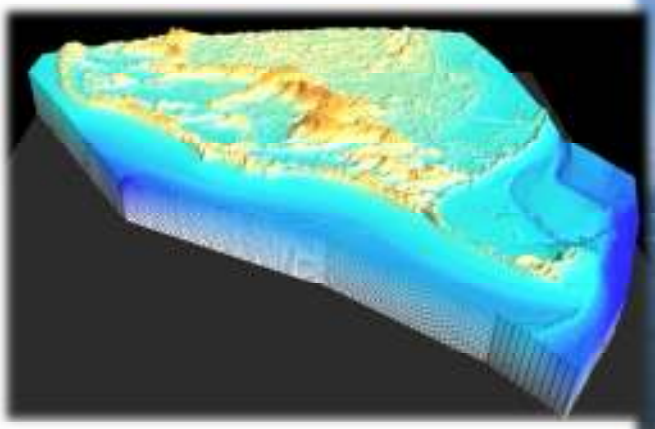
NORTH DEVON BIOSPHERE RESERVE PERIODIC REVIEW 2015



United Nations Education, Scientific and Cultural Organization

NORTH DEVON'S BIOSPHERE

Part of the World Network of Biosphere Reserves

UNESCO - Man and the Biosphere (MAB) Programme - Biosphere reserve periodic review – January 2013

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INTRODUCTION AND ACKNOWLEDGEMENT

This is the periodic review of the North Devon Biosphere. It is a reflection of the work of the Biosphere Reserve over period from 2002 to 2015, a little over the 10 years prescribed in the statutory framework. The efforts described in the review are those that have been largely done in and for the Biosphere Reserve by the members of the Biosphere Reserve partnership. It also includes other works or changes that have been linked with the Biosphere Reserve in other ways.

It is important to acknowledge the efforts of the successive chairmen of the partnership past and present; namely Professor Ed Maltby, Doctor Mike Moser and Professor Michael Winter. The members of the partnership should also be acknowledged, without their efforts, reciprocity and enthusiasm much of this action could not have been achieved. These are:

- Devon County Council
- North Devon Council
- Torridge District Council
- West Devon District Council
- Beaford Arts
- Devon Wildlife Trust
- Coastwise North Devon
- North Devon Biosphere Foundation
- National Trust
- Devon association of Parish Councils
- University of the Third Age, Barnstaple
- Taw Torridge Estuary Forum
- Tarka Country Trust
- Royal Horticultural Society
- West Country Rivers Trust
- North Devon AONB Partnership
- North Devon NIA Partnership
- National Farmers Union
- North Devon Fisherman's Association
- Christie Devon Estates
- FWAG South West
- Defence Estates
- Barnstaple Chambers of Commerce
- Mole Valley Farmers
- North Devon Plus
- Prof Peter Howard
- Bideford College
- Exeter University
- Petroc College
- University of Kent
- University of Liverpool
- Devon and Severn IFCA
- Environment Agency
- Forestry Commission
- Natural England
- MP for Torridge and West Devon
- MP for North Devon
- Baroness Sue Miller

This is not a standalone document but refers to:

- the State of the Biosphere Report which was an ex-post review of the Biosphere Reserve and not just the work of the Biosphere Reserve partnership itself. It was produced in order to ensure that the Biosphere Reserve Partnership has been focussing on the most pertinent issues. The report, where data were available, compares the condition of the Biosphere Reserve, with the outside area for a direct comparison of its condition.
- the new Biosphere Reserve strategy has been produced in tandem with this review and following the State of the Biosphere Reserve report. An ecosystem assessment was carried out as part of the strategy development.
- Annexed to the Biosphere Reserve strategy there are finer action plans being developed or have been developed. These include the Catchment Management Plan, the Woodland Enterprise Zone and forest policy framework, the Sustainable Energy Action Plan. Others are in preparation by the groups.

The main body of the report contains hyper links to websites as instantly verifiable locations to evidence the assertions within the body of the text.

PART I: SUMMARY

a) Name of the biosphere reserve:

Braunton Burrows; North Devon's Biosphere Reserve (AKA North Devon Biosphere)

b) Country: UK

c) Year of designation: 1976, Extended 2002

d) Year(s) of periodic review(s):

1998 and extension application 2002

e) Previous recommendation(s) made by the International Co-ordinating Council (MAB- ICC), if applicable:

- Consider operating at a catchment scale
- Consider the inclusion of Lundy as a core area
- Consider changing the name from Braunton Burrows

f) What follow-up actions are completed and if not completed/initiated, please provide justifications.

- After discussions and agreements with local, regional and national stakeholders the transition area was extended to cover the catchments draining to the north Devon coast. The stakeholders agreed that since the strategy and vision included addressing catchment related issues, it made good sense to formalise that position with the extension of the transition area. This was agreed locally in 2007, adopted in our 2008 strategy and confirmed at the ICC in Jeju in 2009.
- After discussions with stakeholders on Lundy and with the stakeholders on the mainland, including the fishing community, the Biosphere Reserve transition area was extended into the marine environment to encompass Lundy. This was implemented in 2007. The owners of Lundy felt that were already overburdened with designations and felt that it was too early to see the benefits that they might directly have from being a core area. Collaboration and support between the owners and managers of Lundy has increased and developed over the interim years. The Biosphere Reserve service has provided advice and technical support for the management of the Marine Reserve at Lundy and has supported/brought in funds for improving safe access to the island as examples of collaboration. Lundy has also welcomed guests from our twin reserve in Kenya to discuss marine conservation and management. Whilst having the marine reserve as an extra core area and the relationship with the island team is good, the over worked Lundy team fear that the designation will bring more duties upon them. Discussions will continue.
- After discussion with the partnership and the community, the name change was deemed to be important. The owners of the core area felt that their contribution would be diminished by not have the core area recognised in the name. Therefore the compromise of Braunton Burrows;

North Devon's Biosphere Reserve was agreed. The inclusion of the apostrophe was to convey a sense of ownership by the community. (As with the World Heritage Site in East Devon and Dorset Coast having a long and specific official title the working title used is "Jurassic Coast". This principle was agreed by local stakeholders to leave the title of our Biosphere Reserve with its dual identity of the marketing name.) Over the interim years, the name has been shortened to North Devon Biosphere as a working/marketing title. It will be appropriate to change the name formally to "North Devon Biosphere".

g) Update on the implementation of measures to achieve the objectives of the biosphere reserve.

The Biosphere Reserve is now on its 3rd strategy. The first being the original management plan submitted with the application for extension, the second having just completed at the end of 2013 and the new one just being finalised as part of this process.

h) Briefly describe the process by which the current periodic review has been conducted:

This has been done by a major exercise in analysing trends over the last 10 years or as long as data sets are available. This was an interactive process with specialists and with members of the Biosphere Reserve partnership using workshops and email discussions.

There have also been reviews of the strategies and mid-term reviews which contribute to the data on the achievements of the Biosphere Reserve.

There have also been workshops for the ecosystem service assessment and sessions at partnership meetings. The team has also made presentations to the local authorities on the work of the Biosphere Reserve and asking for feedback.

As part of the new strategy and action plan development, stakeholders have been providing views about the work done before.

External evidence of the Biosphere Reserve's work is also shown by researchers from outside the area or visitors from other Biosphere Reserves on their perceptions of the Biosphere Reserve over the last 10 years in their reports.

The report has been circulated to the partnership and the UK MAB National committee and the UK National Commission for UNESCO.

i) Area and spatial configuration:

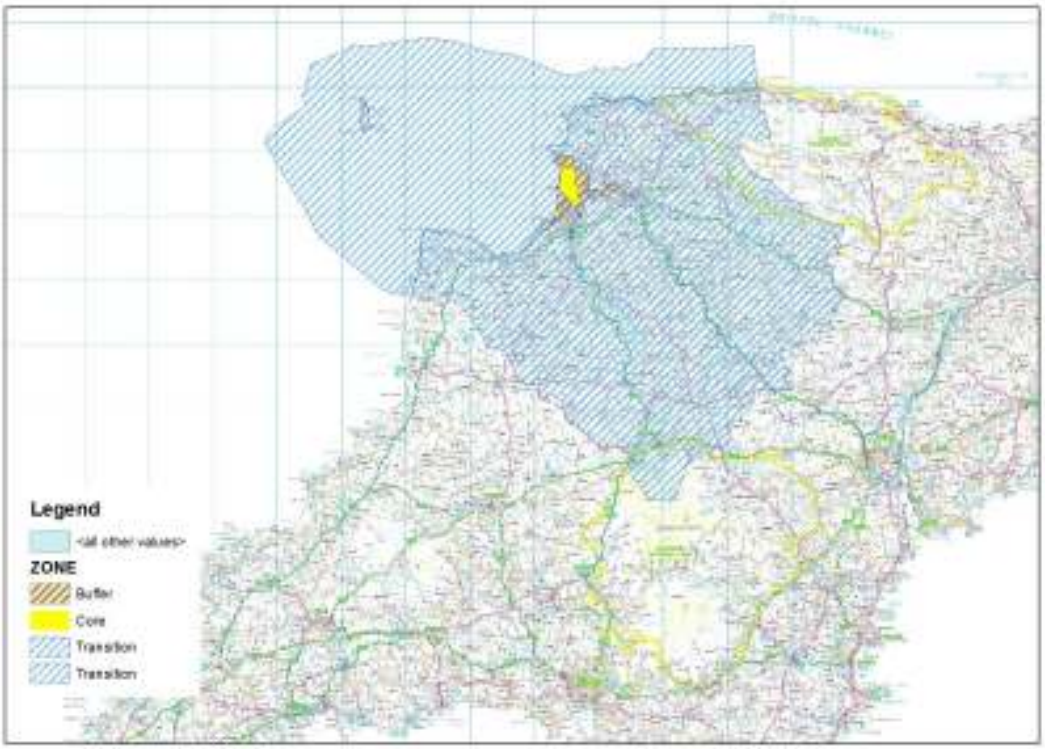

Figure 1 Map of zones of North Devon Biosphere

	Extension 2002 (revised 2007) Units are Hectares	Proposed changes (if any)
Area of terrestrial Core Area(s)	1,333	Possible inclusion of Wetland Special areas of Conservation (SAC)(under discussion)
Area of terrestrial Buffer Zone(s)	2,956	Possible extension to include the entire AONB and some terrestrial SSSIs (under discussion with stakeholders)
Area of terrestrial Transition Area(s)	*229,206*	None
Area of marine Core Area(s)	None	Possible inclusion of marine SAC (under discussion with stakeholders)
Area of marine	1,341	Possible addition of MCZs when they are declared.

Buffer Zone(s)		Possible inclusion of Lundy Marine SAC as buffer if not a core area (under discussion with stakeholders)
Size of marine Transition Area(s)	148,397	Agreed to extend to national 12 nautical mile limit to include all the locally fished areas.

The various permutations that are under discussion are seen in the maps below. These can only be regarded as schematic at this point while we await the decisions of stakeholders and the designation of the marine conservation zones.

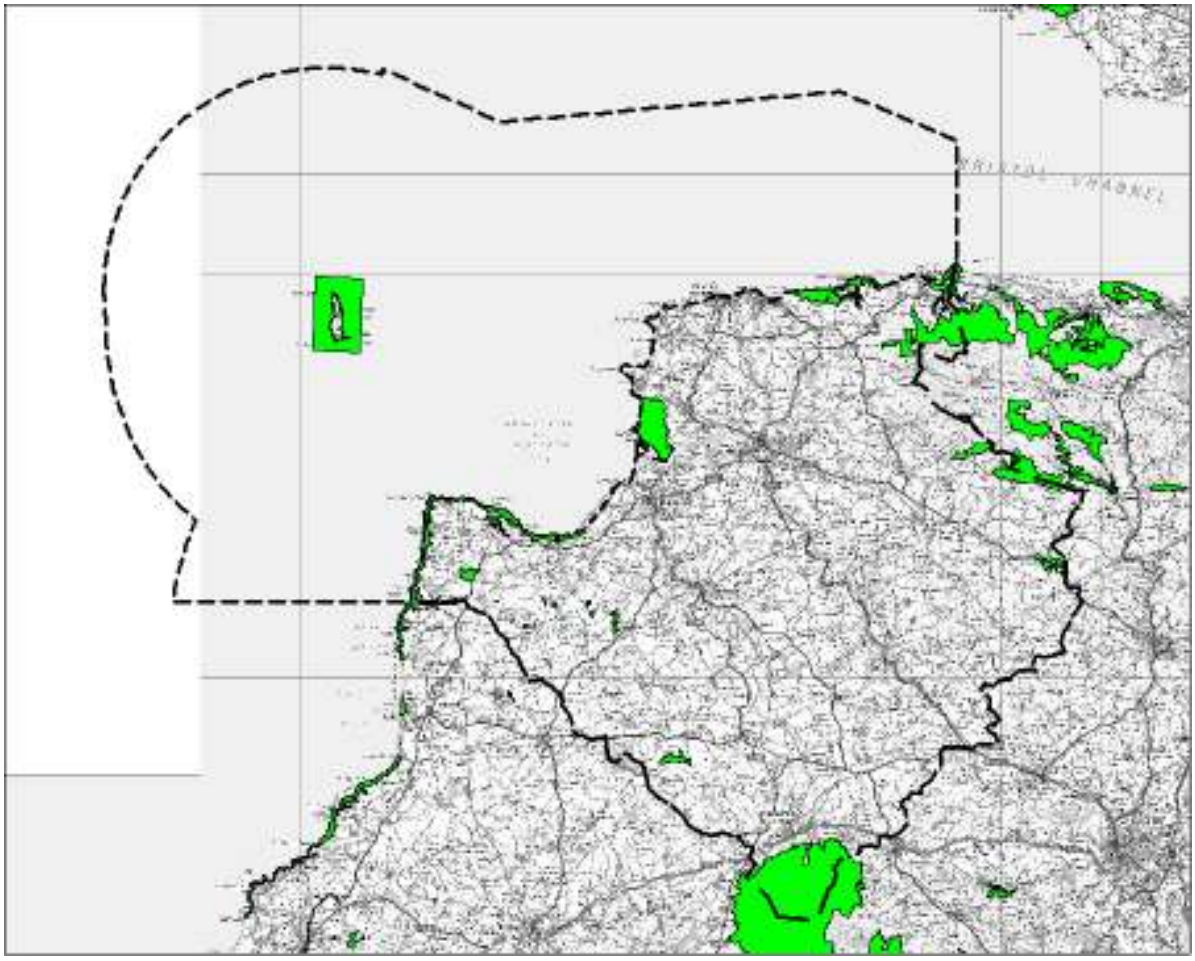

Figure 2 SACs intersecting the existing Biosphere Reserve as potential new core areas. The boundary to the marine area shows the 12 nautical mile extension of the transition area.

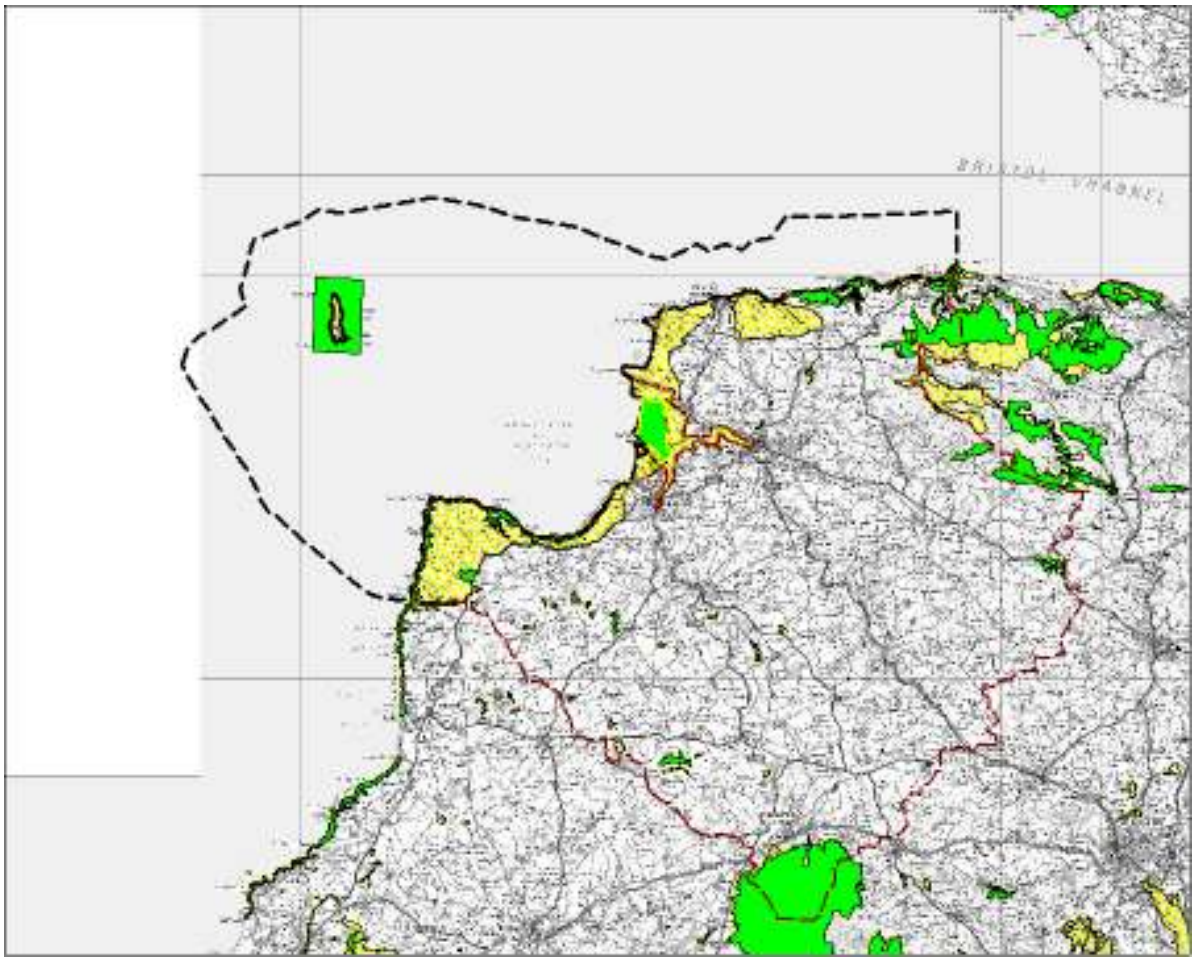

Figure 3 Potential inclusion of AONB as buffer and SAC wetlands as extra core area and SSSIs as buffer areas. (NB the SACs at the edge of the catchment are also surrounded by National Parks)

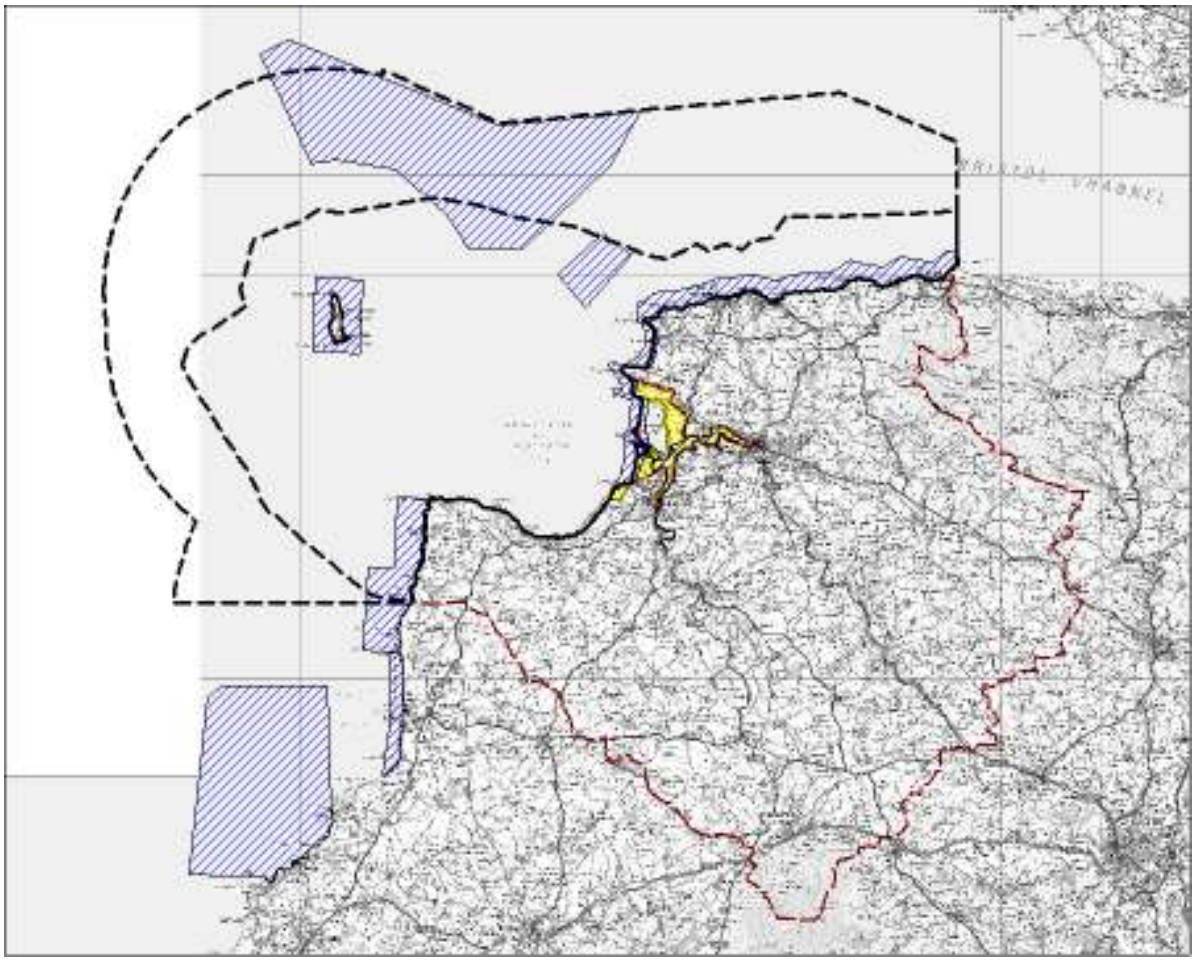

Figure 4 Potential marine extension of buffer zones. (showing current marine boundary and the proposed 12 nautical mile extension.)

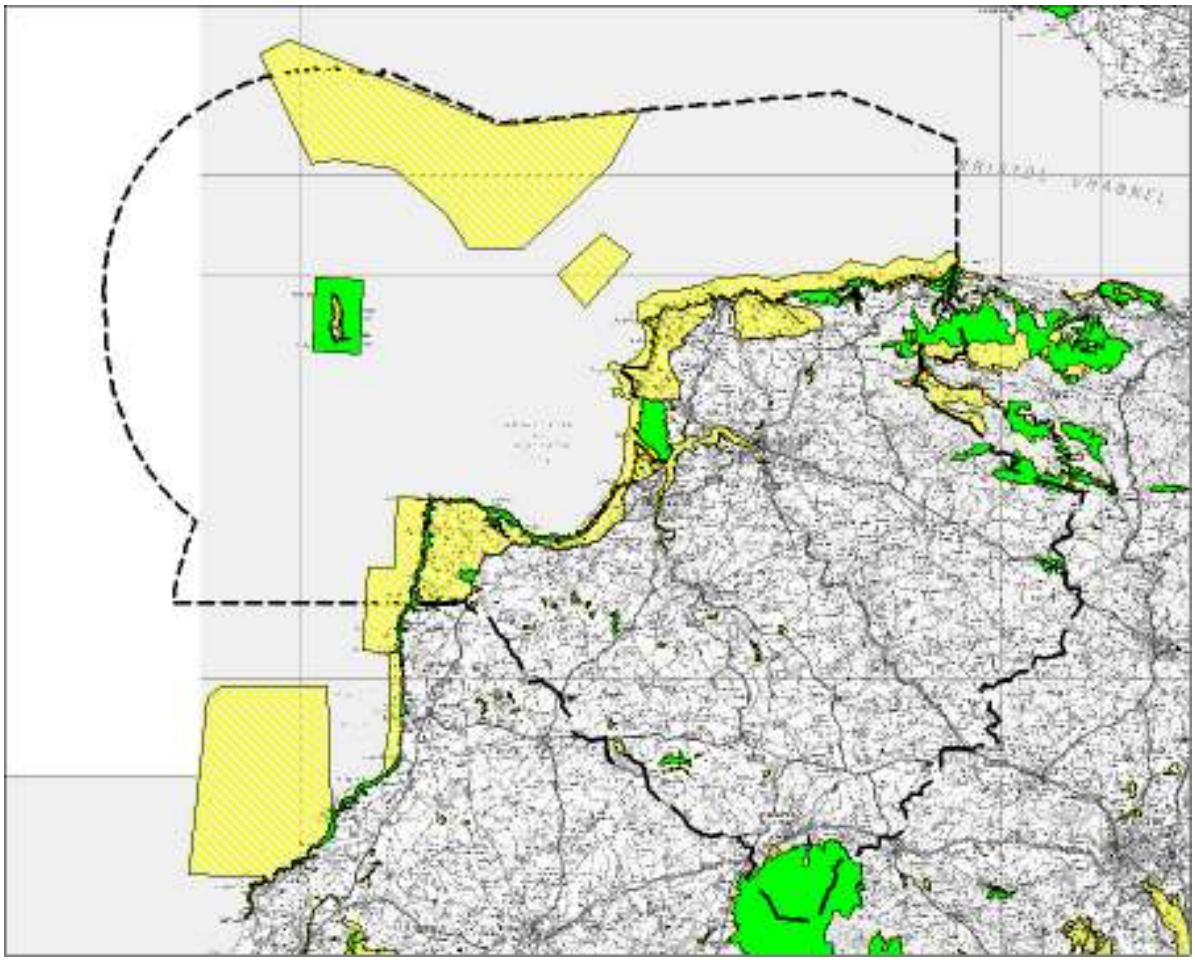

Figure 5 Potential configuration of SACs as core areas and SSSI, protected landscapes and Marine Conservation Zones as buffer areas. Transition Zone extended to the 12 nautical mile limit.

j) Human population of the biosphere reserve:

	Previous report 2002	At present (2011 census)
Core Area(s) (permanent and seasonally)	None	*none*
Buffer Zone(s) (permanent and seasonally)	801	*820*
Transition Area(s) (permanent and seasonally)	*156,452*	169,665

k) Budget (main sources of funds, special capital funds) and international, regional or national relevant projects/initiatives carried out or planned.

	Budget in the previous report (nomination form or periodic review) and date	Current budget (as at 2014)
Biosphere Reserve Team coordination (sources are mainly Local Authority)	£180K	£160k
Asset Management (coast path and Tarka Trail management)	£60K	£50K
EU and National Funded Programmes	c£100K	• Nature Improvement Area: £1,200,000 • Catchment Sensitive Farming: £1,200,000 • Taw River Improvement Project: £600K • Diffuse Pollution Project: £80,000 • ValMER: £400,000 • Life's Journey Project £35,000 • Diffuse Pollution Capital programme : £100,000

l) International, regional, multilateral or bilateral framework of cooperation.

The Biosphere Reserve has been a key tool in delivering the UK commitments to

- UK Biodiversity Action Plan (Convention on Biological Diversity)
- Biodiversity 2020 (Convention on Biological Diversity)
- EU Water framework Directive. (To have water bodies in favourable condition by 2015)

- EU Habitats Regulations Directive (to have habitats in favourable or unfavourable/recovering condition)
- EU Marine Spatial Planning
- UK Marine Policy (creation of marine reserve, coastal access and marine spatial planning)

PART II: PERIODIC REVIEW REPORT

1. BIOSPHERE RESERVE:

1.1 Year designated: 1976, Extended 2002,

1.2 Year of first periodic review and of any following periodic review(s) (when appropriate):

1998. This was carried out as part of nationwide review of the BRs when UK re-joined UNESCO. The review considered whether each of the UK sites could be extended to meet the Seville 95 criteria and identified possible solutions. Braunton Burrows BR was the first to act on the report findings.

1.3 Follow-up actions taken in response to each recommendation from the previous periodic review(s) (if applicable), and if not completed/initiated, please provide justifications.

The Biosphere Reserve was extended in compliance with that report. It adopted the coastal zone plan for the area as the management arrangements for the extended Biosphere Reserve because the plan used the ecosystem approach and included the core area within it scope.

The submitted application in 2002 resulted in agreed extension of the Biosphere Reserve but with some further recommendations to consider. These were:

- Consider operating at a catchment scale
- Consider the inclusion of Lundy as a core area
- Consider changing the name from Braunton Burrows

After discussions and agreements with stakeholders the transition area was extended to cover the catchments draining to the north Devon coast. The stakeholders agreed that since the strategy and vision included addressing catchment related issues, it made good sense to formalise that position with the extension of the transition area. This was implemented in 2006.

After discussions with stakeholders on Lundy and with the stakeholders on the mainland, including the fishing community, the Biosphere Reserve transition area was extended into the marine environment to encompass Lundy. This was implemented in 2006. The owners of Lundy felt that were already overburdened with designations and felt that it was too early to see the benefits that they might directly have from being a core area. Collaboration and support with the owners and managers of Lundy has increased and developed over the interim years. We are now in discussions with the owners and managers of Lundy for its stronger inclusion as either a buffer or extra core area in the Biosphere Reserve.

After discussion with the partnership and the community, the name change was deemed to be important. The owners of the core area felt that their contribution would be diminished by not have the core area recognised in the name. Therefore the compromise of Braunton Burrows; North Devon's Biosphere Reserve was agreed. The inclusion of the apostrophe was to convey a sense of ownership by

the community. Over the interim years, the name has been shortened to North Devon Biosphere as a working/marketing title. This is done in the same manner as the East Devon and Dorset Coast World Heritage Site which is known as the "Jurassic Coast". We now suggest that the name be changed formally to "North Devon Biosphere"

1.5 Periodic Review Process

All of the partners of the membership have been involved; this is 28 organisations that represent public, private and 3rd sector.

Other individuals and organisations in the working groups for the different projects have contributed to the process.

The Local Authorities have had agenda items on the Biosphere Reserve at their general meetings to receive reports and comment on the work the Biosphere Reserve does.

The Biosphere Reserve has also been subjected to the External Scrutiny and Overview Committees of the local authorities to gain some views from them. The Biosphere Reserve has also been subjected voluntarily to external independent reviews over the 10 years by researchers or consultants exploring the benefits and functions of the Biosphere Reserve.

Through the management plan/strategy review we have involved more partners and through the working groups.

These groups include:

Catchment Sensitive Farming Strategic Partnership, the North Devon Biosphere Reserve Catchment Partnership, The North Devon Nature Improvement Area steering Group, the Marine Working Group, Forest Strategy working Group, Sustainable Energy Action Group.

Stakeholder involvement

Partnership meeting have involved workshops (4 over the last 18 months) on the review. There have also been workshops for the ecosystem service assessment and sessions at partnership meetings. We have also given presentations to the local authorities on the work of the Biosphere Reserve and asking for feedback.

External evidence of the Biosphere Reserve's work is also shown by researchers from outside the area or visitors from other Biosphere Reserves on their perceptions of the Biosphere Reserve over the last 10 years in their reports.

As part of the new strategy and action plan development, stakeholders have been providing views about the work done before as well as the work yet to be done.

There has also been considerable desk top research to identify trends in the indicators, and to look back over the minutes and reports for the partnership over the years.

State of the Biosphere Reserve Report:

This has been done by a major exercise in analysing trends over the last 10 years or as long as data sets are available. This was an interactive process with specialists and with members of the Biosphere

Reserve partnership using workshops and email discussions. The report is published on the website of the Biosphere Reserve. http://www.northdevonbiosphere.org.uk/periodic-review.html

There have also been reviews of the strategies and mid-term reviews which contribute to the data on the achievements of the Biosphere Reserve. The report has been circulated to the partnership and the UK MAB National committee.

Schedule of Meetings and attendance

- 4 Biosphere Reserve partnership meetings with specific workshops
- 1 of each of the thematic working groups (6 in total)
- 2 ecosystem assessment workshops
- 3 forest strategy and assessment workshops
- 4 marine ecosystem assessment workshops
- 2 catchment management and stakeholder workshops
- 2 Full Council presentations/discussion to local Authorities
- 2 External Scrutiny Committee meetings with local authorities

As a rule the meetings are well attended. The partnership normally has an attendance of 25 to 28 people.

Working groups each tend to consist of 10 to 12 people, not all from the Biosphere Reserve Partnership and therefore the reach of the Biosphere Reserve into the community is extended. The catchment workshops and the marine ecosystem assessment workshops have been attended by a wider stakeholder group of approximately 30 representatives in each.

Council Meetings normally involve around 30 elected members with members of the public attending.

Overview and Scrutiny meetings for the local authorities normally include around 10 elected members and co-opted community experts.

At each Biosphere Partnership Board meeting the representation includes:

- National agency representation such as Environment Agency, Natural England and Forestry Commission.
- Local authority elected members and officers,
- Individual members, farmers, foresters, landscape experts, fishermen, recreation sector (sailing, etc.)
- special interest representatives (such as Universities and schools)
- Charitable sector: Devon Wildlife Trust, The Biosphere Foundation, Beaford Arts,
- Private sector bodies such as Chamber of Commerce, National Farmers Union, North Devon Fishermen's Association

Within each of these meetings, there tends to be a good gender representation. However, engaging the young people at this level has been proving to be challenging.

2. SIGNIFICANT CHANGES IN THE BIOSPHERE RESERVE DURING THE PAST TEN YEARS:

Brief summary overview: Narrative account of important changes in the local economy, landscapes or habitat use, and other related issues. Note important changes in the institutional arrangements for governance of the biosphere reserve area, and changes (if any) in the coordinating arrangements (including the biosphere reserve organization/coordinator/manager) that provide direction for the biosphere reserve. Identify the role of biosphere reserve organization/coordinator/manager in initiating or responding to these changes.

Biodiversity; There have been several gains on biodiversity, largely due to the actions of the Biosphere Reserve partnership. These include habitat restoration for Dunes, Saltmarsh, Culm Grassland, Upland bog and increased woodland cover. The marine area has been subject to some protection work that has increased some of the key species. However, these positive actions are set against a back ground of general decline in some habitats. The causes may be generalised as chronic pollution, economic pressures for development and food production, increased population. It is strongly suspected that woodlands are losing biodiversity through neglect and too many grey squirrels/deer/rabbits inhibiting regeneration.

Landscape: Over the last 5 years alone there have been changes in the landscape due to the introduction of renewable energy schemes such as wind turbines and solar arrays. Regarding land use, there has been little change, but here have been trends in isolated areas where there has been an increase in the use of maize crops for fodder, and occasionally the introduction of “zero grazing” on 2 farms where crops are brought to the dairy cows housed permanently in sheds.

Economy: During the extension process in 2002 the areas was recovering from the impact of Foot and Mouth disease which not only decimated the farming economy but had knock on effects for the tourism economy. This aftershock was felt for 2 years. As with the rest of the world, the 2008 economic crisis had its impact on the area. This was felt by many of the small businesses. Despite this small manufacturing remains the largest single sector in the economy. The unemployment rate has increased in urban areas but remained stable in rural areas. The overall economy of the area remains depressed. Farm trends have been for holdings to increase in size and the number of small hobby farms to increase. Tourism trends follow patterns of weather and currency exchange rates.

Society: the population has increased by 7% over the 10 years. Part of the increase has been due to in-migration of older people and in-migration from other EU nations, especially eastern Europe.

Governance and coordination: The partnership for the Biosphere Reserve has grown over the 10 years. It now has a main partnership to give strategic direction and conflict resolution. It is supported by a number of working groups or thematic groups delivering a range of projects across the Biosphere Reserve led by various partnership member organisations. The coordinating team has remained fairly constant with the exception of the practical team that have reduced through non-replacement as staff retired or moved on. The coordinating team still have responsibility for the long distance trails in the area.

The overall coordinator/manager has remained the same since the extension of the Biosphere Reserve. To ensure that the partnership appointed the right person for the role of coordinator, the incumbent had to apply for the post in 2003 against open national competition.

2.2 Updated background information about the biosphere reserve.

2.2.1 Updated coordinates (if applicable). If any changes in the biosphere reserve's standard geographical coordinates please provide them here (all projected under WGS 84):

Cardinal points:	**Latitude**	**Longitude**
Most central point:	51 deg 0.835'	-4 deg 8.230'
Northernmost point:	51 deg 18.495'	-4 deg 14.092'
Southernmost point:	50 deg 39.224'	-4 deg 0.351'
Westernmost point:	51 deg 7.97'	-4 deg 54.106'
Easternmost point:	51 deg 1.978'	-3 deg 36.04'

2.2.2 Maps

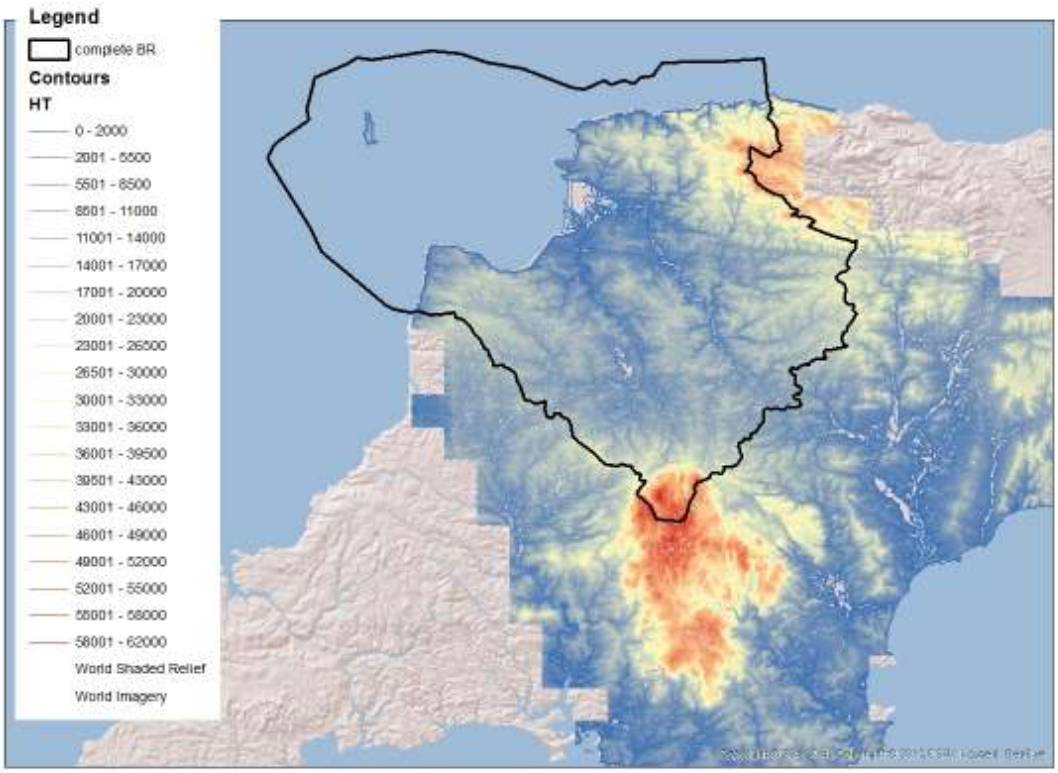

Figure 6 Topographic Map of North Devon

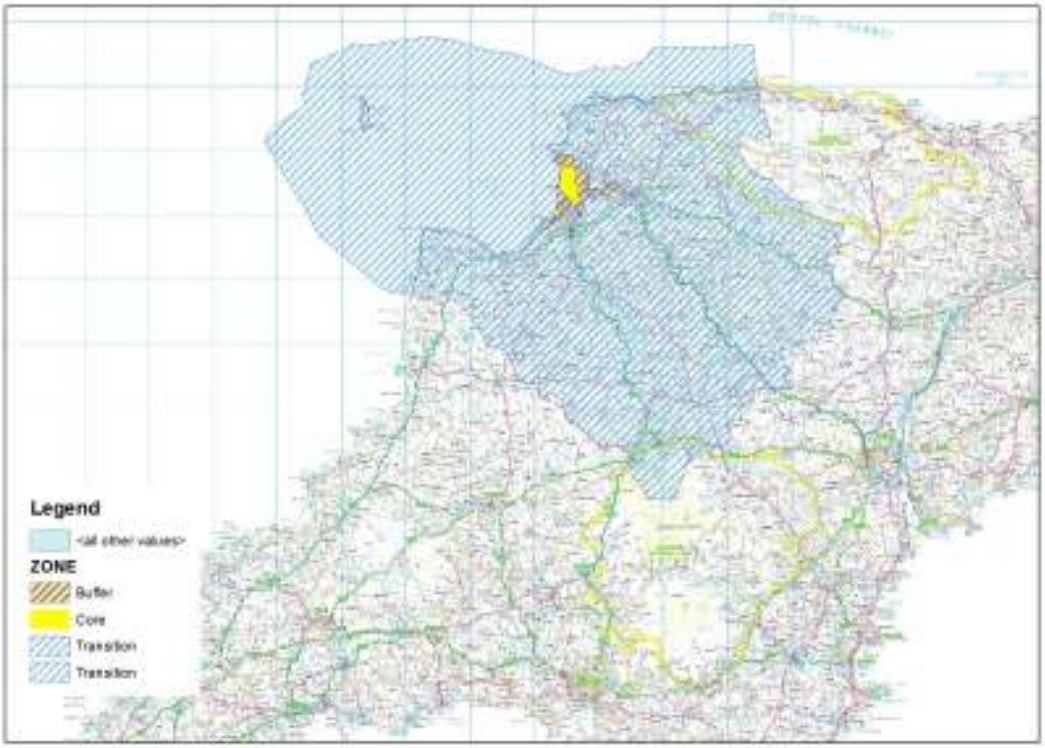

Figure 7 Zonation Map of North Devon Biosphere

If applicable, also provide a link to access this map on the internet (e.g. Google map, website).

www.northdevonbiosphere.org.uk

2.2.3 Changes in the human population of the biosphere reserve.

Most recent census data:

Biosphere Reserve Area Population	2001	2011	Change (%)
	157253	169665	12412 (7%)

2.2.4 Update on conservation function, including main changes since last report.

The members North Devon Biosphere Partnership collectively and individually have delivered a large suite of conservation programmes at the landscape scale and individual site scale. There have been 2 major catchment projects (Nature Improvement Area and Taw River Improvement Project) which have attracted funds to the value of £5.5 million for investment in habitat restoration. Since the last extension of the Biosphere Reserve, there has been extensive work of habitat creation in the estuary area of approximately 23Ha of saltmarsh with more being planned. The core area has an improved management regime which involves grazing the dune turf to maintain a dynamic in the system suited to the rare species for which the site is designated. Significant progress has been made in conservation of the marine areas in declaring new marine protected areas including a no take zone near Lundy and candidate Marine conservation Zones around the coast of the Biosphere Reserve.

2.2.5 Update on the development function, including main changes since last report.

Significant work has been done with the farmers in the Biosphere Reserve to improve the ecological performance of the farms through Catchment Sensitive Farming. This has reduced phosphate and sediment reaching the rivers and levered in investment in the order of £2.5M.

The Biosphere has a Woodland Enterprise Zone programme which is targeted to safeguard and enhance the woodland economy valued at £13M per annum.

The fisheries sector has been operating at a sustainable level for most species over the last 10 years. Effort is ongoing with the industry to improve the certainty of the sustainable yields and the management measures that will support both the industry and the marine species. The value of the fisheries to the area is in the order of £6M and the industry is requesting an extension of the Biosphere Reserve area to cover the majority their grounds as an endorsement of their good practice.

There has been significant investment in renewable energy. The Biosphere Reserve has a strategy for emission reduction. Currently just over 7% of the areas energy needs is derived from renewable energy which is higher than the national average. Support is being directed towards reducing fuel poverty in the area, so that heating homes can be more affordable and sustainable for the lower income households.

Tourism remains a major sector of the economy. Progress has been made with improving its sustainability. The Biosphere Reserve has focused on providing and maintaining a sustainable tourism infrastructure such as cycleways, long distance routes, natural sites and maintaining the quality of the area such as landscape and water quality. The Tarka Trail cycle way for example has been valued at £7.5M to the economy. Surfing has been valued at £52M to the economy of the area. A business charter scheme has been in place since 2008. Promotion and use of this charter could be improved.

Work has been done with the industrial sector to reduce waste and improve ecological efficiency, initially by the Biosphere Reserve then by EnVision. The sector is now working with Biosphere again for endorsement of the good practices it does.

The Biosphere Reserve Partnership has been supporting community development in a moderately small fashion over the 10 years; however, the sector is now looking forward to collaboration on the health and wellbeing agenda.

2.2.6 Update on logistic support function, including main changes since last report.

The research group of the Biosphere Reserve has grown from a very humble beginning to a significant area of activity for the Biosphere Reserve. Since the extension of the area now includes an environmental research institute and the partnership has forged very strong links with the local universities, there is very intensive investment in research in fields such as: biodiversity, ecosystem services, Coastal processes, earth sciences, social and economic policy.

The team has produced various education packs for schools and has produced and delivered foundation degree modules in sustainability linked to the Biosphere Reserve. The designation was instrumental in the reconstruction of a local secondary school for a carbon neutral design.

A key success area has been the use of art to engage with the community to open the debates on sustainability. Working with a rural arts organisation (Beaford Arts), works such as sculpture, theatre, imagery, digital art and films have been reaching a wide audience.

The Biosphere Reserve has a highly commended website that shares information openly with the public and it produces a monthly newsletter.

2.2.7 Update on governance management and coordination, including changes since last report (if any) in hierarchy of administrative divisions, coordination structure.

The Biosphere Reserve Partnership is very active and well attended. It comprises 28 organisations and 3 individual experts. The partnership has been effective at delivering programmes and projects. The partnership oversees the strategy and direction of the reserve; it is supported by 7 working groups:

- Catchment management
- Woodlands
- Green economy
- Marine
- Sustainable Energy
- Community Forum
- Research group

The groups also have project delivery teams and reference groups so that community engagement is as deep as possible.

2.3 The authority/authorities in charge of coordinating/managing the biosphere reserve:

The North Devon Biosphere Service remains the coordinating body. It is core funded by the local authorities and its employment is hosted by Devon County Council.

2.3.1 Updates to cooperation/management policy/plan, including vision statement, goals and objectives, either current or for the next 5-10 years

The Biosphere Reserve is now on its 3rd strategy. The new one is produced in conjunction with this periodic review. The latest version uses a recent ecosystem assessment to guide the strategic aims. The plans have been subject to mid-term reviews in line with best practice of adaptive management.

2.3.2 Budget and staff support, including approximate average annual amounts (or range from year-to-year); main sources of funds (including financial partnerships established (private/public), innovative financial schemes); special capital funds (if applicable); number of full and/or part-time staff; in-kind contribution of staff; volunteer contributions of time or other support.

As is prevalent in the public sector anywhere, the core budget for the team has reduced over the years. The team does not directly manage the access assets. The team now consists of 4 staff and 2 interns. It is however supported frequently by volunteers. The budget is in the order of £160K per annum. The project budget of the partnership tends to show a leverage of 24 fold greater than that investment from the local authorities.

Looking forward, the coordination team will need to recover some costs from projects by becoming increasing funded by the projects rather than purely core funded for governance and coordination. This is likely to involve a transitioning between the government sector and the charitable sector to achieve this.

This large project budget is a mix of public and charitable sector contributions.

The Biosphere Reserve is also piloting biodiversity offsetting as a means to secure no net loss in biodiversity. It has also received project contributions from the tourism sector.

2.3.3 Communications strategy for the biosphere reserve including different approaches and tools geared towards the community and/or towards soliciting outside support.

The Biosphere Reserve has had various communication strategies. A key successful component of the communication has been through the arts as mentioned above. The partnership uses, films, animation, website, social media to raise awareness about the reserve. Despite being regularly in the local press, the awareness of the reserve is not as high as it might be. A recent tourism survey indicated 30% of tourists were aware they were in a Biosphere Reserve. Recent student surveys suggested the local awareness was in the order of 50%, however this was not thought to be a representative population. There is optimism in using the branding guidelines developed at EuroMAB in conjunction with new signage.

2.3.4 Strategies for fostering networks of cooperation in the biosphere reserve that serve as connections ("bridging") among diverse groups in different sectors of the community.

The partnership provides the nexus for the connections between different sectors. The issues are addressed as holistically as possible since we feel that this is the unique selling point of the Biosphere Reserve. The new strategy is developed in such a way using the ecosystem services assessment as the means by which the sectors can collaborate. Within certain sectors, particularly farming we are setting up peer to peer networks which will not only be self-sustaining but can also reach other people that may be resistant to perceived environmental body.

2.3.5 Particular vision and approaches adopted for addressing the socio-cultural context and role of the biosphere reserve.

The Biosphere Reserve works with the local museums and supports the conservation of locally distinctive assets such as buildings and landscape features. Devon County Council has an historic Environment team which records and conserves historic features. The Biosphere Reserve team work with these effectively. For example in giving land management advice, reference is made to the Historic environment Record to ensure that no harm is done and where possible enhancements are made to the historic features.

The core area has a range of archaeological features which have a specific management plan. The features were also interpreted through an experimental system of location aware devices, e.g. interactive GPS units which gave the audience a personalised trip around the World War 2 training relics, the earth science features or biodiversity features of the core area.

We are looking at approaches for new uses of traditional features. For example, hedgerows in north Devon are believed to be the best in the quality in the UK according to certain experts; however their

maintenance is labour intensive. The Devon hedge group has developed a methodology of management that will sustain the hedges and provide a source of biomass for local heating schemes. The Biosphere Reserve team has used LiDAR (light incidence detection and ranging) to assess the energy potential from the hedgerows within a locality.

Traditional Devon Orchards are a feature of the Biosphere Reserve. The Biosphere Reserve works with local organisations such as "Orchards Live" to promote their conservation of local apple and other fruit varieties and the economic use of the fruit. There are also cultural traditions associated with the orchards such as "Wassailing" (a blessing of the tree for good fruit crops in the coming year) and community apple pressing.

The North Devon Areas of Outstanding Natural Beauty (AONB) Team has piloted a national project using aerial images to identify possible hitherto unrecognised archaeological features. (http://www.northdevon-aonb.org.uk/projects/national-mapping-programme-english-heritage) and has used volunteers to visit sites and record their condition. This has led to the inclusion of these heritage features in the interpretation and tourism offer to visitors to the area through their website and specific walks itineraries.

2.3.6 Use of traditional and local knowledge in the management of the biosphere reserve.

The Biosphere Reserve has supported various traditional activities in the area. These are notably in woodland management, sheep grazing on saltmarshes, grazing with traditional breeds on the wetlands for habitat restoration. The Biosphere Reserve has also supported the traditional fisheries from being expunged by EU blanket legislation on drift net fisheries. The particular example is a derogated herring fishery in one village, where the herring can only be caught by a net from a sail or oar powered vessel.

As mentioned above, the orchards a favoured to be managed traditionally. The Biosphere Reserve has supported the groups offering training to the community on the traditional skills of hedge-laying, Devon hedge construction and repair.

2.3.7 Community cultural development initiatives. Programmes and actions to promote community language, and, both tangible and intangible cultural heritage. Are spiritual and cultural values and customary practices promoted and transmitted?

There are various activities in the area that promote the food culture in the area. These include initiatives led by North Devon plus (North Devon food festival), fish festivals (Clovelly Lobster and Crab Festival, Clovelly Herring Festival). The Biosphere Reserve has worked with the University of the 3rd Age (a continuous learning group for senior citizens) to produce a local recipe book.

Christianity is the main faith in the area and there have been some cultural histories relating to features in the area such as Churches and Holy wells. The Biosphere Reserve has not specifically addressed traditional faith issues but had funded a project just prior to designation about documenting the holy wells or springs. There are festivals that have pagan origins that have been applied in the area; these include the "Wassailing" in the orchards or more recently (circa 1700s's) the "Hunting of the Earl of Rone" in Combe Martin. In Hatherleigh, a small market town in the centre of the Biosphere Reserve, burning tar barrels are dragged through the down to ward off evil spirits. These festivals have a life much older than the Biosphere Reserve designation and if they show signs of declining, the partnership may choose to step in and support them.

2.3.8 Specify the number of spoken and written languages (including ethnic, minority and endangered languages) in the biosphere reserve.

English is the language spoken in the area. There is a Devon dialect which has been self-sustaining. To date there has not been a need identified for specific measures to safeguard the dialect. The North Devon museum has been recording the memories of people who have lived in the area for a long time which by default is a record of local words and phrases.

2.3.9 Management effectiveness. Obstacles encountered in the management/coordination of the biosphere reserve or challenges to its effective functioning.

The Biosphere Reserve partnership is the effective mechanism for coordinating between agencies on delivery. The area has been a pilot for the Department for Farming Environment and Rural Affairs (Defra) agencies on how they can effectively work together. In part through the partnership the local authorities' duties to collaborate are met, and 2 of the 4 authorities have produced a joint local development plan. As mentioned in the governance section, the members of the partnership come together and agree actions and priorities and how they will be delivered. The culture of reciprocity within the group means that conflicts, competition and overlap are minimised and effectiveness is enhanced.

2.4 Comment on the following matters of special interest in regard to this biosphere reserve: (Refer to other sections below where appropriate).

2.4.5 Are there any changes in the main protection regime of the core area(s) and of the buffer zone(s)?

There have been no changes in the protection regime of the core of buffer areas other than in 2002 the core area was a Candidate Special Area of Conservation, it is now a confirmed SAC. The management regimes of the core and buffer area have improved. The role of the AONB has grown significantly in its effectiveness since 2002 with continued Defra and Local authority investment in management. The core area has benefited from an agri-environment scheme which is addressing some of the decline in biodiversity brought about by succession from dune grassland to less diverse scrub.

More protection has been achieved in the transition area through declaration of 4 Local Nature Reserves, candidate Marine Conservation Zones (which may be confirmed soon) and more land under agri-environment agreements.

2.4.8. Please provide some additional information about the interaction between the three zones.

Throughout all 3 zones we apply the 3 functions of the Biosphere Reserve. The difference being the emphasis that is placed on development. To adopt the phraseology used in Vietnam, there is a sliding scale of "conservation for development in the core area to development for conservation in the transition area". Given the highly protected status of the core area, the partnership recognises that the biggest gains in change for sustainability can be achieved through wise resource management in the buffer and transition zone and working with the community.

2.4.1 Is the biosphere reserve addressed specifically in any local, regional or/and national development plan? If so, what plan(s)? Briefly describe such plans that have been completed or revised in the past 10 years.

Shortly after the designation of the Biosphere Reserve a new Economic Strategy was developed by the local authorities and private sector partnership in the area (Northwest Devon Economic Partnership.) The new strategy(http://www.torridge.gov.uk/CHttpHandler.ashx?id=1663&p=0) recognised the value of the environment in the region's economy; especially after the Foot and Mouth Disease disaster that dramatically impacted the area. The plan used the 5 capitals approach and cited the Biosphere Reserve as a key step change programme for improving the resilience of the area's economy.

Subsequently the Biosphere Reserve has been quoted as a driver in the area in the application for regional development funds in successive LEADER programmes (Leader plus, Leader4) and in the Fisheries Local Action Group funding applications.

The new joint local plan between North Devon and Torridge District Councils now places the Biosphere Reserve at the heart of its strategy and policies. It uses our experience in ecosystem services to support planning strategy and decisions. (http://www.torridge.gov.uk/CHttpHandler.ashx?id=13375&p=0)

Other strategic documents the partnership has produced are also used in planning policy and supplementary guidance documents. These include the Biodiversity Offsetting strategy (http://www.northdevonbiosphere.org.uk/biodiversity-offsets.html) and the Sustainable Energy Action Plan. (http://www.northdevonbiosphere.org.uk/biosphere-energy-plan.html)

2.4.2 Outcomes of management/cooperation plans of government agencies and other organizations in the biosphere reserve.

The outcomes are literally too numerous to mention in this summary and can be found in appropriate detail in the development and conservation sections of the full report.

Headlines include:

- Creation of habitats: c 100 Ha
- Restoration of habitats: > 4000 Ha
- Water bodies improved: 9
- Businesses supported: c1500 Farms (through Catchment sensitive farming and major conservation programmes), c 80 tourism businesses (Based on direct support and those that advertise they are in a Biosphere Reserve)
- Funding drawn down directly: c£17 million
- Funding programmes supported indirectly: c £10 Million (e.g. Leader and FLAG programmes)
- Capital build projects stimulated: £55 million (Bideford College carbon neutral re-build)
- Community events: c350
- Volunteers engaged in community environment efforts: > 600

2.4.3 Continued involvement of local people in the work of the biosphere reserve. Which communities, groups, etc. How are they involved?

The partnership, as shown in the introduction page is 28 organisations representing a range of sectors and communities in the area. These apart from government agencies include local businesses, community for a, local/village community councils and interested/expert individuals.

Further to the 28 on the main partnership board, the 7 working groups of the structure engage with more people again that may be sector specific bodies or people with a particular interest in that topic. The efforts of these groups are encouraged to be participative. Depending on location and work group theme, this can involve direct involvement of the community in designing and agreeing programmes. The revised community forum of the partnership is changing the emphasis from being strategic to being responsive to the community needs.

Often the Biosphere Reserve team will engage with the community at events such as agricultural shows, having stalls at other events in the towns and markets for people to share their views on what is happening and what they think should happen.

In generating the Joint Local Development Plan, the team joined forces with the local authority planning teams to have community planning events to hear the issues and solutions offered by the community.

The Biosphere Reserve team also use social media to contact people and seek views on various issues big or small.

2.4.4 Women's roles. Do women participate in community organizations and decision-making processes?

The UK has gender equality a statutory requirement. However, we are aware that gender discrimination exists. We try to ensure that there is no discrimination in our work. We also recognise that the role of women within the rural areas can also be subtle and strong at the same time. It has been noted by our land management advisors that decisions around a family farm business, particularly on environmental considerations are more successful when the wife or female partner at the farm is included in the discussions and negotiations. Very soon after the designation extension, we hosted a delegation from Japan who were interested in the role of women in the rural economy. We were able to show that in a restructured rural economy with farm diversification, the women were generating more income than the main farming business.

2.4.9 Participation of young people. How were young people involved in the organizations and community decision-making processes? How were their interests and needs considered within the biosphere reserve? What are the incentives or programs in place to encourage their participation?

Involving young people outside of the education system has been challenging, especially with regard to governance. This is not only true for the Biosphere Reserve but also the local authorities, where we tried in the past to link up to "Youth Councils". This is an area we recognise that we should develop.

2.4.6What research and monitoring activities have been undertaken in the biosphere reserve by local universities, government agencies, stakeholders and/or linked with national and international programs?

Please refer to Page 73 for more detail.

- Abiotic monitoring (esp. Water quality)
- Biodiversity
- Aquatic Biodiversity
- Marine Biodiversity
- Coastal Processes
- Soil Processes
- Food security issues
- Catchment Hydrology
- Ecosystem services
- Forest Pest research
- Social Sciences on rural policy
- Marine Fisheries
- Public Health and Environment

3. ECOSYSTEM SERVICES:

As part of the plan review process we have carried out an ecosystem service assessment both qualitatively and quantitatively. This was initially a desk exercise and largely based on the UK National Ecosystem Assessment. There has also been a recent EU project (ValMER) which is using the Biosphere Reserve as study area to evaluate the marine ecosystems and the values they provide, it also provides a range of stakeholder derived scenarios to explore the changes and trade-offs in the ecosystem services.(www.valmer.eu). Stakeholders were asked to give their local and expert view regarding the condition and trends of the ecosystem services from the various habitats and land cover.

We have presented the services by habitat and service type with the beneficiaries.

Ecosystem	**Service type**	**Service**	**Beneficiary**
Marine Ecosystem:	Provisioning	Food (fish):	local and national community; Fish landed in the Biosphere Reserve are sold locally and exported nationally. Some species are exported internationally.
	Regulating	Carbon sequestration:	global community
		Pollution locking:	local, regional community
	Supporting	Nutrient turnover	local / regional community
	Cultural	Seascape:	Nationally important for community
		Recreation: Boating, angling, surfing, kayaking, Scuba,	Local community

		Tourism:	local, national community
Estuary Ecosystem	Provisioning:	Food; (fish, shellfish, samphire):	local community
	Regulating:	Carbon sequestration	global community
		Tidal flow attenuation	local community
	Supporting:	Waste and nutrient turnover	Local community
		Sediment and pollutant locking	Local community
	Cultural:	Landscape/seascape/ water based recreation	Local community/tourists
	Recreation:	fishing, boating, birdwatching	Local and national community
Dune Ecosystem	Provisioning	Food minor benefits from grazing;	Local community
	Regulating:	Water filtration	Local community
		Carbon sequestration:	global community
	Cultural:	Recreation: walking, wildlife watching	local community
		Landscape	local community
Woodlands Ecosystem	Provisioning:	Food; Venison and wood based fungi/fruit	local community

		Timber:	local community
		Energy:	local and regional community
	Regulating	Carbon sequestration	global community
		Surface water flow attenuation reduces flooding events for local community and reduces the incidents of low flows(dry rivers) in the summer months:	local community
		Water quality: for drinking water and safe water for recreation and aquaculture;	Local community
		Soil/sediment interception improve water quality	local community
	Cultural	Recreation:	local community
		Landscape	local community and nationally important in certain areas
Culm Grassland (Rhos Pasture) Ecosystem	Provisioning:	Food (cattle/sheep)	local community and regional.
	Regulating	Carbon sequestration	global community
		Surface water flow attenuation: Reduces flooding events for local community and	local community

		reduces the incidents of low flows (dry rivers) in the summer months:	
	Supporting:	Nutrient turnover and soil processes	Local and regional community
	Cultural	Landscape :	Intrinsic appeal for local community
Upland peat bog ecosystem	Provisioning	Food from sheep and cattle grazing:	local community
	Regulating	Carbon sequestration:	global community
		Surface water flow attenuation	local community downstream
		Water storage	Water company and local community
		Water purification:	Water company and local community
	Supporting		
	Cultural:	Landscape:	nationally designated landscapes
		Recreation	Local and regional
River Ecosystem	Provisioning	Food (fish)	Local
		Water	Local
	Regulating	Nutrient and sediment transport	Local

	Supporting	Water cycle	global
	Cultural	Recreation (fishing, canoeing/kayaking)	Local/national
General Farmland	Provisioning	Food (cattle, (beef and dairy) sheep, limited arable	Local and national community
	Supporting	Nutrient turnover	Local/regional
	Cultural	Farming practices	National/local
		Landscape	Local

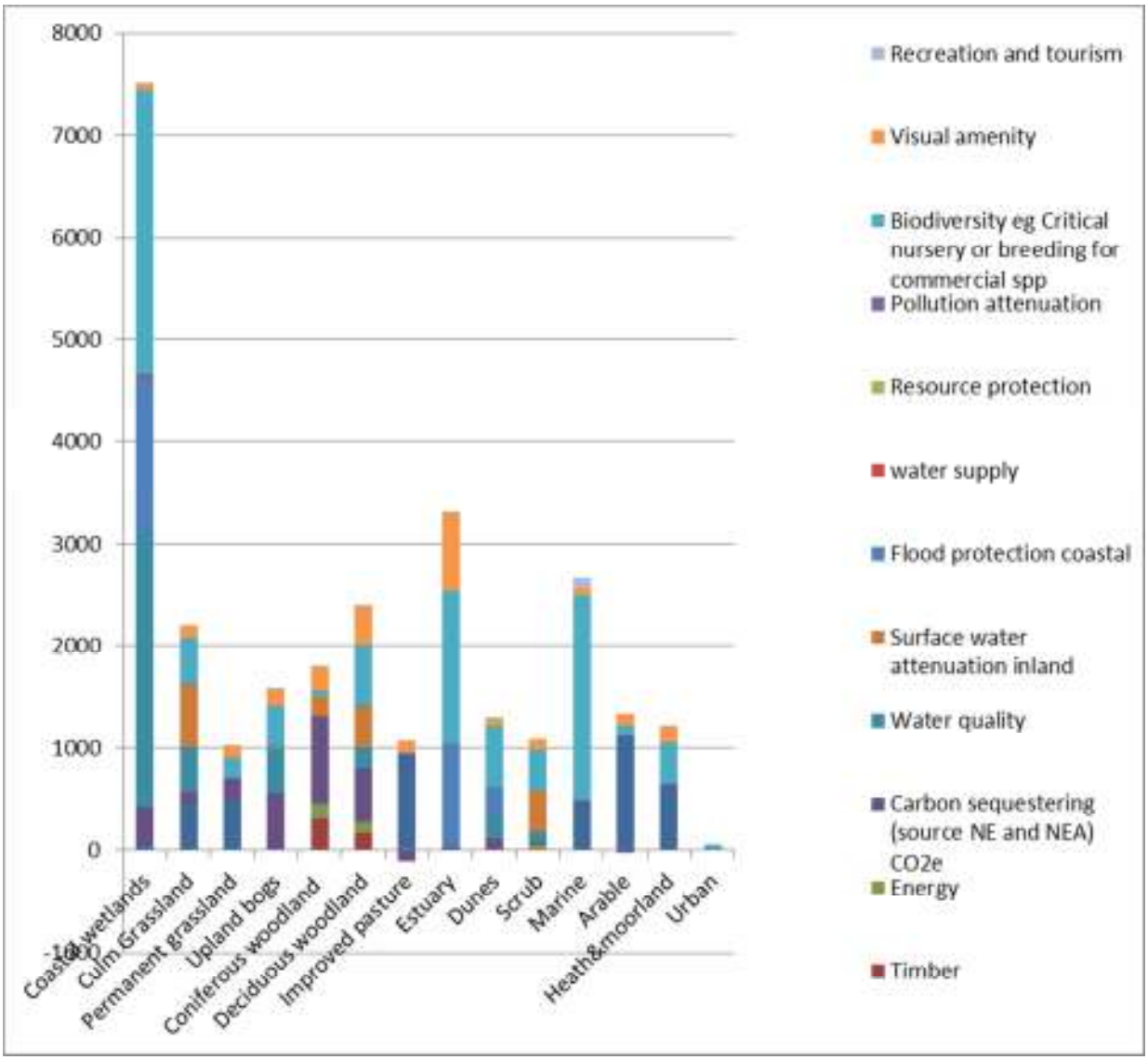

Figure 8 Ecosystem service assessment in the Biosphere Reserve for known values (£/Ha)

These services have been mapped on to the land-cover of the area based on a 25m cell size using data directly recovered from Defra and the Rural Payments Agency for land-use claims by farmers and is combined with specific known habitat maps for the area from local and national sources overlaid on top of the farm claims data.

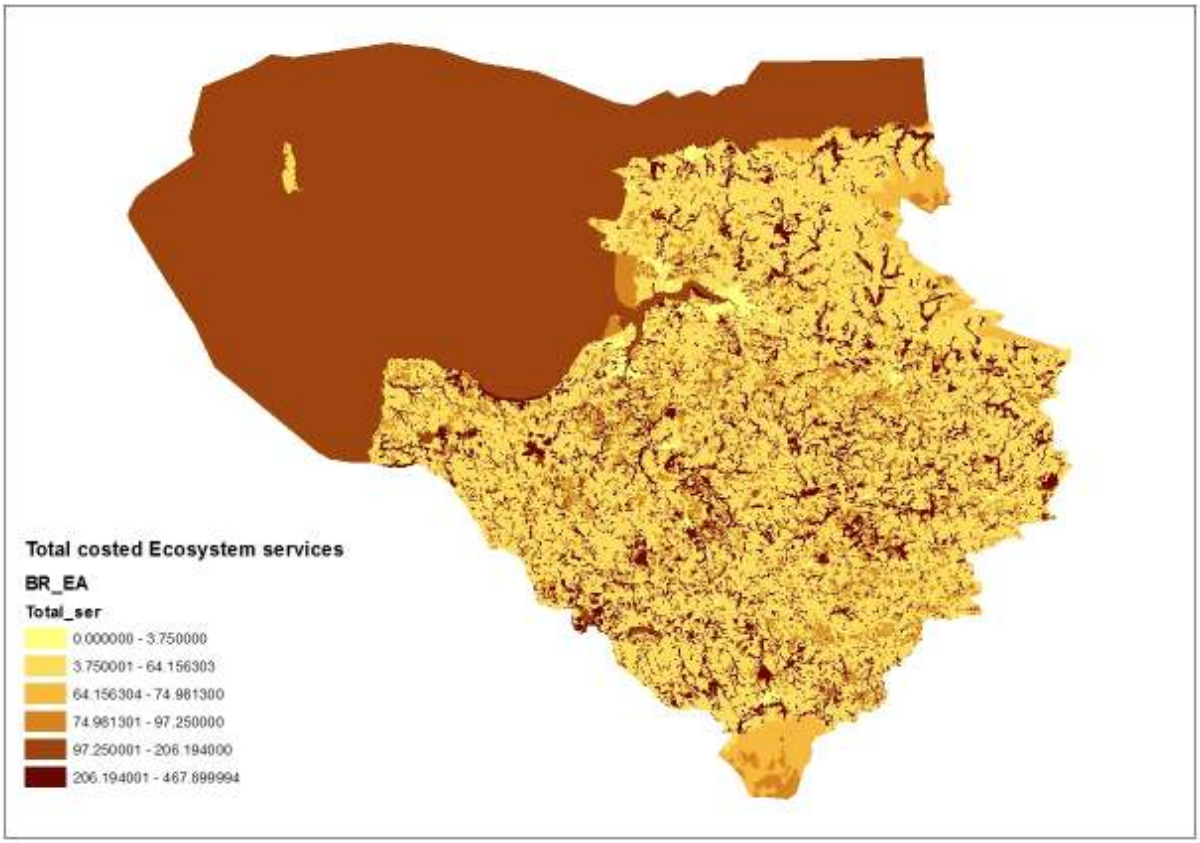

Figure 9 Mapped known values of ecosystem services

Refer to table below;

This was the first ecosystem assessment with very little baseline data to use. A qualitative assessment methodology was adopted due to the lack of good quality data representative of the entire Biosphere Reserve. There were 40 expert and local stakeholders that discussed each ecosystem service relevant to the habitat types in the area. Participants were also asked to score the relevance or importance of the ecosystem service to the needs of the people in the area.

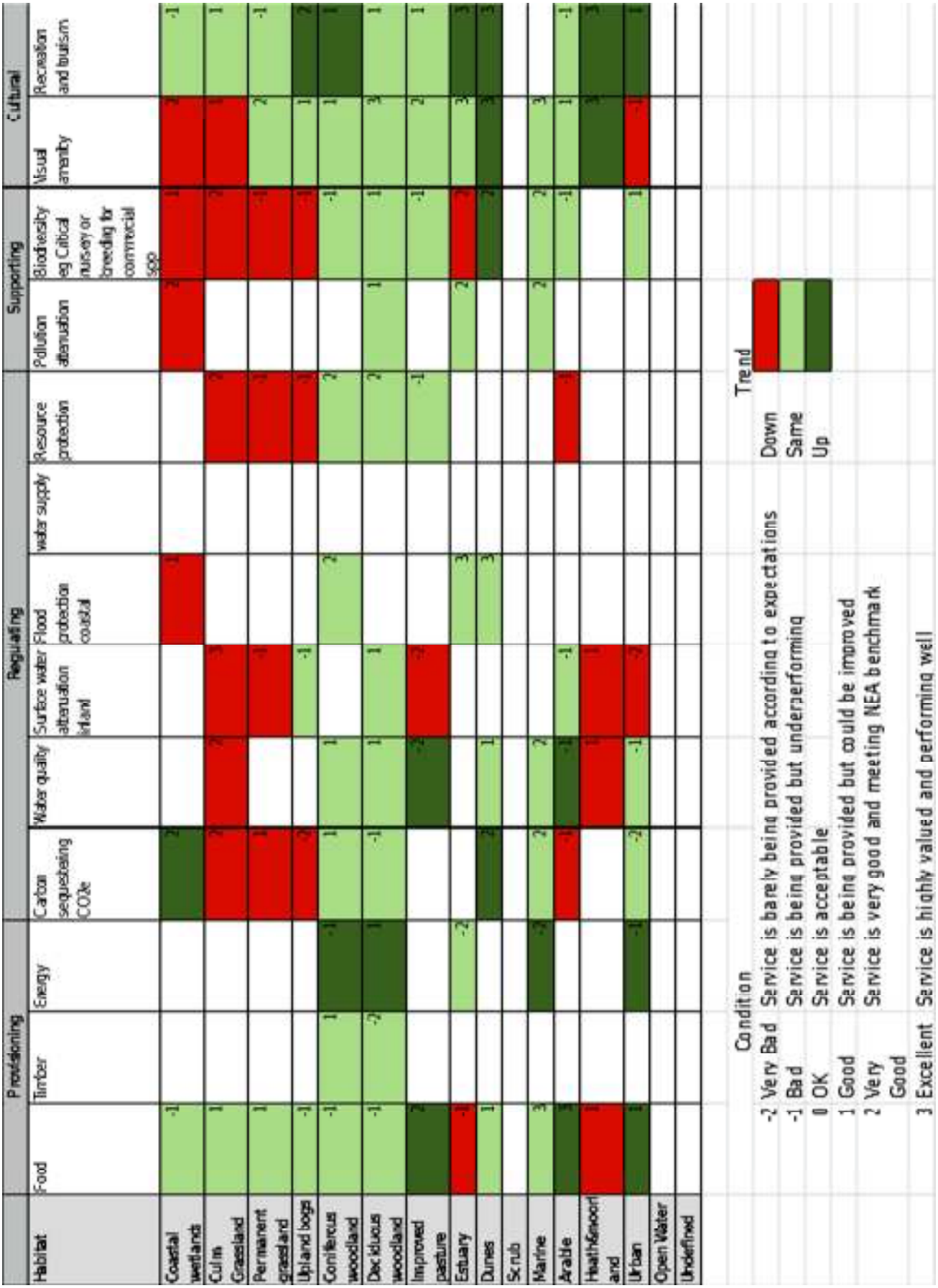

Figure 10 Condition and trend of ecosystem service in North Devon Biosphere

Habitat	Cause for change in habitat or specific ecosystem services
Coastal wetlands	Coastal Squeeze arising from sea level rise. Some creation of habitat taking place
Culm Grassland	Loss of habitat due to farmland improvement/intensification/drainage. Large programmes to restore habitat are not compensating for loss
Permanent grassland	Mis-management of nutrient and soils
Upland bogs	Gradual desiccation from old drainage practices. Programmes in place to block land drains
Coniferous woodland	Lack of good management to optimise timber provision
Deciduous woodland	Lack of good management for carbon sequestration, timber and or energy. Low accessibility for recreation
Improved pasture	Poor control over nutrient management and soil compaction
Estuary	Tourism and development pressures, coastal squeeze
Dunes	Improved management and natural processes
Marine	Good stewardship of fisheries, new marine conservation areas.
Arable	Loss of soils, run off carrying nutrients
Heath&moorland	Generally god, but may be compromised by over grazing

Participants were also asked to score the relevance or importance of the ecosystem service to the needs of the people in the area.

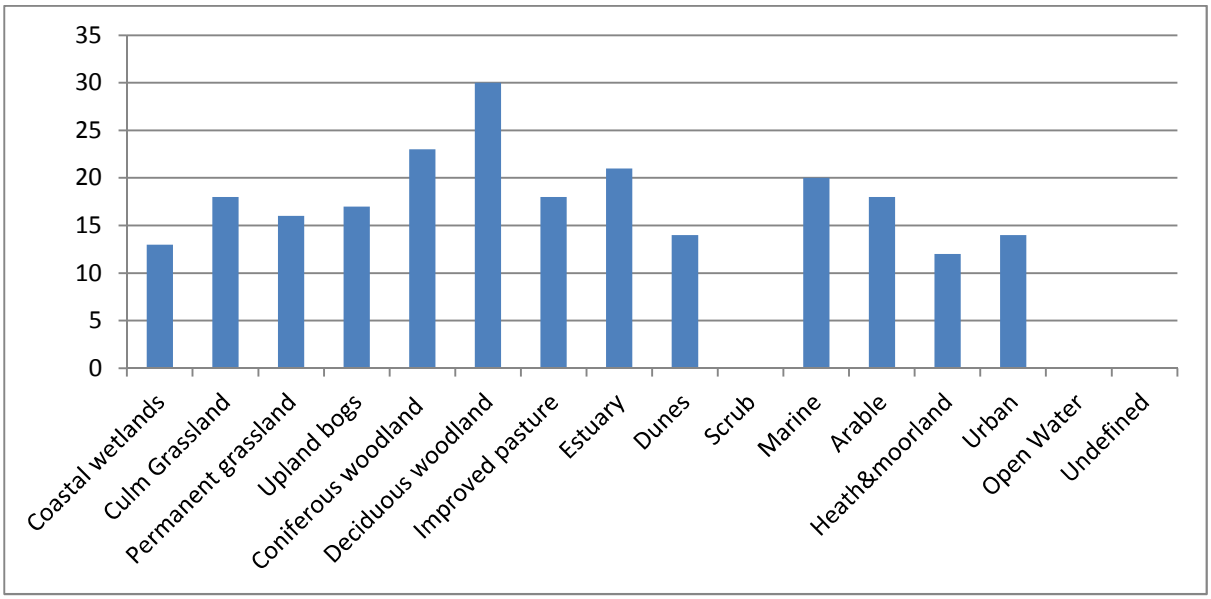

Figure 11 Aggregated relevance scores for the habitats for BR management

The Ecosystem service assessment description is split into habitats and therefore demonstrates the importance of biodiversity in their provision.

The new strategy for the Biosphere Reserve links the strategic aims to the ecosystem service assessment within the strategy. For example the table below indicates which ecosystem services are connected to the Economic, Environmental and Social Polices set out in the new Biosphere reserve Strategy

Ecosystem Service	**Relevant Policies**
Food	ENV2, ENV5, ECON1, ECON5, ECON6
Timber	ECON1, ECON4
Energy	ENV5, SOC3, ECON1, ECON7, ECON9
Carbon Sequestration	ENV1, ECON4
Water Quality	ENV2, ENV4, ECON5
Flood prevention	ENV4, SOC1
Water Supply	ENV4, ECON5

Resource Protection	ENV3, ECON5
Biodiversity supporting functions	ENV1, ENV3,ENV6
Visual Amenity	ECON3, ECON4, ECON7
Recreation and Tourism	ENV1,ENV3, SOC2, SCO4, ECON3, ECON4

Extract from Biosphere Reserve strategy 2014 to 2024; policy and ecosystem service analysis.

4. THE CONSERVATION FUNCTION:

4.1 CHANGE ANALYSIS

There have been no major changes in habitat types over the 10 year period. The only major change was planting on low quality land with broadleaved and with conifer trees funded through the South West Forest Programme.

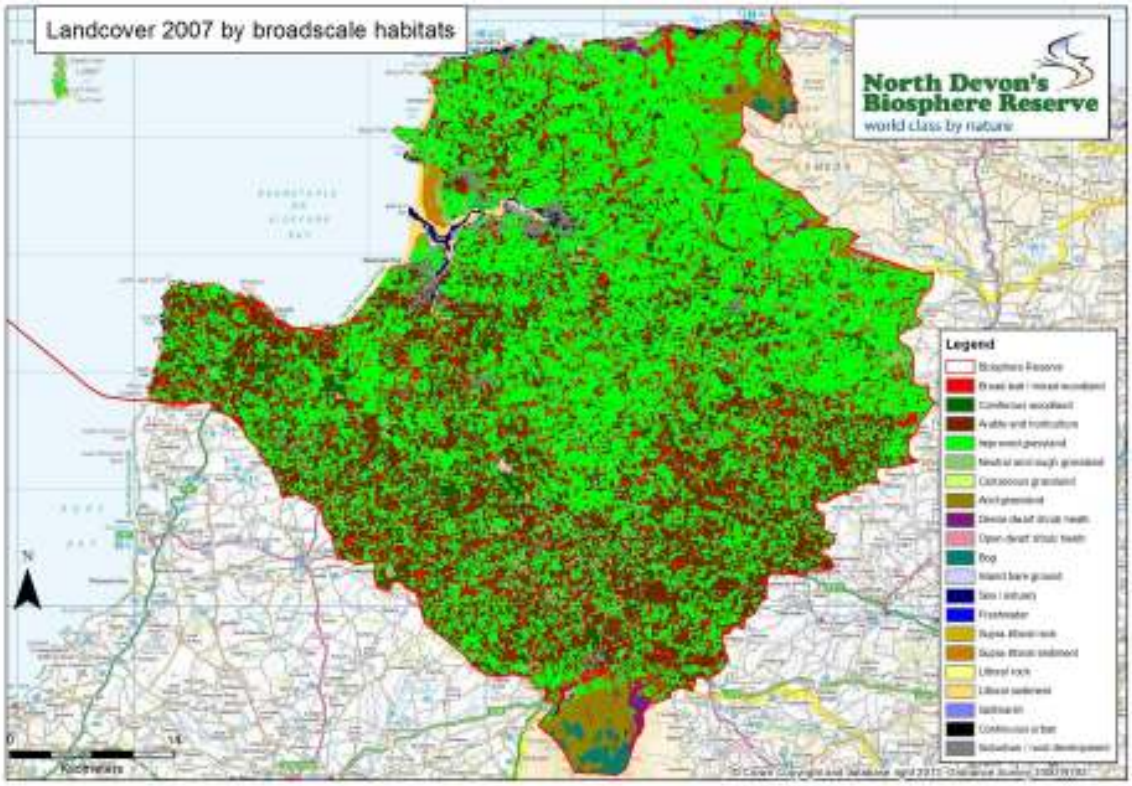

Figure 12 Land-cover map 2007 by broad scale habitats, (source: LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors)

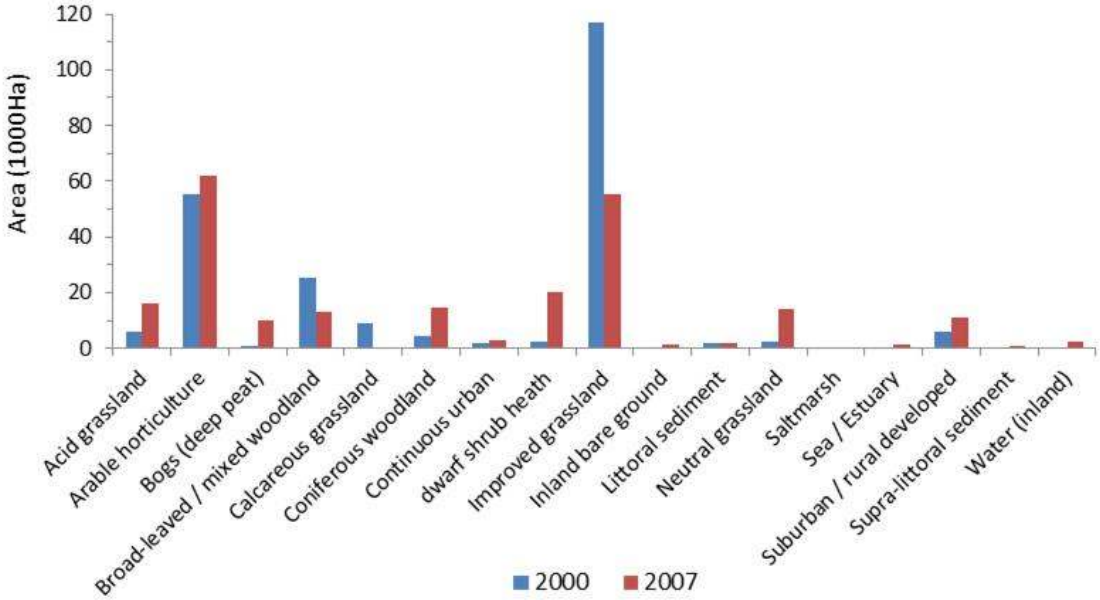

Figure 13 Land-cover by subclass in the Biosphere Reserve (2000/2007) (source: LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors)

Unfortunately the 2000 and 2007 data sets were not compatible to give an accurate image of land-use change and there is no evidence elsewhere to support the change in grassland types that is shown in the analysis. It had been conceded that the algorithm used for the remote sensing analysis in 2007 was not as accurate for the southwest of England as for other parts of the country. Much of the change seen in this analysis can be due to the survey/sampling error.

Looking at a more contextual analysis, the uptake of agri-environment schemes can give some indication of move from improved grassland to semi improved grassland and other habitats. The increase in arable may be attributed to the extended use of forage maize to support the dairy farms.

The increase in coniferous woodland cover will be attributed to the South West Forest Project which paid extra incentives to plant more woodlands, including conifers. There has not been any policy to replace broadleaf forest in favour of conifers; therefore this reduction in woodland cover may be due to removal of broadleaf scrub habitats to recover conservation grasslands.

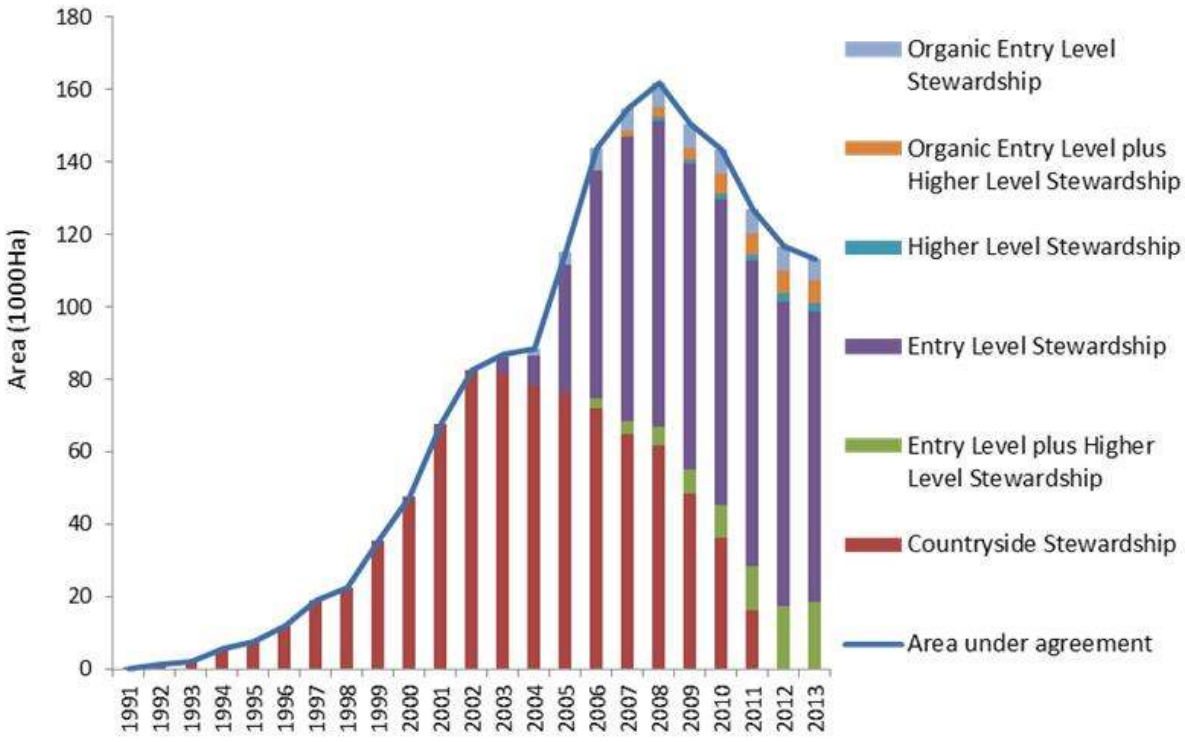

Figure 14 Area of land under different agri-environment schemes

Core Area: The Braunton Burrows dune system has been subject to improved management which has led to the recovery of key species. (Sand toadflax, water germander, round headed club rush). Following grazing trials to identify an optimum way of managing the flora along with the extant activities a programme of grazing with cattle and sheep has was put in place. The area has been split into 4 major management blocks with 3 of them having grazing applied to reduce the scrub encroachment and to encourage some managed erosion of the dune turf to provide microsites for invertebrates and re-colonisation by the rare pioneer species.

There has been significant geomorphological change in the dune face and intertidal areas of the core area due to storms and sea-level rise. A large spit feature (Crow Neck) has virtually disappeared in the storms of 2013/14. The policy for this area is to allow natural processes to prevail. The changes are being monitored by direct measurement and from remote sensing with LiDAR.

In the Buffer areas, there is reasonable stability in the habitats, though again the storms have caused some coastal change along the Pebble Ridge of Northam Burrows. (This was the subject of the discourse in the “Rising Tides” BBC World programme in 2009/10). As with most of our bio-diverse rich sensitive coast the policy is for limited intervention to allow the coast to adjust naturally to sea level rise and storm regimes.

Invasive species: there was insufficient information to have baseline data of the extent of invasive species such as Himalayan Balsam, Japanese Knotweed and Crocosmia. However these are now in development. New threats to native woodland biodiversity include *Phytopthora ramorum* (sudden oak death disease) and *Hymenoscyphus pseudoalbidus* (Ash die back).

4.2 MAIN CONSERVATION PROGRAMMES APPLIED OVER THE PERIOD.

Core Area management:

The dune system has been subjected to a series of management experiments including the use of grazing to support the maintenance of the dune turf and open sand habitats. Over 1000 Ha of the site has been fenced and split into 3 compartments which are grazed. There are other areas of the dune system which are not grazed for logistical reasons. The trials were in 2005 and the implementation started 4 years ago. It is too early to report any dramatic change. The grazing is done with local breeds of cattle and sheep and it is managed by a local farmer.

Figure 15 Southern end of Braunton Burrows and mouth of Taw Estuary

Within the core area and within the buffer zones dune areas there have been some habitat creation experiments in scraping back the vegetated dune turf, to reach more moist soil regimes and to stimulate the old seed bank and recover species such as Water Germander (*Teucrium scordium*) and Round-headed club-rush (*Scirpoides holoschoenus*). The fringing habitat of the wet slack is also suited to the Amber Sandbowl Snail (*Catinella arenaria*). These have been effective at restoring these populations.

Buffer Zone

Estuary re-alignment: The implementation of the strategy for the estuary has continued with regard to adapting to sea level rise by re-flooding land to create new intertidal habitats to compensate for those lost to sea-level rise. As the Biosphere Reserve was being designated 18 Ha of new intertidal land had been created. Since then a further 6 Ha have been created in the estuary area with a further 23 Ha being planned over the next 10 years.

Figure 16 Example of new intertidal habitat creation on Torridge estuary

Resource assessments have been made of the edible mussel which has large natural beds and biogenic reefs at the mouth of the estuary for their sustainable use.

Management measures are in place for controlling the disturbance to the overwintering birds that use the estuary. The measures include recreational craft code of conduct and bait collection for fishing.

Buffer and Transition area

Coastal Management; On the open coast there have been 2 iterations of the shoreline management plan, the Biosphere Reserve partnership has been instrumental in making sure that the biodiversity and sustainability of the plan remains high on the agenda. This has included dune and beach management along the coast and the management of the sea cliffs. The rocky foreshores of the Biosphere Reserve are very important for species such as *Sabellaria alveolata* (honeycomb worm), stalked jelly fish, (*Lucernariopsis campanulata*), cup corals (*Caryophyllia smithii* and *Leptopsammia pruvoti)* and various sea anemones.

Transition Area

Marine and MCZs; From the marine point of view, the Biosphere Reserve led in the local identification of potential marine conservation sites under the UK Governments Marine and Coastal access act to create a viable network of marine sites. The work with stakeholders was a national exemplar resulting in the recommendation of 6 sites. Many of these are being taken forward for adoption as MCZs formally in the UK marine protected area network.

This collaboration also made the Biosphere Reserve a case study for planning with marine ecosystem services in the European ValMER project. (www.valmer.eu). The study worked with our marine stakeholders, identified the uses of the sea bed for a range of services and products. It then explored a range of plausible scenarios of future uses and quantified the change in ecosystem services from the sea bed as a consequence of the use changes. This kind of collaboration has helped the Biosphere

Reserve to gather a shared and valued data set based on national and local data gathering effort. It is being used to support decision making and planning for fisheries management and marine based energy programmes

Nature Improvement Area

Figure 17 Typical Culm grassland scene (source Devon Wildlife Trust)

This was initiated as a UK government pilot in landscape scale conservation. The North Devon NIA was launched under the auspices of the Biosphere Reserve partnership but led by Devon Wildlife Trust and involved a further 13 partners. The programme focuses on the upper catchment of the river Torridge to restore Culm grassland, improve woodlands and restore the river habitats. Using a newly designed monitoring framework designed by Department for Environment Farming and Rural Affairs (Defra), the outputs and outcomes of the project have been monitored in an exemplary manner. In the first three years the following has been achieved:

- Restored 1487 Ha of Culm grassland
- 49 Ha wetland creation
- 13 Ha of grassland creation
- 19 Ha of new woodland planting
- Assessed 92 existing county wildlife sites and identified a further 12

- Improved the management of land next 96km of riverbank to reduce pollution run off.
- 1012 visits to advise 276 farms
- 168 woodland advisory visits to 112 woodlands

Working Wetlands:

This project was started in 2008 by the Devon Wildlife Trust and is still continuing. The programme is centred on the Culm grasslands which a primarily only found in north Devon. It includes a number of limited range species including the Marsh fritillary butterfly. Most of this habitat is being lost through land improvement for agriculture, only 10 percent of the original habitat now exists. The programme focuses on the restoration of the Culm wetlands and provides and evidence based for their continued maintenance and enhancement. The programme has developed principals for restoring grasslands such as green hay techniques to transfer seed from one good site to a receptor site. Approximately 30% of this project is outside of the Biosphere Reserve area. However their gross reported figures are as follows:

- 27 Parish (community) biodiversity audits covering 56,223 Ha
- 240 County wildlife sites being positively managed
- 3, 272 farm advisory site visits made
- 167 agri-environment applications submitted
- £7,400,00 drawn down through agri-environment schemes
- £162, 600 capital projects spent on 74 projects
- 96 sites over 1640 Ha now being grazed sympathetically
- 123 sites on 734 Ha being positively managed
- 306 Km of hedgerow improved with 37 km being restored by traditional “laying”
- 7 new Marsh Fritillary populations discovered.

Mires Project

The Mires project was established in the peat bog areas within the Dartmoor and Exmoor National Parks at the very top of the catchments of the rivers flowing through the Biosphere Reserve. It has been funded largely by the private water companies to quantify the benefits of “Upstream thinking” by restoring the functions of the upland bogs within the National Parks. The work has involved blocking the ditches that drained sections of the bog to hold back the water within the sphagnum and peat. The results indicate that the water table has risen by 2.65 cm. This has reduced the storm flows in the key rivers by approximately a third.
(http://www.exmoormires.org.uk/index.cfm?articleid=8691).

Local Nature Reserve programme

Figure 18 Upper Taw Estuary and provincial town of Barnstaple

To improve the local biodiversity and the links between people and nature, the BR has established Local Nature Reserves with local communities, which are then protected under the planning laws of the country. The small reserves are on private and public lands, they are managed by the local community with technical advice and support from the Biosphere Reserve team and the local authority parks staff. In total 8 reserves have been established, covering and area of 99.6 Ha and a population of 12,500 are within 500m of these sites. The habitats included in these areas are diverse ranging from estuarine habitats, wetlands, grasslands, woodlands and coastal heaths. It is normal in these areas to host interpretation and education events to boost peoples understanding and enjoyment of the sites.

Species Related Works

Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The Torridge hosts the only southern genotype of the freshwater pearl mussel in the UK. The mussel population in the River Torridge has not bred for over 40 years, and whilst they have a 100 year life expectancy, it is important to encourage their reproduction. The critical needs of the mussel are clean water, the right gravel substrates maintained within the river and the abundance of passing juvenile salmon which act as an intermediate host for the young mussel spat (glochidia). Efforts are therefore focusing on:

- reducing diffuse pollution
- reducing sediment run off that smothers the gravels rendering them bad for salmon reproduction and substrate for the mussels.
- captive breeding and stimulation with young salmon
- active cleaning of river gravels

Amber Sandbowl Snail (*Catinella arenaria*); Braunton Burrows is one of the only 2 sites in the UK where this species is found. It requires the pioneer and second stage succession species in the dunes for its food plants particularly around the wet slacks. The habitat management measures described in the core area are in support the recovery of this species.

Pink Sea fan (*Eunicella varicosa*) is listed in the EU habitats directive in Schedule YY. It has been particular feature in the seas around Lundy. The declaration of the Marine Conservation area and the first “no take Zone” in the UK has helped with the conservation of this species and prevented damage from abrasion from fishing, diving and yacht anchoring. A diving survey in 2011 had indicated that the populations of the sea fan have improved since the no take zone designation and then reduced again. The health status of the individuals had fluctuated. However we are now finding the species in several sites, some of which have been included in the proposal for the Marine Conservations Zones agreed with our local fishing community. Many of these new sites have been located by using citizen science and local dive clubs.

Honeycomb reef building worm (*Sabellaria alveolata*) is another EU listed species. The BR has mobilised volunteers recording the presence and extent of the species along the foreshore around the Biosphere Reserve. Conservation of the species can only be achieved through awareness raising and reducing any trampling of the specimens on the foreshore.

Spiny lobster (*Palinurus elephas*). This species is one of the key reasons for designating the Lundy MCZ and it has also been identified in other marine locations around the Biosphere Reserve. The lobster has some protection nationally and can be harvested. Work is ongoing to identify a suitable landing size for the lobsters consistent with their conservation.

Marsh Fritillary (*Euphydryas aurinia*): This is another red data species although on the Least Concern category. It is found more frequently in the Culm Grassland in the BR and is the stronghold of the UK populations. The restoration of culm grasslands, grazing advice and the application of agri-environment measures through landscape scale initiative is helping to support populations. As indicated above 76 new populations have been found over the last 7 years. At least some of these will

be new populations related to the restoration of habitats, others will be existing colonies but identified through new survey work.

High Brown Fritillary (*Fabriciana adippe)*: Has stronghold populations on Exmoor within the Biosphere Reserve. The National Trust has reinstated woodland management practices in the western oakwood habitats on their west Exmoor estate to make them more favourable for the butterflies.

Large Blue Butterfly (*Phengaris arion)*: This species was extinct from the UK. Work to restore habitat to make it suitable for re-introduction has been undertaken within the Biosphere Reserve in the Hartland area of coastal heath. No firm date is set for the -reintroduction.

Atlantic Salmon (*Salmo salar*): 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. Areas of concern for this were:

- the fisheries off the Greenland coast,
- the Irish Sea drift net fishery which are being addressed.
- The rivers where the salmon come to spawn and challenged with man-made barriers to movement and deterioration in water quality as key factors in poor returns.

As a fishery conservation measure, the Environment Agency bought out licences for salmon and sea trout nets early in the period and almost all netsmen 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 sea- 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 largest adults being Multi-Sea-Winter (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.

The rivers have been over fished in the past and the diffuse and point source pollution problems have led to depleted oxygen in the spawning gravels. These problems are being addressed with the Catchment sensitive farming projects and the landscape scale programmes. In this programme, there have been 293 farm visits over 6 years with 286 farmers receiving training via workshops. The visits provide advice and grant aid to the farmers to reduce their impact on the river and its corridor for the species found there (including otter (Lutra lutra) Salmon, migratory trout and various invertebrates).

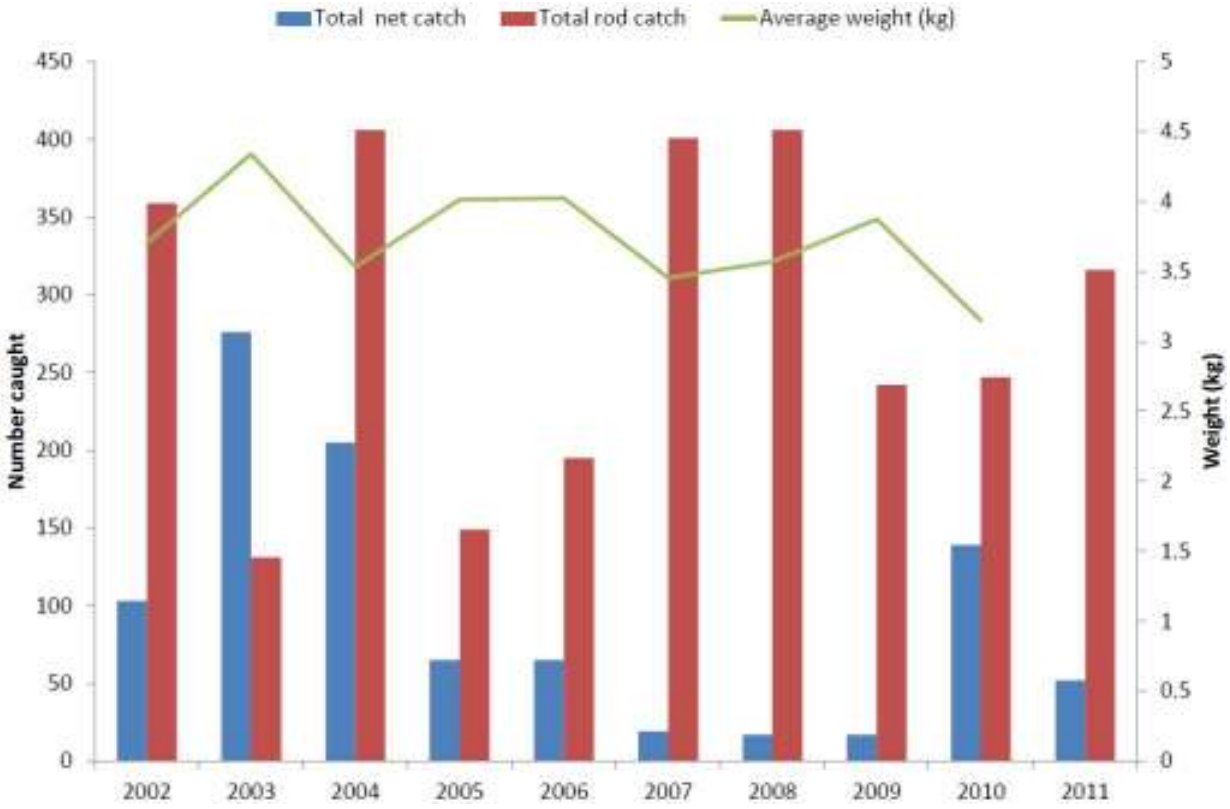

Figure 19 Numbers and weight of Atlantic Salmon caught in the Biosphere Reserve.

Greater Horseshoe Bat (*Rhinolophus ferrumequinum)*: UK populations of the greater horseshoe bat have fallen by 90% in the last 50 years. It is on Annexe IV of the EU habitats directive. There is an outlying roost in North Devon Biosphere which is the 2nd largest roost for this species in the UK. Flight corridors identified from radio tagging have been protected in planning policies. (www.publications.naturalengland.org.uk/file/143004). A new countywide partnership project has just been awarded funding led by Devon Wildlife Trust and including the Biosphere reserve will be working with landowners and the public to improve the foraging habitats for the bats and improve our knowledge of where the bats now move using citizen science techniques to track them.

Puffins (*Fratercula arctica)*: The Puffin from which the island of Lundy derives its name had almost disappeared from the island with a population of 5 pairs in 2000 compared with 3500 in 1939. A rat eradication programme in 2006 successfully removed all of the rodents, and has been maintained with great vigilance since then. The first successful breeding was in 2008 with one pair raising a chick, in 2014 over 35 pairs were breeding.

4.3 CONSERVATION ACTIVITIES LINKS TO SUSTAINABLE DEVELOPMENT ISSUES

With the exception of the Local Nature Reserve Programme, all of the conservation activities take place on private land, normally assisted by agri-environment funds or other grants brought in by the partnership. Linking the produce and adding value to through the Biosphere Brands- “Investing in Nature” and earlier through “World Class by Nature” has been fragmented.

On the marine aspects, the fishermen are interested in using the brand along with the conservation measure as a support mechanism that their fish is sustainable caught in a UNESCO Biosphere Reserve.

4.4 ASSESSING THE EFFECTIVENESS OF ACTIONS OR STRATEGIES APPLIED

In the State of the Biosphere Reserve report we attempted to use bird species as indicators of ecosystem health, however we found the inter-annual data to be sporadic and unreliable. It tells us more about bird watchers rather than birds. There is a new Devon Bird Atlas which gives a more reliable snapshot to use as baseline for multi-annual data.

The Defra funded Nature Improvement Area was set up with a very strong monitoring framework. This was followed rigorously for the NIA programme and the BR provided much of the intelligence to monitor this. (http://publications.naturalengland.org.uk/file/5553196336414720)

If it is financially feasible, the BR will be adopting a very similar framework as well as the Water Framework Directive indicators measured by the governments Environment Agency. (http://jncc.defra.gov.uk/page-1375)

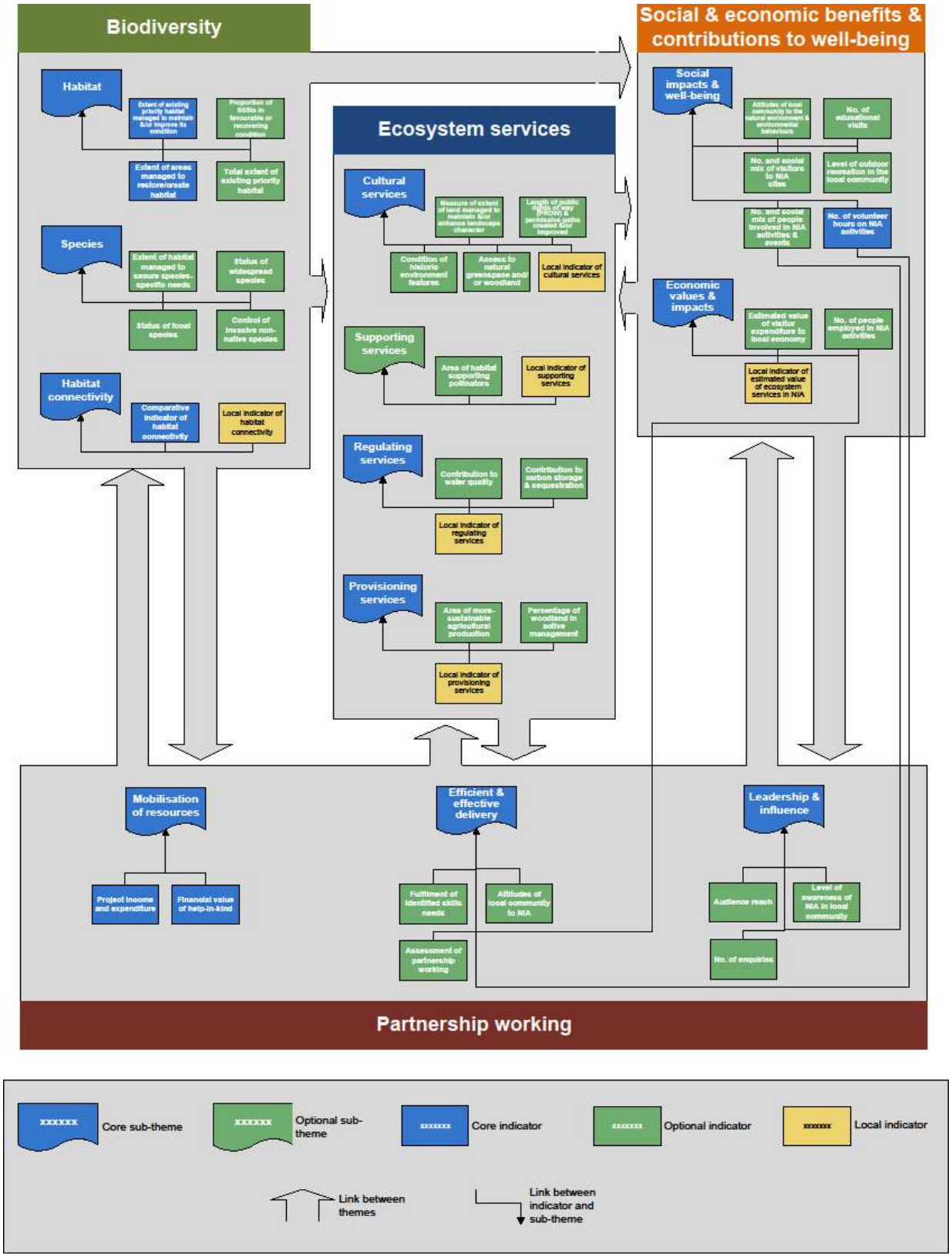

Figure 20 Monitoring framework used in Nature Improvement Areas

4.5 MAIN FACTORS THAT INFLUENCING THE SUCCESSES OF CONSERVATION EFFORTS IN THE ENTIRE BIOSPHERE RESERVE.

The following comments are quotes from our partners on the board of the Biosphere Reserve.

Devon Wildlife Trust

"The strategic vision of the Biosphere Reserve has enabled partners to come together to work at a landscape scale in effective and successful collaborations. Partnership working is proving to be the most efficient way of achieving conservation for sustainable development and the Northern Devon Biosphere is a test bed of best practice."

Independent Board member:

Working as a true partnership where there is a sharing of the workload and benefits. Partners not only sign up to actions but seek to deliver them in cooperation with others rather than compete. This is more of a federal approach to programme delivery.

Petroc College:

"a) Positive: Strenuous efforts by individuals within certain projects, usually with outside funding behind them. Results are good but patchy.

Negative: No overall understanding, especially within the land-owning community, of the meaning of the biosphere designation and hence no pride in it and no special effort to achieve landscape scale conservation improvements
b) I am not sure that 'conservation for sustainable development' is a meaningful phrase. However I feel that massive publicity and awareness-raising has to underpin future efforts if they are to succeed. And I do not mean lots of ' Harry the Happy Hedgehog' type activities. I think there needs to be factual evidence of improvements fed out to the media and public little and often, together with bad news stories about poor practice and impending disasters which the biosphere designation can help to avoid?"

Devon County Council

"The availability of funding, both to support the employment of a co-ordinating Team for the Biosphere Reserve and for specific project activity, is one of the key factors which have influenced the success of conservation and sustainable development effort. On the negative side, dwindling resources for the core team have reduced the in-house capacity to promote conservation activity. On the positive side, excellent project activity and associated conservation achievement has resulted from successful funding bids. The success of several / many of these funding applications is due, in large part, to the recognition given to the Biosphere Reserve. In terms of new approaches, work is currently underway to find a new model to sustain the future of a co-ordinating team, given the high risk of this being further diminished through ongoing hosting by a local authority at a time of extreme cuts in Govt. funding. Whatever the outcome of this process, there will be a need to rely on increased third sector support for conservation project development and implementation."

Biosphere Reserve member of staff

"I am sure that I will not be the only one who feels that through the Partnership, the various conservation organisations within the BR have managed to draw in external funds and work very

effectively together. Working as a true partnership and having the most appropriate partner to lead on applications to draw in funds? Having a "federal" approach to projects rather than single organisation driven means that we share the work and the benefits."

Farming and Wildlife Advisory Group

"Farming in the BR is a key influence on the success of conservation efforts so new strategies should focus on helping farmers to help the local environment. This will involve a greater focus on engaging farmers and understanding the pressures they are under i.e. **listening** to farmers and finding out what **they want/need** rather than *using them* to deliver conservation – let's actively engage them in the process. Providing farmers with advice and support on environmentally sound agronomy and sustainable farming systems will be key to helping them re-orient their businesses rather than focusing purely on habitat conservation, reducing fragmentation and agri-environment grants."

A district council planner

"Robust database: having a good understanding of the spatial nature and the condition of the ecosystems enables actions to be more focused. The use of GIS to identify and model the critical areas for improvement has been invaluable.

Embedding the Biosphere Reserve in local development plans; by working with the local authorities this area is a national lead in using ecosystem services in land-use and development planning. This gives more leverage to the work of the BR and reduces the background causes of decline. However, the National Planning and Policy Framework (NPPF) presents a double edged sword;

<u>Positive</u> NPPF (para 109) recognising the wider benefits of ecosystem services

Introducing the concept of Nature Improvement Areas

<u>Negative</u> NPPF (government planning policy) prioritising economic development and accelerated housing growth over all other considerations including sustainable development and environmental enhancement »

5. THE DEVELOPMENT FUNCTION:

5.1 NATURAL RESOURCES AND ECONOMY

Farming

The structure of the agricultural industry remains as dynamic as it ever has been. There is a prevailing trend for farms to get larger on one hand and also smaller small holdings on the other. The loss of the middle sized family farm is the worrying trend. There are over 4435 farmers in the entire BR with an average holding size of 48.5 Ha.

There has been good collaboration form the farming sector to reduce the diffuse pollution running from the farms into the rivers. Over the last 6 years, the Biosphere Reserves has been coordinating a scheme of "Catchment Sensitive Farming" which trains farmers on pollution reduction and provides grants to the farmers to support investment in those measures. The scheme has resulted in over £3M over that period, approximately half of which has come from the farming sector. The investments are beginning to show in improved phosphate status in 7 water bodies and there has also been better bathing water quality observed in one of the targeted catchment areas.

The present turmoil in the dairy sector has led to many farms changing business base to other livestock farming. Some farms are carrying out "zero grazing" regimes where the cattle are kept inside all year round and the grass is brought to them. This also means that slurry is stored and then spread to land which causes environmental issues over secure storage and appropriate spreading rates. Over the 10 year period farming has gone through a bust and boom back to bust with farm incomes rising then falling again. The impact of the later drop in farm incomes means less money to invest on environmental projects on the farm other than those supported through the agri-environment schemes.

Forestry

The woodlands of the North Devon Biosphere Reserve are extremely important asset to the area. Woodland accounts for 11.4% (26,400 Ha) of the terrestrial part of the Biosphere Reserve. Approximately 76% of the wooded area is under deciduous woodland.

At the re-designation of the BR, new initiative was launched call the South west Forest. This was a government supported scheme to reinvigorate the interest in forestry in the area, most of which was covered by the BR. The initiative lasted for 5 years. In the first 3 years the programme had planted over 1300 Ha of new woodland and created an estimate of 197 jobs in a wide range of sectors. http://www.forestry.gov.uk/pdf/pacec-ff-southwest-report.pdf/$FILE/pacec-ff-southwest-report.pdf

Since then the BR has been supporting the ongoing forestry work along with other partners such as Silvanus and Trees and Land (for a "Ward Forester Programme") along with the UK Forestry Commission.

The Biosphere Reserves has set a target to double the area of woodland cover in order to provide the ecosystem services compensate for those lost through climate change over the next 60 years. Using GIS modelling, the preferred sites that will deliver the optimum change without too much a trade off against other habitats and ecosystem services have been identified.

The current picture of forestry economy is that the woodlands collectively are worth £16M and 490 jobs which is much lower than below the potential production. In terms of known ecosystem services the potential value is in the order of £58.5M (the timber component is based on standing values). A qualitative assessment of the condition and functionality of the woodlands by stakeholders in the Biosphere Reserve partnership suggests that the woodlands are under-performing and these values are not being reached. The BR partnership is proposing to the UK government that the BR is recognised as a woodland enterprise zone which will facilitate the sustainable invigoration of the forest industry in the area. The initiative will capitalise on the buoyant woodfuel market to bring woodlands back into management for multiple objectives of resilience, economy and social benefits.

Fisheries

Sea fisheries management and use in the BR has always been a key component of the cultural identity of the area. The number of vessels operating form the area has gradually reduced in accordance with EU Fisheries policy action.

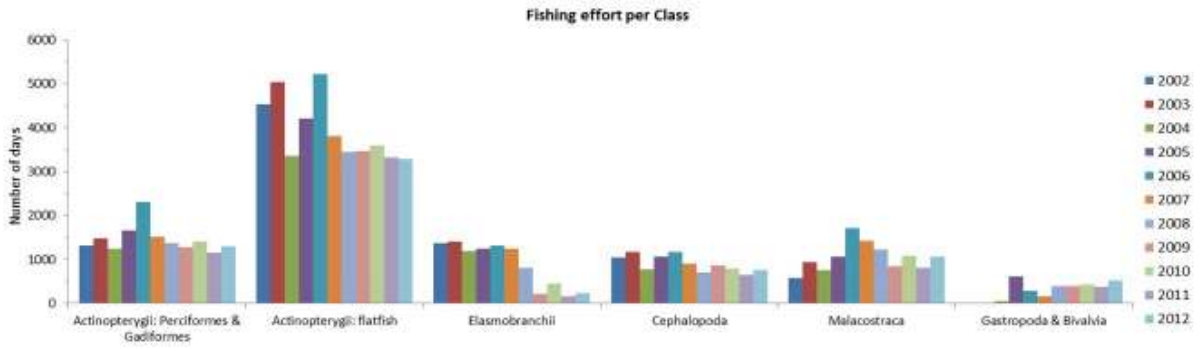

Figure 36. Fishing effort per class (2002-2012) (source: MMO)

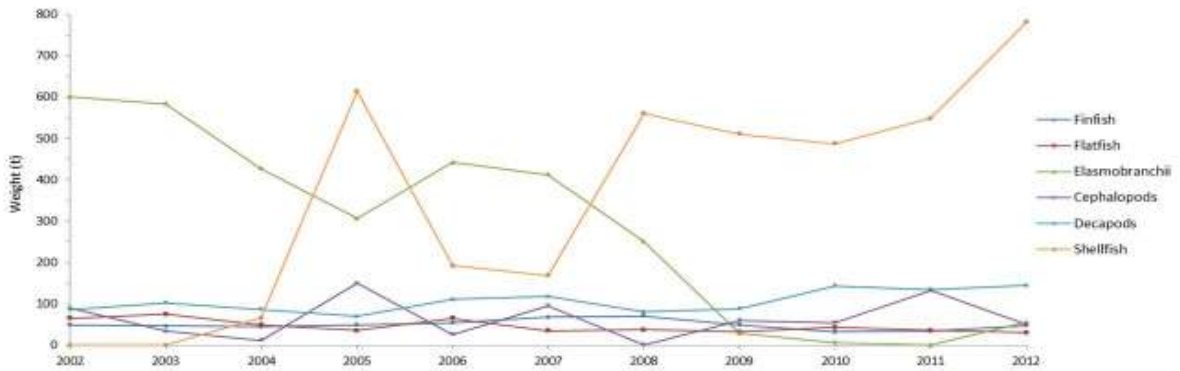

Figure 38. Tonnes landed per class (2002-2012) (source: MMO)

The data show the change in effort, or indeed in some cases the lack of change in effort despite this fleet reduction. The data do show that that the fishery is sustainable. The fishermen have introduced their own conservation efforts through seasonal no take zone areas and were instrumental in the designation of Lundy as the UK's first Marine nature reserve. The North Devon Fisherman's Association has worked with the BR to identify new marine conservation areas and seeks to work with BR on accreditation of its produce.

In 2008, the local fishermen collaborated with the BR on a marine litter project. They engaged in fishing for litter scheme which involved the landing of all the litter that was caught in the nets. A similar scheme has been revived again by the “Clean Marine” project with the North Devon AONB and the regional fish producers organisation “Seafish”.

The fishermen are currently supporting a research programme on the elasmobranch fishery to identify the range of the fish that they catch and establish a fisheries improvement plan. At the moment the is classed as part of a larger fishery area that is not managed so well as the north Deon/Bristol Channel area. A better understanding of the movement of these fish species in the area will enable better fisheries management and protecting nursery areas as well as managing the effort and catch rates.

Renewable Energy

There has been a growth in the application of renewable energy across the area. This has been on domestic and commercial scale applications, largely driven by government incentives to roll out the technology.

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

Further to this roll out of technology the Biosphere Reserves Energy Group has been pressing for retrofitting and new build home designs for energy efficiency to reduce demand. The BR has an energy strategy that baselines the energy use, production and costs and sets out a road map for “energy descent”. http://www.northdevonbiosphere.org.uk/biosphere-energy-plan.html. Higher energy efficiency targets have been adopted into the draft local development plan for the new build homes to be higher in standard than is nationally required. The local authorities are also in discussion about allowable measures which will permit developers to pay for improvements in older housing stock to support energy efficiency in place of more expensive measures on the new stock they are building.

The community collectively spends over £300M per annum on all energy across the BR. The majority of this money is lost from the area since the energy is provided largely from national or multinational organisations based outside of the region. The aim is to have more local energy production and increase the level of local ownership of those facilities to green the economy and improve local circulation of funds. Most of the larger scale projects have a “community fund” which can be used to finance sustainable development projects in the vicinity of the developments.

A large offshore wind array had been planned for an area that was intersecting the BR marine area. The BR partnership published its position on the controversial development, which was being developed at a time of the work on the marine conservation zones in 2012. The Biosphere Reserve Partnership’s approach was to ensure that the environmental assessment was as robust as possible and to seek, where feasible, an economic gain to the BR area through appropriate servicing and management facilities. The application was withdrawn at the last minute by the developer for financial and technical reasons. Energy developments are not always popular and the BR partnership is keen to promote sustainable energy, but not at all costs. Therefore it scrutinizes energy development applications and seeks to make the best through mitigation and advises the planning authorities accordingly.

There are proposals for a tidal technology demonstration area in the marine section of the Biosphere towards the eastern boundary, where the tidal range is in the order of 9 m. The BR partnership is supportive of the development of new green technologies. This test zone is co-located with one of the new proposed Marine Conservation Zones. The partnership agree that co0location does not compromise the objectives of the MCZ and could further the protection by a “no go area”. The Biosphere partnership will work with the manager of the demonstration area to ensure that technologies that are tested and developed there are as ecologically benign as possible.

5.2 TOURISM

Tourism is a major economic activity in the area and has normally accounted for 10% to 14% of the overall GDP in the area. It has been a traditional holiday venue for UK tourists who have been attracted by the coast and the moorlands. The figures below are taken from the Devon County Tourism survey.

		Biosphere	**Devon**
2009	Overseas visitors	66600	468,000
	UK visitors	1119000	5,270,000
	Total visitors	1185600	5738000
	Total Business turnover	£ 486,950,800	£ 3,138,812,000
	Percent employed in tourism	9%	8%
2010	Overseas visitors	82300	441,000
	UK visitors	1201800	5,050,000
	Total visitors	1284100	5491000
	Total Business turnover	£ 520,783,600	£ 3,058,840,000
	Percent employed in tourism	10%	7%
2011	Overseas visitors	75940	425,000
	UK visitors	1251000	5,210,000
	Total visitors	1326940	5635000
	Total Business turnover	£ 534,273,000	£ 3,100,394,000
	Percent employed in tourism	9%	7%
2012	Overseas visitors	52280	387,000
	UK visitors	1252600	5,260,000
	Total visitors	1304880	5647000
	Total Business turnover	£ 596,838,600	£ 3,609,092,000
	Percent employed in tourism	10%	8%
2013	Overseas visitors	92020	536,000
	UK visitors	1197000	5,116,000
	Total visitors	1289020	5652000

	Total Business turnover	£ 597,800,200	£ 3,606,165,000
	Percent employed in tourism	10%	8%

In 2004 a study by the regional development agency identified that 78% of the tourist visits to the area were mainly or largely because of the quality of the environment. Very soon after the re-designation of the BR the local tourism board created a tourism strategy that included the values of the BR and promoted more sustainable tourism. In later refinements it sought to have more growth through less tourists paying more for the quality experience of the area generally.
http://www.torridge.gov.uk/CHttpHandler.ashx?id=434&p=0

The Biosphere Reserve features highly in the promotional literature of the area. There is not enough evidence to suggest that BR itself has changed the visitor statistics to the area, either up or down but it has helped to shape the way that the industry has approached its business. Indications are from the survey that approximately 30% of people coming to the area are aware that it is a UNESCO World Biosphere Reserve. The other designations have been in the area for more than 50 years, so it is not entirely surprising that the Biosphere is low in recognition in the area. Furthermore, the designation has not benefitted from the large marketing budgets the others have had nationally as well as locally. However the growth in awareness is encouraging.

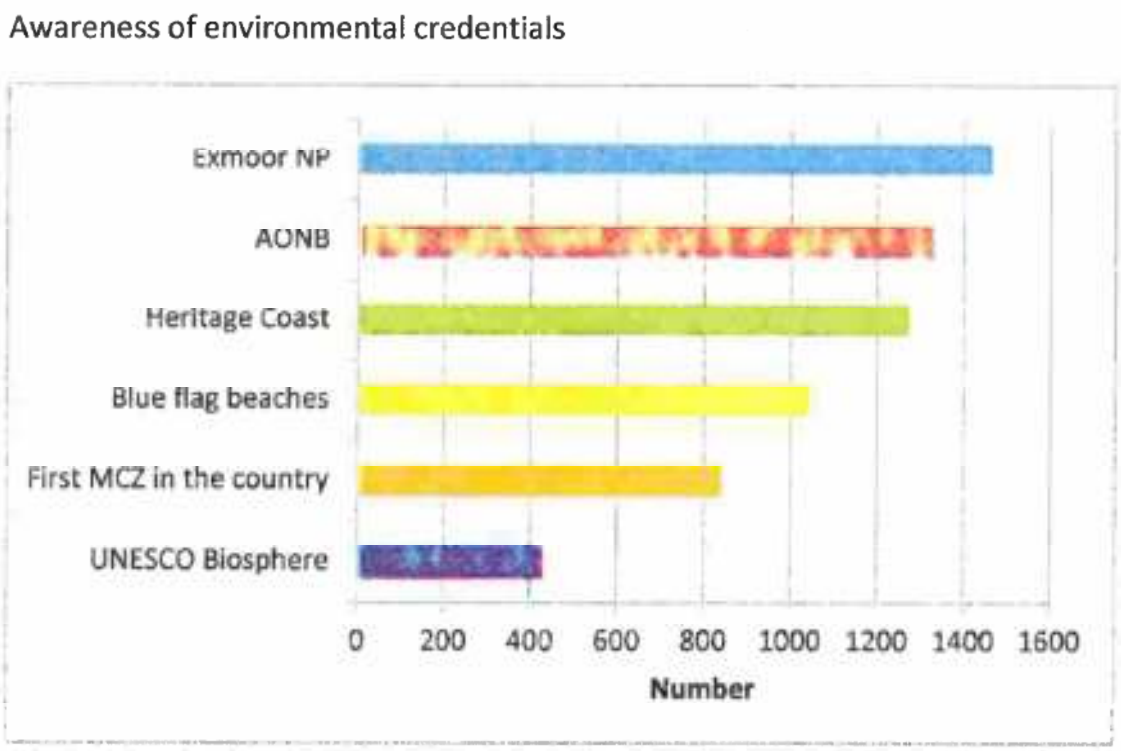

Figure 21 Source: Tourist Survey 2015 (in prep); Awareness of the environmental credentials of north Devon.

In 2013 a South-West England collaboration between UNESCO sites (WHS, GeoPark and BR) the collective campaign showed a heightened interest in the area as a Biosphere Reserve and in south Devon's GeoPark much greater than the World Heritage sites, though it was not possible to tell if this translated to actual bookings.

Environmental tourism features highly in the activities in the area. Walking along the south west coast path is the highest scoring activity. Key tourist activities in the area are shown in the graph below.

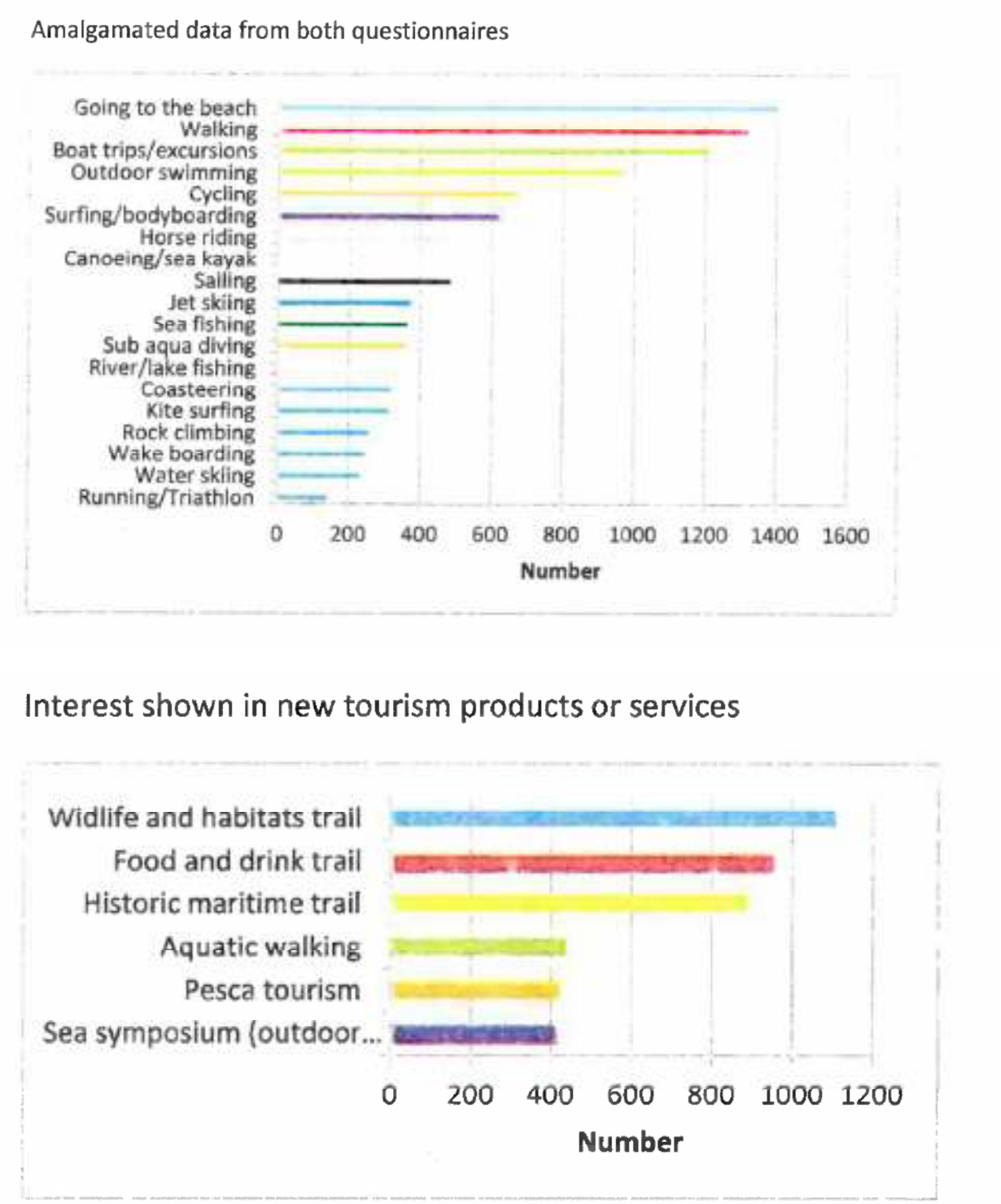

Figure 22 Source: Tourist Survey 2015 (in prep); Sport and outdoor activities undertaken by respondents.

Much of the focus of tourism was on the coastal strip. The promotion of the Tarka Trail, (a long distance cycle path and walking route) is used to draw visitors inland to explore the valleys and the villages there. The value of the Tarka Trail to the local economy is valued at £7.5M per annum, based on visitor numbers and the Cambridge economic model.

A survey in June 2008 estimated that surfing is worth £52M per annum to the local economy. (http://www.northdevonplus.com/assets/the-economic-value-of-surfing-in-north-devon---final-trisurf-report-june-08.pdf) This research came at the end of a partnership project including the BR team on developing the surf industry in a sustainable and socially responsible manner. The figures are based on the day spend of surfers, the accommodation they use and the equipment they buy.

Projects delivered by the BR are also supported by a visitor payment scheme which is funds gathered by businesses from visitor who make a voluntary contribution while making the booking for accommodation. The projects range from cultural heritage conservation and interpretation to small community based conservation projects.

The Biosphere Reserves has worked with the lead bodies for the activities in the Biosphere Reserves to produce codes of conduct for the participants and the businesses. Examples include the Estuary Code of Conduct, and more recently the Watching Wildlife at Sea Code of Conduct. These are negotiated and promoted as a more efficient means of managing activities before introducing laws such as bylaws.

5.3 GENERAL ECONOMIC DEVELOPMENT IN THE BIOSPHERE

The process of nomination of the BR stimulated the review of the economic strategy for the area which put the environment at the heart of the strategy and took a very strong sustainability approach addressing the development of the area through the 5 capitals of Environment, financial, social, human and built. http://www.torridge.gov.uk/CHttpHandler.ashx?id=1663&p=0

Within the local development plan framework the BR has been a national pilot for:

- Biodiversity offsetting; by establishing a mitigation hierarchy of avoid mitigate compensate, the Biosphere is ensuring that as little biodiversity is lost to development. The offsetting strategy (http://www.northdevonbiosphere.org.uk/biodiversity-offsets.html) shows how this system works and the recipient sites of the offsets fit into a biodiversity strategy that improves connectivity between habitats and improves resilience.
- Application of the ecosystem services approach in the planning system; the BR has been a case study in the National Ecosystem assessment for leading practice in the integration of ecosystem services in development planning strategies and decisions.

The BR has inspired several key stakeholders in the area on a good sustainable development trajectory for the economics of the area. The framework for urban development in Bideford for example wished to establish a BR centre (http://www.torridge.gov.uk/CHttpHandler.ashx?id=1666&p=0) within the town to demonstrate the sustainability of the area and be a key attractor and education facility.

Over the interim years the BR has been instrumental in major economic work such as drawing down funds for 2 successive LEADER programmes (c£5m over 8 years) and the Fisheries local action group fund (£0.8M on the last 3 years).

In demonstrating the breadth of application of sustainability, the BR has facilitated initiatives on waste minimisation for the manufacturing sector at the very early stages of the designation, this led to the creation of ENVision, which was funded regionally. The interventions made with companies often led to new products that used the waste material or made savings on energy and reduced risks to the companies. Company savings were cited as being from £10K to over £70K per annum, depending on the scale of the business. It also supported a local “industrial symbiosis club” which was designed to maximise recycling of material between companies to reduce waste and transport. Unfortunately, such a set up needs a critical mass of materials and companies to make it effective; i.e. companies need the right material available at the right time in the right amounts.

In 2008, a Biosphere Business Charter Scheme was established. The charter system used the 7 overarching strategic aims of the Biosphere Reserve strategy as it was then. Each business was given advice on how it might improve its performance, where relevant against each of those aims. It was designed as a stepping stone towards more formal accreditation such as ISO14001.

The 7 charter aims were:

1. To enhance biodiversity in the immediate area for the benefit of the local environment

2. To promote the local culture and beauty of the area

3. To use our natural resources wisely

4. To reduce the carbon footprint of our business by 3% year on year. To be actively promoting and demonstrating adaptation to the challenges that will come from climate change.

5. To trade with as many local businesses as we can that operate in an environmentally and socially responsible manner.

6. Be an active member of local and regional communities and to support local community groups

7. To raise awareness amongst our staff and customers about the benefits of operating sustainably and about the Biospheres special international status

   In return for annual reporting back on the aims and actions agreed, the company was entitled to use the Biosphere's business logo.

Figure 23 Business Charter "Investing in Nature Logo"

There are 28 businesses that are signed up to using the scheme.

5.4 CURRENT STATUS

The BR does not feature strongly in the economic strategy for the area, but it is the main plank in the Local Development Plan. http://www.torridge.gov.uk/CHttpHandler.ashx?id=13375&p=0

This plan sets out the spatial development as well as the overall development of the area. The BR is featured in the polices and the vision for the local plan. This has passed through 2 stages of local consultation and will be adopted after a central government review of the plan. It is pleasing to see that after 10 years of building the bottom up process providing good evidence of the sustainability approach that the local authorities and the community now use the BR as a major policy driver for environment, economic and social benefits.

The BR focus now is on social enterprise as a tool for creating local green economies. It has been a case study in the EuroMAB working group for a framework of Social enterprise in BRs. It now has a network of social entrepreneurs (SEND) http://www.socialenterprisenorthdevon.org.uk/ which it supports. Furthermore the development strategies for renewable energy and the woodland Enterprise Zone favour the development of social entrepreneurs.

The Partnership now has a new informal business engagement mentoring group that supports and advises the team on engaging business partners and getting the brand more widely used. They have

expressed an appetite to do more accreditation work with the Biosphere Reserve for social and environmental criteria.

5.5 ASSESSING THE EFFECTIVENESS OF THE STRATEGIES

It is challenging to assess the impact of the Biosphere Reserve on the overall economy of the area, given the other factors, national and international, that come into play. The overall metrics that have been used can be found in the State of the Biosphere Report. For considering the impact of the Biosphere Reserve metrics such as

- Numbers of business citing the Biosphere Reserve in their promotional information on their websites.
- Renewable energy installations and their output
- Proportion of energy used in the Biosphere Reserve coming from renewable sources.

We have used data from the water company on the volume of water consumption per household in the Biosphere Reserve as a measure of sustainable consumption.

5.8 CHANGES IN CULTURAL VALUES OVER THE REVIEW PERIOD

No major changes have been perceived over the last 10 years. However, there has been an increase in the interest in local foods, following a national trend. The Biosphere Reserve partnership has responded by producing a local recipe book and also recipe cards along with a national celebrity cook to promote the natural produce of the area.

Over this time we have seen a decline in the traditional and artisanal fisheries sector. This has been largely due to conservation measures or through much longer periods of demise. For example there is now only 1 licensed salmon netsman (aged 80 years old) and there is a very small number of traditional herring fishermen in Clovelly. This practice is a derogated fishery for herring where only sail powered boats can be used to catch the fish.

The BR has used the arts sector substantially in our work of engaging people in the debates about sustainability and celebrating culture. See the Logistic section for community engagement.

5.9 COMMUNITY SUPPORT FACILITIES AND SERVICES.

Working with schools.

Petroc College

The Biosphere Reserve team had established and run a “Sustainable development Module” as part of the foundation degrees in Human Bio-science offered at the local Higher and Further Education College (called Petroc). This ran for 5 years, but the main foundation degree supporting this has since

been reduced in budget. Over that period 34 students were trained in the BR and sustainable development to Batchelor degree level.

Petroc also offers further education courses and certificates for vocational training and special education needs. The Biosphere Reserve team works with the college to provide practical training in nature conservation site management.

The college also runs courses on sustainable construction and energy installation to provide a basis for upskilling the local construction industry.

As a result of the supportive work from the Biosphere Reserve, the college was a awarded a National Teaching Award for Sustainable Development in 2009

Bideford College:

This secondary school was in poor condition in 2002. Shortly after the designation of the Biosphere Reserve, a discussion with the school governors led to the school making a successful application to the UK Department of Education for "Special Science Status" using the Biosphere Reserve as a key driver for the status in 2004.

Following this success, the school also applied to a national "Schools for the Future" fund to rebuild the school completely. Based on its location in the Biosphere Reserve it requested to be built as a carbon neutral college. The Biosphere Reserve team were involved in the design parameters with recommendations for built and teaching facility features including outdoor laboratories, biodiversity rich construction and design. The school was rebuilt on site for a total of £55M and completed in 2010. The schools uses a mix of renewable energy technologies such as solar, wind and a woodchip biomass boiler using locally sourced sustainable wood. (http://bideford.devon.sch.uk/newschool/project.htm , http://bideford.devon.sch.uk/bid_ssc_what.htm)

Figure 24 Image shows the sedum roofs and the outdoor lab space. Source: Kingspan Benchmark.

Youth Enquiry Service;

Young people who have been caught breaking the law and have been given a community service sentence have been supporting practical projects. In the Biosphere Reserve in the local nature reserves and the long distance trails. Feedback from the supervisors of the young people indicated that they valued the meaningful work. In at least one case, the person continued to develop a career in conservation and contracting work.

North Devon Homes (NDH);

NDH is the social housing organisation for the area. We have an alliance with the charity to support their work on low carbon and energy efficiency adaptation to their housing stock. We have developed projects and funding applications with the charity and remain in close contact. The Biosphere Team developed 2 major projects for funding with North Devon Homes which were targeted towards training people in the more deprived area to gain employment skills in food growing and environmental management. Although the bids have not been successful, some of the elements have been taking forward including documenting the "Green Pioneers" as an inspiration to set up small environmental social enterprises.

Health in the Community

Abernethy visited the Biosphere Reserve during the studies towards her PhD on the health agenda in Biosphere Reserves. Through this paper, she evidenced the activity of the Biosphere Reserve for schemes such as "Walking for Health" and the educational links between the Biosphere Reserve and the Human Biosciences Foundation degree being taught locally.

5.10 INDICATORS TO MEASURE EFFECTIVENESS

Our state of the BR document uses national data sets to indicate how the BR is progressing. The nationally available indicators mean that we can benchmark with the rest of the region and the country.

Fuel poverty: this is defined as households spending over 25% of the total household income on energy. The reason the Biosphere Reserve area has such high fuel poverty is the lack of choice of efficient fuel and heating systems in the past. This is due to low availability of piped supply of natural gas leaving options for bottle gas, electric or oil fired heating systems. Another reason is the high proportion of old traditional buildings, which have been poorly insulated. We have been trying to tackle this with Energy Company Obligations payments to improve the insulation and energy efficiency. We are also exploring the access to cheaper alternative fuels through sustainably managed woodlands and community woodlands for woodfuel heating systems.

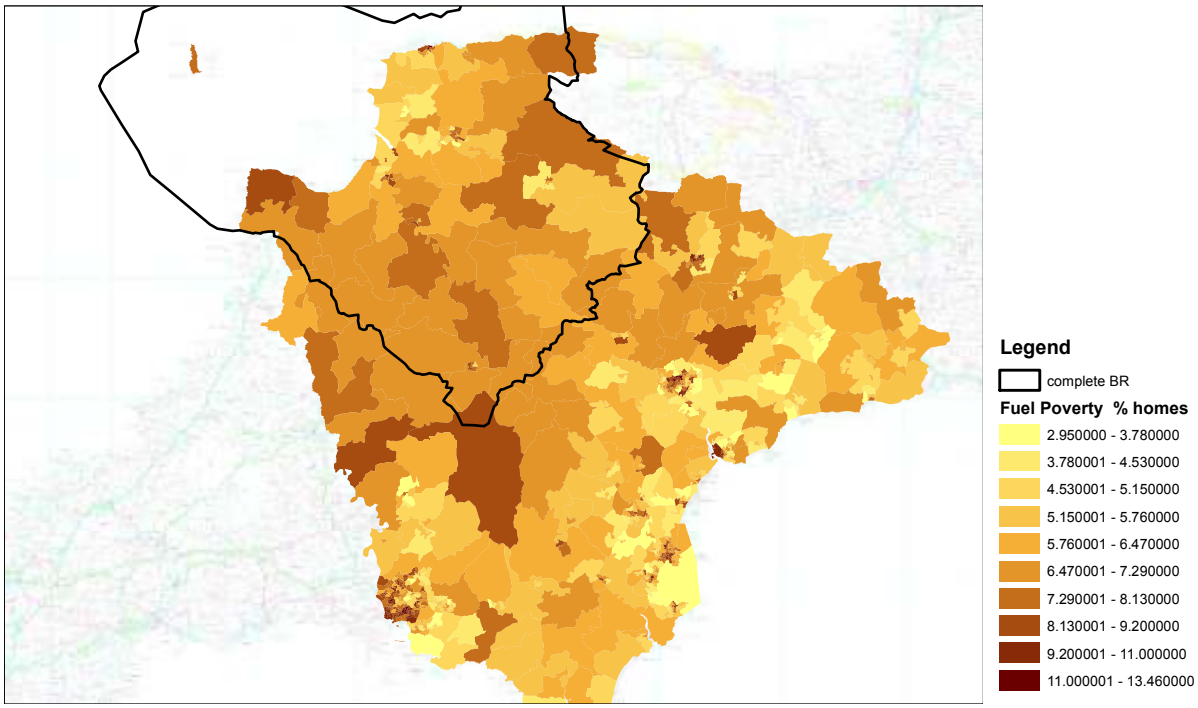

Figure 25 Indication of relative fuel poverty inside and outside the BR

Multiple Indices of Deprivation: These are government statistics normally at Lower super output area level, which presents a reasonable fine grain definition of geographic spread. The MDI is a compound indicator but the indices can be disaggregated into:

- Income (based on the number of families receiving government income support)
- Employment (number of people receiving any unemployment benefit)
- Health and Disability (based years of life loss from the average, morbidity, and mood or anxiety disorders)
- Education, Skills and Training
- Barriers to Housing and Services
- Crime
- Living Environment (indoor and outdoor)

The following GIS outputs from the 2010 Multiple indices of deprivation (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6871/1871208.pdf) give an indication of the relative condition of the community in and outside of the Biosphere Reserve. The data set provides a national series of indicators chosen by the Office of National Statistics. They give a good basis for comparison for places throughout England, however, being England specific, they do not provide a basis for comparison across the WNBR or even the UK.

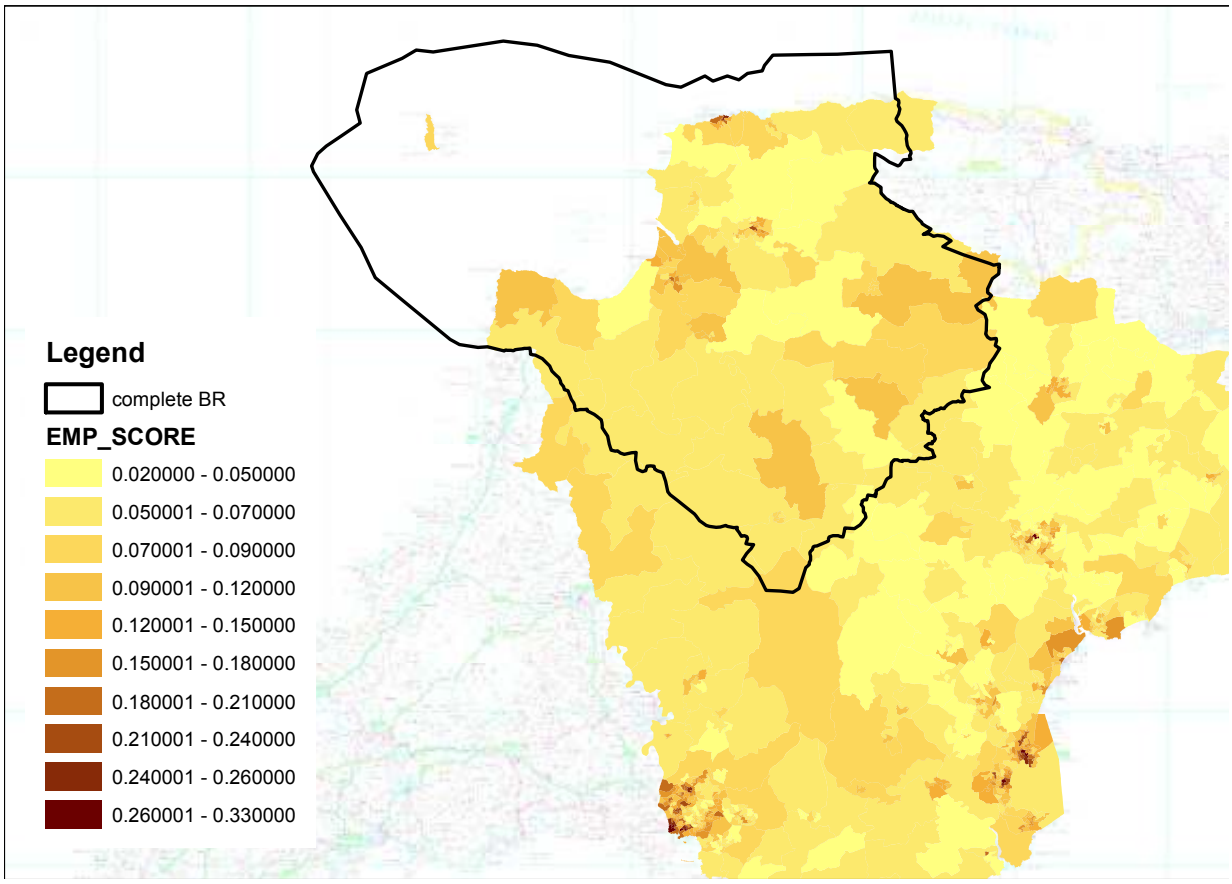

Figure 26 relative unemployment inside and outside the BR.

Figure 26 above refers to the levels of unemployment. Being a largely rural area people in the Biosphere Reserve tend to be fully employed, or seasonally employed through tourism. However, this masks the underlying problems of low wages.

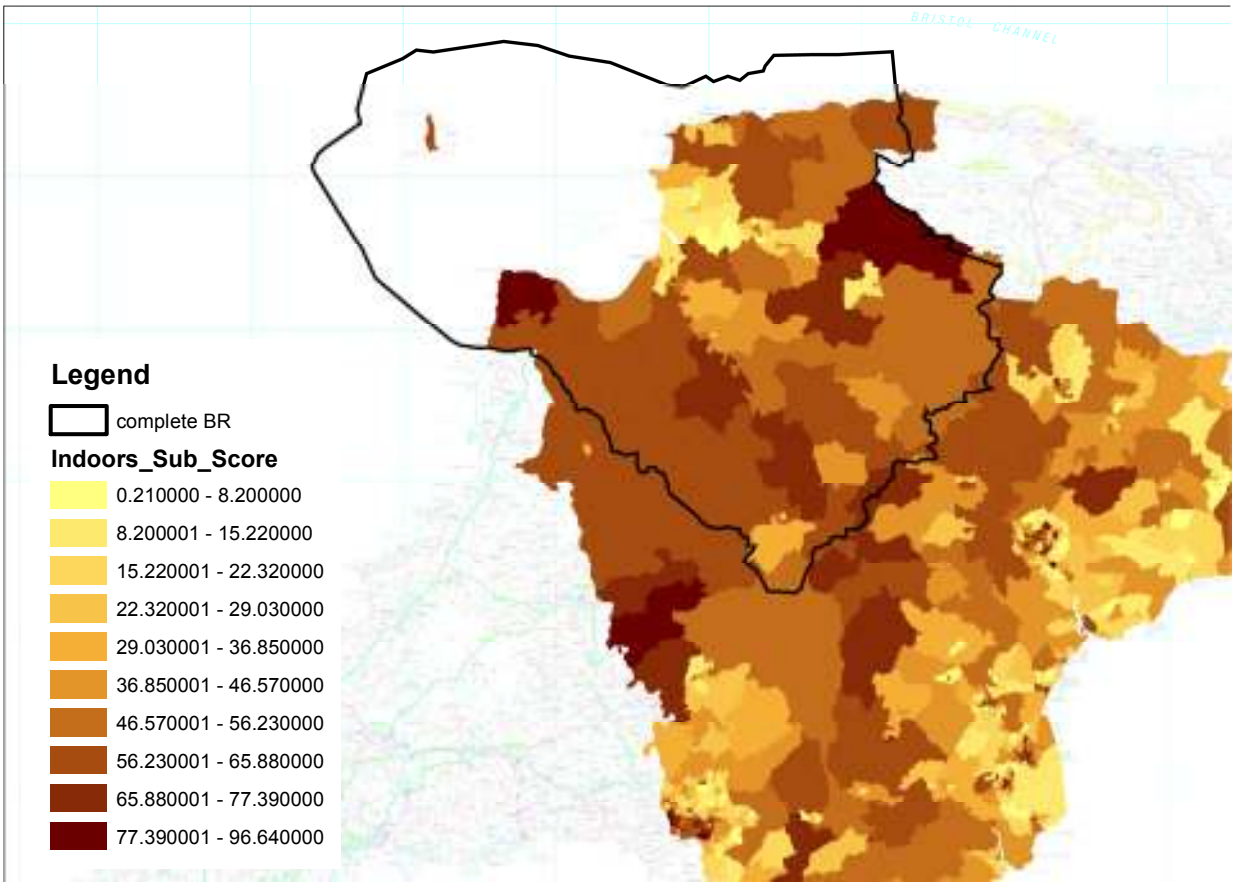

Figure 27 Relative score of conditions of indoor environment

The indoor environment refers to the condition of homes and the use of central heating systems. The housing stock typical of the North Devon area is traditionally built cob (mud) and or stone houses where retrofitting central heating is challenging and therefore expensive. One would expect that the combination of low income and traditional stock would lead to a low outcome on this indicator.

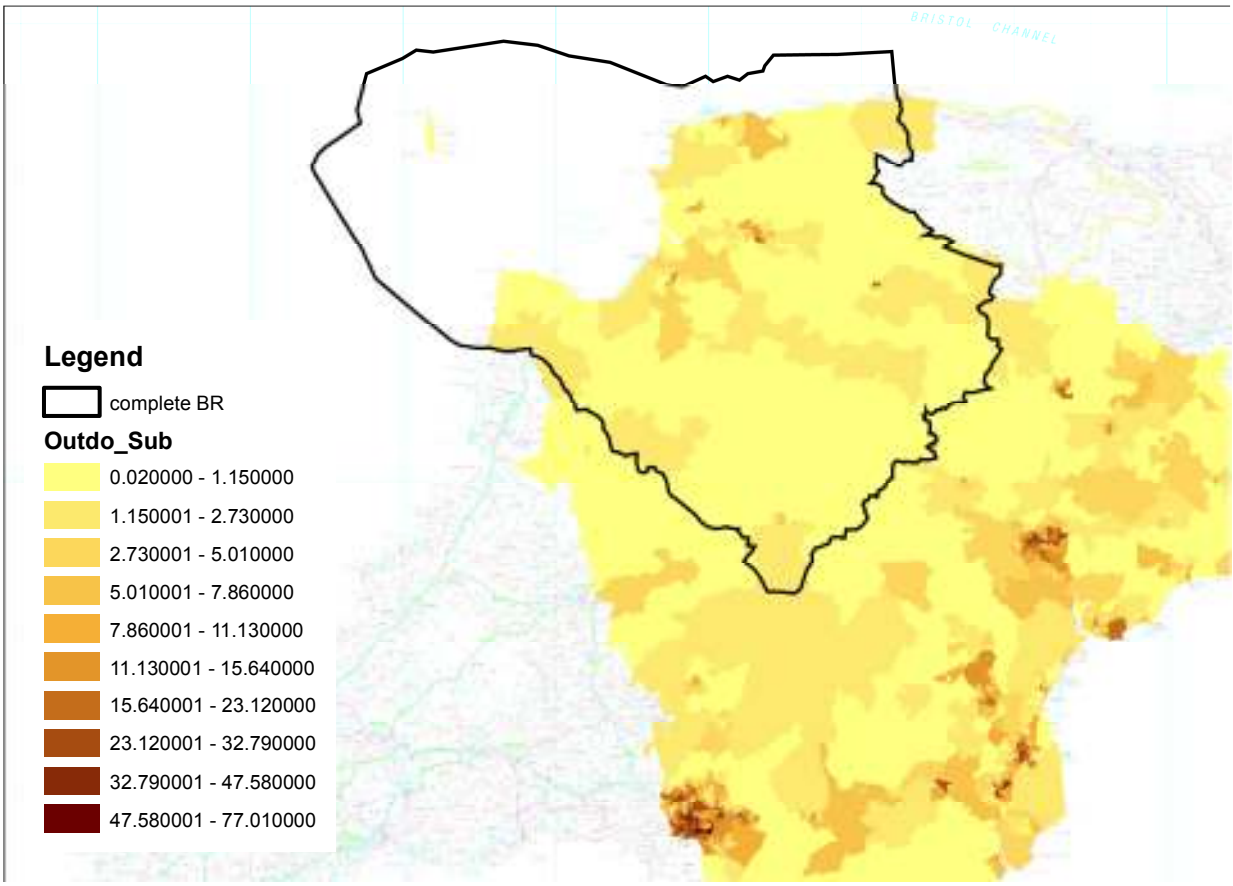

Figure 28 relative scores of condition of outdoor environment for wellbeing

From this data relating to outdoor environment (measured by road accidents and air quality) for the Biosphere Reserve communities is better than those in the south of the county. The clean air in north Devon was a key criteria for the investment of some of the medical and pharmaceutical manufacturing industries locating to north Devon.

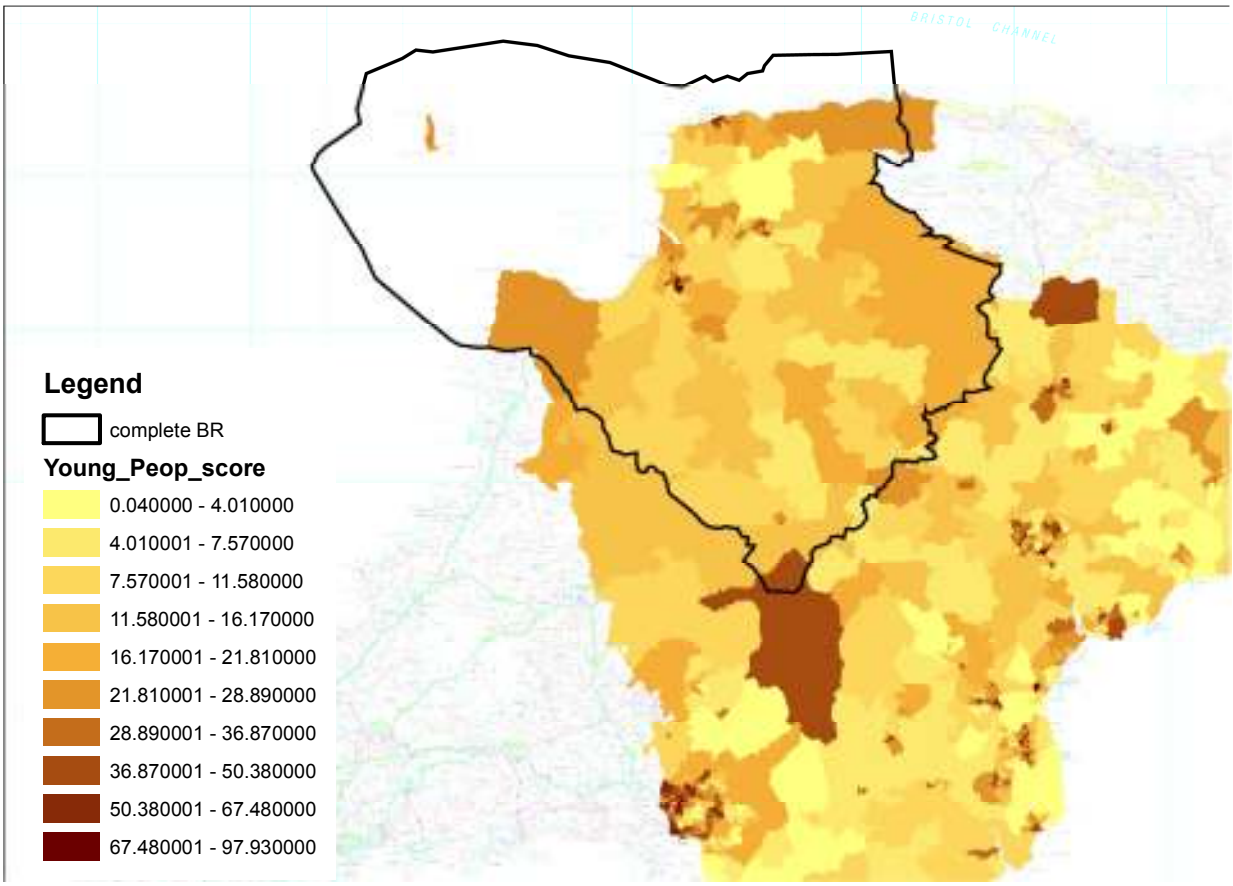

Figure 29 Relative index score for young people

The index for young people and children refers to the attainment at school and the attendance at training. From this we see that the rural communities in the Biosphere Reserve are more disadvantaged than the communities in the south of the county of Devon. This can be through rural isolation, through poor transport links. The new Biosphere Reserve strategy calls for better superfast broadband throughout the rural area to address these issues of isolation to improve business opportunities and improved equality in education and training.

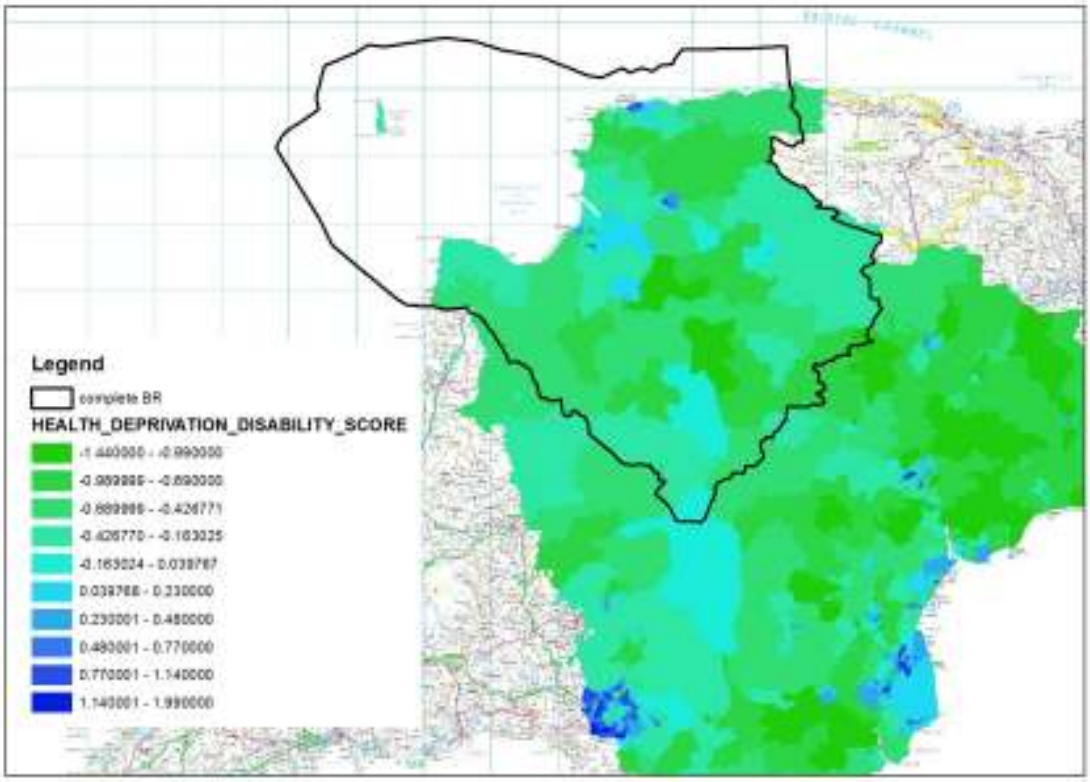

Figure 30 Multiple deprivation index score for health

The Health deprivation scores (based on changes of life expectancy, stress, illness and disability), over the area show a very mixed message. In the deeper rural areas, there is some enhancement of quality of life where as in some urban wards in the towns of Ilfracombe, Barnstaple, Bideford and Appledore/Westward Ho! there is a strong negative health measure. It is in these areas where the Biosphere Reserve team has been focussing efforts on "Walking for Health" and healthy eating a local food growing with the social housing charities.

5.11 FACTORS IMPACTING SUCCESS

Positives

- Long term presence, persistence. The Biosphere Reserve has shown its value in primarily the environmental field, however due to the dogged determination of members of the partnership and the team, the social sector sees the benefit of working with the Biosphere Reserve on projects.
- Grass roots working, dialogue with the community: Moving between the strategic and the grass roots enables the Biosphere Reserve to be responsive to the community needs rather than imposing.
- Credibility as the neutral broker...the "go to people" for information: Being a trusted source for information for people to come to
- Credibility to influence the local policies: The external support and confirmation of the UK National ecosystem assessment authors has given confidence for the planners to see the

merits in the approach. Furthermore the good evidence base and science we use gives confidence for the planners to use our information. This has resulted in the Local Development Plan supporting the Biosphere Reserve values and using ecosystem services as an approach to land planning.

- Can do attitude of the BR partnership and team: The team are very responsive to requests and look for the win-win solutions. This makes them approachable.
- Non-threatening dialogue...BR will not restrict business but support it and encourage it in the right direction. This enables us to have the dialogue with developers.
- Having a strong base within the local authorities: Much of the work and policy direction for the wider public comes from the local authorities. Have the team embedded in the authorities gives them access to resources, and the key people to develop policies, programmes and actions in an integrated fashion.

Negatives

- Poor understanding of what the BR is about: until now (and the new Biosphere Reserve branding guidelines), despite the best endeavours, people associate the Biosphere Reserve with large plastic domes or with only biodiversity. Although we can demonstrate a large range of actions that are not biodiversity, the
- So big we are invisible: The Biosphere Reserve has been used as a justification for many major grant and programme applications such as LEADER funds (2 rounds totalling £7Million, which have been spent on rural development projects), Fisheries Local Action Group (1 round £900,000) for fishing community adaptation. Catchment Sensitive Farming (c £1.2 Million per year). The fact that these happen over such a wide area means that people generally do not notice them despite all the press coverage we achieve.
- The 2008 economic collapse and public finance austerity measures are driving people back to old paradigms. This was clearly evident in the 2009-2015 LEADER 4 programme where a strong sustainable development approach was taken but this was then changed because the stakeholder of the Local Action Group felt that the economic crash was too severe to be very selective or demanding on environmental improvements within businesses.

6. THE LOGISTIC FUNCTION: OR KNOWLEDGE MANAGEMENT

6.1 RESEARCH INSTITUTIONS

The Biosphere Reserve has a research forum which meets more electronically than it does physically. This group agrees on research programmes and projects. Over the last 10 years the awareness of the Biosphere Reserve in its entirety as a good research platform has grown. The annual investment in the area through research has been estimated by our chairman is believed to be approaching £1M.

University of Exeter;

- Centre for Rural Policy Research for much of the work relating to Ecosystem services and how we use these in developing and implementing local policy. They lead on the research on sustainable intensification, food security measures, social issues on farming succession in families, and policy impacts on land-use.
- Geography Department: Collaboration on catchment management, soil management, and natural sciences aspects of land management and ecosystem services.

Rothamstead Research North Wyke

- Research council funded institute which has a well establish farm platform for researching in fine detail the impacts of different crop and management regimes especially for grasslands and soils, animal nutrition. They have also worked on pollution reduction measures and greenhouse gas emissions from soils.

University of Plymouth

- The university's main activity has been largely in the marine and coastal sector, though we have had terrestrial ecological support for some of the programmes. The Marine Sciences Department was our lead body for the Interreg Funded Marine ecosystem services assessment and decision support tool through the ValMER project. The university's ecology department hosted a PhD on grey squirrel impact on woodlands in the Biosphere Reserve and has established a good research platform for the continuation of the work.

University of West of England

- This university has several departments that have worked in the Biosphere Reserve. One of which is on coastal processes. As a result of the collaboration we often have MSc students studying the dunes in the core area. The more recent collaboration we are developing is with a researcher at the university on tools to monitor people's mental wellbeing as we develop projects for improving mental health using the environment of the Biosphere Reserve.

Plymouth Marine Labs

- A marine focussed research council funded body, recently produced a PhD on the ecosystem service trade-offs in the estuary against a hypothetical construction of a barrage for renewable energy.

Natural England

- Natural England is the government agency advisor for conservation of biodiversity. It therefore conducts and contracts monitoring programmes for compliance with the EU Habitats Directive and the domestic legislation on conservation.

Environment Agency

- Environment Agency is the government agency responsible for the aquatic environment, integrated pollution and prevention control and for flood and coastal erosion rick. They routinely monitor the condition of the environment. Their data is used in our monitoring framework

6.2 RESEARCH THEMES

(For each specific topic provide reference citations. Provide the full citations alphabetically by lead author at the end of Section 6 or in a separate annex).

Abiotic monitoring: There are 2 offical meteorological stations in the Biosphere Reserve, but over 50 informal stations that have fed information to the UK Metoffice and their data can be downloaded from the British Atmospheric Data Centre. These data have been used to interpolate regional climate models to assess the possible impacts on a finer scale. Water quality monitoring is carried out primarily by the Environment Agency under the Water Framework Directive. The monitoring also includes river gauges.

Biodiversity: British Butterfly Conservation, Plantlife, have led research into restoration and species recovery techniques for Marsh Fritillary butterfly and dune flora respectively. Natural England, the Biosphere Reserve team, Devon Wildlife Trust have also carried out research on habitat restoration and recreation for dune flora, saltmarsh and intertidal habitats, and Culm grassland.

Aquatic Biodiversity: Westcountry Rivers Trust supported by various universities have carried out research on the genotypes of salmon linked to specific river basins. Environment Agency has led research along with Natural England into the species recovery for the freshwater pearl mussel.

Marine biodiversity: Lundy has long been a centre for research on marine biodiversity. As the first Marine protected area in the UK, there has been over 40 years of monitoring and science on the site. Much of this work has been led by the Marine Biological Association, University of Plymouth, Swansea University, Natural England and the Devon and Severn Inshore Fisheries and Conservation Agency. Recent topics include; impact of no take zones on species recruitment, impact of management on conservation of features such as the Pink sea Fan, disease incidence on shellfish in and outside of the no take zone.

Coastal Processes: The Biosphere Reserve team has been an effective leader in increasing the understanding of coastal processes in the area. It has played a key role in the development and application of the shoreline management plan. Two important pieces of work were:

- a coastal evolution study for changes in the next 100 years, carried out by Professor John Pethick. The work from Pethick challenged the earlier preconceptions of the evolution of the north Devon coastline and provided a better level of understanding of why and how we can adapt as a community. The concepts taken from this work have also been applied to the likely changes to the coast of the Yucatan peninsula.
- A PhD by Ralph Brayne (University of Exeter) supported by the Biosphere Reserve on the understanding of pebble movements along the coast and threshold wave energies for boulder dynamics. This work has shed light on how mobile shingle ridges change over long and short periods of time.

Soil processes: This is largely the domain of North Wyke (part of Rothamstead Research). The institute has a farm research platform to explore and accurately monitor the impacts of various treatments. This group in conjunction with University of Exeter have taken our understanding of soil erosion and mechanics further and have carried out important work on the nitrous oxide emissions inventory for soils across the UK.

Food security issues: University of Exeter, North Wyke and the west Country Rivers Trust are leading a consortium on the concept of "sustainable intensification" and on the practical consequences it might have in an area. The research is in early stages but it is exploring the production mechanisms, different scenarios and also the social acceptability of such approaches

Catchment hydrology: Various independent and government agency research has looked at this aspect. A MSc thesis in 2009 created a lumped hydrological model for the area that explored land-use change stimulated by climate change and sociological responses. The results of that work have now driven the policy of the Biosphere Reserve for climate resilience and have been backed up by subsequent work by other researchers. University of Exeter Geography department have quantified the flood attenuation and sediment trapping functions of different habitats to prove the concept.

Ecosystem services: Various works have been done by University of Exeter and linking to the UK National Ecosystem Assessment exploring cultural and regulatory services. The ValMER project led by University of Plymouth used ecosystem services provided by the seabed and developed a decision support system using a Bayesian belief network to input into the model.

Forest pest research: There has been a recent PhD (still being finalized) on grey squirrels (*Sciurus carolinensis)* and the impact on forestry in the Biosphere Reserve. This is being supervised by the University of Plymouth. A new grey squirrel group has been formed to roll out the innovation in squirrel control for the area.

Social sciences on rural policy: The Centre for Rural Policy Research based at University of Exeter has used the area to explore the social aspects of the farming community, for example how information is exchanged, how practices have changed, the identification and role of key actors in the community, the challenges of succession (or lack of it) in family farms. The Centre also carries out policy research and attitudinal research within the farming community such as the use of citizen juries in agreeing the benefit sharing of ecosystem services.

Marine Fisheries. Whilst there are national agencies that will carry out fisheries relevant research (CeFAS and Defra), Plymouth University and in particular IFCA carry out participative research with the fishing industry on fisheries management. Current projects include Ray (Rajidae) and the migration

behaviour to identify an appropriate ICES fisheries management zone and confirm the voluntary seasonal not take zones applied by the fishing community.

Public Health and environment: This is still a theme in its infancy regarding Biosphere Reserve engagement. However there has been research relating to bathing water quality, healthy access to environment, mental wellbeing and access to the environment. We have forged links with researchers at the University of west of England who have developed apps for measuring individual wellbeing.

6.3 USE OF TRADITIONAL AND LOCAL KNOWLEDGE

The area is rich in traditional rural and maritime skills which have been kept alive through training programmes and passing on to interested groups. The local museum network in the area also provides a good repository of the information recorded directly and through video and audio recording of the traditional people.

Figure 31 Volunteers learning traditional hedge-laying skills

Popular subjects are:

- Traditional building techniques such as cob and thatch; delivered
- Tradition Devon Hedge construction and hedge laying; delivered by the Biosphere Reserve team and the Devon rural skills trust. The skill is still used commercially and is kept alive by regular competitions.
- Woodland management; through the Bulworthy Project (http://www.bulworthyproject.org.uk/) where traditional woodland produce are made and demonstrated regularly in first person
- Traditional Fishermen's knitwear; Appledore village had a tradition of different knitting stitches for fishermen's family's jerseys; primarily to make it easier to identify of a body if it was washed up on the shore. This has been documented by the local museums
- Traditional recipes: these are promoted through locally distinctive food projects, the recipe book published by the Biosphere Reserve and recipe cards.

The locational knowledge of the fishermen has been very useful in identifying the best sites for marine conservation. This has been captured at meetings through mapping and interviews.

6.4 ENVIRONMENTAL/SUSTAINABILITY EDUCATION.

Development of specific learning resources: These resources reflect the ethos of the Biosphere Reserve by bringing together different themes and subjects, and integrating them through a focus on sustainable development. These curriculum resources have been developed with expert advice and with the involvement of school teachers and other practitioners.

People and Environment: Developed by Devon Curriculum Services in partnership with teachers and pupils, this is a suite of learning and teaching materials for primary schools focused on North Devon's Biosphere Reserve - its past, present and future. They have been written to the requirements of the English primary curriculum and have been planned to make creative and challenging links between Citizenship, History, Science and Geography at Key stage 2 level. They encourage children to consider how the Biosphere and its people, economy and culture has changed in the past, is still changing today and the challenges of sustainable development that await in the future. They are based on nine "Key Questions", for which schemes of work and associated enquiry based learning materials have been developed. The process takes the child through the stage of learning:

- “in the biosphere”, understanding that they live in the Biosphere Reserve
- “about the biosphere” what is special about where they live
- “for the biosphere” what they can do as active citizens in support of the Biosphere Reserve

All schools in the Biosphere have access to the Resources through the internet for a small fee (£50), and since 2010, 21 different primary schools have used them.

Nature Works: Developed through the northern Devon Nature Improvement Area project (2012-2015), this teacher's pack contains a scheme of work with 3 lines of enquiry, plus a resources section full of materials to help support your work in schools. The pack is aimed at KS1 & 2 with ideas suitable for work at KS3 and upwards. The pack is available on CD and has been sent out to schools within or near the NIA (about 45 schools altogether). The curriculum areas covered include arts and sciences, geography and geology, storytelling and environmental art as well as Earth Education and environmental education activities.

Foundation Degree in Sustainable Development: Developed in partnership with the Biosphere and taught by the Biosphere Manager, this course uses Biosphere examples from North Devon and around the world to support the teaching of sustainable development theory. The Course is taught at Petroc College in Barnstaple and forms part of a Plymouth University degree.

Foundation Degree in Animal Conservation: This course is part of a Plymouth University course and is taught at Petroc College in Barnstaple by a Biosphere volunteer. 2015 is its first year and the students will use undertake some field work on Biosphere projects.

Other education activities: As well as developing specific resources to support formal education the Biosphere works with partners to provide and support Biosphere activities for schools, usually as part of particular Biosphere Projects.

‘Giants in the Forest': This national project combines art, technology and the natural environment to inspire people to think about their surroundings, how they are changing and their place in shaping that change. As a result of attracting the project to North Devon in 2012, three giant wicker heads festooned with growing native woodland plants have been hoisted into place into trees overlooking the River Torridge on the Tarka Trail near Torrington. As part of the Biosphere’s Nature Improvement Area Project more than 200 pupils from 7 primary schools used the Giants as inspiration for creative writing about the area's high quality environment. In spring 2014 another 220 pupils from 8 primary schools did the same. http://www.northdevonbiosphere.org.uk/giants-in-the-forest.html

‘Confluence’: Confluence is an arts, technology and environment project being delivered by Biosphere partners Beaford Arts, University of Plymouth's i-DAT (Institute of Digital Arts and Technology), the North Devon Biosphere Foundation and Appledore Arts. During the project four partners and 8 schools worked with four professional artists to develop new art work about places alongside the River Torridge - one of the flowing green arteries that links the inland moors and farmland with the coast. They used environmental data collected live by i-DAT's devices called ECOIDS to create new art works. http://www.northdevonbiosphere.org.uk/confluence.html

Responding to Nature: This is an educational project run by Beaford Arts in the northern Devon Biosphere in Autumn 2014 as part of the Northern Devon Nature Improvement Area (NIA) Project. The project has worked with communities and schools to encourage creative responses to their emotions about being in nature. Those responses are uploaded and shared via a project website. http://www.beaford-arts.org.uk/index.php?id=420

Schools have also been involved in various smaller scale events and activities such as:

Eco-Schools Programme: This is a national scheme aimed at greening the way that schools operate. In the past we had supported the schools seeking to have Eco-school accreditation with biodiversity rich schools grounds, waste and energy efficiency, and a good environmental curriculum.

By comparing the number of schools inside and outside of the Biosphere Reserve with EcoSchool Awards, we can see that the Biosphere Reserve has had an impact.

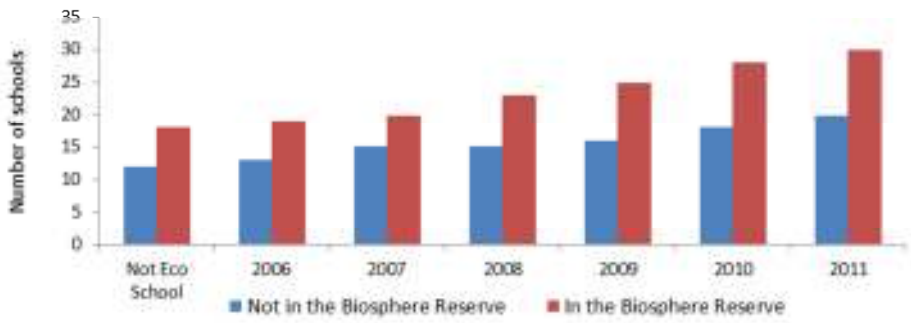

Figure 32 Schools participating the EcoSchools programme

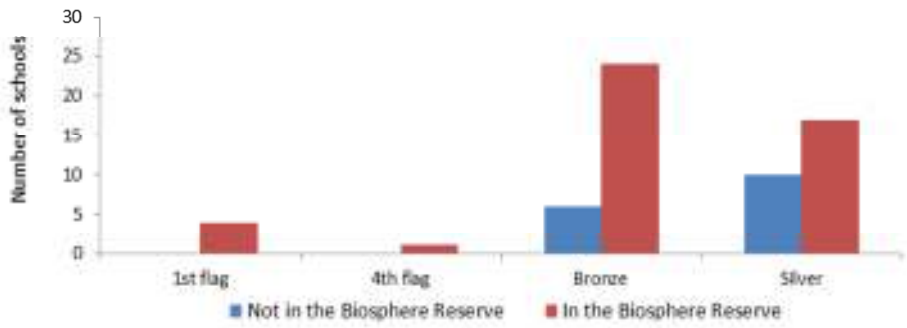

Figure 33 Schools attaining different award levels in the ecoschools programme

2014 Bioblitz (https://www.youtube.com/watch?v=poFxaiz2W-Q#t=23) was organized by Coastwise, a local community NGO committed to increasing awareness about marine wildlife. This project maximised the use of specialists and public over 24 hours to make as full an inventory as possible for the Woolacombe area.

Facilitated visits to places that engage them with nature in a positive way (what Biosphere's are all about). Three short 3 short films produced through the Biosphere's Northern Devon Nature Improvement Area Project illustrate the range of ways communities have been engaging with the nature on their doorstep

Children from Langtree interviewed older residents about their memories of wildlife, nature and farming. This information helped form the basis for practical wildlife action in which local children helped make decorated bee hotels which were then positioned in the school grounds and in support of wildlife in the local churchyard.

E.g. Meeth Nature Reserve where a film was made of a winter walk with children from the Messy Meeth Monkeys community group. It helps show the benefits to our health and wellbeing from getting outside in nature - regardless of the weather and the time of year.

E.g. Torrington Common: his short film helps explain the work of the Torrington Conservators who oversee one of the Northern Devon Nature Improvement Areas largest accessible green spaces.

CITIZEN SCIENCE AND TRAINING

The Biosphere has, in partnership with the Northern Devon Nature Improvement Area Project set up a Riverfly Monitoring Scheme. This is part of a national citizen science programme through which volunteers monitor the insects and other invertebrates living in the Rivers and streams of the Biosphere's Torridge catchment as part of a process to keep watch on their ecological health. http://www.northerndevonnia.org/the-riverfly-volunteer-network. We also have other community groups monitoring their local water quality in response to developments they did not trust, such as zero grazing regimes.

The Biosphere has also encouraged schools and volunteers to participate in the UK's national OPAL (Open Air Laboratory) citizen science scheme.

Skills training: The Biosphere, on its own or in partnership with other organisations has in the last decade organised many events to provide training in traditional rural skills that are fast dying out such as hedge laying, stone faced hedging, orchard management, apple juicing and charcoal making. These are usually of interest to people post retirement. E.g. http://www.northdevonbiosphere.org.uk/news/traditional-hedge-craft

USING THE ARTS AS A TOOL FOR ENGAGEMENT AND FOR LEARNING

In North Devon we have had the benefit of a great partnership with the arts sector specifically with Beaford Arts (http://www.beaford-arts.org.uk) which is a rural arts organisation based in North Devon Biosphere. The approach has been that we can use art as the key to open the door with people to start the conversation about sustainability.

Past projects have included:

Figure 34 Images of Art in the travelling landscape 2002

Art in the travelling landscape: a millennium funded project which installed a range of artworks along 40 km of the Tarka Trail Cycle Way to encourage people to explore the route and the villages close to the route. Working with 4 lead artists a set of artistic way-marking posts, shelters and seats were installed that resonated with the landscape in which they were placed and drawing attention to the cultural stories of the location.

Figure 35 Images of artistic solutions to increase public access to the environment. 2005

Art in the Landscape: a project designed to deeply involve the community to encourage them how they might access the landscape more regularly. These included a project on how to light the cycle route leaving a village that add a sense of safety for the users. The challenge was that too much light would disturb the flight routes of the Greater Horseshoe Bats that used the cycle route as feeding corridor. The result was gently illuminated text columns which displayed scrolling text updated regularly by the local school from subjects in science, geography or poetry, etc.

Another set of works in this project encouraged people to spend more time by the local wetlands. The artists installed special picnic benches and earth works and a sunken platform into the small lake that gave the people a duck's eye view across the water. This is now one of the most regularly used sites alongside the Tarka Trail.

The Revilious Archive is the set of images taken by James Revilious, a local photographer, in the 70's and 80's who famously documented rural life in north Devon. Beaford Arts as the custodians of the archive has worked with the Biosphere Reserve to use the images as a way to get people to consider the changes in the area.

Figure 36 The Confluence Data Ecologies project: Images courtesy of Antony Lyons.

Figure 37 The Confluence Data Ecologies project: Images courtesy of Antony Lyons.

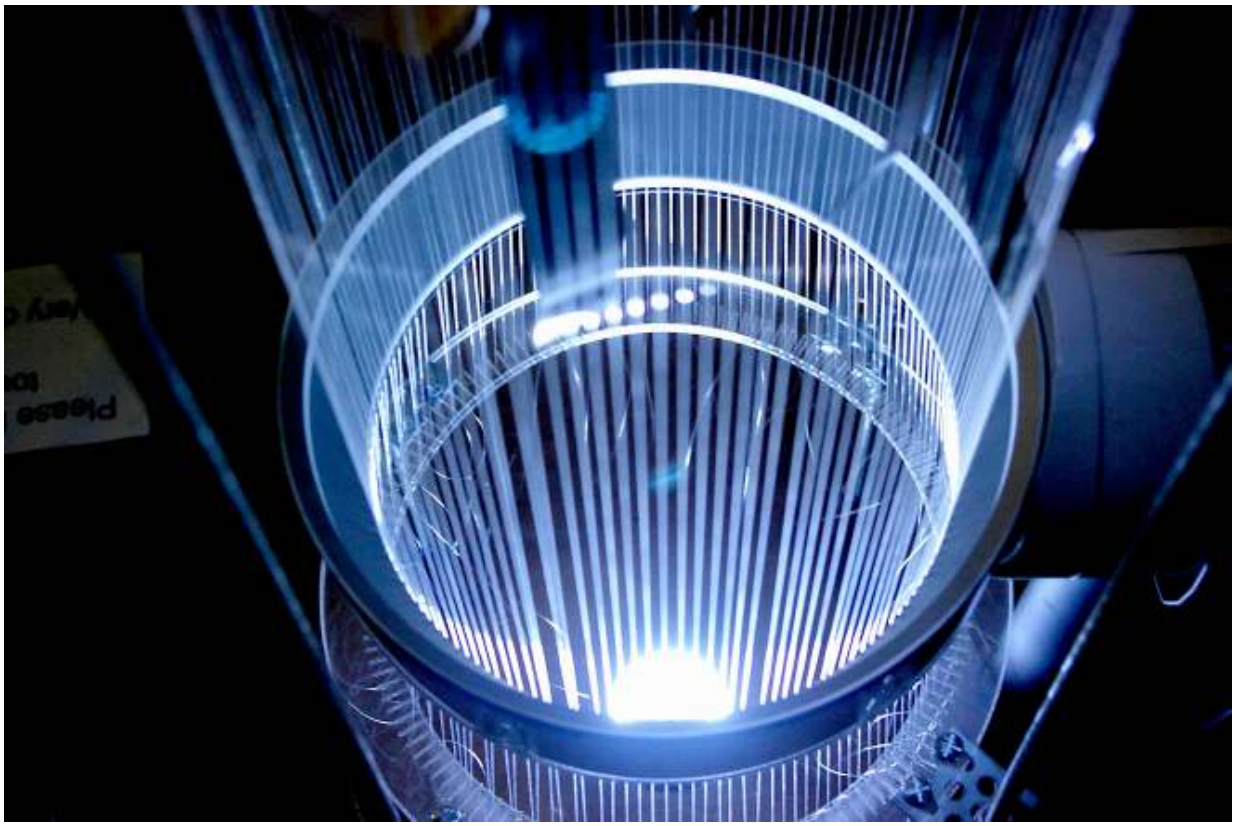

Figure 38 The Confluence Data Ecologies project: Images courtesy of Antony Lyons.

Confluence was a trans-disciplinary project working with 4 lead artists embedded in the 5 local schools. The project worked with the Plymouth University Institute of Digital Art and Technology, Beaford Arts and the Biosphere Reserve Foundation to deploy a range of new digital loggers to record patterns in the environment. Schools and the public could log into the website and witness the visualisation of the data being gathered in real-time to stimulate thinking about the connectedness of the parameters. The artists also developed their special projects which explored:

- The behaviour of bats around a local school
- Underwater noises around the Biosphere Reserve
- The behaviour of tides in the estuary
- The human physiological response to changes in the landscape as one walked through the Biosphere Reserve

The works were presented in an exhibition which also included a virtual reality dome projection of some of the works. The project culminated in a seminar at Plymouth University on the use of digital information and data visualisation.

Beaford Arts have also used their education outreach in some of the research for the value and response to the cultural ecosystem service provision in the area by documenting the artistic response of the children when taken to different locations. This work was supported by University of Exeter.

Figure 39 Map and responses from children's visit to their environment. Courtesy of Beaford Arts

Beaford have also commissioned theatrical works using the environment to provide a superb setting. However the most impactful theatre work was a play called " the Common". This was a series of mini-plays which raised the discussion about putting a value on ecosystem services, without being judgemental about the rights and wrongs of such a paradigm. The play was a sell-out in each of the performances with excellent follow-on discussion from the audience about the subject.

Feedback from the audience:

"An inspiringly insightful piece of contemporary theatre with important messages for our collective future – we ARE the land."

"Very thought provoking – take it to Westminster!"

"Brill! Sock it to Whitehall."

"Great performance, loved the weaving together of those authentic words."

"It was a triumph. Full of admiration for the performers. Very moving and you got the Devon nuances."

"Thought you were brilliant from many aspects! Loved the auction running through – the humour and the very many different relevant points of view. Really has made me think more about this. Great writing, great acting and liked the way you used the whole hall and audience! Thank you for a memorable Friday night!!"

Source: Beaford Arts.

We can only conclude that engagement through arts is a critical tool for the success in conveying accessible messages and provoking the conversation about people and their connection to nature.

6.5 ASSESSING THE EFFECTIVENESS OF THE STRATEGIES?

The formal learning resources are linked to the formal education assessment and monitoring processes within schools, so schools that use them can gauge their effectiveness in contributing towards set curriculum targets and children's developmental progress.

As the Biosphere, we encourage practitioners using these resources to provide feedback to us about how they are using them and how effective they think they are.

For less formal activities involving schools , we encourage outcome monitoring of the activities – measuring the children's understanding of the concepts being covered before and after the activity. For many projects/activities such as the Giants in the Forest, Responding to Nature and the Three Short Films, we have tangible outputs such as stories, pictures and videos of and by the children.

In terms of indicators, we look at the number of schools that use resources and take part in activities and the number of children and young people they effect. We monitor the number of volunteers involved in projects such as Riverfly and the numbers that attend events such as the Bioblitz.

It must be remembered that the Biosphere itself does not employ any educational specialists, and works through experienced and qualified partners. The willingness of partners to be involved with the Biosphere on educational activities is an indication of how we are doing, our profile and our effectiveness.

The biosphere reserve's main internal and external communication mechanisms/systems

<u>Internal:</u>

- Partnership meetings – partnership members receive papers, agendas and minutes and have a responsibility to pass matters of interest onto their 'constituents'
- Our website is a crucial communications channel.
- Some of our host/core funder bodies have internal communications systems such as regular newsletters to staff or elected members. We try to include Biosphere information/updates on those.
- Face to face meetings with local elected members or appropriate committees, trade bodies etc.
- Biosphere's regular e-newsletter to 'signed up' supporters (just over 700 of these)
- E-mail

<u>External:</u>

- Social media – twitter (at time of writing, 271 followers and following 126) , Facebook (1144 likes) and You Tube
- Face to face meetings with other organisations, individuals and groups that share an interest with the Biosphere.
- Face to Face meetings with local community groups to share information and knowledge
- Local media – Press releases resulting in local and sometimes national coverage in the printed and broadcast media. Recent examples of TV coverage include "Escape to the Country", BBC Points West about the Nature Improvement Area and the TVE Earth Report film, Rising Tides. Recent radio coverage has included BBC Radio 4s "Any Questions" and BBC local radio coverage of the Biosphere's glow worm survey and Life's Journey Project.
- E newsletter
- Events – volunteer events, shows etc. Some of these are one–offs, others are more regular such as the Biosphere's presence at the local agricultural shows

Our Biosphere Reserve website is: www.northdevonbiosphere.org.uk

Our monthly newsletters can be found on: http://www.northdevonbiosphere.org.uk/biosphere-newsletters.html

Our twitter and Facebook accounts are: NDevon Biosphere (@NorthDevonB10) and

https://www.facebook.com/NorthDevonBiosphere

6.6 CONTRIBUTION TO THE WORLD BIOSPHERE RESERVE NETWORK

Since the enlargement of the Biosphere Reserve in 2002, North Devon has been leading, encouraging and supporting the other serves in the UK to go through a re-nomination process, or alternatively for those sites which cannot achieve the functions of the designation, to withdraw. The result is that the UK now has 4 fully functioning Biosphere Reserves and will hopefully have another enlarged site in Scotland and hopefully another brand new reserve on the Isle of Man.

We have led collaboration projects between the Biosphere Reserves such as the "Giants in the Forest" project. We are also keen to draw on the lessons from the other UK sites on their more recent nomination and governance processes to keep ours efficient.

Regionally the Biosphere Reserve has been an active member of EuroMaB since 2005 in organising the events and leading on working groups as well as presenting papers. As a result of this we have good but informal relationships with Iroise in France, Kinekulle and Lake Vanern Archipelago in Sweden, Frontenac Arch and Georgeham Bay in Canada.

More recently this Biosphere Reserve has led a bid for an Interreg Project with Brighton and Lewes Downs Biosphere, and the Audmarois Biosphere Reserve in France.

On the global scale North Devon has supported work in Baa Atol, Noosa, Great Sandy with exchange of information and exchange of movies for example with Noosa. On a more fundamental level the Biosphere Reserve has work with East Usambara Mountains in Tanzania, Amboseli in Kenya and very recently in Cu Lao Cham-Hoi An in Vietnam.

In 2008 North Devon Biosphere Reserve developed a twinning arrangement with Malindi Watamu in Kenya. The supporting activity continues through the Watamu Marine Association which is a community body that supports the development of the community in association with the Biosphere Reserve on focus areas of marine conservation, marine tourism and marine pollution reduction. Other work that we have done in the Malindi-Watamu Biosphere Reserve is a pre-feasibility study for projects on Reduced Emissions from Deforestation and Degradation. We are in the process of seeking funds to support the extension of the Biosphere Reserve in Kenya to include the Arabuko Sokoke Forest as a supplementary core area in association with the Kenya MaB National Committee.

Benefits of cooperation

Cooperation at the UK and EU level brings benefits to the Biosphere Reserve and the network through

- Raising visibility of the Biosphere Reserves and the MaB Programme generally, having common purpose and shared identity to give communications the "critical mass" to have an impact. A clear example of this is in the Interreg Manche programme area, where there are 4 Biosphere Reserves, the UNESCO sites have specific mention within the programme and highlighted for funding activity. This could not have happened if there were only one.
- Sharing of expertise and knowledge between the sites.
- Development of collaborative projects, particularly within the EU for projects such as Interreg. These have been particularly exemplified in the ValMER project where cooperation with the Mer d'Iroise Biosphere Reserve is leading to new collaborations potentially around seal conservation and management around fisheries.

Through thematic network collaboration in EuroMaB, this Biosphere Reserve has been active in the development of the Framework for Social Enterprise in Biosphere Reserves and in the development of a Canada based International Centre for Rural Sustainability.

Anticipated future WNBR collaboration

EuroMAB: Through working on the different work groups for river basin management, social enterprise, the centre for rural sustainability.

Coastal and Island Biosphere Reserve Network: this network is facilitated through UNESCO HQ in Paris. We hope to fully engage with this network and share our experience in fisheries, marine conservation, climate change adaptation and sustainable coastal tourism.

Twinning with Malindi-Watamu: we fully expect this to continue and increase as we work with the local stakeholders on the proposed extension.

Through our strengthened research group, we anticipate collaboration on an EU level with Horizon 2020 as a research fund and further afield on thematic areas such as food security and land management.

6.7 CRITICAL LESSONS IN THE LOGISTIC (KNOWLEDGE MANAGEMENT) FUNCTION

Positives:

- “UNESCO” is a strong and attractive brand that helps to start a conversation
- Sometimes the brand is not important, being recognised for what you do is. E.g. providing the information, the education packs and training is valued.
- Using the arts as a medium to engage people is invaluable
- Research groups take a little time to re-orientate towards a new Biosphere Reserve. They will have been following a particular line of investigation for some time, to expect them to switch tracks and focus area can take time. The investment in the Biosphere Reserve research is now quite impressive, but it has taken time and investment from the Biosphere Reserve team to achieve this.
- Social media is a huge asset to work with, but it takes a new knowledge on how to use it effectively.
- Buying into other people’s brands as well as them buying into yours. Employing a communications person specifically for our B10 (10 years of the Biosphere Reserve) was particularly effective. Through social media the contractor was able to work with regular event providers to re-brand their events as being in support of the Biosphere Reserve and even launch a special brew of Biosphere Beer.

Figure 40 Launch of the B10 beer with TV celebrities (and others) (source, Western Morning News. http://www.westernmorningnews.co.uk/Celebrations-Biosphere-Reserve-s-tenth-birthday/story-19190972-detail/story.html)

Negatives:

- The Biosphere Reserve concept has (until the work on the EuroMaB communication group) been a challenging concept to sell to the normal person in the street. It has been seen in some lights negatively "as all things to all people", where ironically it is the holistic and or integrated approach that this the unique selling point of the Biosphere Reserve concept.

SCHEDULE OF RESEARCH IN THE NORTH DEVON BIOSPHERE RESERVE FROM 2002 TO 2015

This is the results of search of the published research in or relating to the North Devon Biosphere. Some are done and supported by the Biosphere Reserve partnership; others are carried out independently but are useful to our understanding of the area.

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7. GOVERNANCE, BIOSPHERE RESERVE MANAGEMENT AND COORDINATION:

7.1 TECHNICAL RESOURCES FOR MANAGING THE BIOSPHERE RESERVE

The partnership works in a collegiate manner with the various agencies in the area. Whilst most of the technical management is provided through the Biosphere Reserve coordination team, other agencies provide other technical services as projects demand. For example these might be on coastal engineering, highway and safety management, technical planning law, water quality and environmental science from government agencies and NGOs.

The Biosphere Reserve team now consists of 4 permanent people.

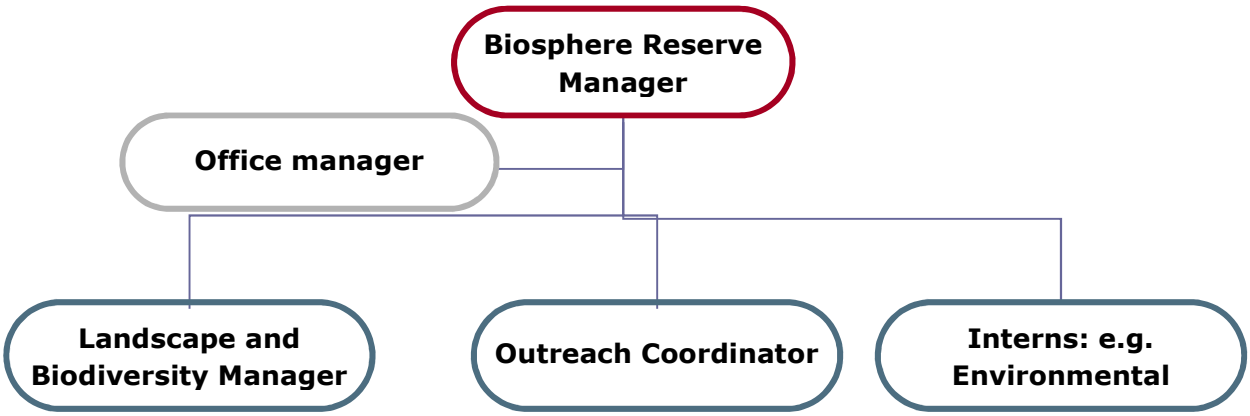

Figure 41 Structure of Biosphere Coordinating team

Biosphere Reserve Manager; Dealing with governance and coordination and special areas of interest such as marine work, climate change, planning issues, forestry, economic development and catchment governance.

Outreach Coordinator: responsible for communications, education and community based projects, adding value to sustainable tourism assets

Landscape Biodiversity Manager: responsible for catchment management sensitive farming, biodiversity planning, community based local nature reserves and landscape features

Office Manager: dealing with logistics of the team, website and social media management.

There are also long term volunteers and interns that work with the team who have successfully supported the marine work, tourism development, surveying and data management.

When the Biosphere Reserve was originally established, the team was also responsible for managing “assets” such as the Tarka Trail and the Southwest Coast Path. The required having a large team initially that was then gradually replaced with an outsourced contracting system. The asset management function of the team is now managed by the Highway Authority. However the Biosphere Reserves team is still responsible for securing the “added-value” derived from those assets. The Highway Authority still reports to the Biosphere Reserve partnership on the management of the assets.

The coordinating team has a funding executive that directly ensures that the team are appropriately funded provide a host employment; currently through Devon County Council. The team is hosted under the authority; it is not directed by the authority, the group serves the partnership.

7.2 GOVERNANCE FRAMEWORK.

There is a formally constituted partnership that oversees the Biosphere Reserve. The partnership is not a legal entity. It is made up of 28 organisations and community representatives covering all disciplines of the Biosphere Reserve. It meets 3 times a year and is responsible for the overall direction and strategy of the Biosphere Reserve.

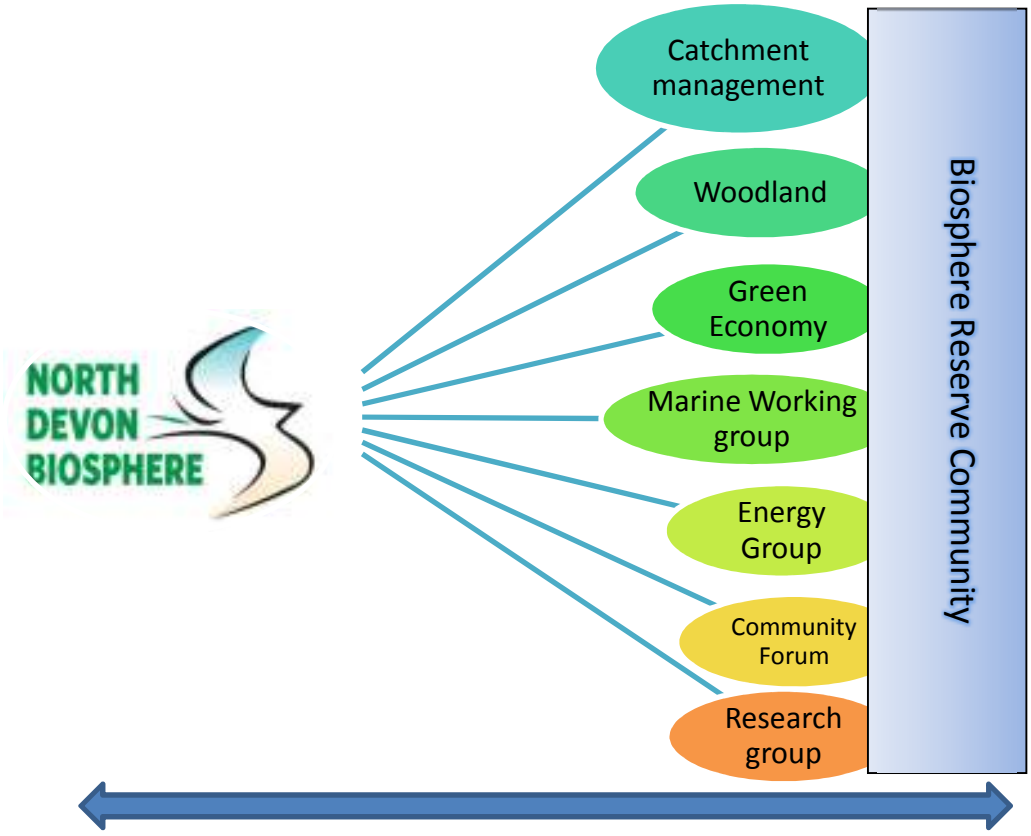

Figure 42 Structure of Governance of the North Devon Biosphere

The partnership is serviced by working groups which may in-turn oversee project delivery groups, chaired by people not in the Biosphere Reserves employed team; these are

- Catchment management; for the catchment related strategy and for initiatives such as catchment sensitive farming and biodiversity planning
- Forestry board; dealing with forest programmers including the Woodland Enterprise Zone
- Community Forum; designed to network with community based organisations and to develop programme in response to community needs
- Marine Working Group; responsible for MCZs and marine management initiatives

- Green Economy group: made up of cross sectoral local business leaders who are supporting environmental efficiency and Biosphere Business Charter
- Sustainable Energy Group; responsible for the Sustainable energy action plan and its implementation
- Research Group: a forum for agreeing the research themes in the Biosphere reserve

The membership of the groups extends beyond the membership of the management board and therefore collectively has better community and expert reach. There is a reasonable gender balance in the area and the partnership reflects this gender balance.

The partnership board includes:

- Local authority elected and technical officer representation
- Government agencies: (Forestry Commission, Environment Agency, Natural England, Ministry of Defence)
- Local Agencies: (Inshore Fisheries and conservation agency, National Parks, AONB)
- NGOs: (Such as Wildlife Trusts, Rivers Trusts)
- Parish Council representation (there are 154 parishes/communities in the Biosphere Reserve, therefore representation is via the Association of Parish Councils)
- Cultural interests (Rural arts organization)
- Local Fora (Taw Torridge estuary Forum, University of the 3rd Age, Coastwise)
- Commercial Interests (Chambers of Commerce, National Farmers Union, Tourism sector, North Devon plus)
- Local community representatives
- Experts (landscape, heritage)
- Local Members of Parliament

The thematic groups, as well as including members of the main partnership board include relevant stakeholders, individuals and communities. Some of those groups, the forestry and the catchment management group in particular have community reference groups that have assisted in their planning and implementation.

7.4 CONFLICT MANAGEMENT

There are conflicts over various issues:

Renewable Energy and landscape; such as wind turbines and solar arrays. The conflicts are often between developers and the very local community interests or with specific interests such as protected landscape areas.

Fisheries and marine conservation: whilst this is often perceived as a conflict area, in reality the area is fortunate to have a community of fishermen who are largely supportive and indeed proactive in conservation measures.

Development and environmental conservation: The development can be farming or forestry practices or the usual urban development. It is normal for the various groups to work through the issues and seek solutions.

Land-use and resource management: there are frameworks for dealing with some of the resource issues. For example water is dealt with under the water framework directive. In these cases the Biosphere Reserve can set up the meetings and groups to find the solutions to the issues such as maintain minimum ecological flows in the rivers. The groups also use advanced participatory planning for various land-uses such as spatial planning for connectivity, or supporting the Catchment Abstraction Management Plan development.

The partnership provides a mechanism for the agencies government and non-government to come together and work on shared solutions. For example, the Biosphere Reserve has been a test area for how the government agencies sponsored by the Department for Environment, Farming and Rural Affairs can collaborate and share workloads rather than compete or duplicate effort.

Quite often the conflicts may be imposed from national requirements. In these cases the community often some to the Biosphere Reserve governance to find ways to mitigate any damage as much as possible.

The tools for conflict management include:

A good evidence base for the issues; such as energy needs, impacts of various measures and working with the stakeholders to gather that evidence so that is has credibility to all partners

Creating and communicating position statements so that the process is transparent. An example was the proposed offshore wind turbine array, which was scheduled to cover over 200 sq. km and be the largest in the world when it was complete. The issues were over sea-scape and the economic impact on the fisheries of the area as well as the ecological impact of the structures. The response form the Biosphere Reserve was to agree a position statement acknowledging what everyone agreed was positive about the proposal, share the concerns over the negative aspects and seek to minimise these as much as possible before coming to consensus on the final proposals.

Creating the space for policy development; an example was developing the shoreline management plan which has a time horizon of 100 years. It was foreseen that dealing with coastal change on such a timescale was going to be problematic; therefore we set up a programme in advance of the SMP gathering evidence from the community and working with international experts who could effectively take their evidence and explain it in terms of the long time frame processes. This resulted in a stronger consensus for the SMP to be accepted.

Recognising the conflict between renewable energy and landscape conservation, the Biosphere Reserve team worked with the AONB team and District Council planners to produce a landscape character assessment that incorporated the capacity for renewable energy within the landscape. (http://www.torridge.gov.uk/CHttpHandler.ashx?id=8828&p=0)

7.7 UPDATE ON THE MANAGEMENT/COOPERATION PLAN/POLICY:

Since the enlargement of the Biosphere Reserve, there have been 3 strategies.

The first was a forward thinking approach to the coastal zone plan for the estuary, which defined its boundary by issues, and this was the basis of the new designation in 2002.

In 2008, under a refresh of the governance a new 5 year strategy was developed. This had strategic aims of:

- Reverse decline in biodiversity
- Conserve and celebrate our heritage and best landscapes
- Promote a sustainable economy
- Use resources wisely
- Tackle climate change on local and international scale
- Safe strong healthy and proud community
- Develop a Community of learning for the wider world
- Ensuring an Organisation fit for purpose

The strategy was supported by a rolling action plan that was reviewed after 3 years.

This plan was extended to 2014 to ensure that any new plan chimed with the new EU programmes and made resourcing for the actions easier to tie into new funding streams.

The new strategy 2015 to 2025 has been developed on the back of the review of the previous strategy and on the ecosystem service assessment that was carried out by the partnership. The new plan is based around the 3 pillars of sustainability and links to the 3 functions of the Biosphere Reserve. Using the Driver, Pressure, State, Response (DPSR) model, strategic policies have been developed which the working groups take forward in their action plans. The strategy is written at policy level such that the partners can develop their actions that contribute to the objectives (e.g. increase the level of awareness of the Biosphere Reserve to 50% of the community understand the Biosphere Reserve) can be met by a number of adaptive methods that are approved by the partnership.

The new plan policies are listed below:

Policy	Target
KNO1: Develop knowledge base for the Biosphere Reserve and further research on critical areas and disseminate.	Target: Publicly searchable knowledge base in place by 2017
KNO2: Substantially raise awareness of the Biosphere Reserve through targeted communication strategies; optimise and selectively use social media to build support and communications about programmes and projects, develop new tools for engagement with the community including the arts.	Target: 50% of the community recognises the Biosphere Reserve by 2016, 75% by 2018.

KNO3: Develop a research and monitoring agenda to adapt to emerging needs including social and environmental sciences.	Target: Research programme in place with at least 2 PhD projects per year, 6 MSc theses and a citizen science programme in place.
KNO4: Promote apprenticeships in key sectors such as forestry, farming and tourism and promote skills development in sustainable entrepreneurship in schools and colleges.	Target: Funded Apprenticeship programmes in place by 2016 for 16 to 25 year olds.
KNO5: Develop the capacity in the area for people to use North Devon as a site for learning to implement bio-regional planning for sustainable development.	Target: To have at least 2 international visits per year from other areas to learn specifically about how North Devon Biosphere Reserve functions.
ECON1: Develop and support programmes for the promotion of local goods and services and develop local supply chains for green economy sectors.	Target: To have a range of local produce (fish, woodland produce and farm produce) specifically supported and branded as made/sourced in the Biosphere Reserve.
ECON2: Promote the use the Biosphere Reserve as an Environmental Quality assurance marque advised by the Partnership and part of an aspirational brand that attracts inward investment, backed up by technical support.	Target: To have a Biosphere accreditation system in place that is adopted by local businesses.
ECON3: Develop a strong sustainable tourism policy and programme that improves the year round tourism activity, disperses the tourism pressure and improves inland tourism offer.	Target: Sustainable Tourism strategy in place by 2015 and major projects in place supporting the work by 2016.
ECON4: Reinvigorate the forestry industry in north Devon underpinned by an approach for multiple benefits for the public and commercial interests.	Target: The Biosphere Reserve is designated and operating as a Woodland Enterprise Zone by 2020 with 85% of woodlands in management and 20% increase in economic benefit from woodland produce by 2025.

ECON5: Develop and apply agricultural systems which maintain productivity but reduce impact on the environment.	Target: Application of sustainable intensification of agriculture concept to boost productivity and reduce polluting effects leading to improved food security and enhanced ecosystem services on non-farmed land.
ECON6: Develop fisheries management measures linked to more local processing that will sustain a fishing industry in North Devon and enhance the marine biodiversity of the area and underpin with the Biosphere Reserve brand.	Target: The Marine area out to 12 nautical miles is covered by an operational fisheries improvement plan linked to marine conservation zones and other fisheries management measures.
ECON7: Support energy conservation in new and current buildings and apply a renewable energy programme that meets the local demand and minimises the impacts on the landscape especially if it is locally funded.	Target: At least 80% of local energy work is serviced by local contractors and domestic energy efficiency is improved by 20%.
ECON8: Promote the development and ongoing support for local social enterprises that work in sympathy with the Biosphere Reserve strategy.	Target: Support the recruitment of social entrepreneurs to be contributing to more than 7% of the local economy by 2025.
ECON9: Advocate and support universal superfast broadband coverage and facilitate transport solutions which boost local trade and reduce emissions	Target: To have 100% superfast broadband coverage across the Biosphere Reserve by 2018 and reduce transport emissions by 20% by 2020.
SOC1: Advocate for community resilience and implement measures that enhance ecosystem services which will serve to reduce the impact of extreme events.	Target: The social capital in the area is known, and community-based volunteering increases by 10%.
SOC2: Develop and promote enjoyment of the environment as a tool for public health improvement.	Target: Reduce the incidence of mental and physical illness in the Biosphere Reserve by 10% by 2024

SOC3: Facilitate the improvement of environmental performance and heating technology of homes to reduce poverty.	Target: Reduce the number of homes classed as fuel poor by 20% by 2019.
SOC4: Promote active communities in rural areas around themes of sustainability and promote the development and continuation of cultural activities and be an advocate for lower impact lifestyles.	Target: Participation in cultural activities increases by 10% by 2024.
SOC5: Promote the conservation and enhancement of cultural assets and sites and the public participation in their management.	Target: All current listed sites are conserved and 20% are enhanced for public enjoyment.
ENV1: Support and facilitate land-use and land-use change that will maximise functional connectivity between semi natural habitats and optimise hydrological systems recognising the financial implications of such changes.	Targets: Ecological connectivity is improved by 30% on the 2014 baseline figure. Frequency of 2% hydrological flooding events are reduced to 1.5%.
ENV2: Develop fishery management and methods in conjunction with a sustainable sea area management programme that includes Marine Conservation Zones that will effectively support both fisheries and conservation of marine ecosystem services.	Targets: At least 10% of marine area is covered by protection and fishery yields are sustained.
ENV3: Ensure that development should not be permitted that removes critical natural sites and land-take by development is subjected to a programme that ensures no net loss of ecosystem services and biodiversity through on site design and offsite offsetting.	Targets: No net loss of biodiversity from developments, and enhancements are achieved where possible to ensure ecosystem service function.
ENV4: Catalyse cross-sectoral activity that will support achievement of good ecological status of the Biosphere Reserve water bodies and sustain good ecological status thereafter.	Targets: Good ecological status achieved by 2021 and sustained thereafter.

ENV5: Implement the Biosphere Reserve Energy policy to reduce energy demand and produce renewable energy to ensure that appropriate balances are needed for food, fibre, energy, biodiversity, landscape and ecosystem services.	Target: carbon emissions from the Biosphere Reserve are reduced by 50% by 2025.
ENV6: Implement programmes to control invasive species such as Himalayan Balsam, Japanese Knotweed, Himalayan Knotweed, Giant Hogweed and Montbretia.	Target: Extent of invasive species is known and area reduced by 15% by 2020.

The derivation of the Biosphere Reserves strategy and the thematic plans that sit beneath it involve the community form the outset using the reference groups and the work groups as previously described.

The plan is based on consensus, but because it is based on good evidence, its strategic aims and actions have been adopted into statutory plans such as the local development plan. http://www.torridge.gov.uk/CHttpHandler.ashx?id=13375&p=0

From strategy to Action

The overall structure of the Biosphere Reserve governance is not unique in the UK, similar models are used in protected landscapes. However, we are fortunate that the partners sign up to lead on actions rather than leave it to the coordinating team to lead of everything. There is a good level of reciprocity within the partnership which means that workloads are shared as is the access to external funding resources.

As evidenced in the programmes described under the functions of the Biosphere Reserve, project delivery groups come together and co-design projects, agree roles and responsibilities and appropriate lead bodies for the funds that may be on offer.

7.8 CRITICAL FACTORS FOR BIOSPHERE RESERVE GOVERNANCE AND PLANNING:

- A good independent chairperson for the partnership; he/she must be respected in the community, live within the Biosphere Reserve and able to have the time to give to the partnership.
- A well-funded core management team. If the team has to look for its own funding from the outset it can distract them from carrying out the demanding function of coordination. The new reality is that funding will never be 100%, but the team is well respected amongst its peers for their technical skills to be effective delivery partners.
- Transparency leads to trust between the partners this in turn has enabled a good level of reciprocity

- Good evidence base; being able to develop policies and actions based on a sound knowledge gives credibility to the proposals.
- High levels of participation allowing for knowledge sharing and accepting the local knowledge as well as the expert knowledge leads to deeper agreement of the plans and proposals.
- Adaptability; being able to be flexible to try to meet the demands of the various sectors as far as is sustainably feasible. Being approachable for new ideas and having the “can do” attitude, rather than using reactive or defensive behaviour.
- Good sense of humour combined with high levels of professionalism to ensure people are happy to provide a good quality service.

8. CRITERIA AND PROGRESS MADE:

[Conclude by highlighting the major changes, achievements, and progress made in your biosphere reserve since nomination or the last periodic review. How does your biosphere reserve fulfil the criteria. Develop justification for the site to be a biosphere reserve and rationale for the zonation. What is lacking, and how could it be improved? What can your biosphere reserve share with others on how to implement sustainable development into practice?]

Brief justification of the way in which the biosphere reserve fulfils each criteria of article 4 of the Statutory Framework of the World Network of Biosphere Reserves:

1. "Encompass a mosaic of ecological systems representative of major biogeographic region(s), including a gradation of human interventions".

(The term "major biogeographic region" is not strictly defined but it would be useful to refer to the Udvardy classification system (http://www.unep-wcmc.org/udvardys-biogeographical-provinces-1975_745.html)).

The Biosphere Reserve sits in the Temperate Broadleaf Forest region of the Udvardy Classification.

The Biosphere Reserve encompasses a diverse marine area of mobile sub-tidal coarse sediments, circa-littoral and sub-littoral rocky reefs*, circa littoral fine sands* ,high energy intertidal rocky foreshore*, high energy sand beaches, intertidal estuarine mud and sand flats*, saltmarshes*, dunes*, coastal and maritime cliffs*, coastal heath, coastal floodplain and grazing marsh, unimproved acid grasslands, western oak forest*, upland oakwood*, lowland mixed deciduous woodland, coniferous forest, Culm grassland (Rhos Pasture)*, upland blanket bogs*, moorland and heath*, rivers and streams, traditional orchards and wood pasture and parkland*, hedgerows*, Lowland (grassland and arable) and upland farmland, urban habitats

(* denotes habitats where those found in the Biosphere Reserve are of national or international significance)

2. “Be of Significance for biological diversity conservation”.

The Biosphere Reserve comprises 6 Special areas of conservation listed in the Natura 2000 network (14,319 Ha), it has 21,918 Ha of Sites of Special Scientific Interest which are of national interest for biodiversity. Rare and endangered species include:

Freshwater Pearl Mussel (*Margaritifera margaritifera*), Only southern genotype population in the UK.
Amber Sandbowl Snail (*Catinella arenaria*) Internationally rare
Pink Sea fan (*Eunicella varicosa*); Nationally rare
Honeycomb reef building worm (*Sabellaria alveolata*) Nationally scarce;
Spiny lobster (*Palinurus elephas*) Nationally scarce.
Marsh Fritillary (*Euphydryas aurinia*): red data spp
High Brown Fritillary (*Fabriciana adippe)*: Red data spp
Atlantic Salmon (*Salmo salar*): UK BAP species
European Otter: Nationally protected and UK BAP species
Greater Horseshoe Bat (*Rhinolophus ferrumequinum)*: Internationally rare

Puffins (*Fratercula arctica)*:
The Lundy cabbage (*Coincya wrightii*): Endemic to Lundy
Lundy Cabbage Beetle: Endemic to Lundy

Successful species recovery programmes are in place for these.

3. "Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale".

(Including examples or learning experiences from putting sustainable development into practice).

The North Devon Biosphere Reserve has strategies and programmes that it has delivered over the last 10 years that have: reduced diffuse pollution from farms, supported sustainable fisheries, supported sustainable energy installation, green tourism development, is a core policy in the local authorities' Joint Local Development Plan has a programme for re-invigoration of a sustainable forest industry, supports farmers towards sustainable agricultural systems, uses an ecosystem service approach to land-use change and planning.

……

4. "Have an appropriate size to serve the three functions of biosphere reserves".

Core area of 1300 Ha (but extra core areas are being considered)

Buffer area of 3300 Ha

Transition area: 519784 Ha

Within this area there is a population of 170,000 people.

5. Appropriate zonation to serve the three functions

ZONE	Terrestrial Or Marine	AREA(Km2)	MAIN LANDUSE
Core	Ter	13.33	Dunes (SAC highly protected)
Buffer	Mar	13.41	Estuary (SSSI)
Buffer	Ter	4.27	Grazing (Heritage Coast)
Buffer	Ter	0.1	Cliff (SSSI)
Buffer	Ter	13.15	Arable and Grazing (Heritage coast and AONB)
Buffer	Ter	2.07	Grazing (Heritage coast and AONB)
Transition	Ter	2291.84	Agriculture, forestry and urban (Mixed protection)
Transition	Mar	2906.0	Sea (with agreed extension) (Mixed protection)

6. “Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve”.

An active Biosphere Reserve partnership board is in place which produces the Biosphere Reserve strategy, develops and delivers programmes and projects. Supported by 7 thematic working groups which interact with the community and deliver the projects
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7. Mechanisms for implementation:

a) Mechanisms to manage human use and activities
b) Management policy or plan
c) Authority or mechanism to implement this policy or plan
d) Programmes for research, monitoring, education and training

A The Core area and the Buffer Zones are enshrined in National legislation as areas for managing human interventions on the natural areas . Relevant Acts include: EU Habitats and Species Directive 1992, Countryside and Rights of Way Act 2000, Natural Environment and Rural Communities’ Act, Wildlife and Countryside Act 1982, Marine and Coastal Access Act 2009

B The Biosphere Reserve Strategy and it subsidiary action plans provide a focus for concerted action between the statutory and voluntary agencies.

Main objectives of the Biosphere Reserve:

Policy	Target
KNO1: Develop knowledge base for the Biosphere Reserve and further research on critical areas and disseminate.	Target: Publicly searchable knowledge base in place by 2017
KNO2: Substantially raise awareness of the Biosphere Reserve through targeted communication strategies; optimise and selectively use social media to build support and communications about programmes and projects, develop new tools for engagement with the community including the arts.	Target: 50% of the community recognises the Biosphere Reserve by 2018, 75% by 2020.
KNO3: Develop a research and monitoring agenda to adapt to emerging needs including social and environmental sciences.	Target: Research programme in place with at least 2 PhD projects per year, 6 MSc theses and a citizen science programme in place.

KNO4: Promote apprenticeships in key sectors such as forestry, farming and tourism and promote skills development in sustainable entrepreneurship in schools and colleges.	Target: Funded Apprenticeship programmes in place by 2016 for 16 to 25 year olds.
KNO5: Develop the capacity in the area for people to use North Devon as a site for learning to implement bio-regional planning for sustainable development.	Target: To have at least 2 international visits per year from other areas to learn specifically about how North Devon Biosphere Reserve functions.
ECON1: Develop and support programmes for the promotion of local goods and services and develop local supply chains for green economy sectors.	Target: To have a range of local produce (fish, woodland produce and farm produce) specifically supported and branded as made/sourced in the Biosphere Reserve.
ECON2: Promote the use the Biosphere Reserve as an Environmental Quality assurance marque advised by the Partnership and part of an aspirational brand that attracts inward investment, backed up by technical support.	Target: To have a Biosphere accreditation system in place that is adopted by local businesses.
ECON3: Develop a strong sustainable tourism policy and programme that improves the year round tourism activity, disperses the tourism pressure and improves inland tourism offer.	Target: Sustainable Tourism strategy in place by 2015 and major projects in place supporting the work by 2016.
ECON4: Reinvigorate the forestry industry in north Devon underpinned by an approach for multiple benefits for the public and commercial interests.	Target: The Biosphere Reserve is designated and operating as a Woodland Enterprise Zone by 2020 with 85% of woodlands in management and 20% increase in economic benefit from woodland produce by 2025.
ECON5: Develop and apply agricultural systems which maintain productivity but reduce impact on the environment.	Target: Application of sustainable intensification of agriculture concept to boost productivity and reduce polluting effects leading to improved food security and enhanced ecosystem services on non-farmed land.
ECON6: Develop fisheries management measures linked to more local processing that will sustain a fishing industry in North Devon and enhance the marine biodiversity of the area and underpin with the Biosphere Reserve brand.	Target: The Marine area out to 12 nautical miles is covered by an operational fisheries improvement plan linked to marine conservation zones and other fisheries management measures.

ECON7: Support energy conservation in new and current buildings and apply a renewable energy programme that meets the local demand and minimises the impacts on the landscape especially if it is locally funded.	Target: At least 80% of local energy work is serviced by local contractors and domestic energy efficiency is improved by 20%.
ECON8: Promote the development and ongoing support for local social enterprises that work in sympathy with the Biosphere Reserve strategy.	Target: Support the recruitment of social entrepreneurs to be contributing to more than 7% of the local economy by 2025.
ECON9: Advocate and support universal superfast broadband coverage and facilitate transport solutions which boost local trade and reduce emissions	Target: To have 100% superfast broadband coverage across the Biosphere Reserve by 2018 and reduce transport emissions by 20% by 2020.
SOC1: Advocate for community resilience and implement measures that enhance ecosystem services which will serve to reduce the impact of extreme events.	Target: The social capital in the area is known, and community-based volunteering increases by 10%.
SOC2: Develop and promote enjoyment of the environment as a tool for public health improvement.	Target: Reduce the incidence of mental and physical illness in the Biosphere Reserve by 10% by 2024
SOC3: Facilitate the improvement of environmental performance and heating technology of homes to reduce poverty.	Target: Reduce the number of homes classed as fuel poor by 20% by 2019.
SOC4: Promote active communities in rural areas around themes of sustainability and promote the development and continuation of cultural activities and be an advocate for lower impact lifestyles.	Target: Participation in cultural activities increases by 10% by 2024.
SOC5: Promote the conservation and enhancement of cultural assets and sites and the public participation in their management.	Target: All current listed sites are conserved and 20% are enhanced for public enjoyment.
ENV1: Support and facilitate land-use and land-use change that will maximise functional connectivity between semi natural habitats and optimise hydrological systems recognising the financial implications of such changes.	Targets: Ecological connectivity is improved by 30% on the 2014 baseline figure. Frequency of 2% hydrological flooding events are reduced to 1.5%.

ENV2: Develop fishery management and methods in conjunction with a sustainable sea area management programme that includes Marine Conservation Zones that will effectively support both fisheries and conservation of marine ecosystem services.	Targets: At least 10% of marine area is covered by protection and fishery yields are sustained.
ENV3: Ensure that development should not be permitted that removes critical natural sites and land-take by development is subjected to a programme that ensures no net loss of ecosystem services and biodiversity through on site design and offsite offsetting.	Targets: No net loss of biodiversity from developments, and enhancements are achieved where possible to ensure ecosystem service function.
ENV4: Catalyse cross-sectoral activity that will support achievement of good ecological status of the Biosphere Reserve water bodies and sustain good ecological status thereafter.	Targets: Good ecological status achieved by 2021 and sustained thereafter.
ENV5: Implement the Biosphere Reserve Energy policy to reduce energy demand and produce renewable energy to ensure that appropriate balances are needed for food, fibre, energy, biodiversity, landscape and ecosystem services.	Target: carbon emissions from the Biosphere Reserve are reduced by 50% by 2025.
ENV6: Implement programmes to control invasive species such as Himalayan Balsam, Japanese Knotweed, Himalayan Knotweed, Giant Hogweed, grey squirrel and *Montbretia*.	Target: Extent of invasive species is known and area reduced by 15% by 2020.

Does the biosphere reserve have cooperative activities with other biosphere reserves (exchanges of information and staff, joint programmes, etc.)?

At the national level:

Through the UK MaB National Committee and the recently established informal network of UK Biosphere Reserves

At the regional level:

Through participation in EuroMAB and through project specific collaboration on EU funded work.

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Through twinning and/or transboundary biosphere reserves:

Continuing the Twining Activity with Malindi-Watamu, Kenya and through supporting other reserves with advice and access to funds.

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Within the World Network:

Participation in the thematic networks for Marine, Coastal and Small Island Biosphere Reserves

Capacity building programmes in Africa (especially Tanzania and Kenya)

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Obstacles encountered, measures to be taken and, if appropriate, assistance expected from the Secretariat:

None

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9. SUPPORTING DOCUMENTS

[List of the annexes submitted with periodic review report.]

(1) Updated location and zonation map with coordinates : Shape files will be submitted

(2) Updated vegetation map or land cover map: JPEG/ Raster data set will be submitted

(3) Updated list of legal documents

Recent additional legislation relevant to the Biosphere Reserve

- Natural Environment and Rural Communities Act 2006. Places a duty on all statutory bodies to pay due regard to conservation
- Climate Act 2008: sets targets and duties to meet emission reductions by 2050 and allows establishment of emission trading schemes.
- Marine and Coastal Access Act 2009: enables the creation of a network of marine protected areas, access to the coastal strip and creates the Maritime Management Organisation and local Inshore Fisheries and Conservation Agencies

(4) Updated list of land use and management/cooperation plans

Biosphere Reserve Strategy,

Biosphere Catchment Management Plan,

Sustainable Energy Action Plan and

Woodland Enterprise Zone Plan.

(7) Further supporting documents.

Annual reports in PDF format

CD copy of educational materials

Hard copy of other reports.

10. ADRESSES

10.1 Contact address of the proposed biosphere reserve:

North Devon Biosphere,
5th Floor, Civic Centre, North Walk, Barnstaple, Devon, UK, EX311ED
Biosphere-mailbox@devon.gov.uk
Web site: www.northdevonbiosphere.org.uk

10.2. Administering entity of the core area(s):

Natural England, Renslade House, Tudor Court, Exeter, Devon County Council EX4 3AY
Web site: https://www.gov.uk/government/organisations/natural-england

And
Christie Devon Estate, Trafalgar Lawn, Barnstaple, Devon, EX32 9BD

20.3. Administering entity of the core and buffer zone(s):

Devon County Council
County Hall, Topsham Road, Exeter, EX2 4 QU
www.devon.gov.uk

North Devon District Council
Lynton House, Commercial Road, Barnstaple, EX31 1DG
www.northdevon.gov.uk

Torridge District Council
Riverbank House, Bideford, Devon, EX39 2QG
www.torridge.gov.uk

Mid Devon District Council,
Phoenix House, Phoenix Ln, Tiverton, Devon EX16 6PP
www.middevon.gov.uk

West Devon Borough Council
Kilworthy Park, Drake Road, Tavistock, Devon, PL19 0BZ
www.wetdevon.gov.uk