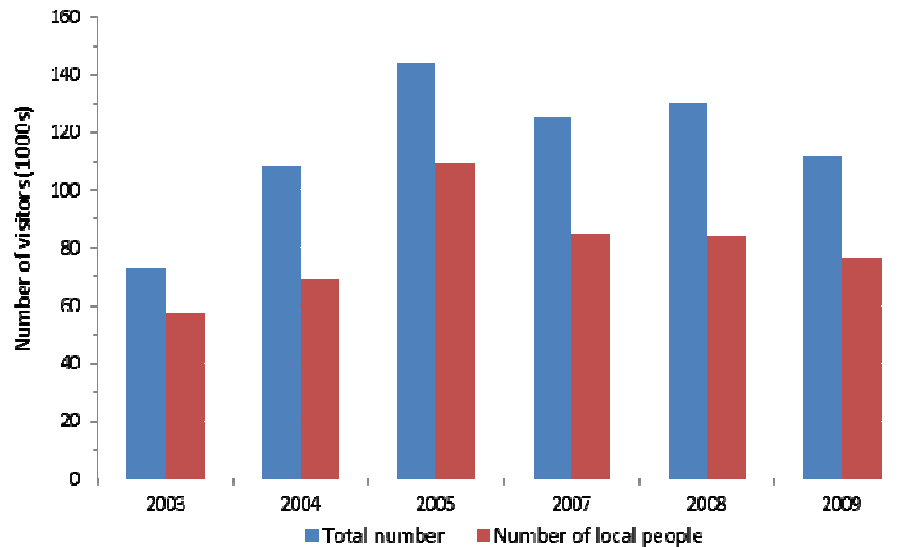


Figure 41. Participation in the North Devon Festival (2003-2009) (source: North Devon theatre)

It is important for an area to know the impact of culture. This information is a proxy for the dynamism and vitality of the area. It is important for the Biosphere Reserve because it is large, rural nature which needs cultural dynamic.

http://www.nationalmuseums.org.uk/resources/press_releases/record-visitor-numbers-uk-national-museums/

In this part 4 examples are showing, the North Devon Festival, The Burton Art Gallery, Barnstaple Museum and Barnstaple Library.

The figure 41 show that the main origin of the person in the event are local. Furthermore since 2005 the number of participant decrease. This may be due to the decrease in the funding for the Festival was in decline for this period and therefore reduced the marketing.

The festival figures show how important the festival was as a tourism asset.

The second figure, show the number of visitor in the art gallery. Between 2008 and 2011 the participation increase (~93 000 in 2008 to 161 000 in 2011). In 2012 the number decrease slightly to 149 000 visitors.

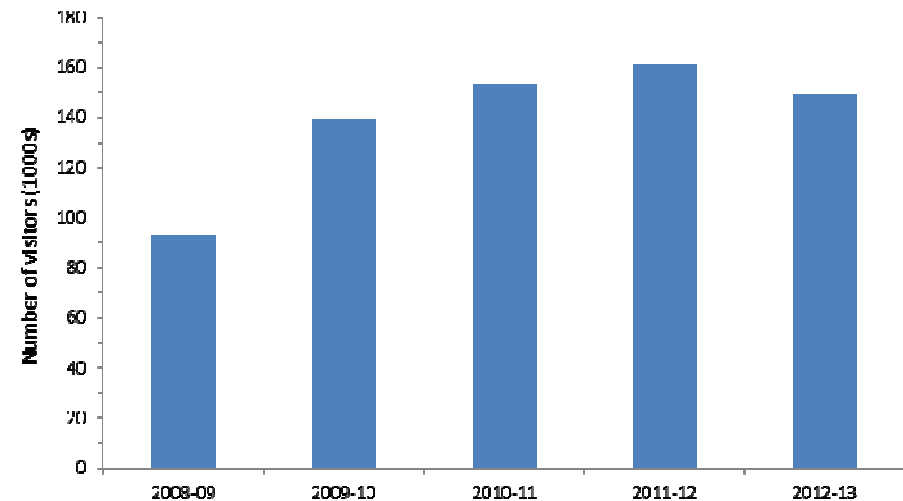


Figure 42. Total number of visitor (2008-2013) (source: The Burton Art Gallery)

Society

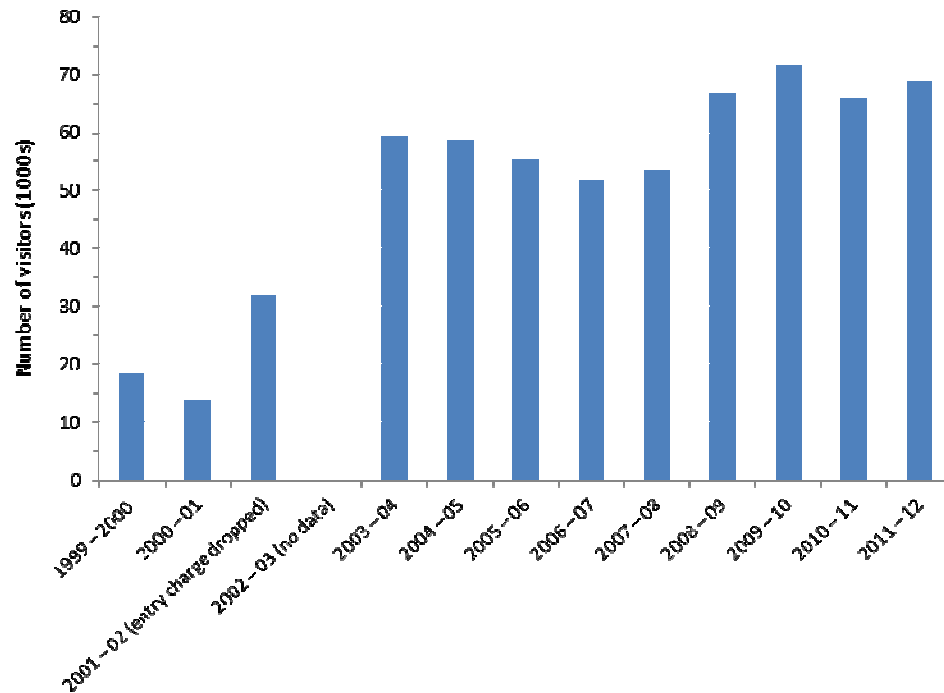


Figure 43. Number of visitors to Barnstaple Museum (2000-2011) (source: Barnstaple Museum)

The figure 43 show an unequal trend between 2000 and 2012. Since 2007 the number of visitors increase but after 2009 the trend levels.

The figure 44 from Barnstaple Library show a global decrease since 2001. this trend can be involve by the increase of the internet access .and the use of e-book technology.

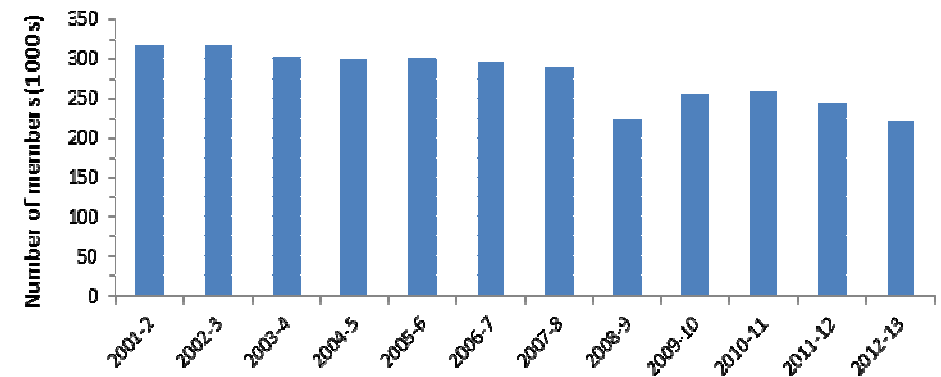


Figure 44. Barnstaple Library membership (2002-2012) (source: Barnstaple Library)

Society

Flood Risk

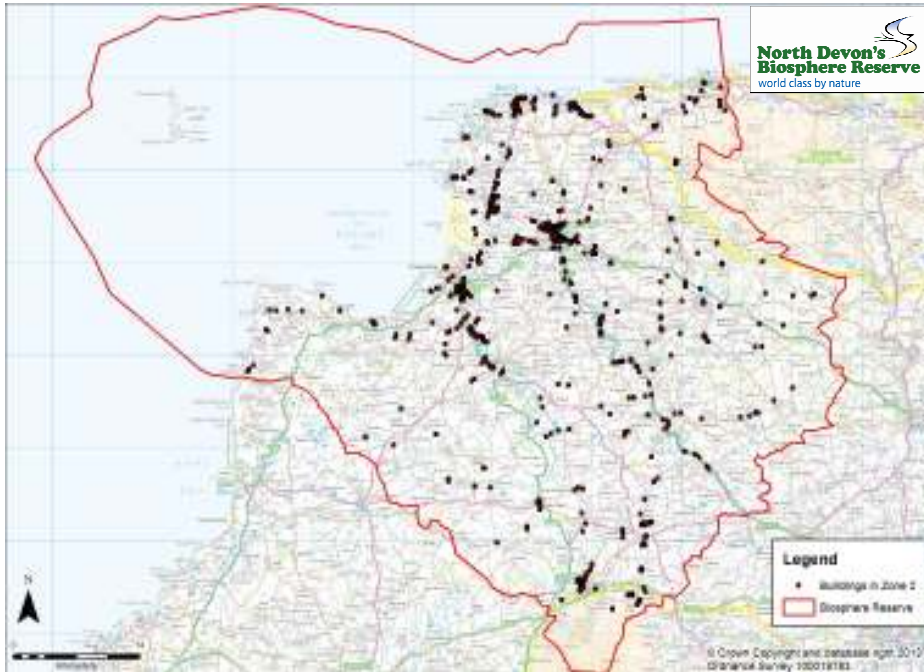


Figure 48. Buildings in Flood Zone 2 (2013) (source: flood risk management DCC)

Head line Data:

~4900 buildings are within a flood risk zone, the main of the buildings are residential (~4170) and the rest non-residential ~730 buildings.

The defence against the flood are multiple,

- **floodplain or flood defences**

The Flood Zone 2 is area comprises land assessed as having between a 1% and 0.1% annual probability of river flooding or between a 0.5% and 1 in 0.1% annual probability of sea flooding in any year.

<http://www.ambiental.co.uk/riskcentral/flood-zones/>

The figure 48 show the distribution of the Flood Zone 2 within the Biosphere Reserve. The map show the importance of the water (sea and river) in the Biosphere Reserve.

The figure 49 in link with the map show the percentage of flooding models in the Flood Zone 2. 62% of the flood are fluvial (cause by the river) and 32% are fluvial and tidal (sea) flood.

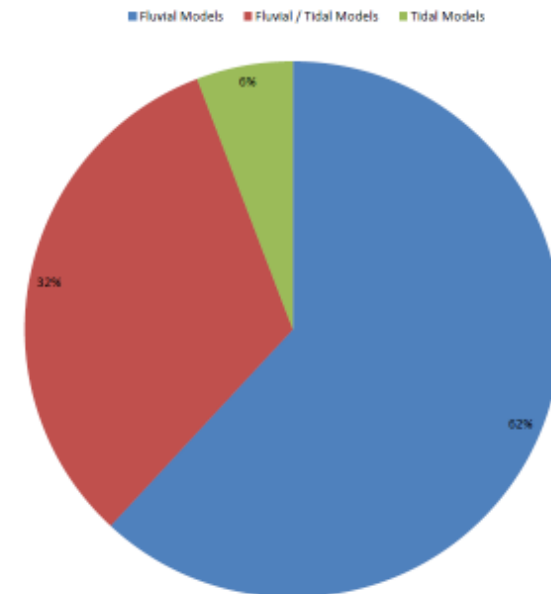


Figure 49. Percentage of flood Zone 2 covered by different flooding models (2013) (source: flood risk management DCC)

Society

Environmental Education and Awareness

The environment awareness and education is an important function of the UNESCO Biosphere Reserve.

Different action have been create in the aim to educate the population for the protection of the environment.

The Biosphere reserve use different approaches to reach the public.

One of the main actions is includes the arts. The Biosphere Reserves has used arts to be a method to enage people to begin to understand the science and start a dialogue. The Biosphere Reserve increase the local engagement with actions such as “Giants in the forest”, “Seas4 life (is in action bringing together the local coastal and marine environment in link with artists, heritage, beauty, biology and geology).

The twinning with the other biosphere reserves in the world are important. An example is the twinning with the Kenya the North Devon Biosphere Reserve develop and share new idea for the protection of the environment and the sustainable development.

The new technology is used by the Biosphere team to create a new link with the public. The global website of the Biosphere Reserve share all the information about the area and the action take in place for her development. <http://www.northdevonbiosphere.org.uk> . Some other websites allow at the public to share their own “memories” about the area. <http://www.mybiosphere.org.uk/> . They share mainly their pictures and commentaries.

The sustainable development is the first aim of the UNESCO Biosphere Reserve, the action such community carbon audits or more recently the Energy plan are develop the research about the energy efficiency of the home and the advice to save emission

Many other actions have been carried out such as Biosphere Action Week or natural health service to develop the attraction of the Biosphere Reserve for a large public.

The other important part of the environmental awareness and education is reaching out to the schools. Some of the school in the area are partnership with the Biosphere to exploit the potential of the reserve for out-of-class room learning. An other important part of the education of the school is the eco-school status at the national level.

Society

Environmental Education and Awareness

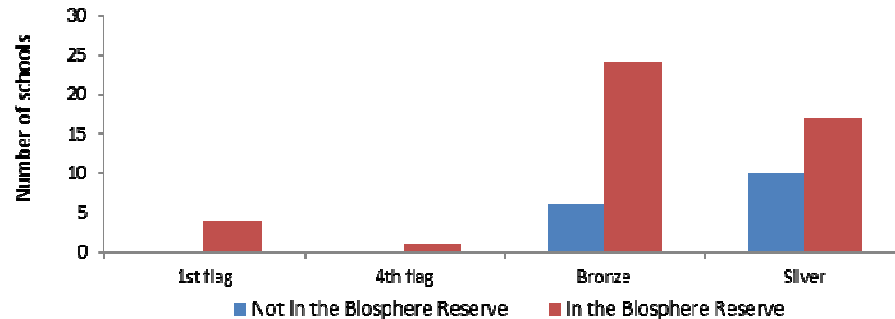


Figure 50. Eco—award to schools engaged by the Biosphere Reserve team (2013)
(Source: North Devon’s Biosphere Services)

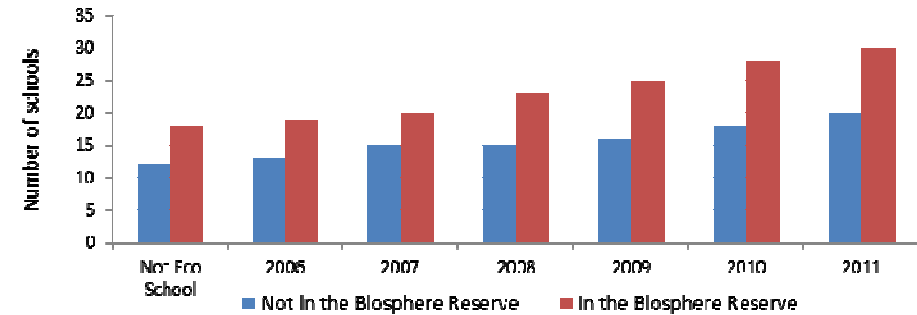


Figure 51. Cumulative number of schools engaged by the Biosphere Reserve team registering for eco-school status (2013) (Source: North Devon’s Biosphere Services)

What is an eco-school?

Eco-Schools is an international award programme that guides schools on their sustainable journey, providing a framework to help embed these principles into the heart of school life.

<http://www2.keepbritaintidy.org/ecoschools/aboutecoschools>

The figure 50 show the different level of the engagement from the school by the Biosphere team. Many of the eco-school are in the Biosphere Reserve. They can be more touch by the communication if the team about the importance of the environment and the sustainable development.

The other figure show the cumulative number of the inscription of the school for to become eco.

The global trend is since 2006 the number of registering has been increase.

Society

Heritage Protection

The heritage in the area is very important.

The heritage is the link between the past and the future and to keep the historic monument and the memories. Furthermore as well as maintaining the natural spaces it is good that historic places are also part of the legacy for the next generation.

Quite often the cultural sites will have a link with the maintenance of biodiversity.

The heritage assets include properties, material or immaterial with artistic or historic importance. This heritage is a whole set to protect, to restore, to save and to show and can be an important factor for community cohesion.

The figure 45 show the distribution of the parks and gardens, wreck and scheduled monuments protected in the Biosphere Reserve.

The global distribution is heterogeneous, just some concentration can be shown near Dartmoor and Exmoor where there are more ancient sites. This may also be a reflection of the surveys that have been done under the auspices of the National Parks.

Data regarding the condition of protected sites or listed sites is not available across the entire Biosphere Reserve.

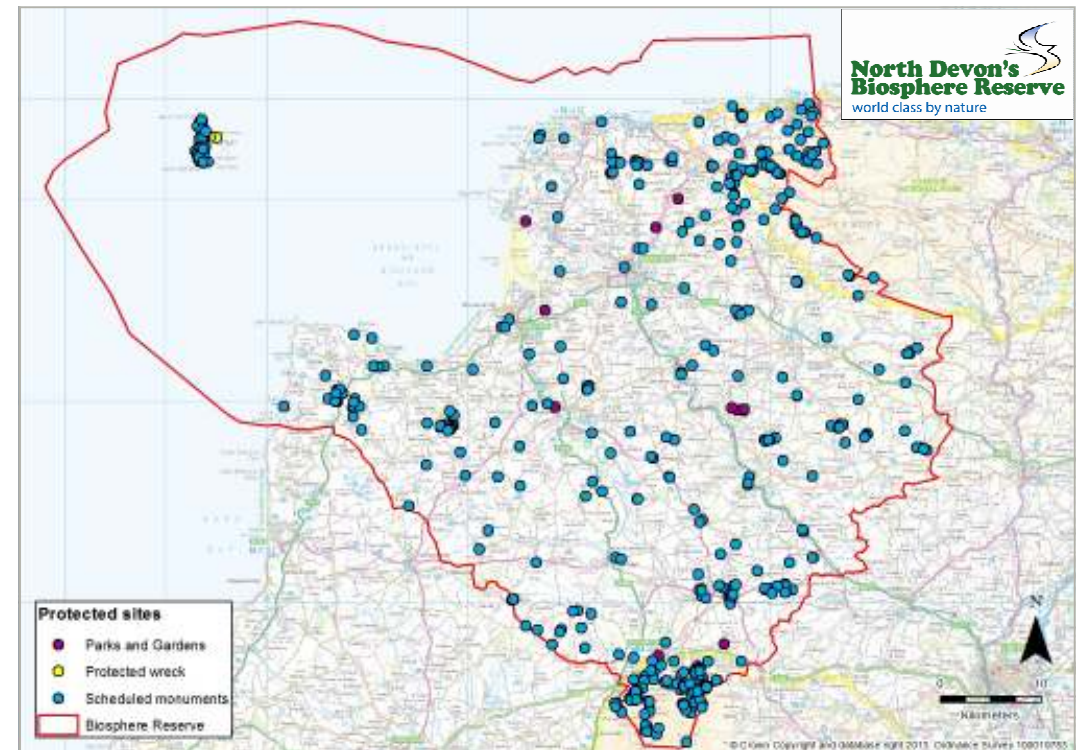


Figure 45. Protected sites (2013) (source: Historic environment service DCC)

Society

Heritage Protection

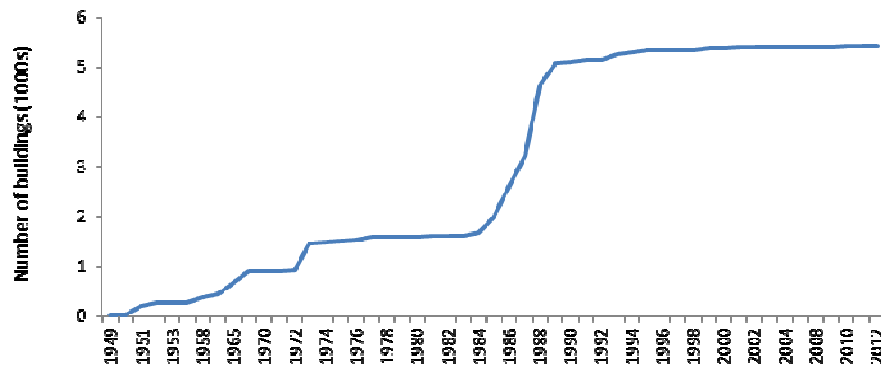


Figure 46. Cumulative number of listed buildings since 1949 (source: Historic environment service DCC)

In England there are approximately 374,081 listed building entries.

(An entry can sometimes include more than one building – such as a terrace.)

There are also:

- 19,717 scheduled ancient monuments
- 1,601 registered historic parks and gardens
- 9,080 conservation areas
- 43 registered historic battlefields
- 46 designated wrecks
- 17 World Heritage Sites

<http://www.english-heritage.org.uk/caring/listing/listed-buildings/>

The figure 47 show sthe listed buildings, the distribution is uniform across the area.

The cumulative number of the listed buildings (**figure 46**) an important increase in 1984 until 1990. pass to 1500 to 5000 listed buildings.

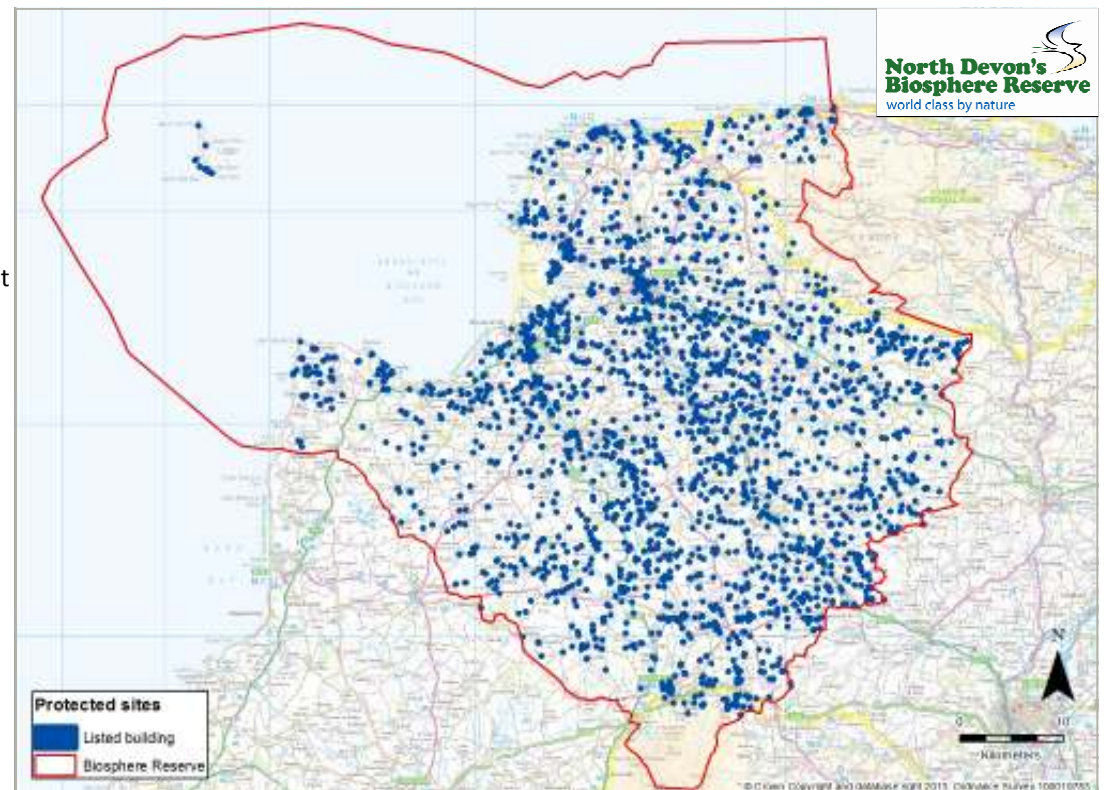


Figure 47. Listed building (2013) (source: Historic environment service DCC)

Economy

Industry

<http://www.northdevonbiosphere.org.uk/accreditation-scheme-2/>

North Devon's UNESCO Biosphere Reserve is an important accolade for the area and it is important that local businesses benefit. Biosphere Reserves in Germany, Switzerland and France have developed accreditation schemes for businesses in their areas and participating businesses have generally increased their turnover (up to 50% in the Rhon Valley in Germany and 3% year on year in Entlebuch, Switzerland).

North Devon's Biosphere Reserve has developed a simple accreditation scheme for local businesses as part of its Investing in Nature programme. It helps businesses on their journey to become more sustainable. It is designed to:

- Include a range of businesses from varying sectors including accommodation, catering, food producers and retailers, fishing, farming and creative industries.

- Generate and demonstrate economic, social and environmental gain from the businesses' association with the Biosphere Reserve.

- Keep things simple with the minimum of bureaucracy and administration

- Support Local businesses on their journey to improve their sustainability (and their bottom line) and to provide networking opportunities for local businesses.

- Strengthen the local economy by encouraging an ethos of localism - keeping money circulating within the local economy.

How does the accreditation scheme work?

The scheme has three award levels; bronze, silver and gold that are increasingly challenging to attain but deliver increasing benefits. Progression within the scheme recognises that increasing businesses' sustainability is a journey that begins with little steps.

The awards

Bronze: Businesses based in the Biosphere reserve sign up to the Invest in Nature charter. They receive free information and guidance to help them make a real and recognisable contribution to the Charter's seven principles. This is the first step to setting your business on the path to a more sustainable future.

Invest in Nature Business Charter

The charter helps to draw up a series of sustainable working principles for businesses. It forms the basis of the bronze accreditation.

Visitor Gifting

Investing in Nature is the visitor gifting scheme for the Biosphere Reserve and is being pioneered by Marsdens Cottage Holidays. They are adding just a pound to their visitor's bills on an opt out basis with the money raised being used to help improve and maintain the world class environment that is so important to their visitors.

"As a family-owned locally-based business run by people who share a real passion for the place in which they live and work, Marsdens is proud to support Investing in Nature and be the recipient of the first ever North Devon Biosphere Sustainable Business Award. We're committed to doing all we can to support and protect our beautiful Biosphere Reserve" Martin Wickham, Chief Executive of Marsdens Cottage Holidays in Devon.

Marsden's visitor gifting scheme contributions from 2011 are supporting the Biosphere Life's Journey Project that is improving access to and telling the story of cultural sites linked by the Tarka Trail

"Tourism contributes a crucial £376 million to the economy of north Devon each year - and our world class environment is the main attraction that brings in these visitors. With all of today's pressures, we have to invest to sustain this precious asset - restoring hedegrows, planting trees, improving countryside access routes, reducing pollution, clearing litter. Investing in Nature is not only welcome, but essential." Dr Mike Moser, Former Chair of the Biosphere Reserve Partnership.

Economy

Urban and rural economic activity

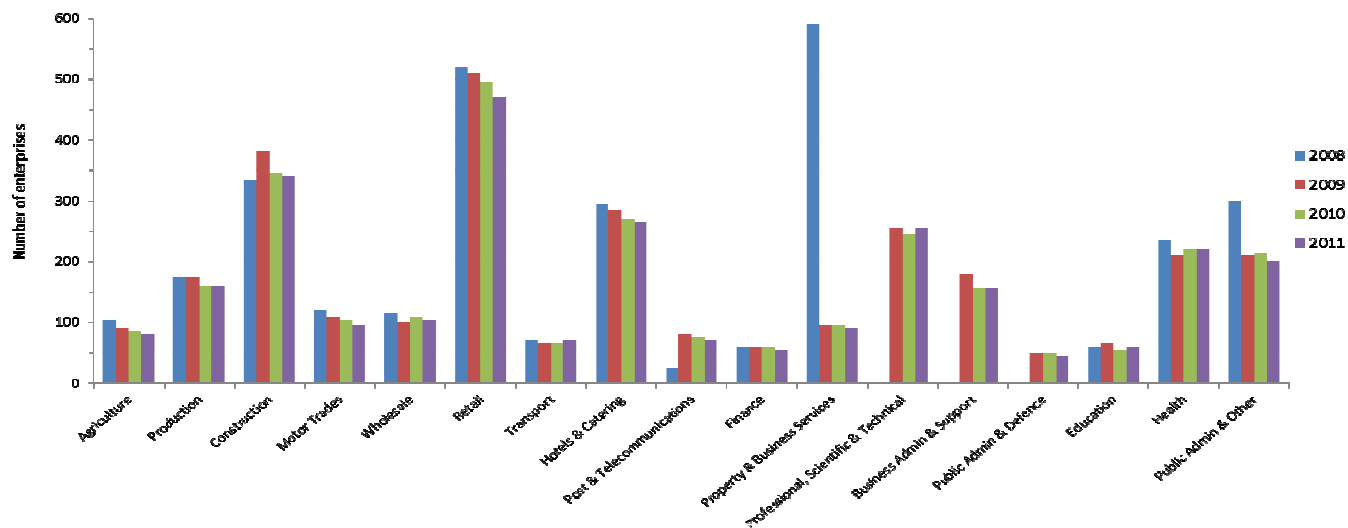


Figure 31. Industry by type in urban locally unit (source: ONS)

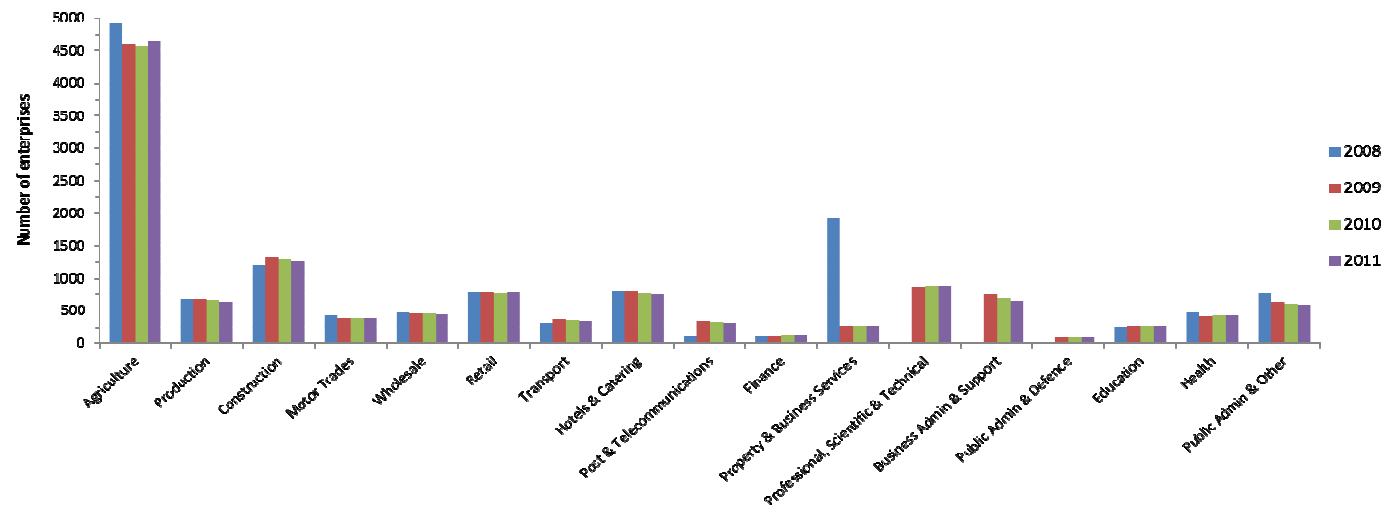


Figure 32. Industry by type in rural locally unit (source: ONS)

Economy

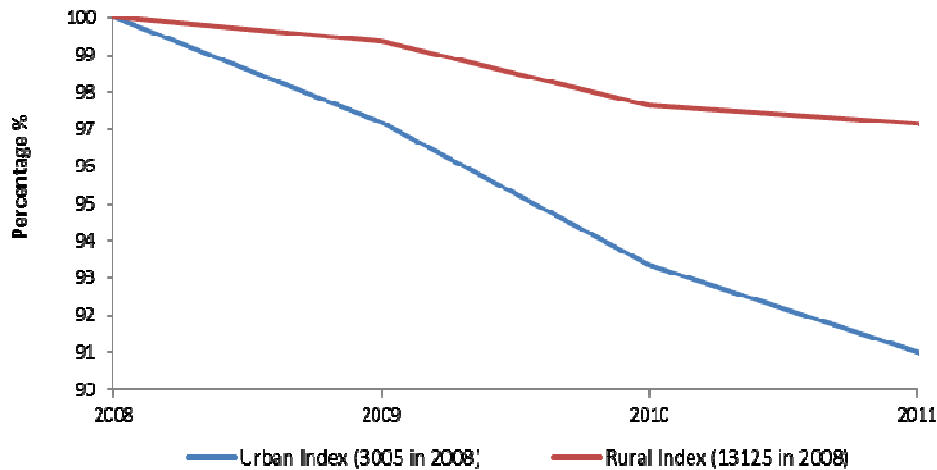


Figure 33. Urban and rural index of the enterprises 2008-2011 (source: ONS)

The figure 33 allows some analysis to explore the difference between the urban and rural main types of industry. In the urban figure the main types include over 200 different industry types (retail, construction, hotels and catering, professional, scientific and technical, health and public services, etc)

Conversely, in the rural area the main type of industry is agriculture, with more than 4500 registered businesses., but not a huge diversity

The both figures show a huge number in 2008 for the property and businesses services.

For both rural and urban sectors, the numbers of registered businesses between 2008 and 2011 decrease, though more markedly for the urban areas. This is largely due to the economic recession.

Vast majority of industry in rural units is agricultural; construction is the next highest but amounts to approx. 70% less than the number of agriculture enterprises. For each industry type change in number of enterprises year on year is small and if there is a change the general trend is a decrease over the four years.

In the UK level the number of industry decrease too.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/194219/Enterprise_Apr_2013.pdf

The agriculture is a major part of the activity in the Biosphere reserve and seems to be reasonably resilient, though the income for each sector is not shown.

Economy

Agriculture

The figure 34 shows the main type of land-use is permanent grassland (sown for more than 5 years) with more than 150,000 hectares in 2007. The change between 2000 and 2007 is small. The maize and the permanent grassland increase but the temporary grassland has decreased.

The figure show the main activity is the sheep production. It is in link with the high number hectares of permanent grassland.

Despite this high number of sheep the number since 2000 has decreased. This is in line with the national trend. Different causes can explain this situation. Since the change from headage payments for stock. The first is the pressure of the prices of the market influence the trend of the livestock.

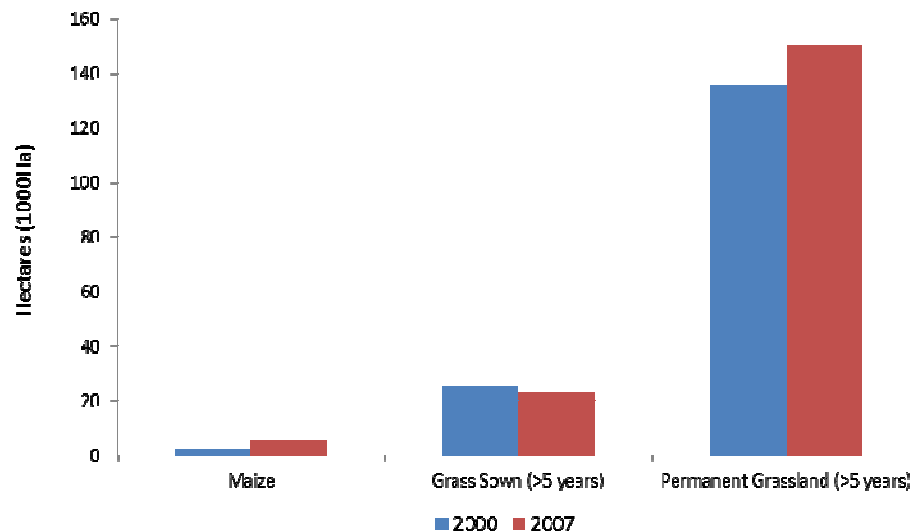


Figure 34. Area of agricultural activity (2000/2007) (source: DEFRA)

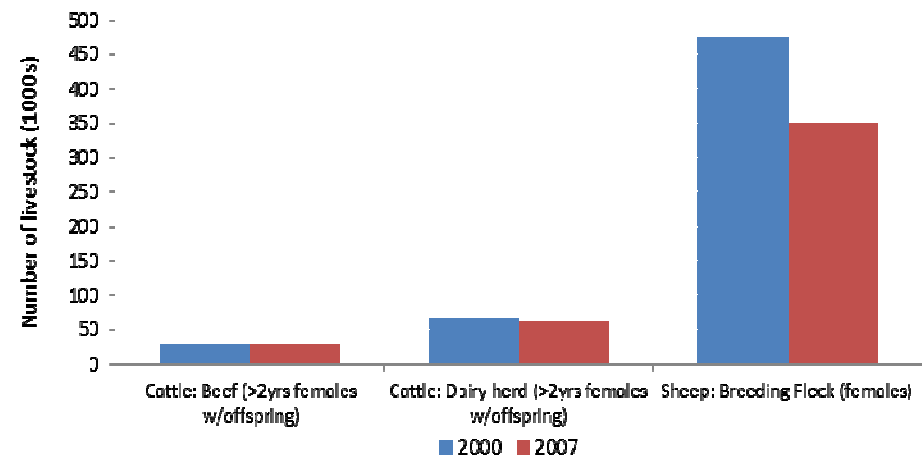


Figure 35. Number of livestock (2000/2007) (source: DEFRA)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243835/structure-jun2013finalcropslivestock-eng-19sep13.pdf

These different numbers for the BR follow the UK trend. The permanent grassland increase to 1.5% and the dairy production of 0.7%. despite these numbers the UK number of number of livestock increase to 3.8% between 2001 and 2013 instead decrease in the BR. Dairy farming has been under significant pressure due to price squeezing from the supermarkets and increased production costs. This has often led to production costs per litre of milk being higher than the wholesale price.

Economy

Fisheries

Fishing is an important economic activity in the Biosphere Reserve. The Value of the fishing industry is estimated to be over £13M when value added and supply chains are included.

Due to the small numbers of boats at each of the ports of (Lynmouth, Ilfracombe, Bideford, Appledore and Clovelly), registered it is breaches data protection rules to disaggregate some data and therefore makes estimates of fishing effort and catches to be analysed. Further more during normal trawls varuous species classes are caught and therefore the effort Towing time or days at sea) when analysed by species double counts the effort. However, the trends seem to indicate that landings are roughly matching the effort and the yield is remaining roughly constant and therefore the fishery appears to running at a sustainable yield.

The increase in shellfish exploitation has been largely due to an increase in potting and the addition of the whelk potting industry.

The global landing in the UK has decreases since 2002.

<http://www.cefas.defra.gov.uk/publications/shellfishnews/shellfishnews-31.pdf>

<http://www.marinemanagement.org.uk/fisheries/statistics/annual.htm>

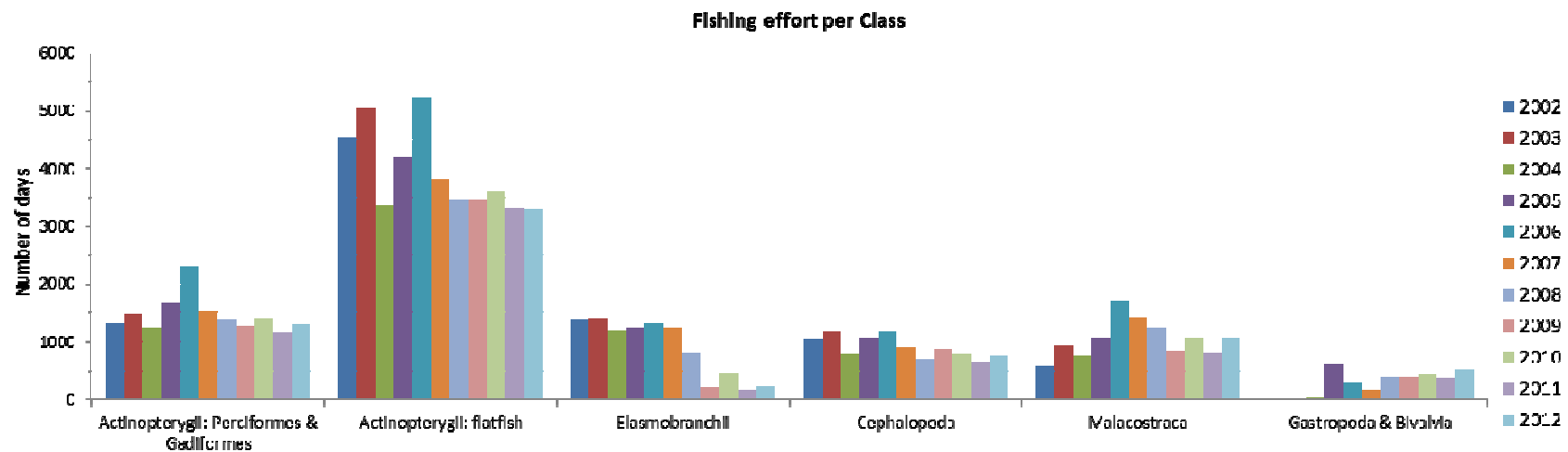


Figure 36. Fishing effort per class (2002-2012) (source: MMO)

Fisheries (cntd)

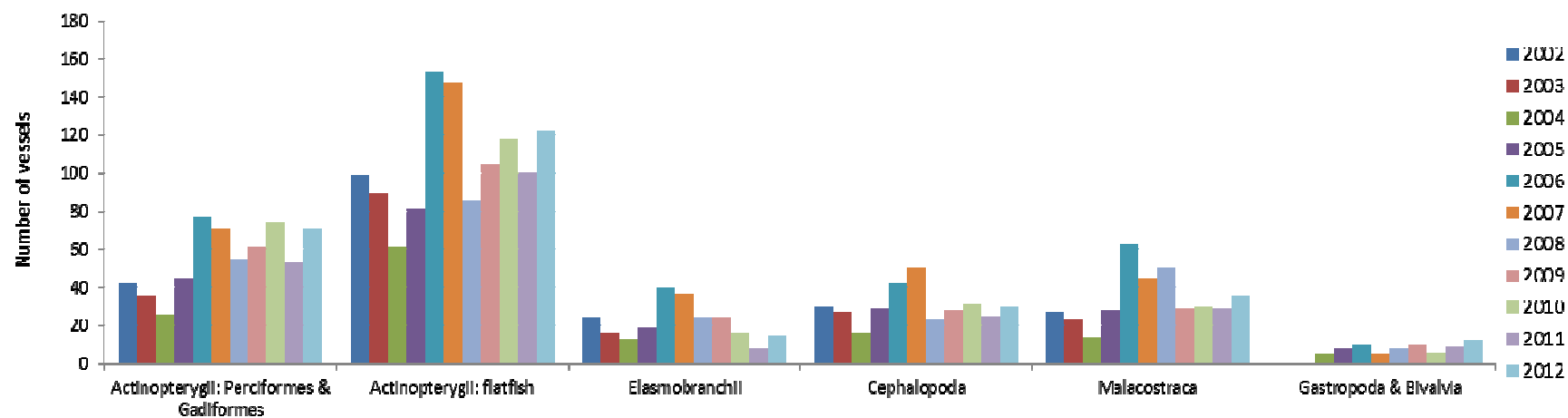


Figure 37. Number of vessels landings catch per class (2002-2012) (source: MMO)

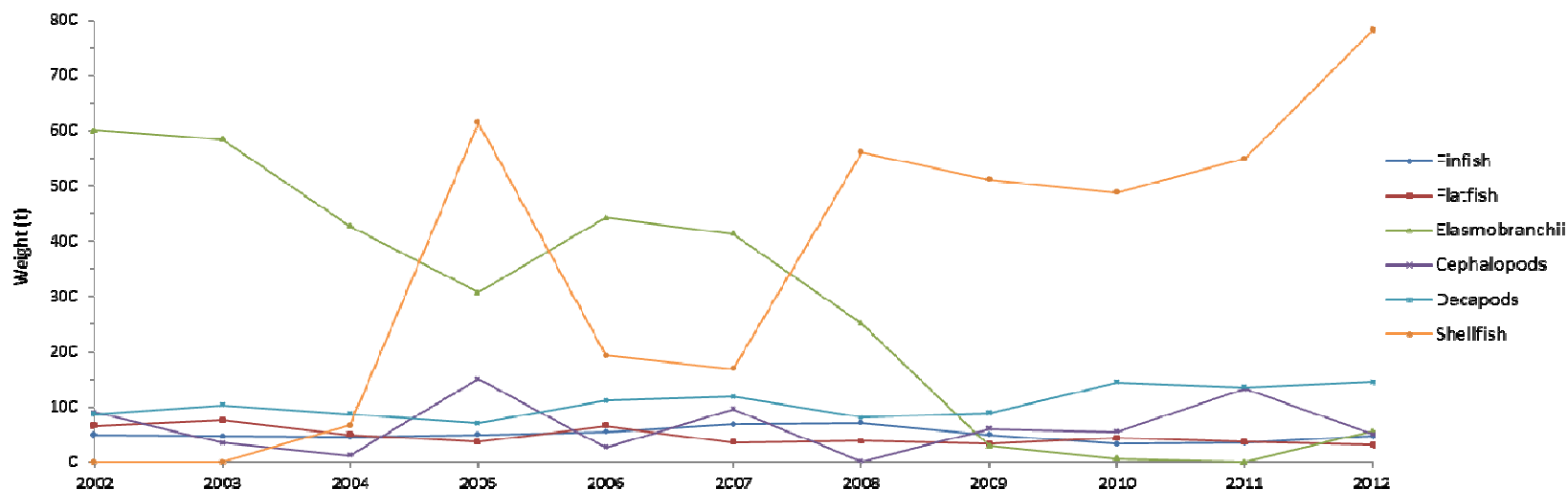


Figure 38. Tonnes landed per class (2002-2012) (source: MMO)

Economy

Tourism

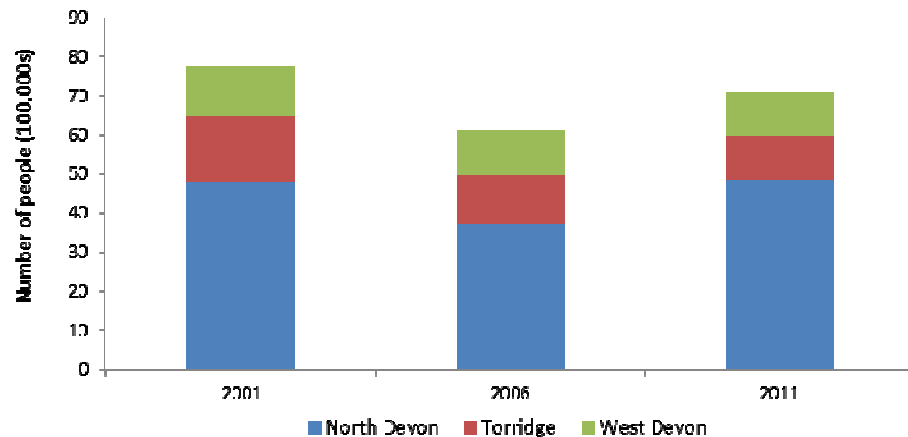


Figure 39. Total number of tourists visiting for 2001/2006 and 2011 (sources: South West Eng-

The number of tourist in the Biosphere Reserve change between the three years. In 2001 the number of tourists was near 80 000 person, in 2006 ths number decrease to 60 000 and trend to increase after this year. At the UK level the number of tourist increase too after 2006.

The figure 39 show the difference between districts. The North Devon records the highest due to accommodation provision. The proportions stay the same for Torridge and West Devon districts.

The other Figure shows the origin of the tourist. The main information show is domestic tourism is the most important in the area. Experience has shown that the proportions of overseas to domestic tourism fluctuates with currency strength and weather.

The Biosphere reserve is an attractive place for the coastal tourism, with the hinterland overlooked. Despite the important marine part the area stay mainly rural and the tourism is hard to maintain in this kind of area

Compared to the UK number:

<http://www.ons.gov.uk/ons/rel/ott/travel-trends/2011/index.html>

http://www.tourismalliance.com/downloads/TA_327_353.pdf

Number of overseas visitors 2001 = 22,835,00 and in 2011 ~ 30, 000,000 .

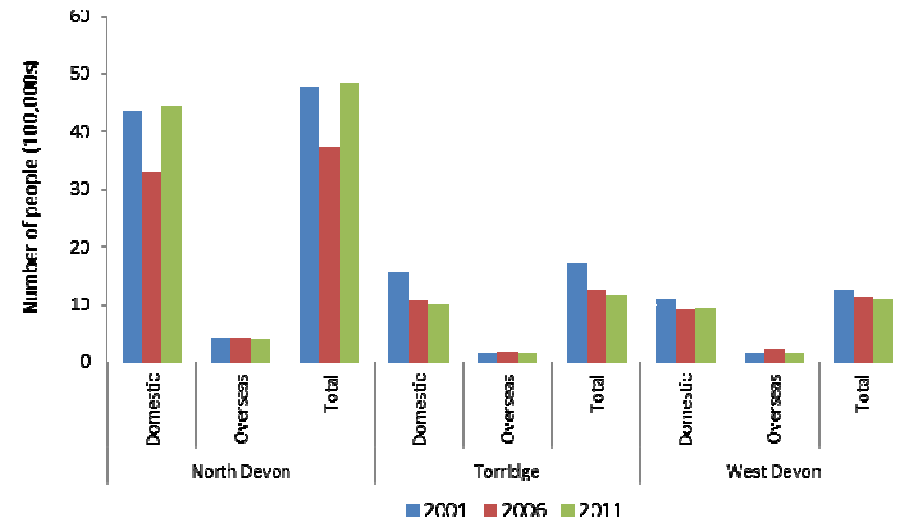


Figure 40. Origin of tourists for each district for 2001/2006 and 2011

(sources: South West England and DCC)

Resources use

Energy

Energy consumption

In terms of total energy consumption there is an approximately equal split across the three broad sectors in the Biosphere Reserve (**Figure 52**). Due to polualtion and area, North Devon has a higher total energy consumption than Torridge, which uses more than West Devon and Mid Devon.

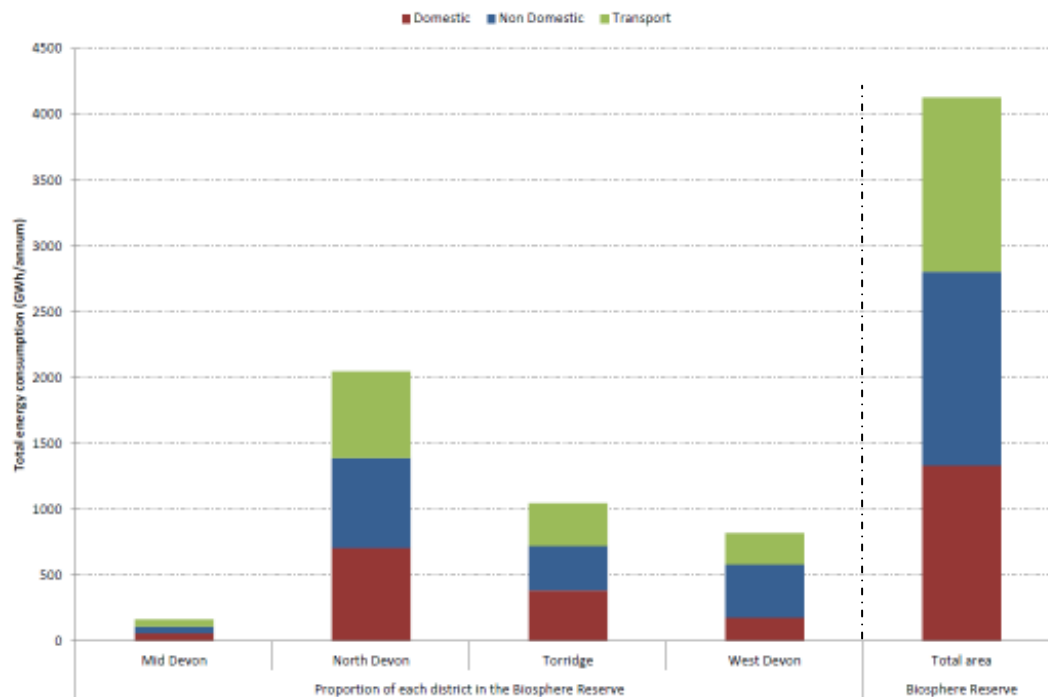


Figure 52. Total energy consumption by sector in the Biosphere Reserve. (source: Energy plan 2013)

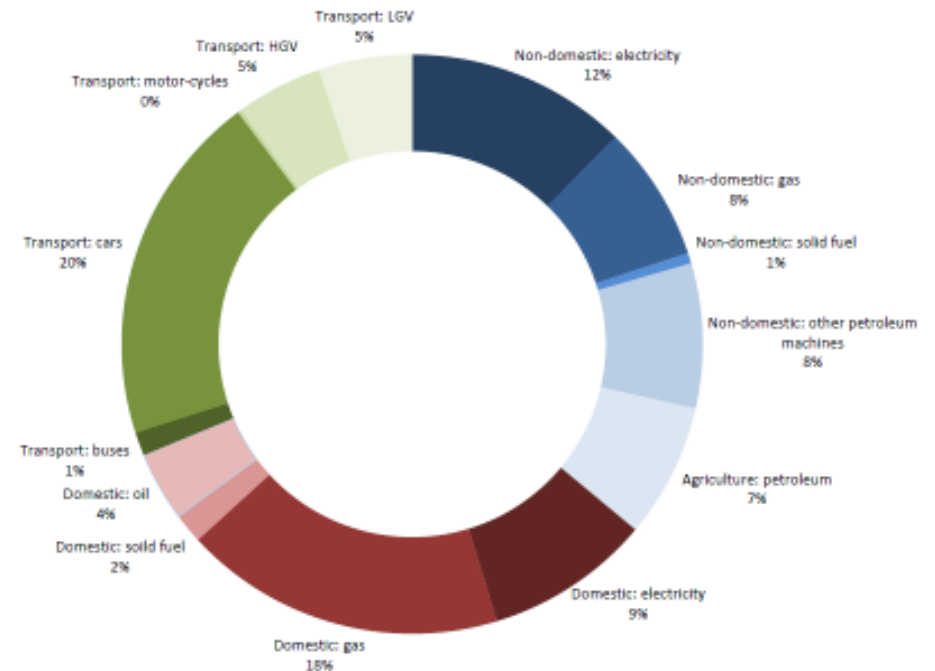


Figure 53. Total energy consumption by sub-sectors in the Biosphere Reserve. (source: Energy plan 2013)

There is a mix of fuel types in each sector. In comparison to the national picture (23% gas; 4% electricity) there is a much smaller proportion of domestic gas use to electricity or oil in the study area. In the non-domestic sector, nationally gas is the most important fuel type whereas in the Biosphere Reserve electricity makes up the highest proportion.

West Devon has the highest non-domestic intensity than the other authority areas, reflecting the presence of the Taw Valley Creamery site (Arla Foods UK Plc). Both West Devon and Mid Devon have similar transport intensity which is higher than the other authority areas, probably influenced by the presence of two major A roads (A361 and A377) in Mid Devon, and the rurality of West Devon, which includes Dartmoor National Park, and the A30 and the A386.

The highest transport energy use is by cars (**Figure 54**), reflecting the rural nature of the study area with people having to travel some distance to reach their nearest food supplier.

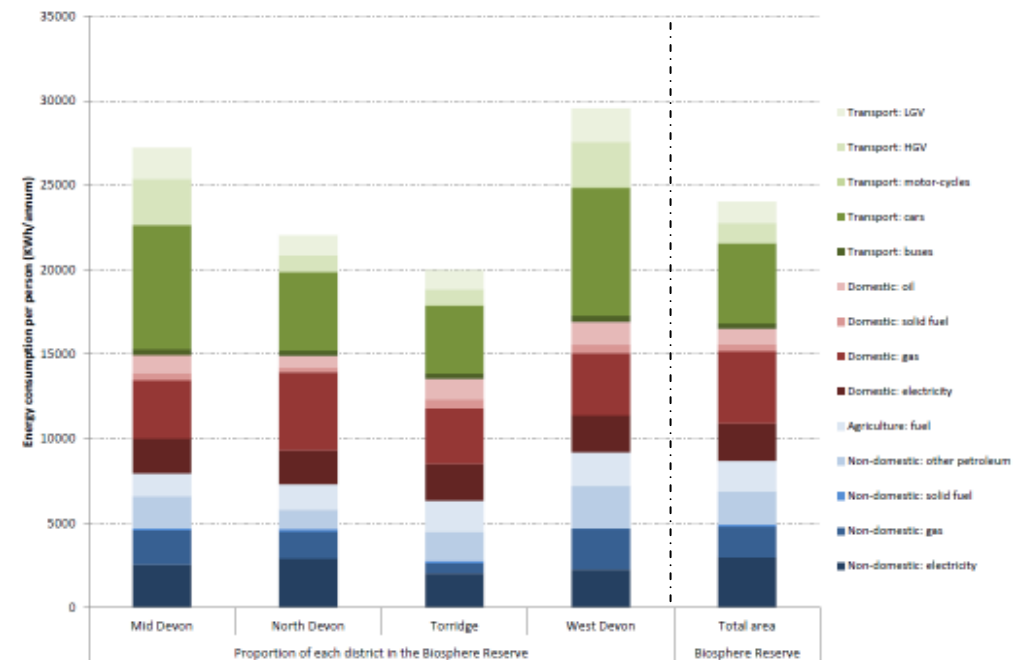


Figure 54. Total energy consumption by person and by sub-sectors in the Biosphere Reserve. (source: Energy plan 2013)

Resources use

Energy

Energy expenditure

In contrast to energy use, there is not an even split of cost across the three main sectors. Transport accounts for ~50% of the energy spend in the study area (**Figure 56**).

The cost of electricity is greater than other fossil fuels which explains why non-domestic electricity represents a greater proportion of the spend in that sector than it does consumption (**Figure 56**).

The total annual spend on energy in the Biosphere Reserve is estimated to be over £370million pa (**Figure 55**); with almost half of that spend in North Devon.

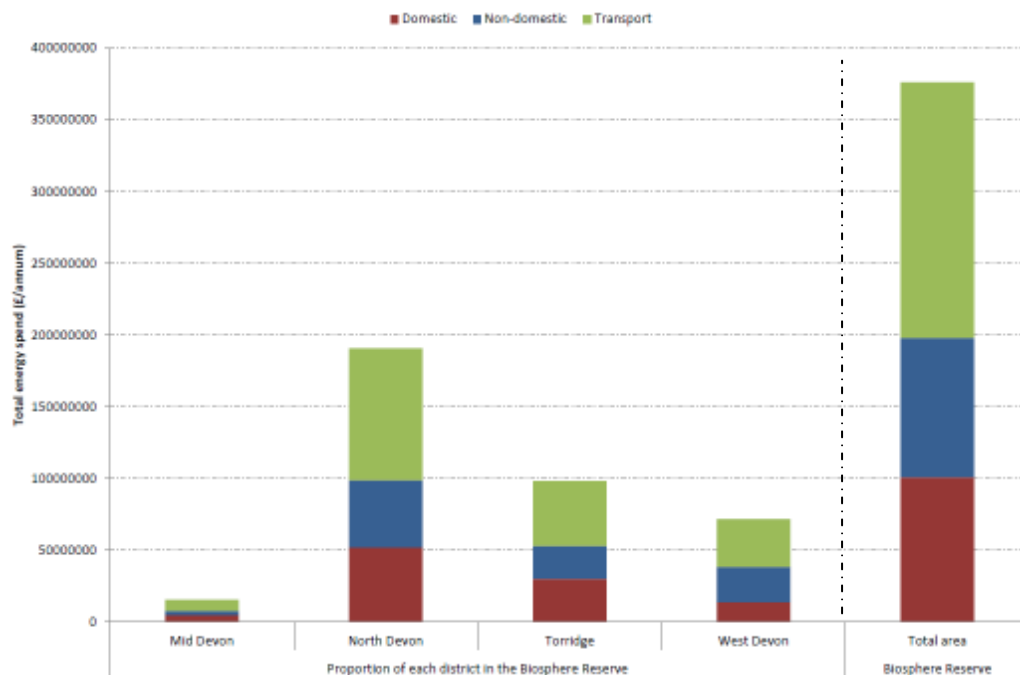


Figure 55. Total energy spend by sectors in the Biosphere Reserve. (source: Energy plan 2013)

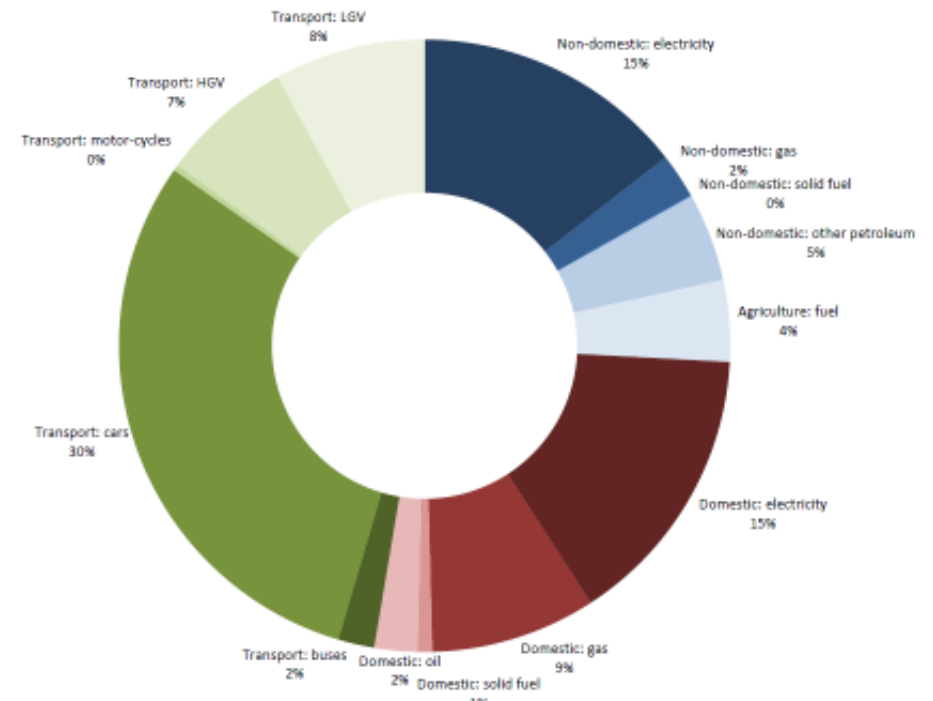


Figure 56. Total energy spend by sub-sectors in the Biosphere Reserve.
(source: Energy plan 2013)

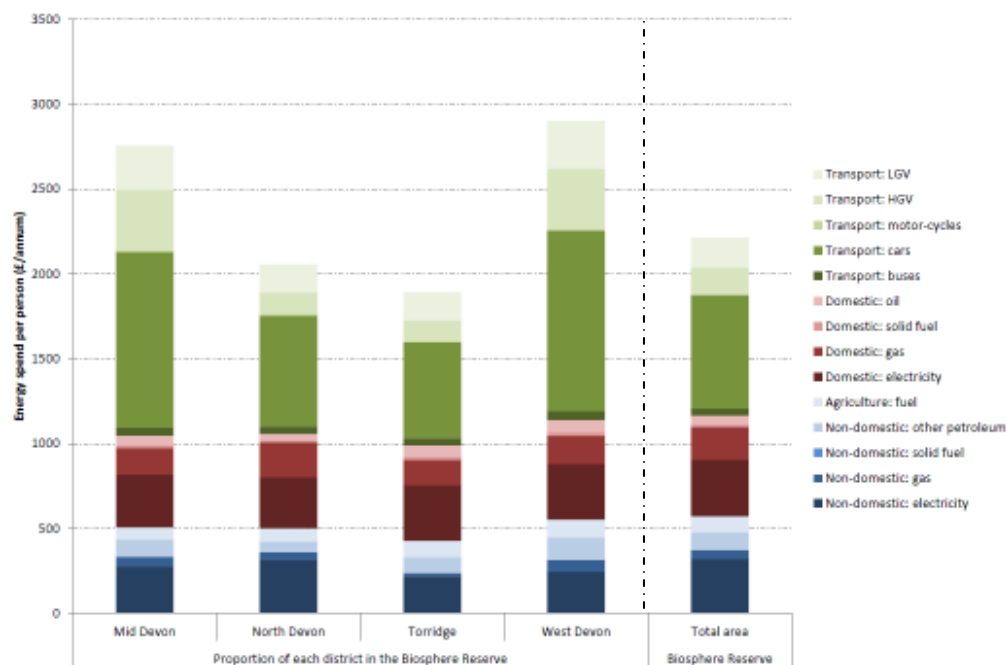


Figure 57. Total energy spend by person and by sub-sectors in the Biosphere Reserve.
(source: Biosphere Reserves Energy plan 2014)

The equivalent of over £2,200 is spent per person per year on energy (**Figure 57**).

Approximately £500 is spent a year on domestic energy use per person.

The equivalent of approximately £700 is spent on private vehicle use per annum. This may be exaggerated as it likely includes people travelling through the area.

Overall, the amount spent on energy in the whole area every year is equivalent to 11% of its economic output (Gross Value Added, GVA), or the equivalent of ~14,500 full-time jobs (FTE) (**Table 7**).

This part of the report is expanded on in the Biosphere Reserves Energy Plan , managed by the Biosphere reserve team.

For the future use and expenditure in energy, the Energy plan make two scenarios (Business As Usual and Passive) to show the potential pressure on energy demand in the Biosphere Reserve. Some result have been submit to explore the different solution to save energy and CO2 emission in the future.

Table 7. Economic indicators for energy spend in the Biosphere Reserve (Source: Devonomics).

	Energy spend				% Energy spend of GVA	Energy spend as equivalent FTE
	Non-Domestic	Domestic	Transport	Total		
Mid Devon	£2,967,013	£4,762,488	£7,794,813	£15,524,314	1.8%	502
North Devon	£46,861,303	£51,012,812	£91,829,087	£190,703,201	13.7%	6172
West Devon	£22,922,442	£30,128,935	£45,311,354	£98,362,731	15.2%	3290
Torridge	£24,515,478	£13,931,902	£33,245,017	£71,692,397	11.2%	2414
Biosphere Reserve	£97,266,235	£100,836,136	£178,180,271	£376,282,643	10.5%	12378

9. Resources use

Energy

Renewable Energy

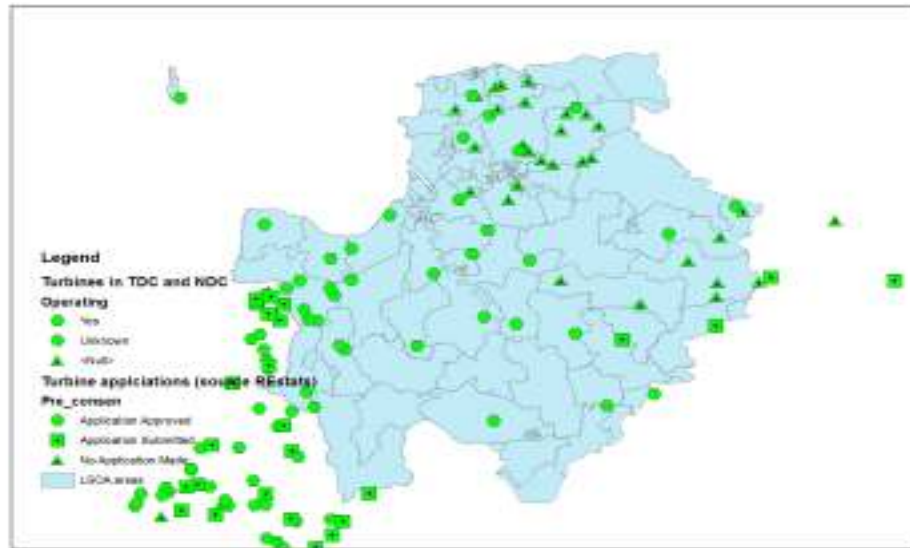


Figure 58. Wind energy installations

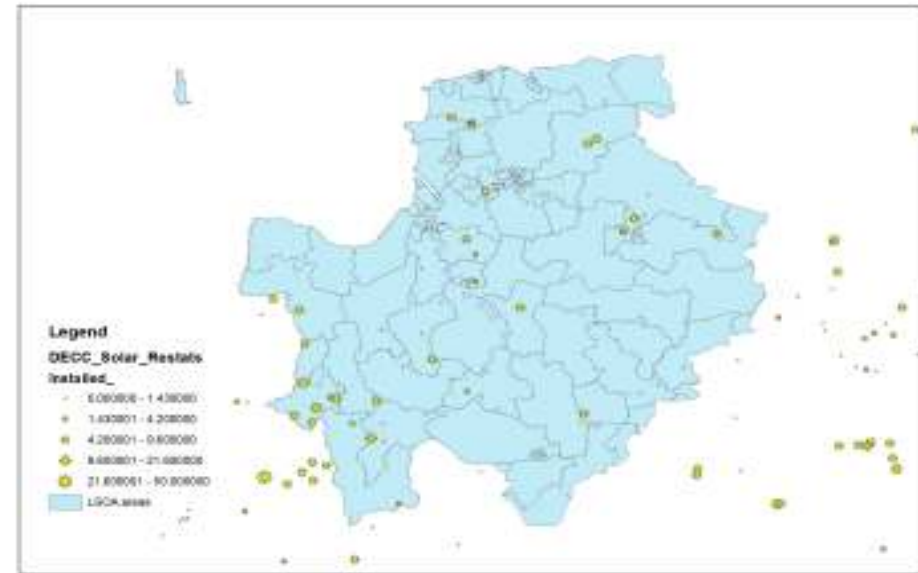


Figure 59 Solar energy Installations

Renewable energy technology	Total installed capacity (MW)	Number of installations	Average capacity per installation (MW)
Anaerobic digestion	6.1000	2	3.0500
Biomass	8.0174	134	0.0598
Heat pump	3.0236	283	0.0107
Hydro	1.7648	6	0.2941
Onshore Wind	74.0596	89	0.8321
Solar PV	47.1904	3433	0.0137
Solar Thermal	0.9801	253	0.0039

These figures indicate the extent of major renewable energy technologies in the Biosphere Reserve area. Allowing for load factors, in 2012 the energy from renewable resources from within in the Biosphere Reserves was approximately 7% of the consumption .

9. Resources use

Water

Water supply

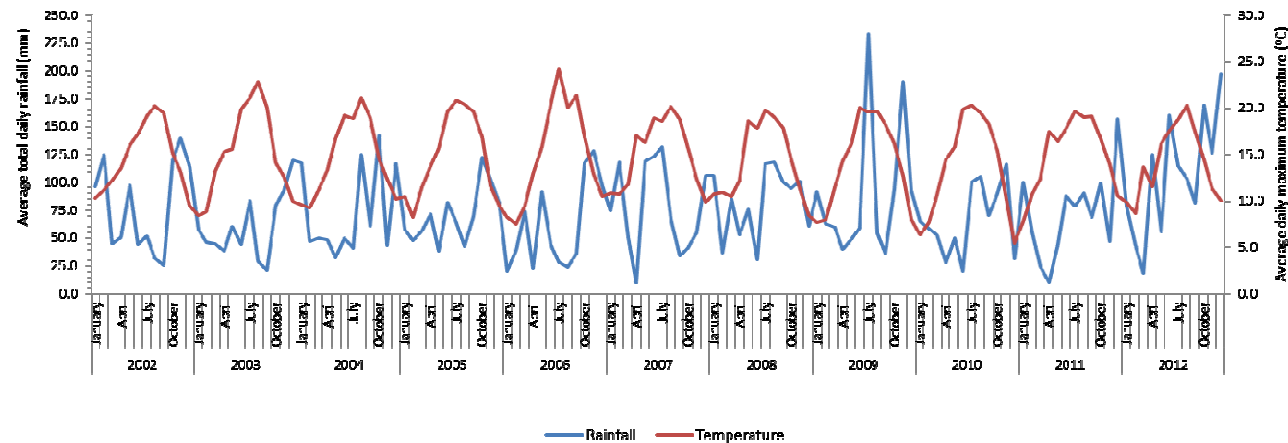


Figure60. Average rainfall and temperature, 2002—2012, from the 2 station in the Biosphere Reserve.

(sources: UK Met Office for Chivenor and North Wyke stations)

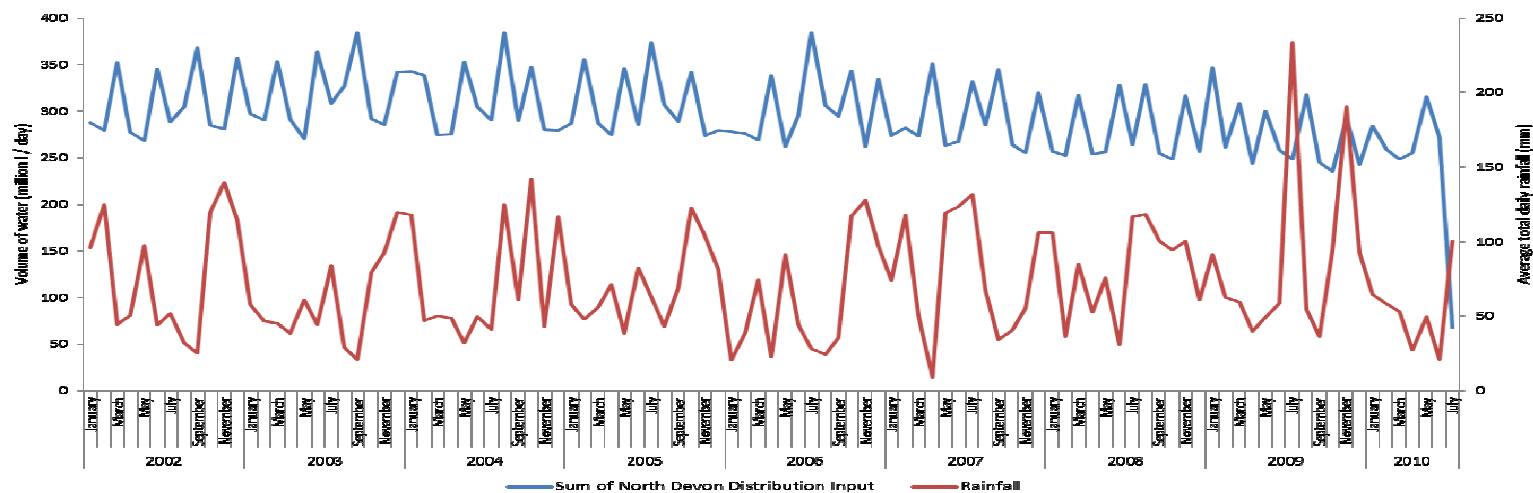


Figure61. Average rainfall and water distribution input in the North Devon , 2002—2010, from the 2 station in the Biosphere Reserve.

(sources: South West Water, Met Office)

Climate trends over the 10 years are not discernable, other than there has been some more extreme events of rainfall and storms in the recent years.

<http://www.metoffice.gov.uk/climate/uk/summaries/anomalygraphs>

9. Resources use

Water

Bathing water

There are over 400 coastal and inland bathing waters in England. The Environment Agency tests each bathing water 20 times during the bathing water season (15 May to 30 Sept). The quality of the bathing water has improved over the last 20 years.

However, some incidences of failures can be found, one notably is in the Biosphere Reserve at Instow. The Environment Agency makes guidance for the local authority to manage their beaches. Some advice concerns the beaches themselves (dog bans, cleaning, etc) however within the Biosphere Reserve, the catchment area is managed too (good drainage connections, sustainable drainage, catchment sensitive farming, etc...). Instow is the only beach inside the estuary and so will be a constant challenge.

The bathing water quality is important for the health, wellbeing and economic benefits for the local community.

Mainly the quality of the bathing water is good. Except for Wildmouth and Instow. Combe Martin recently reached the required standards after a great effort from the Biosphere Reserves partnership and the Parish Council of Combe Martin.

The other map shows the trend of the last 6 years of the bathing water quality. These trends follow the global level: most of the beaches have better bathing quality.

<http://www.environment-agency.gov.uk/homeandleisure/recreation/145872.aspx>

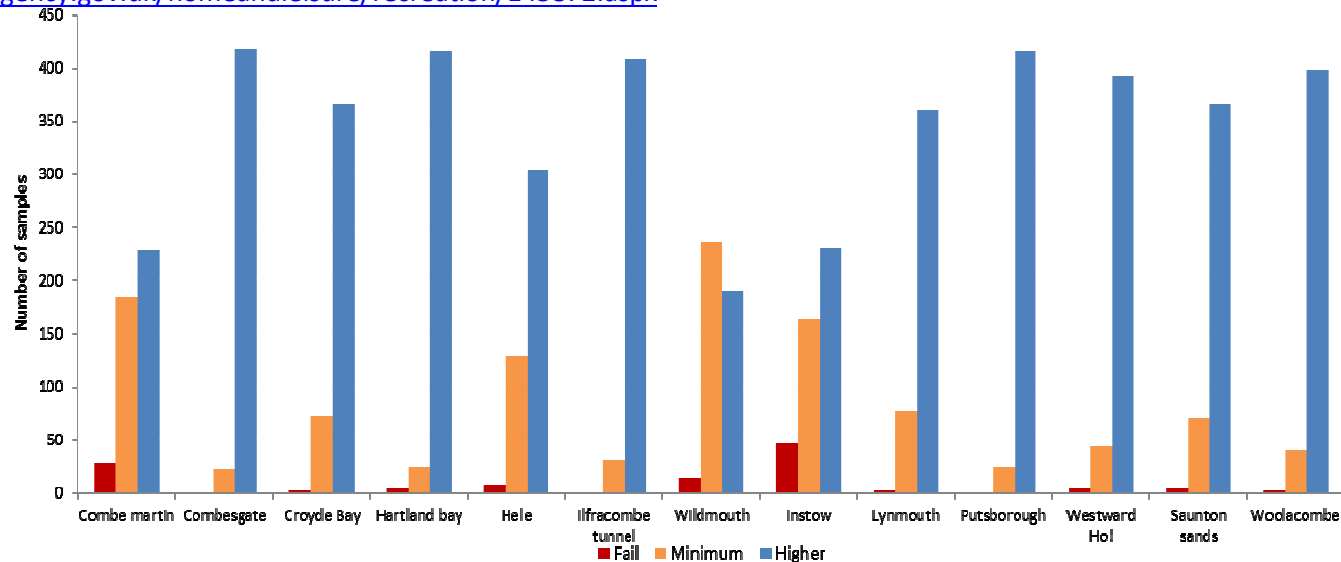


Figure62. Number of different tests of bathing quality for each beach in the Biosphere Reserve (sources: Environment Agency)



Figure63. Overall bathing quality and recent trend (last 6 years) map 1 in the Biosphere Reserve (sources: Environment Agency)



Figure64. Overall bathing quality level 2002/2012 (map 1) in the Biosphere Reserve (sources: Environment Agency)

Resources use

Water

River Water Quality

The quality of the water bodies is in tight link with the plan Catchment sensitive farming use by the Biosphere Reserve. The figure show mainly the quality of the stream is the area is good to moderate.

In the Appendix 2009/2010 and 2011 maps have been done to show the evolution of the quality of the stream. Unfortunately, these data are not enough in a long term to show the real impact of the action on the area.

Many discussion and action have been done and will done for the quality of the stream. Soon survey of some stream will be done in the area of the Biosphere. This survey will base on the identification of the invertebrate to study their presence and permit at the public to understand the functioning of the stream and the impact of different action around the catchment.

Another important part of the action of the Biosphere is the discussion with the farmer in the area.

In the first part of the rapport (2.1.p), more actions have been describe.

All of the transitional and coastal water bodies are in good condition with the exception of the estuary which is failing for nitrates.

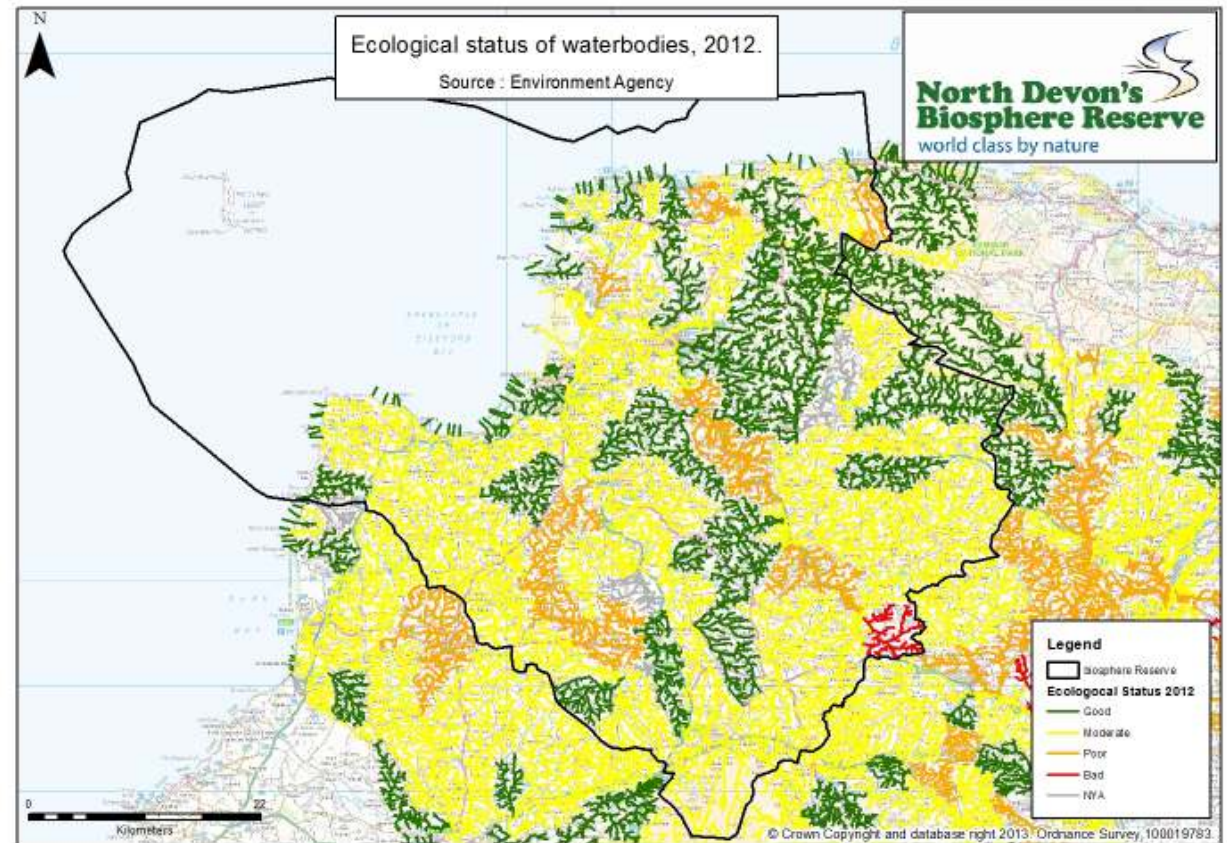


Figure65. Ecological status of water bodies 2012. (sources: Environment Agency)

Resources use

Waste

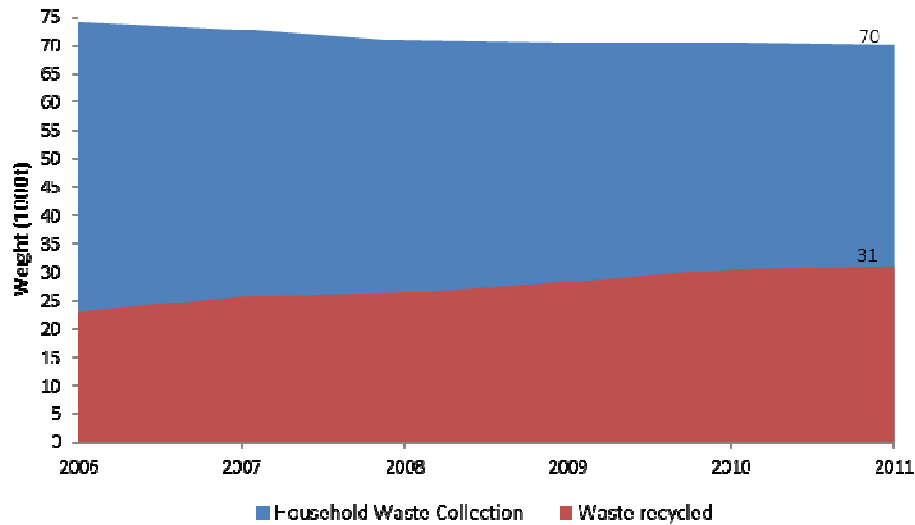


Figure66. Household waste collection and waste recycled (sources: Waste data flow)

The figure 66 shows the trend of the municipal domestic waste collection and recycled in the Biosphere Reserve. Since 2006 the weight of the waste collection has slightly decreased and the recycling proportion has increased.

These observations can be interpreted by the important effort of communication for the public about recycling the waste but also by the economic crisis which can change the way of living and consuming by the people. In the North Devon and Torridge district the communication and action about the recycling has been strong and they have been the highest performing within Devon. More authorities are concerned about saving waste for the ecology and the economy of the area.

Devon County Council use new communications methods to communicate with the public like such as TV and other media adverts, post-cards, and Facebook. They have also partnered with the Biosphere Reserve on issues such as marine and beach litter.

<http://www.recycledevon.org/>

Resources use

Land use

Environmental schemes

Landowners are eligible for a number of schemes in the Biosphere Reserve. These are Entry Level Scheme, Higher Level Scheme, Organic Entry Scheme and Woodland Grant Scheme.

<http://www.naturalengland.org.uk/ourwork/farming/funding/aesiereport.aspx>

These aid the choice of the farmers to manage their area in respect of the environment with the grant support. The impact of this choice is important to maintain or restore the habitat and species in sensitive areas.

The figure 67 show the evolution of the area under agri-environmental schemes spanning two EU funding periods

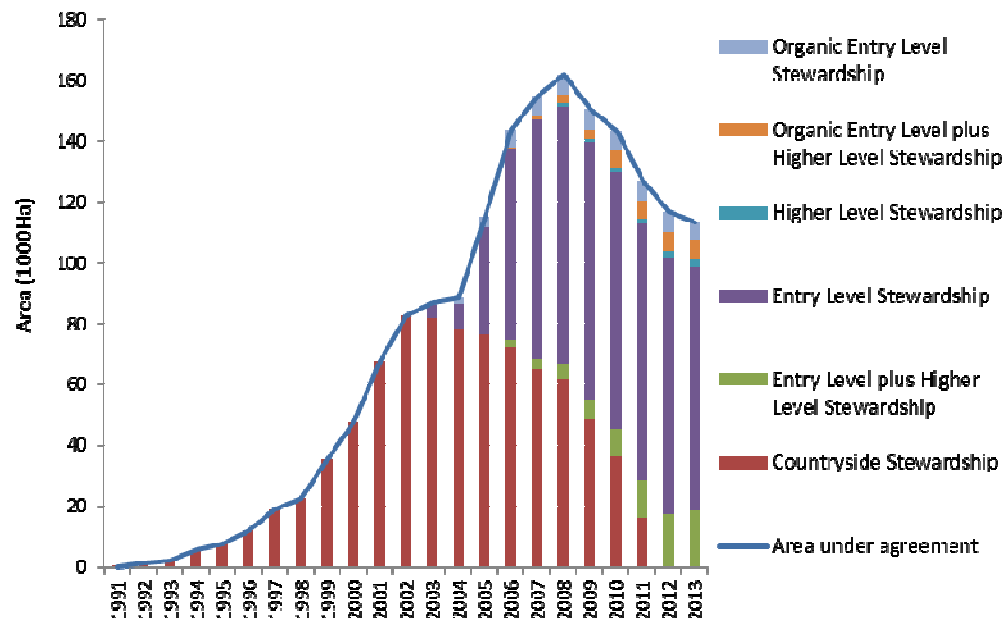


Figure67. Area under agri-environment schemes (1991 to 2013), Source: Natural England)

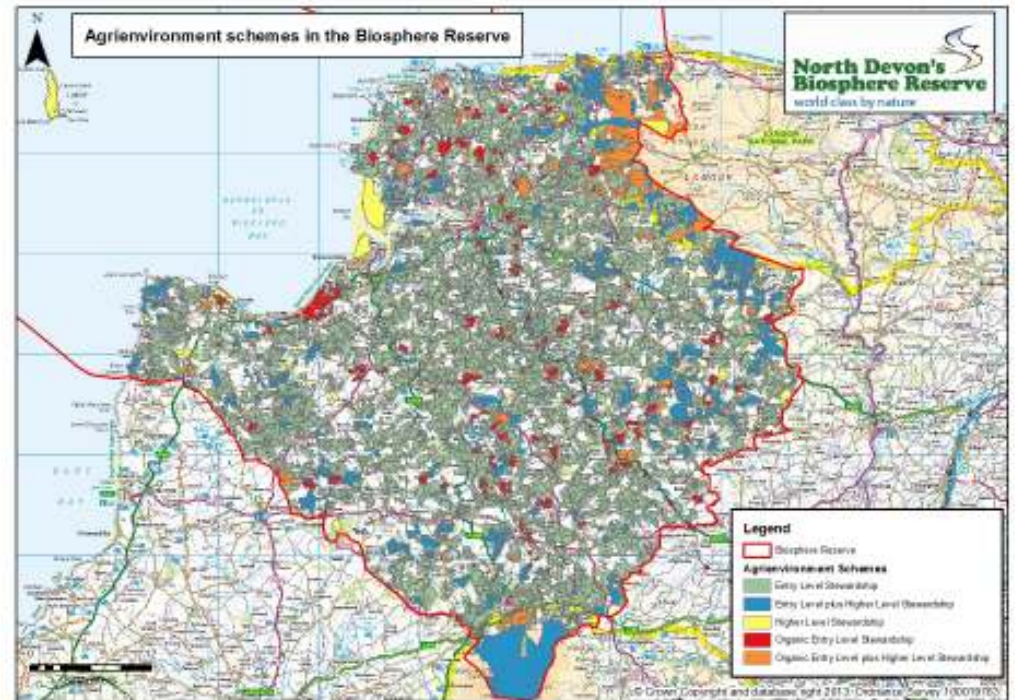


Figure68. Agri-environment schemes in the Biosphere Reserve, 2013, (source: Natural England)

The area covered by schemes reach a peak in 2008. There was a change in scheme design and targeting at this point which made it more challenging to gain the funding for the scheme. Due to funding restrictions it is more important to make sure that the grants are awarded to the areas that will deliver the greatest benefits.

Resources use

Land use

Protected areas

In link with the protection of the sensitive species or habitats, the figure () show the distribution of main areaof protection in the Biosphere Reserve.

Special Area of Conservation: SACs

Sites of Special Scientific Interest: SSSI, SSSI condition in Appendix

Area of Outstanding Natural Beauty : AONB

National park

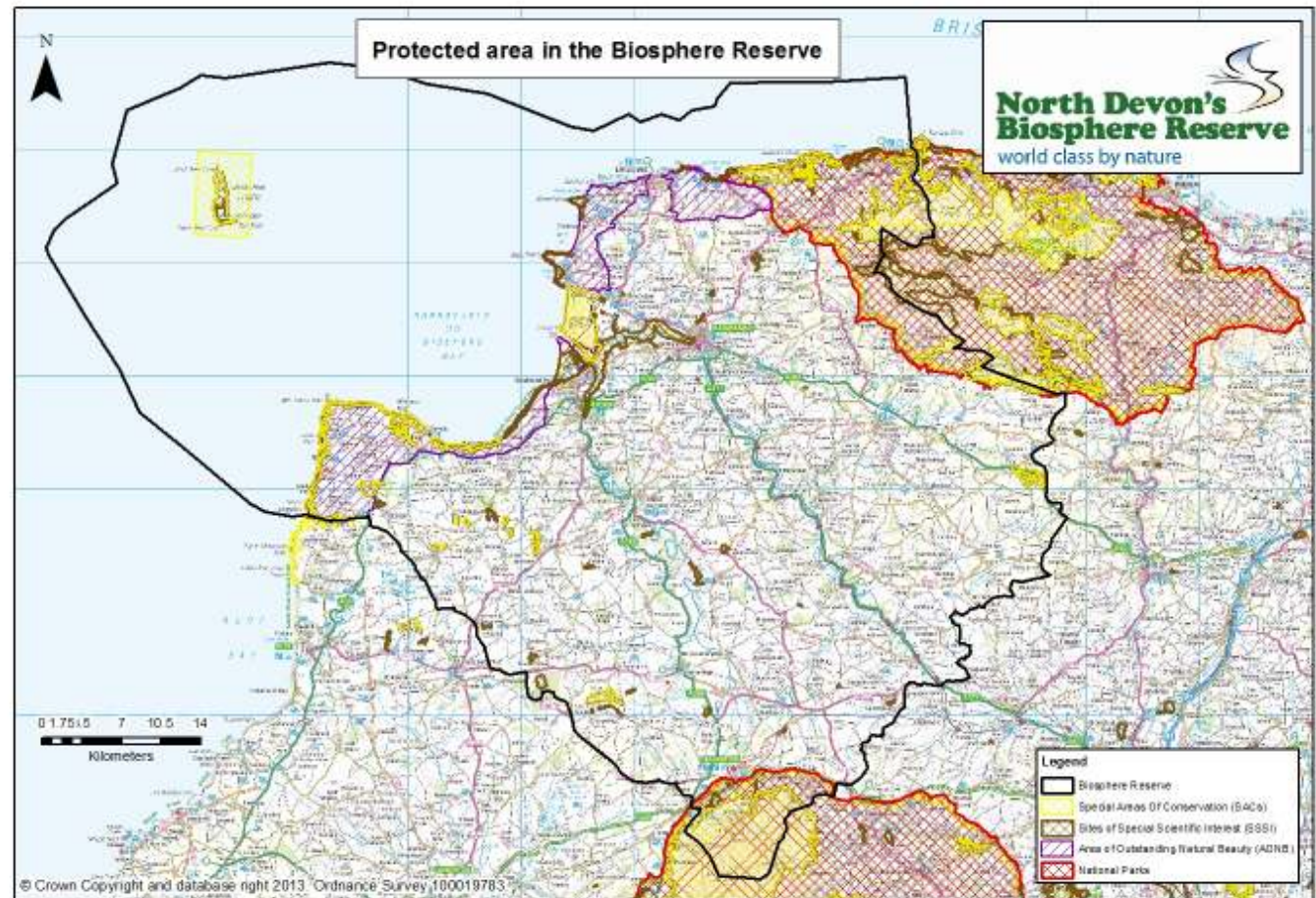


Figure69. Protected area in the Biosphere Reserve,2013, (source : Natural England)

Resources use

Land use

Land-cover

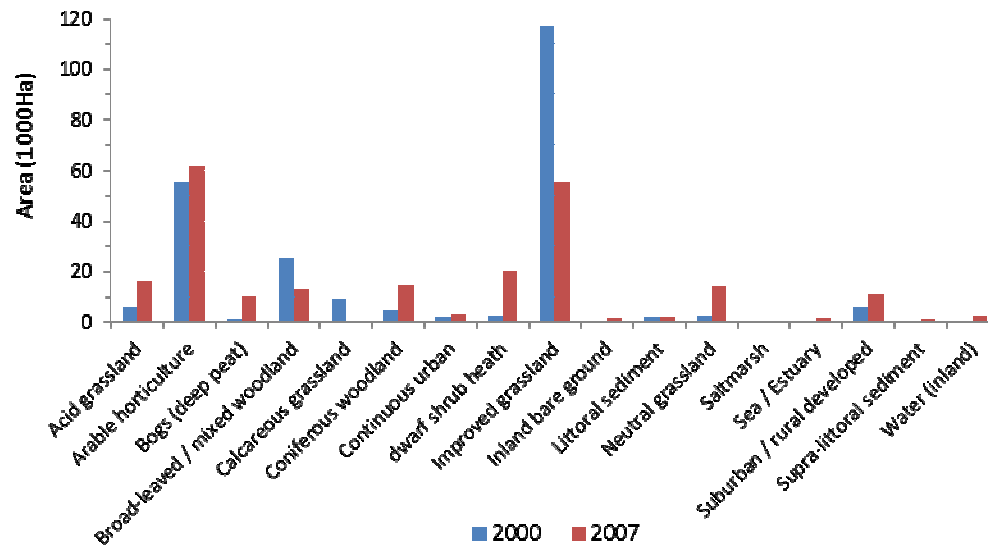
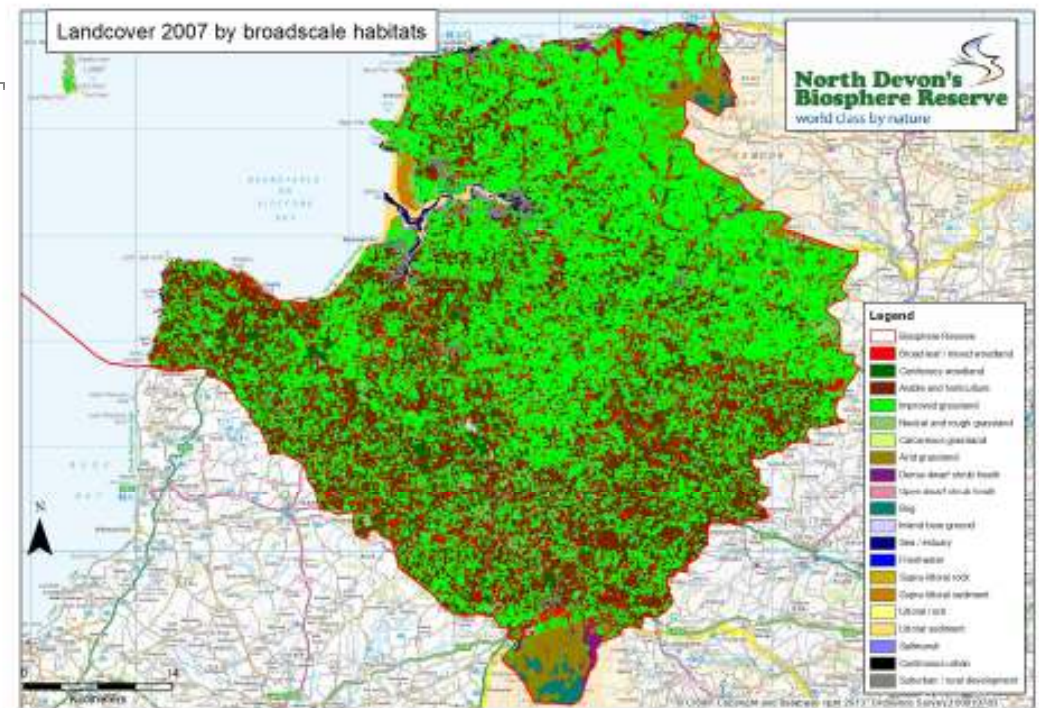


Figure70. Land-cover by subclass in the Biosphere Reserve (200/2007) (source: LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors)



Figure?. Land-cover map 2007 by broad scale habitats, (source: LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors)

Appendix 1 Data sources and treatment of data

Species and habitats:

Birds

Advice for choice: Establish list of common bird and habitats, advice of some expert.

Choice: these species because more common in the Biosphere Reserve. Main of the species are classify in BAP or list of protected species.

Data: Devon watching bird record

Treatment of the data: Geo-referencing on GIS, mapping

Mapping and treatment by Access and excel, 6 habitats within ¾ species record

Information:

Report of The state of Devon's Nature, 2012

Report of State of the Nature UK

RSPB, <http://www.devonbirds.org/home>

Michael Tyler, The birds of Devon, 2010, Exeter, 746p.

Marine species

Advice for choice: North Devon's Biosphere Reserve and Wildlife Trust.

Choice: Nationally and regionally important indicator species

Data: JNCC and MRLRC

Treatment of the data: Mapping GIS

Visualisation of the presence of 4 species, simple state of the species. No compare with other years.

Information: <http://www.naturalengland.org.uk/ourwork/marine/mpa/mcz/features/species/sunsetcupcoral.aspx>
<http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/iyb/pinkseafan.aspx>
<http://www.naturalengland.org.uk/ourwork/marine/mpa/mcz/features/habitats/rosswormreefs.aspx>

Trout / salmon

Advice for choice: Environment Agency

Choice: Main species in connexion with the sea and very important for the evolution of some other species. Ex, the freshwater pearl mussel...

Data: Environment Agency

Treatment of the data: Mapping GIS

Keep the information in the document about the net, rod and average weight of the records in the Taw-Torridge River.

Information:

Environmental agency, Fisheries statistics 2002/2011

Freshwater Fisheries statistics for England, Wales and the Border Esk, 2009

K. Hendry and D. Cragg-Hine, Ecology of the Atlantic salmon Conserving Natura 2000 Rivers, Ecology series N°7, Life, 36p

Otters

Advice for choice: Environment Agency

Choice: Good indicators for the quality of the rivers

Data: Environment Agency

Treatment of the data: Mapping GIS

Demography:

Population change

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale.

Information:

Age

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale.
Grouping class of age.

Information:

Gender

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale.

Information:

Ethnic

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale.
Put forward the different ethnics groups with comparison 2001/2011.

Information:

Unemployment

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale

Information:

Education

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale.
Choice higher qualification.

Information:

Transport

Data: Census 2001/2011 ONS

Treatment of the data: use the LSOA scale to add the information at the Biosphere scale

Information:

Economy:

Industry

Data: Census 2001/2011 ONS

Treatment of the data: use the data about the local units by broad industry group, between 2008/2011.

Information:

<http://www.northdevonbiosphere.org.uk/accreditation-scheme-2/>

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/194219/Enterprise_Apr_2013.pdf

Agriculture

Data: DEFRA

Treatment of the data: Use the layer of 5*5 grid. Not possible to make a good map so use the information to make a graph for each code needed, main activities (Maize, grass crown, grassland permanent) and number of livestock (beef, dairy and sheep) of 2000 and 2010.

Information:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243835/structure-jun2013finalcropslivestock-eng-19sep13.pdf

Fisheries

Data: From Marine Management Organisation (MMO).

Treatment of the data: use species class, n° of vessels, tonnage and activity days for each harbour in the Biosphere Reserve Area for 2002 to 2012.

Information:

<http://www.cefas.defra.gov.uk/publications/shellfishnews/shellfishnews-31.pdf>

<http://www.marinemanagement.org.uk/fisheries/statistics/annual.htm>

Tourism

Data: From South west England and Devon County Council.

Treatment of the data: Use the information contents in the different document. use 2011/2006 and 2011 for the main date because not the same date for each document. the scale use is the district. And Domestic and overseas travel have been analyse.

Information:

<http://www.ons.gov.uk/ons/rel/ott/travel-trends/2011/index.html>

http://www.tourismalliance.com/downloads/TA_327_353.pdf

<http://www.swtourismalliance.org.uk/finance-facts-figures/regional-tourism-data/>

http://www.devon.gov.uk/index/councildemocracy/improving_our_services/facts_figures_and_statistics/factsandfigures/economy/economytour.htm

Culture

Data: From Barnstaple Library, Barnstaple Museum, Burton Art Gallery and Museum, North Devon Theatre.

Treatment of the data: use some sample from different place, and analyse the frequent during 10 years. Barnstaple Library (2011 to 2013), Barnstaple museum (200 to 2012), North Devon Festival (2003 to 2009) and Burton art gallery (2008 to 2013).

Information:

http://www.nationalmuseums.org.uk/resources/press_releases/record-visitor-numbers-uk-national-museums/

Heritage

Data: From historic environment service (DCC)

Treatment of the data: Listed building and protected buildings (Scheduled monument, Parks

Resources uses

Energy use

Data: CF Energy Plan

Treatment of the data:

Information: (energy Plan)

Renewable energy (energy Plan)

Data: CF Energy Plan

Treatment of the data:

Information: (energy Plan)

Water supply

Data: South West water,

Treatment of the data: temperature and rainfall in Chivenor and North Wyke have been added, 2002 to 2010 information.

Information:

<http://www.metoffice.gov.uk/climate/uk/summaries/anomalygraphs>

Bathing quality

Data: Environment Agency (Bathing water data explorer)

Treatment of the data: the data have been use according to the level of quality (average of the number of sample higher, minimum and fail) and the trend of the average of the higher sample for each beach in the Biosphere Reserve. Use the coefficient of this trend to make map with the trend and the state of the quality of the beaches between 2007-2012.

Information:

<http://environment.data.gov.uk/bwq/explorer/index.html>

<http://www.environment-agency.gov.uk/homeandleisure/recreation/145872.aspx>

Watercourses quality

Data: Environment Agency

Treatment of the data: the data have been use according to the eco status (Good, moderate, poor and bad) of the watercourses between 2009 and 2012.

Information:

Waste

Data: Waste data flow,

Treatment of the data: use household waste collection (Kg per head) and waste recycled (tonnage). To know the proportion of collection and recycled waste, the coefficient of population in each district within the Biosphere Reserve and convert in tonnes.

Information:

<http://www.wastedataflow.org/>

<http://www.recycledevon.org/>

Agri-schemes (CSS)

Data: Natural England

Treatment of the data: Current data GIS mapping

Information:

<http://www.naturalengland.org.uk/ourwork/farming/funding/aesiereport.aspx>

Protected area

Data: Natural England

Treatment of the data: Simple state of the repartition of the SSSI, SACs, AONB and National Park in 2013.