Natural England Research Report NERR089

Applying a Natural Capital Approach in Practice: Lessons Learned from the North Devon Landscape Pioneer

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Applying a Natural Capital Approach in Practice: Lessons Learned from the North Devon Landscape Pioneer

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Executive Summary

This report sets out what the North Devon Landscape Pioneer did in North Devon to trial a natural capital approach and embed it within a participatory and deliberative process. It explains what we have learned from the experiment. It also describes how the natural capital process interacted with the Pioneer's exploration of improving land management, another key work area for the North Devon Landscape Pioneer.

The North Devon Landscape Pioneer

Nature's recovery is essential for societal wellbeing. It is also a government priority; the Governments' 25 Year Environment Plan (25 YEP) (HM Government 2018) aims to improve the environment within one generation. The 25 YEP suggests a number of new approaches to help with the challenge. Natural capital is one such approach. Natural capital treats the environment as a set of assets which provide benefits to society. In order to inform best practice for the delivery of the 25 YEP, four Pioneers were set up across England. Defra tasked the Pioneers with:

- testing and trialling a natural capital approach;
- exploring more integrated decision making and delivery;
- investigating innovative finance; and
- sharing lessons learned.

We explored whether we could embed a natural capital approach, using economic evidence of the benefits that the environment was providing in North Devon within a participatory and deliberative process with partners from the North Devon Biosphere. Partners included those working in the environment sector to local businesses, industries and the public sector. A participatory and deliberative process means properly involving partners, where they have a genuine opportunity to steer and influence plans and the opportunity to discuss different options together. To embed a natural capital approach the Pioneer sought to understand the state of natural capital in North Devon including how it was being managed and invested in, identify priorities for enhancing natural capital and explore how to do this strategically. It used a number of innovative approaches to do this. The ultimate aim of the process was to develop a range of strategic solutions which would support and enhance the natural environment, resulting in improved benefits provided to people.

Lessons learned from trialling a natural capital approach

The Landscape Pioneer made significant progress in understanding how to implement a natural capital approach and the benefits of doing so. We learned that:

- Using a natural capital approach helped us to think differently about the environment. It facilitated the development of innovative and ambitious ideas and products. These included, a biosphere-wide analysis of environmental investment, exploration of the systemic reasons for environmental failure and the attempt to identify strategic, innovative interventions to address these. Taking the partnership through this process developed a shared and strategic mindset about how to improve the environment in North Devon. This is reflected in the Natural Capital Strategy and the Environmental Land Management Trial being tested in North Devon now.

- Applying a participatory and deliberative natural capital approach requires a significant amount of time and resources. It is worth it in terms of buy-in and outcomes but it really does benefit from bespoke resourcing at the outset.

- A natural capital approach should consider the 'whole system' of the environment. It would be best to start at a strategic level and then delve into the detail when needed. A participatory strategic planning process could be used to do this.

- Special aspects of the environment and / or place must be considered explicitly throughout a natural capital decision making process. This will depend on the place and partners key interests, but is likely to include biodiversity, landscape and geodiversity.

- The trial of a new approach provided an opportunity to engage new partners. The Pioneer expanded on the Biosphere partnership to include stakeholders from economic planning, development, business and tourism. A broad range of partners should be engaged from the start of a natural capital process, from both the 'demand-side' of ecosystem services (for example public health, education, communities) and the 'supply-side' (land managers, water companies, environment sector).

- The participatory and deliberative process was key to the success of the trial. Taking the partnership through a meaningful participatory and deliberative process resulted in a high level of buy-in. Partners felt able to steer outcomes and were able to input and feedback at each stage of the process. They now have collective ownership of the Natural Capital Strategy and are taking this forward in a North Devon Action Plan. Thus, partnership working is very valuable, and investing in it is important.

- Economic values of benefits flowing to society were generally limited to a subset of assets and services. But this was not a surprise and has confirmed our existing views about evidence needed during a natural capital process. That is, it is imperative to include qualitative evidence about values of the environment as well as any quantitative evidence available. The evidence base should also be spatial to enable an understanding of environmental benefits flowing to people and to target interventions to enhance them.

- Developing strategic interventions which improve the environment and which could be funded by private sector investment was challenging. We think this is down to a number of issues. Firstly it is difficult to provide financial returns to investors, because often investments in the natural environment provide public goods to everyone, rather than to specific individuals and businesses. Other issues include the scale of projects we were considering, current knowledge in the environment sector about finance and the provision of investment mechanisms to move money from investor to projects. Overcoming these barriers will be key to be able to draw in more investment from the private sector.

- The trial of a natural capital approach helped us to understand what transformative change looks like. We learned that landscape-scale changes are needed to how we use and manage land as well as how we incentivise, motivate and support those who impact rural land management. We suggest a number of innovative changes to governance which would facilitate the change needed to improve the environment.

This report

This report will discuss the test and trial of a natural capital approach in more detail, including specific steps in the process that we experimented with and key learning from each of these. It also reflects on our combination of a natural capital approach with a participatory and deliberative process. It suggests a number of important lessons for anyone interested in applying a natural capital approach to plan for recovering nature in their place. It also demonstrates how the natural capital process interacted with the Pioneer's investigation of improving decision making in rural land management.

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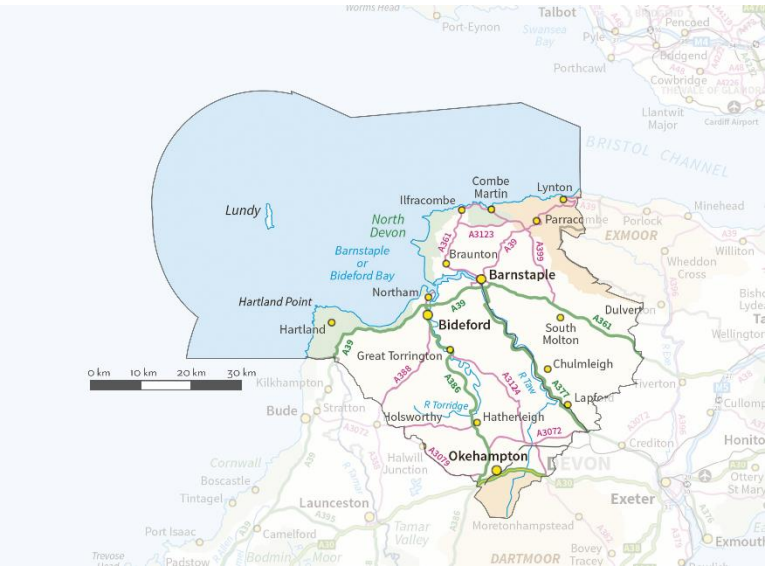
1 Introduction

Nature's recovery is essential for societal wellbeing. It is also a government priority; the Governments' 25 Year Environment Plan (25 YEP) (HM Government 2018) aims to improve the environment within one generation. It recognises that new approaches to nature conservation are needed to meet this challenge. To go from declining nature, to recovering nature, we need a transformational shift in our approach. This means a step change in what we do and where and how we do it. We ask if a natural capital approach is one way of achieving this.

Four Pioneers were established by Defra and tasked with exploring natural capital to provide learning to pave the way for others. Natural England led the North Devon Landscape Pioneer. The Cumbria Catchment Pioneer and the Manchester Urban Pioneer were both led by the Environment Agency. The Marine Pioneer was based in Suffolk and North Devon, led by the Marine Management Organisation (MMO). The North Devon Marine and Landscape Pioneers learned from each other and together have explored the use of natural capital across the land and sea interface.

1.1 The North Devon Landscape Pioneer

The North Devon Landscape Pioneer boundary was that of the North Devon UNESCO Biosphere (see Map 1)[1]. The Biosphere is one of 668 Reserves in 122 countries designated by United Nations Educations, Scientific and Cultural Organisation's (UNESCO's) Man and the Biosphere Programme to safeguard significant ecosystems[2]. It includes areas governed by the North Devon and Torridge district councils, as well as small sections of Mid and West Devon. Throughout this document we refer to the whole biosphere area as North Devon. North Devon is home to around 166,000 people and a variety of rare wildlife, within a beautiful and highly valued landscape. The dramatic and distinctive coastal landscapes of North Devon also sit within the Biosphere and are protected as Areas of Outstanding Natural Beauty (AONBs).



Map 1. The North Devon UNESCO Biosphere and Pioneer boundary. North Devon is in South West England. © CountryScape. Ordnance Survey data and database rights © Crown Copyright

1.2 The Pioneer Partnership

[1] https://www.northdevonbiosphere.org.uk/

[2] http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/

The Biosphere Core Partnership became the working group for the Landscape Pioneer. At the beginning of the Pioneer partners included those from the environmental sector, for example, Devon Wildlife Trust, North Devon AONB and the Devon Local Nature Partnership. However, as the Pioneer progressed the partnership was broadened to include those from local businesses, industries and different public sector representatives. A list of partner organisations that were involved in the Pioneer's natural capital workstream is included in Appendix 1.

1.3 Experimenting with natural capital in North Devon

The Pioneers were tasked by Defra with four aims to explore (Box 1). In the Landscape Pioneer the four aims were not addressed in specific projects in turn but explored through two workstreams each with a number of different components (see Figure 1). This lessons learned document focuses on the natural capital workstream of the Pioneer. The impact of this workstream on other Pioneer actvities is also discussed as well as learning about a natural capital approach which arose from the other activities. The Pioneer also had the freedom to respond to emerging new policy areas and initiatives so evolved through their lifespan. The Pioneers had limited resources, so some aims were explored in more detail than others.

Box 1. Four asks of the Pioneers

a) Test new tools and methods as part of applying a natural capital approach in practice;
b) Demonstrate a joined-up, integrated approach to planning and delivery;
c) Pioneer and 'scale-up' the use of new funding opportunities; and
d) Grow our understanding of 'what works', sharing lessons and best practice.

In practice, through the four aims, the Landscape Pioneer wanted to explore innovation for the environment. This included exploring investment and governance to understand how we can facilitate the transformative change needed to improve the environment for nature and people.

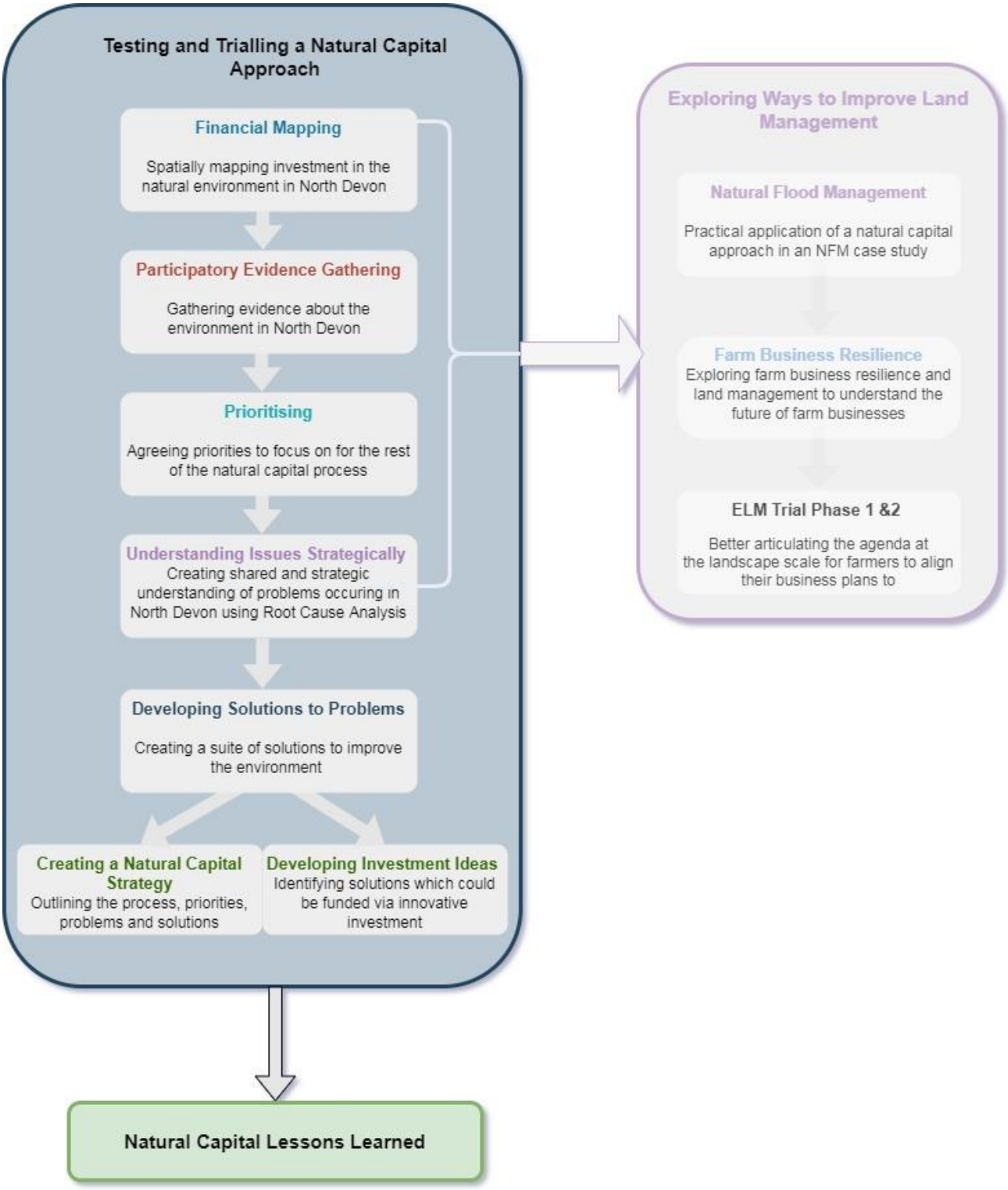


Figure 1. The natural capital workstream of the North Devon Landscape Pioneer contained a number of different components, which are discussed in this document. The natural capital workstream provided a platform for Pioneer land management activities. These further explored farm business and land management decision-making drawing on the shared understanding of the evidence, depth of knowledge and strategic solutions generated in testing and trialling the natural capital approach. The contribution of testing a natural capital approach on these activities is discussed.

2 Trialling a natural capital approach in North Devon: What did we do and what did we learn?

2.1 What is natural capital?

Natural England's Natural Capital Logic Chain (Figure 2) shows the framework that we apply to the environment when using a natural capital lens[3]. We can treat the environment as a set of assets which provide people with ecosystem services and benefits (see Box 2 for a definition of natural capital). It is the benefits which can be valued using monetary or non-monetary techniques (Braat & Degroot 2012; Degroot et al. 2010; Haines-young & Potschin 2010; TEEB 2010). Being able to understand and describe the environment in this way can help to improve decision making (Guerry et al. 2015).

Box 2. Natural capital means "*the elements of nature that directly or indirectly produce value to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions*" (Natural Capital Committee 2013).

Figure 2. Natural England's Natural Capital Logic Chain. This logic chain shows how we can get from ecosystem assets, to value to people. It also highlights important aspects which impact on final values, such as assets quantity, quality and location as well as pressures and drivers of change. This logic model is based on Haines-Young & Potshcin (2010) cascade model of ecosystem services, and adapted by Degroot et al. (2010). Image from Wigley et al., 2020 © Westcountry Rivers Limited.

2.2 What did we do during our trial of a natural capital approach?

We explored whether we could embed a natural capital approach, including using economic evidence of the benefits that the environment was providing in North Devon, within a meaningful participatory and deliberative process. The combination of these two concepts was an experiment. A participatory and deliberative process means properly involving partners, where they have a genuine opportunity to steer and influence plans for their place, and discussing (or deliberating) different opinions, evidence and options together to come to an agreement (Renn 2006). The focus on the participatory and deliberative approaches stems from the Ecosystem Approach; a framework which aims to promote land management which provides a range of benefits to people, and champions involving people in decisions about their place (Convention on Biological Diversity 1995). The use of a

[3] This logic model is based on Haines-Young & Potshcin (2010) cascade model of ecosystem services, and adapted by Degroot et al. (2010).

participatory and deliberative process can help partners come to agreement and build ownership of shared outcomes (Reed, 2008). This approach is critical to developing shared plans which will be supported across a partnership.

The natural capital process we trialled included a number of different activities (see Figure 1), but it can be summarised as:

1. Financial mapping
2. Participatory evidence gathering
3. Prioritising
4. Understanding issues strategically
5. Developing solutions to problems
6. Creating a Natural Capital Strategy for North Devon
7. Developing investment ideas
8. Developing lessons learned to influence best practice.

The ultimate aim of the process was to develop a range of strategic solutions to solve specific issues in the environment in North Devon, which would support natural assets and their ability to provide benefits to people. We also investigated if we could find innovative funding opportunities facilitating more investment to deliver the changes needed. We were flexible and adapted the process as we progressed, learning lessons along the way.

The learning in this report was developed by using:

- Natural England team reflections of the process, including what went well and what could be improved. These were captured throughout the process and at the end of the trial.
- Partner feedback questionnaires completed after workshops during the trial,
- Partner feedback on what had gone well, what had gone less well and their lessons learned from the experience at the end of the trial.

This report will now discuss each activity in the natural capital process, discussing learning from each one, and overall.

3 Financial Mapping

3.1 What are we spending money on at the moment? Who is spending what and where?

This original and innovative exercise was carried out at the beginning of the Pioneer. The aim was to gain a partnership-level perspective of current investment in North Devon's natural environment. Partners provided their investment data, identifying how much money they spent, on what and where, if possible. Eftec, an environmental economics consultancy, developed an analytical tool which used accountancy rules to smooth three years of spend data to generate an annual spend for 2017. This analysis shows how much money is being invested in each kilometre grid square across North Devon on average per year, by which organisation, what it's spent on and on which habitat. An expenditure heatmap (Figure 3) was created to show the variation in spending in different 5km2 squares across North Devon.

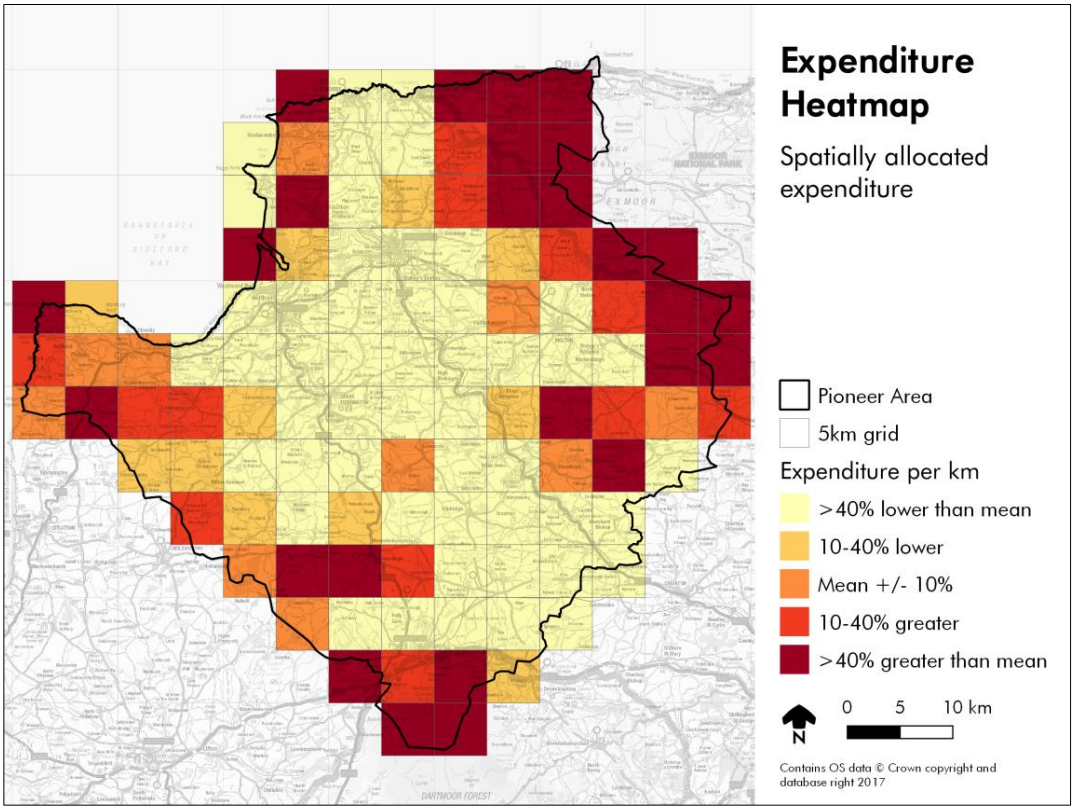


Figure 3. The expenditure heatmap shows variation in total investment spatially in North Devon. It combines data from different partner organisations to display variation at a partnership level, for those organisations which were able to provide investment data (Eftec in press). © Eftec and CountryScape. Contains Ordnance Survey data and database rights © Crown Copyright 2017.

The results of this analysis showed that multiple organisations were investing money in similar outcomes in the same locations and habitats. The majority of spending (90%) was undertaken by four organisations (three of which were part of the public sector). However, only 8% of total investment analysed was spent collaboratively. This suggests that there is room to improve collaboration and further coordinate investment by different organisations to generate better outcomes for the environment. The heatmap shows that spending is higher around designated areas; darker squares on the map correspond with National Parks and the AONB. The analysis also demonstrated that public spending on the environment represents around 3% of all government expenditure (which is around £1,670m per year) in the local area (of which includes around £275m on health, £630m on social security services/payments and £92m on education).

3.2 Key learning

- Undertaking an original approach brings challenges. For example, we learned that in many organisations financial data and spatial data are not integrated. It is not common practice to tag the exact location of spending, but this is something which is very helpful for those investing in the environment. Geo-tagging investment allows organisations to match up local spending with local outcomes and can help to demonstrate whether investments are providing value for money, or not.

- However, not all spending can be geo-tagged because it isn't spatially targeted, for example spending money on staff training or capacity, cannot be linked to a specific location, but it does help to address outcomes. Other spend may be spatially targeted but in a different location to where the underlying problem is caused. A good example of this is investing in sewage treatment works. The location of the investment is in the area of the sewage works, but the spend is addressing water quality issues which are created in the rural catchment upstream or in nearby urban areas.

- This innovative exercise was a good way to begin the Pioneer because partners had something new to discuss 'around the table'. Partners engaged with the exercise really well. We received positive feedback from partners, with one partner mentioning that it provided them with an opportunity to think differently *"the financial mapping gave an overarching view of how much money was flowing through and gave an opportunity to think if there was anything we would do differently if we had more control."* There was an initial nervousness around sharing the data created from this activity, but it has since been agreed by the partnership to publish this work externally, because the work is highly valued. The tool developed for financial mapping is now being developed further by Eftec to allow it to be repeated in different locations.

- After the initial financial mapping exercise, Her Majesty's Treasury (HMT) worked with the information provided to investigate public sector spending further. They aimed to better understand spending by a range of public sector organisations that invest in natural capital in England. After the exercise HMT recommended that to increase the impact of spending, the whole landscape of spenders needs to be reviewed. This should include organisations which impact on natural capital rather than just those trying to improve it, for example the Department for Transport as well as Defra group bodies and agencies. Drivers of spending (for example, regulation, EU commitments and international agreements) need to be identified strategically to be able to understand how to align spending better in future.

4 Participatory evidence gathering

4.1 What state is North Devon's environment in?

After analysing investment in the environment, we wanted to understand the current state of the environment. We set out everything that we wanted to know about North Devon using a natural capital framework. This included information about:

- The condition of North Devon's ecosystem assets – their quantity, quality, location, management and investment. Assets were categorised by broad habitat type (Watson et al. 2011) with one spreadsheet of information collated per habitat.

- The ecosystem services and benefits which flowed from each asset – described, quantified and valued where possible, as well as information to show if the flow of services was improving or declining (their trend) and what might happen in future (their trajectory).

The column and row headings used in the evidence gathering spreadsheet are included in Appendix 2 to demonstrate the types of information that we were looking for.

To find data to create the evidence base, local reports and data were investigated, such as information from the State of the Biosphere Report (Bell et al. 2015). The financial mapping analysis provided information about investment in different broad habitats. We then used participatory evidence gathering to identify further data to fill gaps and to increase ownership in the evidence base. At a workshop, partners identified additional reports and data as well as providing their expert judgement, creating qualitative data about the state of assets and ecosystem services. Data within the evidence base was deliberated at the workshop to check and challenge it, so that the partnership came to a consensus. For each piece of information in the evidence base, we also included an objectivity rating, to be transparent about the confidence we had in our evidence.

4.2 Key learning

- We found that using a spreadsheet to set out our evidence was an accessible and clear way to present it because it enabled us to have one large sheet for each broad habitat type and it was easy to add information to. This allowed partners to easily check the data and add to the evidence base within the workshop and in a follow up online check. However, we think that we had gathered information in too much detail for this stage of the process. We had split the environment down into small components and had created a very large and detailed spreadsheet for each habitat type. We didn't end up using all of the information that we had gathered. Therefore we think it would be better to start at a more strategic level, digging into the detail when needed. This would be a more proportionate approach and would have helped strategic thinking later in the process.

- The addition of qualitative data was useful both to fill evidence gaps and involve our partners, increasing ownership in the evidence base and therefore buy-in to the process. One partner mentioned that the *"involvement of different people was a real positive, it was a challenging idea to trial and having people who know the place adds the dimension that is missing from pure natural capital accounting."*

- Whilst gathering evidence we used categories of ecosystem services which were non-overlapping, to make sure that we did not count the contribution from assets more than once (see Appendix 2 for a list). We needed this for the next stage of our experimental process. For this reason we hadn't included biodiversity or geodiversity as services in their own right because they contribute to other services. However partner feedback confirms our views that these services, and other special aspects of the place's environment, should be explicitly

included throughout a natural capital decision making process to ensure that they're equally addressed.

- Our evidence base was not spatial in that we had not used Geographic Information Systems to capture additional data or to create any new maps for this process. But we recognise that ideally it should have been. A spatial evidence base is needed to target interventions to the most appropriate locations through opportunity mapping. If we were starting again, we would use Natural England's Natural Capital Atlases data and framework to integrate national and local data about the ecosystem assets in North Devon (Lear et al., 2020).

5 Prioritising

5.1 Where are the biggest opportunities for change?

Having assessed the current state of the environment, the next challenge was to agree priorities to investigate further. We wanted to identify the best opportunities at a landscape scale, with large potential gains in benefits. To do this, we trialled using current economic values of the ecosystem services provided by assets in North Devon. We thought the best opportunities for big gains would be in assets providing high value services but in a poor condition and with a declining trend. This approach, allowed us to order our assets and services (for example woodland and climate change mitigation) into a prioritised list. The interim pairs in Table 1 were the assets and services which came to the top of the list.

However, our experiment aimed to combine a natural capital approach with a participatory and deliberative approach. So we discussed the prioritised list and the decision rule at a workshop. We wanted partners to consider the list and agree as a group if there was a need to swap in other habitat-ecosystem pairs based on their own knowledge of North Devon.

Table 1. Assets providing services were sorted using a decision rule, identifying assets providing high-value services, in poor condition and declining trend in the Interim Pairs column. This list was discussed at a workshop, and some pairs were swapped or changed by the partnership, the final eight priorities are listed in the Final Pairs column, with new pairs in bold.

Interim Pairs based on decision rule	**Final Pairs reflecting stakeholder values**
Improved Pasture – water purification	Improved Pasture – water purification
Arable – water purification	Arable – water purification
Arable – recreation & tourism	**Culm Grassland – water regulation**
Permanent Grassland – recreation & tourism	**Coastal Margins – tourism, recreation and cultural services**
Deciduous Woodland – climate regulation	**Woodland – climate regulation**
Deciduous Woodland – water regulation	Deciduous Woodland – water regulation
Improved Pasture – climate regulation	Improved Pasture – climate regulation
Permanent Grassland – water purification	Permanent Grassland – water purification

5.2 Key learning

- Using economic evidence in this way was a novel experiment. We learned that some partners felt uncomfortable with using economic evidence in this way. The initial pair sorting process felt too much like a "black box". The information presented to partners at a workshop was too far removed from the evidence base that they had contributed to and were familiar with. Because we had used overall value of benefits being provided rather than per hectare, our prioritisation exercise biased habitats with larger land area in North Devon. It was also limited to habitats and benefits for which we had data, for example farmland habitats or those providing food or carbon regulation services. One partner said *"The accounting threw up some interesting things in that it clearly skews towards what there is more of rather than what*

is seen as most valuable to the people that live in a place, but it also showed that there are real opportunities to be taken."

- Our experiment further emphasised the views held by the authors; that we do need to qualitatively recognise the value of ecosystem services to partners and other stakeholders. The Economics of Ecosystems and Biodiversity (TEEB) sets out a three step process for valuing ecosystem services, starting with recognising value, then demonstrating values through economic methods and finally capturing values in decisions[4]. Partners can describe the benefits of the environment important to them to qualitatively recognise value. This evidence should then be equated with quantitative economic values during a decision making process. Otherwise the outcomes don't reflect what people value and don't bring partners along. We do need to find ways of recognising what communities need from the environment in their place. Importantly we could also involve them and ask them, but we recognise that there are also other sources of evidence which could be assessed to understand community need for the provision of ecosystem services, for example, through data sets such as the People and Nature Survey[5], (formally Monitoring the Engagement with the Natural Environment[6]).

- The discussion and deliberation session during the workshop did alter the pairs which were taken forward. This discussion was needed to combine economic evidence with a deliberative process and agree the priorities as a partnership, but one partner did mention that *"the final list reflected the particular interests, priorities and assertiveness of those people present at that workshop. It could easily have been different if different people had been present."* This issue will always be the case with participatory processes, and highlights the need to have as broad a group of partners involved as feasibly possible. Ideally a broad group of partners would include those involved in the supply of ecosystem services (for example, farmers and land managers, environmental NGOs) as well as those interested in the demand in ecosystem services (for example, public health, community leaders). During this process, we were effectively relying on the economic evidence to represent demand, but the evidence wasn't strong or comprehensive enough to do this for us. Although a broader range of partners joined at a later stage widening the partnership was not possible at this point because we were unable to announce the Pioneer externally before the 25 YEP was published. Ideally a partnership would be broad and representative from the outset.

[4] TEEB approach to valuation http://teebweb.org/about/approach/
[5] https://www.gov.uk/government/collections/people-and-nature-survey-for-england
[6] https://www.gov.uk/government/collections/monitor-of-engagement-with-the-natural-environment-survey-purpose-and-results

6 Understanding issues strategically

6.1 What are the root causes of the problems?

The Pioneer recognised that if we are to turn the tide on nature's decline we need a step change in the way we manage the environment. This required us to reconsider what we do to solve environmental issues. Much of current environmental management is a mitigatory fix for a wider systemic issue, for example planting buffer strips to reduce pollution entering rivers. This action can improve water quality in the river by intercepting nutrients (Stutter et al. 2012), but does not deal with the causes of pollution run off. We wanted to understand the root causes of the problems in North Devon in relation to our priority assets and services (see Table 1), so that we could come up with solutions which would help solve the issues strategically.

We used Root Cause Analysis to do this. This involves identifying the immediate causes of the problem, and asking why they occur (Rooney and Vanden Heuvel 2004). The analyst then examines why each of these further causes occur. By asking "why" at least five times, the chain of causes for each problem can be mapped out and the root cause or causes can usually be identified.

Working in small focus groups, the partners drew up one problem statement for each asset and service pair (such as 'reduced water quality' for arable land and water purification). They then asked Why? at least five times to understand all the different causes of the problem. Partners discussed their evidence and expertise to create a series of shared and visual maps showing the multiple causes of problems in North Devon (for one of the maps see Figure 4). The Root Cause Analysis report uses published reports to confirm our partners' evidence (Eftec 2020).

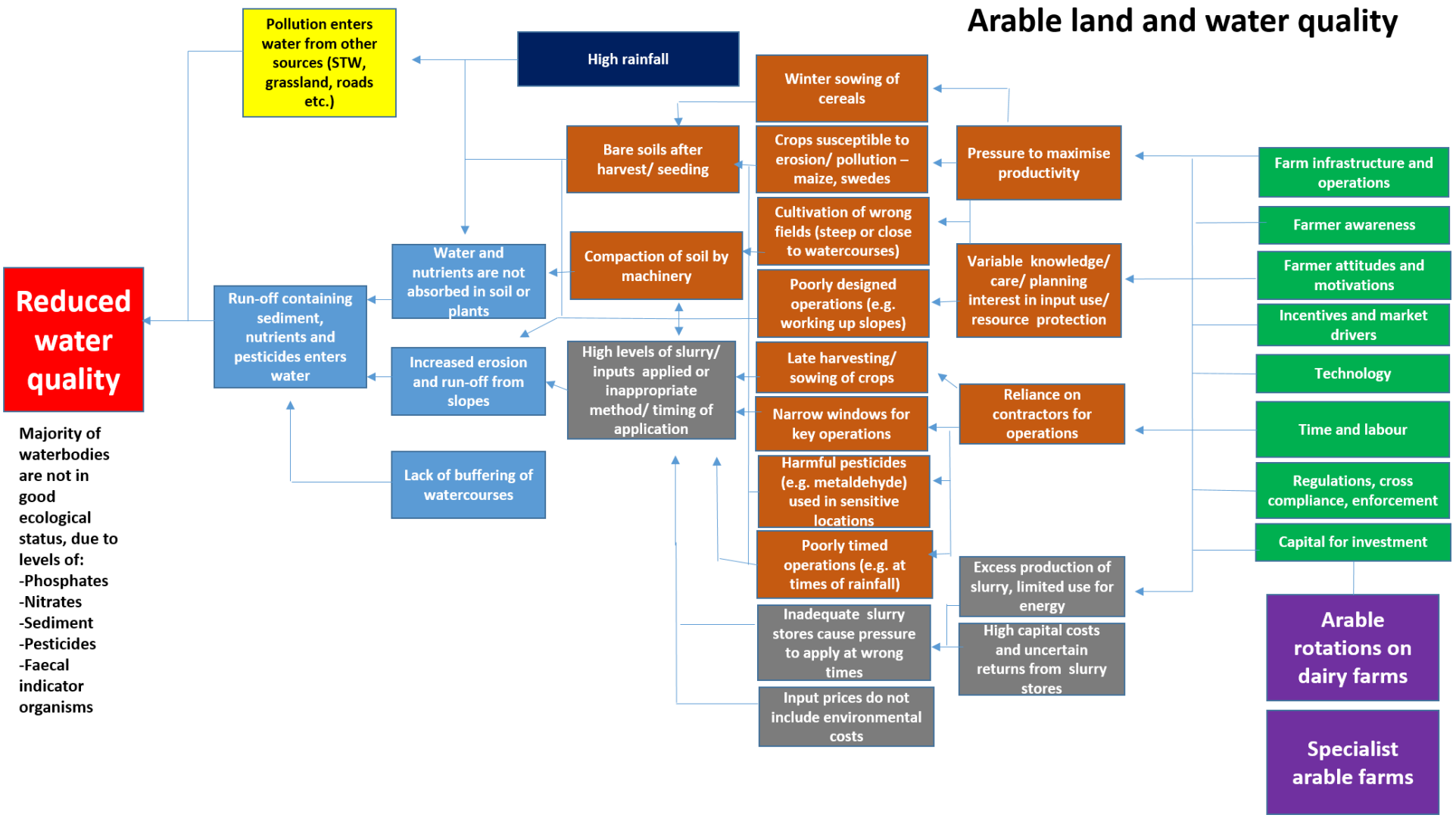


Figure 4. One of our root cause maps. The problem, reduced water quality, and the causes from arable land impacting on the issue. From Eftec (2020).

6.2 Key learning

- Partners enjoyed creating these maps and found it a useful exercise. *"I found the root cause analysis particularly interesting and useful. It was informative to establish the multiple causal links of particular issues and to trace the root causes back to something that can be addressed, whether locally or nationally."* They also thought that the maps *"laid out a clear route identifying what could change to improve the environment."* The exercise broadened the focus from one specific asset and service to a strategic discussion of the whole system in which it sits. This was important for the next stage of our process, because the RCA maps demonstrated the root causes, which were the most strategic causes to address through our solutions. The exercise also allowed partners to contribute and collaborate with each other in their area of expertise. The RCA maps evidenced the reasons for the focus of current environmental *practices "RCA was a good tool to show others why we do what we do. For example it shows us that to improve soils you need to improve farm infrastructure".* The evidence in the RCA maps has been used in other Pioneer activities, such as the development of the ELM test and trial.

- However we found that RCA needed a well-defined problem to work best. Some pairs were hard to make a problem statement from and some of the problem statements actually contained several problems. These root cause maps are more complex. We also discovered that the process was slightly repetitive, because we had pairs which were very similar to each other, for example, arable land and water quality, as well as improved pasture and water quality. This would be improved by developing a well-defined set of problem statements which cover the range of priority assets and services. This was a function of our process up to this point. A natural capital approach for decision making could use a participatory strategic planning process as a framework to guide activities[7]. This begins with defining a vision for the partnership, the current barriers to reaching it, and then explores how these can be overcome. RCA could be used to investigate the barriers to reaching the vision to identify strategic interventions which would treat issues at their root causes. The Natural England Natural Capital Evidence Handbook explains how using a vision, understanding problems and then developing solutions to solve the problems can be used as part of a natural capital planning process (Rice et al. in press).

[7] https://www.involve.org.uk/resources/methods/participatory-strategic-planning

7 Developing solutions to problems

7.1 What can we do strategically solve the problems in North Devon?

After understanding the problems and their root causes we needed to create solutions to fix them. We had a number of criteria for our potential solutions. We wanted them to be:

- Strategic, treating problems at their root causes
- Feasible
- Investible
- Support assets, good for the provision of multiple ecosystem services
- Good for biodiversity

We had several, iterative, partner workshops to identify solutions as a group. We used evidence from the Root Cause Analysis to think about solutions which would solve the problems along the root cause chain. The Natural Capital Strategy presents the range of solutions, and the ecosystem services which they would support or enhance (Sunderland et al. 2020). Table 2 shows the land management solutions for farmland as an example. Figure 5 demonstrates some of the land use and land management changes identified during our process. We attempted to prioritise our solutions by those which would deliver multiple benefits to people but this was challenging, for a number of reasons, outlined below.

7.2 Key learning

We found that partners had a lot of good ideas for potential solutions. However meeting all of the criteria was very challenging. We have identified a number of reasons for this:

- The habitat and ecosystem service pairs we were working with represented component parts of the environment, for example arable land and its contribution to water quality, woodland and its contribution to carbon sequestration, and this hindered strategic and creative thinking.

- Although we broadened our stakeholder partnership by this point, we still may not have had all the right people contributing, for example strategic leaders.

- Many of the most strategic solutions needed are outside the scope of the partnership's control, for example land management and governance. Our RCA evidence shows that we need changes to motivations, incentives and capacities of those who impact on land management as well as physical changes to the landscape.

- The more strategic physical changes include land use change from farmland to semi-natural habitats, which is a less feasible option than changes to farmland management.

- We were attempting to prioritise interventions by those which provided multiple benefits of the highest value, but in most cases, the benefits that interventions would provide would depend on how they were implemented. Therefore, each intervention had to be assessed for the potential benefits that they might provide.

We found a way forward by recognising a typology for the interventions. This was changes to: land use; land management and land managers incentives, motivations and capacities, and governance. The typology enabled us to treat the proposed interventions differently whilst still considering the whole system of problems and potential solutions. We were able to move forward with a set of interventions, which together acted across the root cause chain to support the provision of multiple benefits. If we had this typology from the beginning it would likely have been easier to identify a suite of interventions for the strategy.

Table 2. Potential land management solutions for farmland which would enhance the priority ecosystem services and others (from Sunderland et al. 2020). Evidence was researched to show which solutions would support or enhance which ecosystem services. A 1 means that it is supported by peer-reviewed evidence from the Ecosystem Services Transfer Toolkit (Waters et al. 2014 NECR 159), or a 2 which shows that it is support by expert opinion from our process or evidence from Natural England's Natural Capital Indicators Project (Lusardi et al. 2018).

Farmland	Provisioning services				Regulating services								Cultural services			
Ecosystem services / **Interventions**	Food	Fibre	Fresh water	Air quality	Climate (global)	Water regulation	Erosion regulation	Water purification and waste treatment	Disease regulation	Pest regulation	Pollination	Natural hazard regulation	Cultural, spiritual and religious values	Aesthetic values	Recreation and eco-tourism	Biodiversity
Slurry management –slurry storage and treatment including anaerobic digestion					2			1							1	2
Limited stocking rates for reduced slurry inputs		1			1	1	1	1	1	1						1
Improved arable soil and agricultural practice – including decompaction; winter cover cropping, crop rotations, conservation tillage.	2				1	2	1	1			2	2				1
Nutrient input limits – organic and inorganic	2				1			1								2
Timing and management of grazing (e.g. not graze overwinter)						1	1	1								
Fencing watercourses							2	1								1

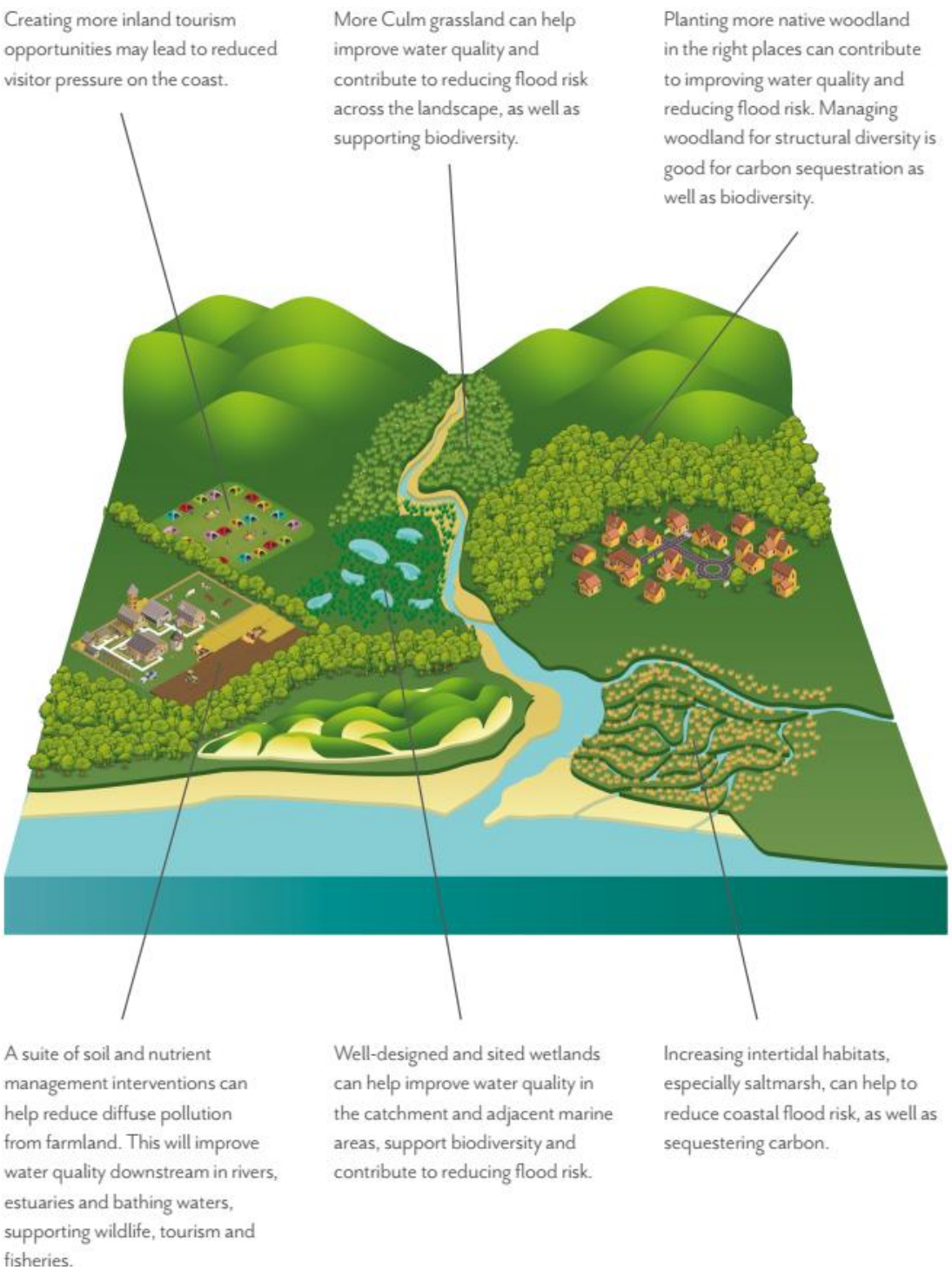


Figure 5. A selection of the solutions needed to support priority ecosystem services in North Devon © CountryScape 2020 from A Natural Capital Strategy for North Devon – Executive Summary (Sunderland et al. 2020).

8 Creating a Natural Capital Strategy for North Devon

8.1 The Natural Capital Strategy

After identifying interventions we then wrote up our process, evidence, problems and solutions to create a Natural Capital Strategy for North Devon (Sunderland et al. 2020)[8]. The Strategy simplifies the eight asset and ecosystem service pairs into four natural capital priorities. These are: protecting and improving water quality, minimising flood risk, increasing carbon storage and sequestration to mitigate climate change and reducing the impact of tourism and recreation at the coast.

Evidence of the current problems which occur within these priorities is outlined and a suite of solutions are presented. The Strategy recognises that implementing the solutions immediately, at the scale needed to really make a difference to the problems would be challenging. It suggests four changes to governance needed to make the changes in the strategy happen. The adoption of these principles would represent a transformational shift in the way we work in the environment. The four principles are outlined in Box 3.

Box 3. Making it happen, what governance changes are needed? (Sunderland et al. 2020)

1. Institutional responsibility

Environmental problems need to be clearly owned by an institution or partnership. This institution needs to be legitimate, have the right expertise and, critically, sufficient 'levers' to change the outcome. This means being able to introduce or adapt regulation and incentives to improve outcomes, monitor performance against these and adapt if necessary.

2. Adaptive management

We are dealing with complex systems which are not fully understood. We need to carry out actions that make strategic sense, notwithstanding uncertainties. Results are then assessed and new action plans developed in an adaptive cycle.

3. Localisation

Ecosystems and benefits are inter-related. They need addressing as part of a single planning system, rather than separately. In practice this requires significant responsibility at sub-national or local scale. National governance has to split things up into issues to make them manageable, so it loses this interrelatedness and complexity. Issues should be dealt with at the lowest level possible.

4. Shared Commitment

A wide range of changes need to come together, in a mutually reinforcing way, to support the changes we are seeking. A wide group of partners need to share commitment to improving the issues.

[8] http://publications.naturalengland.org.uk/publication/6070000127574016

8.2 Key learning

- The solutions in the Strategy focus on natural capital or nature-based solutions. Partners reflected *that "other solutions are [also] required and this is important. For example an increase in regulation. These are non-natural capital solutions but they are needed and we haven't been able to cover these."* During our process we found that our focus on natural capital solutions would mean that the Strategy wouldn't comprehensively address the priorities. This is because to comprehensively address problems in the environment you also need 'grey infrastructure' changes, that is, improvements to built infrastructure like the sewage and transport networks. In addition, changes to governance, and the ability to influence environmental pressures such as the emission of greenhouse gases are required. If we were able to address these wider suite of changes it would allow us to address the whole system which is creating the environment issues that we experience. To achieve this, strategic planning for the environment should be integrated across different sectors so that it is possible to join up all of the actions needed to support and improve the environment.

- One of the partners mentioned that the Strategy is *"not business as usual"* and represents a difference in ambition for the environment. Our strategic and participative process has been key to this success because the Strategy is composed of the input from partners throughout the process. A number of activities facilitated partners to think differently about the environment, such as the financial mapping, root cause analysis and creative thinking to develop the solutions.

- The definition of the four governance principles needed to deliver the Strategy came from experience and learning throughout the Pioneer. The principles demonstrate how we could work together better in partnerships to achieve more for the environment. We have learned that thinking about how we work is as important as thinking about what we should do on the ground.

9 Developing investment ideas

9.1 Are there opportunities for more funding?

Our partners created a large list of potential solutions. With consultants, Eunomia, we then explored which of these could be funded in different ways. These were developed into four investment opportunities with new models of funding discussed (Eunomia 2020) (see Box 4).

Box 4. Investment opportunities for North Devon
(Eunomia 2020)

1. Developing and marketing local food networks that promote sales of produce from farms that maintain and improve natural capital;
2. Creating a new carbon offsetting standard for priority North Devon carbon storage habitats;
3. Creating a woodland management support hub; and
4. Developing an ecotourism standard that will promote habitat restoration on the river Torridge.

9.2 Key learning

- This was a challenging activity. We expected to find more innovative and fundable ideas. One partner noted that *"The investment opportunities aren't new! Which maybe shows that innovation is hard."*

- We learned that it was difficult to identify opportunities where there would be a financial return on investment. This is because the environment provides benefits which are not always marketable (i.e. public goods), for example providing habitat for rare wildlife. It is also difficult to create opportunities which would arise in cost savings or benefits to one company or individual. The environment provides a wide variety of public benefits rather than only providing the benefit which the investor is seeking. However, there may be some opportunities for innovative investment based around corporate responsibility or offsetting environmental impacts in future. For example, offsetting carbon emissions via funding the creation of carbon sequestering habitats is an area with increasing opportunity for investment. This is being developed in the UK through the Nature for Climate Fund as referenced in the new Environment Bill[9].

- We also learned that there is an issue with scale. We were looking for ideas within the Biosphere boundary so projects were relatively small and would have localised benefits, but larger investors, such as insurers, want to invest as part of a large project with wider benefits. Thus there is a barrier of scale which needs to be overcome. If investment was possible at a country-wide scale, with risk reduced to investors by public sector base funding, attractive investment opportunities might be easier to develop.

- Our difficulties in identifying investment opportunities and developing them into business cases could also have been because of a lack of knowledge about how to do this in the environmental sector. There aren't very many successful experiences to learn from, and therefore there are few people with the capacity, knowledge and skills needed to prepare and build investment cases required to gain more investment. Since the conclusion of the Pioneer, Triodos Bank is supporting four pilot projects to encourage private investors to invest in the environment[10]. These use a blended funding model with seed funding from Defra, Environment Agency and the Esmee Fairbairn Foundation providing start-up funds to develop the projects capability to accept further investments. These projects will provide valuable learning to enhance knowledge in this area.

[9] https://services.parliament.uk/Bills/2019-21/environment.html
[10] https://www.triodos.co.uk/press-releases/2020/green-projects-given-support-to-attract-private-sector-investment-to-tackle-climate-change-and-restore-nature

10 The participatory and deliberative approach

10.1 Did we manage to engage partners in a meaningful participatory and deliberative approach?

Our approach aimed to be participatory and deliberative. This section of the report considers if this was achieved, the constraints and challenges of doing so, as well as the benefits for the Biosphere partnership going forward.

The partnership was committed to the Pioneer and input large amounts of time to it's activities. Partners provided their evidence and expertise and they discussed and deliberated with each other at every stage of the process. They worked together on innovative exercises as well as identifying and shortlisting all of the solutions included within the strategy. Partners also commented on many iterations of the Strategy, inputting throughout its development. At each stage of the process we asked for feedback from the partnership. This allowed us to adapt activities and influence the final products to reflect partners' ideas, as well as learn lessons throughout the process. This was resource intensive for the project team and the partners, but it has resulted in a strategy with a high level of buy-in because they own everything which is included in it. The Strategy is now being taken forward by feeding into the Biosphere's joint land and sea action plan, showing that the partners are progressing the strategy locally. This demonstrates that partnership working is very valuable, but resource intensive, so needs to be funded.

Partner feedback suggests that they felt the process was meaningfully participatory and deliberative. Partners said that *"we were able to steer the outcomes. We felt that biodiversity outcomes weren't represented well and we pushed back on this and we felt that this was listened to and it comes out in the final product"* and "*the steering group felt like a truly collaborative place.*" Partners showed a high level of engagement and commitment during the process. Building on an existing partnership helped because "*there is a lot of social capital in existence in North Devon, and what worked well was leveraging information, time and energy from all of the people and groups in the area."* This suggests that previous partnership activities made engaging partners easier and facilitated their contribution to the Pioneer.

However, due to limited resources, partners were all providing their time in kind. This creates a number of challenges in a technical and novel process. There were workshops which partners could not all attend and times when decisions had to be made by the project team without consulting all of the partners. Occasionally partnership organisations had to send different representatives to the separate parts of the natural capital process due to constraints on resourcing. This made it harder to make decisions and progress work as new individuals needed to be brought up to speed with the rest of the process. A key lesson to improve this next time is about transparency of decisions and record keeping. The project team have taken on the lesson suggested by the partners that *"partnership working requires good record keeping and transparency to document difficult issues and decision making during the process. When a decision is made without people or during workshops there needs to be a method for transparency (e.g. an open file note or record) to track issues, record difficult areas and note what may need addressing another time."* Ideally partners would also sign up to send the same person to the entire process to ensure consistent representation.

There was *"good engagement [in the Pioneer] across a variety of sectors given challenging circumstances."* However, the Pioneer was missing partners from some key industries *"it felt like an absence of industry farmers throughout the process. The groups talked about what we wanted from farmers rather than what farmers were trying to do themselves."* The lack of inclusion of farmers or representatives of them (other than the National Farmers Union who were included) within the test of a natural capital process was due to resourcing constraints and a communications embargo until the 25 YEP was released. Ideally farmers and other rural land managers would have been included at

the outset and consulted on priorities and potential solutions, because our findings have shown that many of the improvements needed involve changes to rural land management. It would be difficult to have included individual land owners and managers in a process which was strategic and covered such a large land area, but more representatives of farmers could have been included throughout. Similarly the Pioneer didn't include representatives of community groups, other than those from local authorities, or consult with communities about potential changes. This again was due to resources and a difficult launch period without the ability to formally announce the Pioneer when it began. Ideally these groups would be engaged with at the beginning of a collaborative process and able to influence the outcomes.

Being involved in the process has had knock-on impacts for the partnership. Partners mentioned that *"it's been interesting to be part of one approach to test a local natural capital process, and to compare this with other approaches to natural capital both nationally and in other parts of England"* and that *"it feels like we are in a good place now to go forward."* Taking part in this process has built capacity within the partnership, enabling partners to develop and implement a trial of the new Environmental Land Management Scheme, discussed further in Section 12.

11 Summary of key learning from testing and trialling a natural capital approach

11.1 Overall learning

- We have learned about what transformative changes are needed to recover nature. These are not just what we do to manage the environment, but how well effort is planned, coordinated, incentivised and governed.

- Using a natural capital approach helped us to think differently about the environment. The approach facilitated the development of innovative and ambitious ideas and products, such as a biosphere-wide analysis of environmental investment, exploration of the systemic reasons for environmental failure and the attempt to identify strategic, innovative interventions for investment.

- Applying a participatory and deliberative natural capital approach requires a significant amount of time and resources. Nonetheless, it is valuable in terms of buy-in and outcomes, but the process needs bespoke resourcing at the outset of a project.

- If we were starting again, we would align our process more closely with a standard participatory strategic planning process, in which we would start with a vision and then consider the barriers to achieving it. The Natural England Natural Capital Evidence Handbook builds on this, as well as the Ecosystem Approach and other natural capital evidence to describe key elements which should be undertaken as part of a natural capital planning process (Rice et al. in press).

11.2 Natural capital process and evidence

- Our **participatory evidence gathering** was comprehensive and worked well helping us to engage partners and find available data. However, we found that it was possibly too detailed because it split the environment into lots of small components and therefore did not reflect how the system really works in practice. Thus, our take home point is that it's best to start at a strategic level first, considering the whole system, and then drill down to the detail when needed.

- Our trial of **economic prioritisation** was innovative and ambitious, but didn't work as well as we thought it could have. Economic evidence about the values of services provided by assets is very important, but our experience has suggested that it should be used to provide evidence during a collaborative decision making process, rather than to drive prioritisation independently.

- We found a further issue with the **availability of economic evidence** about benefits that the environment provides. There are few ecosystem services for which the benefits to people can be quantified and even less for which it can be economically valued. Thus our experience has confirmed the importance of qualitative evidence, to accept imperfect evidence and to take peoples' qualitative values of the environment into account during a decision making process.

- An evidence base should also include spatial information. This is essential to consider the appropriate location for interventions through opportunity mapping.

- **Root cause analysis** helped the partnership to get into a strategic thinking space. It worked really well for clearly defined problems. It helped partners to think about transformative change because it showed a clear link between multiple causes of problems, and highlighted those at the root cause of issues.

- Identifying innovative and strategic **solutions** was challenging. Using a typology to classify them was key to moving forward and to demonstrate the full suite of interventions needed to address the problems. We found most of our solutions were about changes to rural land use and land management, as well as motivations, incentives and capabilities of land managers.

- **Financial mapping** shows that there is significant potential to better align investments in the environment around shared priorities, encouraging organisations to work more collaboratively with one another and improving outcomes.

- It was difficult to identify clear opportunities for private **investment** in the environment, which would provide financial returns. We think this is down to issues of scale, knowledge, investment mechanisms and financial returns, as well as the provision of public goods rather than private goods when the environment is enhanced.

- Our experience confirms our view that **special aspects of the environment and / or place must be considered explicitly throughout a natural capital decision making process**. This will depend on the place and partners key interests, but is likely to include biodiversity, landscape and geodiversity.

11.3 Partnerships

- We worked with a variety of partners. Broadening out the partnership, helped to identify more creative solutions. We think that it is important to have more partners from the demand-side of ecosystem services – for example, public health, community leaders and education to balance what people want with what can be provided. Thus ideally a broad range of partners covering both the supply-side of ecosystem services as well as the demand-side, should be involved in the process from the start.

- We've learned that working on a novel idea with a wide range of partners isn't easy. The Pioneer had a broad ask and wanted to evolve as it progressed. Thus it was difficult to give partners clear expectations about input required during the process and exactly what would be learned at the end.

- The Pioneer had limited resources, which restricted the lead Natural England team and the Partnership. It was experimental so we couldn't say exactly where we were going, what we would learn and exactly how much time it would take from the beginning to the end. We recognise that ideally these would be set out from the beginning so that partners could commit to engaging throughout knowing what would happen, when, how and what the output would be and have an opportunity to shape the process from the start.

- Partnership working was very valuable for the Pioneer. It was key to the successes of the trial. Investing in it is important.

- Mechanisms are needed to maintain transparency during partnership work. This could be via an open file note to record decisions at workshops, to track issues, record progress and questions to pick up another time.

11.4 Next steps

- This work has helped to inform the Natural Capital Evidence Handbook. The learning from the Pioneer, the Upland Ecosystem Pilots (Waters et al. 2012) as well as other key sources of evidence are brought together to provide a potential natural capital process to follow for partnerships (Rice et al. in press). This is where we would start if we did it again, although it is still likely to be an iterative and 'messy' process if truly participatory and deliberative.

- Learning from the Pioneer has informed Defra's development of future policy to plan for nature recovery (the proposed Local Nature Recovery Strategies in the Environment Bill) which are being piloted now.

12 Applying natural capital in Pioneer case studies

Alongside the testing of a natural capital approach, the Landscape Pioneer also investigated how applying a natural capital approach to land management decisions can help. These land management activities explored farm business and landscape scale decision making and governance to understand how to facilitate transformative change. The three main case studies were delivered in parallel with the natural capital testing work. They occurred at different times during the process and drew on a variety of evidence produced from the trial. They provided partners who were involved with both workstreams the opportunity to explore the application of the natural capital approach to important land management issues in North Devon. The lessons learned from these activities also fed back in to the natural capital testing work, as partners brought their own learning to different activities. Lessons learned and key messages from this work are reflected in the overall Pioneer partners lessons learned and key messages contained in Appendix 3.

12.1 Applying a natural capital approach to natural flood management investments

The natural flood management (NFM) case study was an attempt to apply a natural capital approach to a specific natural environment investment to generate early Pioneer lessons and understanding. For more information, see the Case Study of the Caen Catchment report[11] (Johnson et al. 2018).

This work considered potential natural flood management interventions for the Caen Catchment, and their impact on natural capital. Ideally the report would have provided information about the changes which could have been expected due to various NFM interventions using quantitative data. However, the case study found that there was limited data and capacity for including and applying quantitative and economic data at this scale. Instead, this work used a mostly qualitative approach to show the potential impacts of NFM on natural capital in the Caen.

The case study also found that more information is needed on the costs to land owners for implementing NFM interventions and how these might vary due to local factors, both in terms of cost of creation of the intervention but also costs to their farm businesses going forward.

This case study suggests that if natural capital accounting is to be used in this context, it should focus on identifying the net benefits of a natural flood management approach. This evidence could be used to aid the development of a shared and integrated delivery plan for a place.

12.2 Farm business resilience

This case study provided the opportunity to test wider understanding and support for a natural capital approach with landowners and managers in a sub-catchment of the Pioneer boundary.

This included working with a group of landowners and farmers in the Wistlandpound catchment. Natural England, Devon Wildlife Trust, South West Water, and the North Devon Catchment Partnership explored the use of a natural capital approach to investigate the future of farm businesses financial and environmental resilience (DR Company, unpublished).

To engage farm businesses, partners used the natural capital and the Root Cause Analysis evidence generated by the Pioneer's natural capital process. The aim was to encourage farmers to think more strategically about the environment and the potential future opportunities for their farm businesses. The Root Cause evidence enabled this strategic thinking, by demonstrating the causes of common environmental problems and therefore what could be done to solve them.

[11] https://www.northdevonbiosphere.org.uk/landscape-pioneer.html

During this project we learned that while the technical language of a natural capital approach can be inaccessible the inherent concepts are easily understood. Many farm businesses expressed an interest in both exploring their future business viability and in working collaboratively with each other in a sub-catchment to generate positive environmental outcomes. This work informed the Pioneer ELM Trial Phase 1 which started in January 2019. This group of farmers are still engaged in ELM Trial Phase 2 until June 2021.

12.3 ELM Trial Phases 1 and 2: operationalising a natural capital approach for landscape and farm business planning

A partnership Task and Finish group was established to develop an Environmental Land Management (ELM) Trial. The Trial aimed to operationalise a natural capital approach for landscape and farm business planning. The Task and Finish group consisted of existing working groups of the Biosphere Partnership and partners involved in the natural capital approach work-stream. Partners developing the Trial were able to draw on a number of innovative products tested in the natural capital approach. As well as having access to resources, being involved in the natural capital testing built capacity in the partners. Working together over a period of time and through a range of innovative activities has helped to establish shared knowledge of the problems and agreement of the scale of change and approach needed to overcome them.

The North Devon Pioneer ELM Trial has drawn together:

- Financial mapping, to understand current organisational investments in the natural environment,
- Participatory evidence gathering outputs to understand what the natural capital evidence is telling us about asset condition and service provision in the North Devon landscape,
- Root Cause Analysis to demonstrate the root causes of priority environmental problems,
- Farm Business Resilience, to include the current financial and environmental situation of farm businesses, and,
- The Natural Capital Strategy to understand the priorities across North Devon.

The Task and Finish group drew on its long term partnership working in nature improvement and the Pioneer products to develop an innovative ELM trial which integrates farm business and natural capital planning in a whole farm approach. The aim is to provide farmers with information about what they could do on their farm to contribute to the landscape-scale changes needed to improve natural capital in North Devon. The trial will also demonstrate to farmers how changes that would improve the environment could also help with their farms business resilience going forwards.

This work will provide insights on farmers' responsiveness to change, their potential interest in land use change and how feasible the delivery of the landscape priorities from the Natural Capital Strategy may be over time. As well as enhancing their natural assets, farmers need to reduce environmental pressures and manage farm infrastructure. This trial is exploring how these can be brought together with natural capital indicators and in terms of how they contribute to the landscape priorities. The results of Phase 2 of this ELM Trial will be available after May 2021.

13 Conclusions

13.1 What have we learned about transformative change?

The Pioneer was asked to explore how to do things differently. Whilst there were four specific asks the ambition of all of the Pioneers was to be innovative, exploring the transformative change needed to leave the environment in a better state than we found it. By combining an innovative approach to natural capital with root cause analysis and financial mapping, and taking the partnership through the process, the Pioneer created new and strategic evidence for North Devon. This evidence helped partners to think differently about the environment. This has allowed the Pioneer to demonstrate what is needed to be able to turn nature's decline into nature's recovery. Important changes are needed in how we work together in partnerships to deliver environmental outcomes, how we use and manage land within our landscapes and how we motivate, incentivise and support key sectors. The Farm Business Resilience and ELM trial have embedded these ideas in practice and the work is continuing to be explored.

The North Devon Landscape Pioneer has generated a number of key lessons which help us to understand the shift needed in our approach to begin recovering nature. It has made significant progress in understanding how to implement a natural capital approach and the benefits and challenges of doing so. The lessons learned from testing a natural capital approach in the Landscape Pioneer have informed Defra's development of future policy to plan for nature recovery (the proposed Local Nature Recovery Strategies in the Environment Bill). Learning from North Devon has been combined with previous projects to develop the Natural Capital Evidence Handbook to help others apply natural capital in practice (Rice et al. in press). Using this Natural Capital Evidence Handbook, within an iterative and participatory approach is our recommended way to apply a natural capital approach and where we would start again in future.

14 Appendices

1. Appendix 1: Partners involved in the Landscape Pioneer's trial of a natural capital approach

Andigestion

North Devon Chamber of Commerce

Clinton Devon Estate

Dartmoor and Exmoor National Park Authorities

Defra

Devon County Council

Devon Local Nature Partnership

Devon Wildlife Trust

Environment Agency

Forestry Commission

Frontier Agriculture/King Seeds

National Farmers Union

National Trust

Natural England

North Devon Area of Outstanding Natural Beauty

North Devon Biosphere

North Devon Biosphere Foundation

North Devon District Council

North Devon Councillors

North Devon Homes

North Devon Marine Pioneer

Rothamstead Research

RSPB

Savills

South West Water

Teignbridge District Council

Torridge District Council

University of Exeter

Visit Devon

Westcountry Rivers Trust

2. Appendix 2: Building a shared evidence base

To build our evidence base we wanted to know:

1) what natural capital assets we've got;
2) how much of them we have;
3) where they are;
4) what quality they are;
5) what ecosystem services they provide; and
6) what the value of these ecosystem services is.
7) to whom: and
8) What it costs to maintain them

We used the National Ecosystem Assessment (NEA) habitat types (Watson et al., 2011) as our natural capital assets. They are:

- Mountains, moors and heaths,
- Semi-natural grasslands,
- Enclosed farmland,
- Woodland,
- Freshwater, wetlands and flood plains,
- Urban,
- Marine; and
- Coastal margins.

The list of ecosystem services that we chose to gather information on was based on the Millennium Ecosystem Assessment framework (Watson et al., 2011). The simplified table shows only the categories of ecosystem services, we used the ecosystem services identified in Table C.

Table C: Ecosystem service categories used in evidence gathering spreadsheets

Provisioning	**Regulating**	**Cultural**
Food	Air quality	Cultural, spiritual and religious values
Fibre	Climate (global)	Aesthetic values
Genetic Resources	Climate (local)	Recreation and eco-tourism
Biochemicals, natural medicines, pharmaceuticals	Water regulation	
Fresh water	Erosion regulation	
	Water purification and waste treatment	
	Disease regulation	
	Pest regulation	
	Pollination	
	Natural hazard regulation	

3. Appendix 3: Partner lessons learned

Top 10 key lessons and messages from the Landscape Pioneer Partners about the natural capital approach		
1	Natural capital process: Start with a vision	Start with a vision for the area based on sound principles and defined environmental outcomes. The natural capital ***process*** should be guided by national standards and technical experts with the ***vision*** for the future of natural capital guided by stakeholders. Listen to your stakeholders about their aspirations for natural capital.
2	Natural capital process	The natural capital approach needs to follow a transparent process, clear pathway and simple steps (i.e. how it relates to unquantified elements of ecosystem services such as cultural services & biodiversity). When is it best applied? Recognise that natural capital is only one approach to environmental management, and while it has benefits, it won't be suitable for tackling all environmental challenges. Clarity is needed to guide application of natural capital approach. Agreement of whichever method is chosen needs to be supported by a broad group and the majority of stakeholders, beneficiaries, brokers and service providers in a place. Commitment to it can then be gained and challenges from stakeholders can be better acknowledged and managed.
3	Natural capital process: Data & evidence	Undertake a fit for purpose natural capital assessment that uses all best available data, evidence and experience possible from all of your stakeholders. Outstanding issues with local records centres data availability and licensing need to be addressed.
4	Natural capital process: Biodiversity	Embedding biodiversity in the natural capital approach is very important. This includes not just biodiversity necessary for function and deliver of ecosystem services to people, but also intrinsic biodiversity (having nature for nature's sake). Ensure that biodiversity is at the heart of your process and that any natural capital interventions deliver a net gain for biodiversity at the very least.
5	Partners	Partner engagement, communications and commitment including continuity of attendance are critical parts of a programme for productive collaboration. Important to include a broad range of economic partners from the start when considering natural capital including those that might potentially become investors including landscape managers and owners.
6	Governance	Governance of natural capital and its users and investors does need a local delivery model that has the respect and legitimacy from the other partners. This does not need to be a universal system operator - this can be multiple and regional and done in partnership.

7	Purpose & scope of the Pioneer	Clear articulation about the purpose and scope of the programme helps to engage partners. Effective collaboration with stakeholders can enable an iterative approach to agree the framing and what it is the programme is trying to influence. Local ambition and capacity will play a role. In the case of the Landscape Pioneer it was very broad from the outset, aimed to have a flexible approach and we didn't have the 25 YEP to provide direction. This makes it much harder to manage expectations and to understand if you have delivered what you need to do E.g. Have we influenced environmental land management, farmers, subsidies etc.?
8	Commitment	Recognise that the process may identify the key issues and way forward, but there needs to be a commitment from partners to drive it forward on completion, and to take ownership of the projects identified to help deliver them.
9	What's next? mandates & capacity	The Strategy isn't business as usual so how will it be progressed? Effective delivery requires governance, accountability, and local capacity. This is a significant challenge and we need to work out how to take this message to each of the relevant bodies. Organisations will need to invest in their capabilities for future delivery. Partners need to agree what is meant by natural capital as different organisations view it differently. It is also important to have a clear understanding of the role and number of different organisations involved. Currently many different organisations take ownership of natural capital but it means that roles and responsibilities are unclear. Many delivery bodies state natural capital in their agendas but do they actually have the mandate, responsibility and/or capacity to deliver a natural capital approach?
10	What's next?	The principle of making better decisions by including natural capital evidence (as a matter of course) into financial decisions is essential in delivering 25YEP objectives. We should progress with investment cases, continual evidence gathering and deliver the four governance principles. This could become the basis of a road map that coordinates between and influences emerging strategic plans such as Northern Devon 2050.
Key lessons and messages from the Landscape Pioneer Partners about the Pioneer overall		
1	Language	Get the language right for different audiences.
2	Transparency & records	Partnership working requires good record keeping and transparency to document difficult issues and decision making during the process. When a decision is made without people or during workshops there needs to be a method for transparency (e.g. an open file note or record) to track issues and record difficult areas and what may need addressing another time.
3	Budget	Securing a suitable budget to facilitate the workload is essential.

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