Trial of the Natural Capital Protocol
with the dairy sector

Overview Report for

Crown Estate Scotland

October 2019
<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Version Details</th>
<th>Prepared by</th>
<th>Reviewed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>19/09/2019</td>
<td>Draft Report</td>
<td>Paul Silcock</td>
<td>Charlie Russ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Charlie Russ</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>09/10/2019</td>
<td>Final Report</td>
<td>Paul Silcock</td>
<td>Charlie Russ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Charlie Russ</td>
<td></td>
</tr>
</tbody>
</table>
Acknowledgements

Cumulus Consultants and AECOM would like to thank a number of individuals and organisations for their invaluable input in helping us to undertake this trial of the Natural Capital Protocol with the dairy sector.

We would firstly like to thank Crown Estate Scotland and Scottish Environment Protection Agency which commissioned and funded this work. We would particularly like to thank Andy Wells and Hannah Whyte from Crown Estate Scotland, and Nicola Melville and Stephen Field from SEPA for their guidance and support.

The trial could not have taken place without the agreement, participation and enthusiasm of the dairy farm business which took part: David Taylor, with support from his daughter Kirstin Taylor, Dryfesdalegate Farm, Lockerbie. Very many thanks for their time, energy and contributions. It was much appreciated.

Thank you also to those who provided additional information including Jonathan Mitchell, Savills.
# Contents

1 **Introduction** .................................................................................................................. 1  
   Context .............................................................................................................................. 1  
   Project aim ........................................................................................................................ 1  
   Project scope ................................................................................................................... 1  
   Project approach ............................................................................................................. 1  
   Project outputs ............................................................................................................... 1  
   Structure of the report ..................................................................................................... 2  

2 **Business involved and Protocol application** ................................................................. 3  
   Business involved ........................................................................................................... 3  
   Protocol application ....................................................................................................... 3  

3 **Key findings** ................................................................................................................. 6  
   Business reports ............................................................................................................ 6  
   Farmer and estate staff feedback ..................................................................................... 7  
   Consultants’ feedback ..................................................................................................... 10  

4 **Conclusions, recommendations and implications for policy** ....................................... 13  
   Conclusions .................................................................................................................... 13  
   Recommendations ......................................................................................................... 14  
   Implications for policy ................................................................................................... 14
1 Introduction

Context

1.1 In 2017 a coalition of organisations with an interest in land management initiated a trial of the Natural Capital Protocol for land-based businesses in Scotland. The trial was led by Crown Estate Scotland and focused on an upland estate, upland farm and arable farm in North East Scotland. It was funded by a number of organisations including Crown Estate Scotland, Scottish Environment Protection Agency (SEPA) and Scottish Natural Heritage and undertaken by Cumulus Consultants and AECOM.

1.2 This project extended the trial to the dairy sector, focusing on a dairy farm business on Crown Estate Scotland land in South West Scotland. It built on the previous work and will contribute to a range of trials co-ordinated through the Scottish Forum on Natural Capital Sustainable Land Management Working Group, which SEPA coordinates.

Project aim

1.3 The specific aim of the project was to trial the Natural Capital Protocol with a dairy business in order to test the value of the protocol for informing dairy sector business decisions and to help promote the approach.

1.4 The research evaluates the effectiveness of the protocol for this application and recommends what adaptation of the framework and accompanying guidance would facilitate its use by businesses in the dairy sector.

Project scope

1.5 The project focused on trialling the Protocol with one dairy farm. The scope of the assessment was limited to the farm boundaries only, although account was taken of risks and opportunities beyond the ‘farm gate’, including the supply chain and wider farming/public context, where relevant.

Project approach

1.6 The project approach included the following tasks:

- Inception call to agree the aim, context and scope of the project.
- Preparation including desk-based review of evidence, including that relating to the dairy sector in Scotland.
- Implementation including initial engagement with the dairy farmer, a series of three on-farm meetings, a review of farm documents and data, analysis and assessment.
- Analysis and synthesis of results.
- Reporting and presentation.

Project outputs

1.7 The project outputs were as follows:

- Brief overview report (this report) to complement the overview report produced for the original Trial (dated 22 March 2018).
- Dairy farm business natural capital assessment; and
• Updated presentation

The dairy farm natural capital assessment and the updated presentation have been provided separately.

Structure of the report

1.8 The remainder of this report is split into three parts:

• Chapter 2 introduces the business involved and outlines the way in which the Protocol was applied.

• Chapter 3 summarises the findings from the business report and captures the feedback from the businesses and ourselves as the consultants.

• Chapter 4 sets out the conclusions and recommendations for consideration.
2 Business involved and Protocol application

Business involved

2.1 Dryfesdalegate Farm is a lowland farm with two main enterprises, dairy and beef, with associated crop production for feed and forage. The core farm is rented from Crown Estate Scotland. We set out below in Table 2-1 a summary of the farm enterprises included in the trial.

Table 2-1: Farm enterprises

<table>
<thead>
<tr>
<th>Business (location)</th>
<th>Farm/estate type</th>
<th>Area</th>
<th>Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryfesdalegate Farm</td>
<td>Lowland dairy farm</td>
<td>134 ha (plus 89 ha elsewhere)</td>
<td>Dairy: 238 Holstein Friesian dairy cows plus followers Beef: up to 400 beef cattle for finishing or selling on as stores Forage and Feed Crops: 101ha of permanent grassland 38ha temporary grassland 11ha of spring wheat 18ha of spring barley</td>
</tr>
</tbody>
</table>

Protocol application

2.2 The Protocol stages and steps – which formed the basis for the natural capital assessment and report for the business – together with details of how it was applied in practice, are outlined in Table 3-2. In broad terms, the Protocol was applied in the same way as during the original Trial. Differences this time included:

- Application of an established approach as opposed to developing the approach as we undertook the work.
- Streamlining of documentation used (e.g. meeting questions/guides).
- Exclusion of an assessment of gross impacts on natural capital and ecosystem services, instead focusing on net impacts over a defined time period.
- Greater focus on the strategic and technical context for the dairy farm to inform risks and opportunities.
- More specific farm-based actions for consideration, including farm plan.
- More photographs to help track changes in natural capital assets.
- Inclusion of two mini case studies focused on specific future natural capital opportunities for the business, as opposed to a retrospective case study.

2.3 The key outputs of the assessment are highlighted in bold in Table 2-2 and described in Table 2-3.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Step</th>
<th>Application / outputs</th>
<th>Meetings involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRAME: Why?</td>
<td>1. Get started</td>
<td>Introduced natural capital (NC) as a concept, the protocol and the project/trial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gathered information on the business/enterprises and became familiar with farm/estate.</td>
<td></td>
</tr>
<tr>
<td>SCOPE: What?</td>
<td>2. Define the objective</td>
<td>Discussed/agreed objectives for the farm/estate and anticipated business benefits.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Scope the assessment</td>
<td>Agreed scope of the assessment including organisational focus (farm/estate enterprises and activities) and boundaries (farm/estate boundaries).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Determine the impacts and/or dependencies</td>
<td>Produced NC asset register and ecosystem services (ESS) delivered by assets, integrating relevant public data. Brainstormed/reviewed key/material impacts and dependencies of farm/estate.</td>
<td></td>
</tr>
<tr>
<td>MEASURE AND VALUE: How?</td>
<td>5. Measure impact drivers and/or dependencies</td>
<td>Used data gathered to complete qualitative assessment of dependencies of enterprises on NC and ESS and net impacts of enterprises on NC and ESS over time/tenancy period, using colour-coded scoring. Prepared dependency and impact pathway diagrams for key farm/estate activities.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Measure changes in the state of natural capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Value impacts and/or dependencies</td>
<td>Produced two mini case studies focused on specific natural capital opportunities to enhance the business’s economic and environment performance.</td>
<td></td>
</tr>
<tr>
<td>APPLY: What next?</td>
<td>8. Interpret and test the results</td>
<td>Identified risks and opportunities associated with farm/estate dependencies and impacts. Reviewed and refined NC assessment with farmer / estate staff.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Take action</td>
<td>Proposed actions for consideration of farmer / estate staff.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-3: Natural capital assessment – description of key outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural capital asset register</td>
<td>Lists extent of assets (e.g. hectares of land) and condition, and identifies changes over time period (e.g. 2009-2019).</td>
</tr>
<tr>
<td>Assessment of dependencies of enterprises on Natural Capital (NC) and Ecosystem Services (ESS)</td>
<td>Scores the extent to which different enterprises are dependent (reliant) on NC and ESS.</td>
</tr>
<tr>
<td>Assessment of impacts of enterprises on NC and ESS over time/tenancy period</td>
<td>Scores the impacts of different enterprises on NC and ESS over a defined time period or tenancy period.</td>
</tr>
<tr>
<td>Dependency pathways</td>
<td>Illustrates how different enterprises depend on NC and ESS and how changes in these may impact positively or negatively on the business.</td>
</tr>
<tr>
<td>Impact pathways</td>
<td>Shows the ‘logic chain’ from business activity to impacts on NC and ESS and the costs and benefits associated with these impacts.</td>
</tr>
<tr>
<td>Case study</td>
<td>Demonstrates application of the Protocol to a specific project or intervention.</td>
</tr>
<tr>
<td>Risks and opportunities</td>
<td>Identifies business risks and opportunities related to NC and ESS dependencies and impacts.</td>
</tr>
<tr>
<td>Actions for consideration</td>
<td>Suggests actions for consideration to build on the assessment and realise benefits for the business.</td>
</tr>
</tbody>
</table>
3 Key findings

Business reports

3.1 The full findings of the natural capital assessment are included in the Dryfesdalegate Farm report. Key or 'headline' findings are set out below.

3.2 A summary of the key natural capital assets is shown in Table 3-1. There has not been any significant change in the extent of different natural capital assets on the farm over this period, but there has been an overall improvement in the condition of the productive land and hedgerow assets. Woodland and water assets have remained relatively stable. While most assets have a moderate status currently, watercourses have a poor status.

Table 3-1: Natural capital asset summary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Extent</td>
<td>Condition</td>
</tr>
<tr>
<td>Dairy &amp; beef enterprises</td>
<td>Temporary grassland (38 ha)</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td></td>
<td>Permanent grassland (60 ha)</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td></td>
<td>Hedgerows (0.2 km)</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td></td>
<td>Woodland (1 ha)</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td>Crop production</td>
<td>Arable land (30 ha)</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td>Other</td>
<td>Water (rivers, streams, 3.6 km)</td>
<td>➔</td>
<td>➔</td>
</tr>
</tbody>
</table>

Trend: “➔” = Improving/growing “➢” = stable “➔” = deteriorating/shrinking

Status: **Good**, **Moderate**, **Poor**

3.3 Dryfesdalegate Farm’s key natural capital dependencies include provisioning services – crop and livestock production; regulating services – local climate regulation, soil quality regulation, and disease and pest regulation; and cultural services – cultural heritage. The farm’s dependency on regulating and cultural services underpin the more obvious dependencies of crop and livestock production.

3.4 Over the past ten years of the tenancy, there have been medium positive impacts in terms of crop and livestock provisioning services, recreation and cultural heritage services, but mixed/negative impacts relating to several regulating services:

- Climate regulation services – an increase in cattle numbers is likely to have increased greenhouse gas emissions from the farm with negative impacts on global climate regulation. Local climate regulation may have improved as a result of hedgerow gapping up.
- Soil quality regulation services – farming practices such as careful grassland and crop management, better utilisation of manure and slurry, and spring crops / cover crops are likely to have improved soil quality.

Trial of Natural Capital Protocol with the dairy sector – Overview Report
9 October 2019
• Water quality regulation services - while stock numbers have increased, negative impacts on water quality are likely to have reduced with improvements in crop, stock and grassland management and investment in slurry storage, resource use etc.
• Wild species diversity - there is likely to have been a mixed impact on wild species diversity. A negative impact associated with increased stock numbers will have been mitigated by an increase in the extent and diversity of habitats and reduced inputs/pollutants.

3.5 A range of risks and opportunities relating to the natural capital on the farm were identified. They include risks and opportunities related to global/national drivers (e.g. climate change, and changes in schemes and trading arrangements associated with Brexit) through to site-specific issues (e.g. development of metrics for the estate/farm and the provision of a variety of 'public goods').

3.6 Similarly a range of actions were suggested for consideration including those relating to: internal data and reporting; working with partners and stakeholders; and funding and investment.

3.7 Some of the broad approaches to monetary valuation of the costs and benefits were described and demonstrated in more detail in the mini case studies at the end of the business report. The mini case studies focused on a specific future natural capital opportunities at Dryfesdalegate Farm:

• Improving soil and achieving better resource utilisation. Analysing soils and slurry/manure, and applying the latter in a targeted manner to meet crop/grass requirements, can improve soil, save costs and generate a range of other benefits. The cost-benefit ratio is positive, even without taking into account non-market values.

• Planting more hedges and trees. Planting additional lengths of hedgerow and/or gapping hedges, and the planting of more hedgerow trees can be beneficial for livestock shade, shelter and production as well as a range of regulatory and cultural ecosystem services. This, again, results in a positive cost-benefit ratio even before taking account of non-market values and available grants.

Farmer and estate staff feedback

3.8 We obtained feedback on the trial of the Protocol from the farmer, David Taylor, through a series of evaluation questions discussed at our third meeting.

Understanding and awareness

3.9 For David, as with many farmers, the linkages between the environment and their farm business is intuitive, but applying the Protocol helps to make those linkages explicit. He had not previously thought of the environment in terms of natural capital 'assets', but looking at his business through a natural capital framework has made him more aware of its impacts and dependencies. In particular it has widened his awareness of how his business affects other people/businesses:

"I realise there are more knock-on effects [of the farm management and activities] than I did in the past. Better awareness means a better image to convey to others. People
should be happier that farmers understand the implications of what they’re doing on the land”.

In the context of subsidy reform, based on the principle of ‘public payments for public goods’, and with consumers increasingly conscious of their environmental footprint, being better able to articulate the linkages between the farm business and the environment is likely to be helpful.

Besides introducing the general concept of natural capital assets, impacts and dependencies, applying the Protocol has also helped to change David’s mind-set around some specific issues: particularly buffer-strips, which he says he now sees “more of the benefits”.

3.10 When asked whether any new risks or opportunities had been flagged up, David suggested that applying the Protocol had certainly helped to “highlight them a bit more”. While risk and opportunity are factored into decision-making for farmers on a daily basis, the assessment helped to capture these in a more structured way. Soil health in particular has become more salient in David’s thinking, and he is very aware of the productive and environmental benefits of good soil structure – reducing drought-stress, improving nutrient retention, and reducing run-off for example. The impact pathways showing the ‘logic chain’ from business activity to impacts on natural capital, and the costs and benefits associated with these impacts, helped to make these interlinkages more explicit.

**Process**

3.11 The Protocol process made sense to David. When we had trialled the Protocol before, two of the businesses involved said that the process had been a bit opaque to begin with, but much clearer at the end. This was likely a function of the evolving application of the Protocol to land-based businesses through that trial. Having an established process made the assessment simpler. It also enabled us to better prepare David and give the direction of travel, thereby helping with understanding of the process and end result.

3.12 The main challenge identified by David was simply the time to engage with and input to the natural capital assessment – when the working day is already extremely busy, it is difficult to find the time to set aside and go through the assessment thoroughly. However, the results of the case study assessment show that there are potentially significant cost-savings from improving soil and achieving better resource utilisation, so it can be cost-effective to set that time aside. David concluded that he would “delegate a bit more, to give more time to make better decisions”.

3.13 David didn’t feel the process required any improvements: he said it made sense, was thorough, worthwhile, and easy to digest.

**Outputs**

3.14 When asked whether the report/framework adequately captures the value added to natural capital assets by the farms and the estate, David agreed – “as best it can, with the limited information given”. Some of the data requirements of the Protocol go beyond that routinely collected on the farm – for example, testing soil organic matter – and David could see that the assessment would provide a much more comprehensive picture if this data was available.
3.15 He felt that the business report, case study and framework were clear and useful, and that generally the outputs were helpful (including visuals such as tables, dependency/impact pathways and maps):

“They're more than adequate for me to get a view of what I should be doing and potential improvements”.

Outcomes (business)

3.16 There were some very concrete actions proposed by David when asked whether he would do anything differently in light of the assessment: specifically, soil sampling, and more hedgerow planting.

3.17 David agreed that the Protocol would help in terms of improving economic and environmental performance, and resilience. While most of the risks and opportunities are intuitive and are already being factored into decision-making – even if sub-consciously – it was felt that the Protocol does at least highlight / quantify / formalise the issues. David also recognised that the Protocol dovetails with existing tools and schemes such as farm assurance schemes and agri-environment schemes, and “adds extra”. He could see that it would give him evidence to support future agri-environment scheme applications, and while it might be helpful to link the Protocol more directly to the schedules/formats/terminology used in Basic Payment Scheme (BPS), he felt that it was “probably OK as is”.

3.18 It was generally felt that the Protocol had delivered the benefits identified at the beginning – David didn’t feel there was anything that had been missed out, although the data limitations have already been noted.

Outcomes (wider application)

3.19 When asked whether he would recommend the Protocol to a friend, David agreed that, if they were not already familiar with the concept of ‘natural capital’, it would certainly be helpful.

3.20 On the wider application or roll-out of the Protocol, David felt this would be beneficial. However, for wider circulation he felt that “a simpler version may be more welcome… this could be more attractive”. This has been taken into account in the final version of the farm report.

Overall experience

3.21 When asked to rate the experience of the trial on a scale of 1-10 (1 = very poor; 10 = very good), David’s response was as follows:

“9 or 10. Very thorough. Opened my eyes to some of things I have but wasn’t aware of. Also now know what things are beneficial and how, and what things are negative”.

Trial of Natural Capital Protocol with the dairy sector – Overview Report
9 October 2019
Consultants’ feedback

3.22 We have reflected on our experience delivering the trial of the Protocol, and set out our observations below:

Process and outputs

3.23 Having trialled the Protocol on land-based businesses before, and having developed and streamlined a process to follow, the assessment at Dryfesdalegate Farm was made considerably easier. It also enabled us to better prepare David and give the direction of travel, thereby helping with understanding of the process and end result.

3.24 The dairy sector is highly technical, with veterinary, welfare, environmental, and production best practice evolving rapidly. It was therefore important to invest time to ensuring that we were fully appraised on the sectoral and policy background, and were able to apply this to the assessment.

3.25 We tried to make the assessment as business-focused and business friendly as possible. This included breaking down the NC assessment to different elements of the dairy farming system (e.g. feed/forage crops, different grassland types etc). We also had to invest time in thinking around different aspects of the business/sector and specific opportunities that would make the most difference to the business and its natural capital.

3.26 Time availability was an issue for the farmer, both in terms of initial preparation and during the assessment – particularly when it came to the provision of additional data. This is not unique to the individual/business in question; dairy farmers tend to be very busy. In such a highly technical business, the involvement of the farmer is really important when it comes to understanding of the concepts and, to an extent, consideration of the issues, risks and opportunities. If the farmer had had more time available, we may have been able to explore some of the issues in greater depth.

3.27 The farm selected for the trial was a relatively typical dairy farm. Dairy farming is capital intensive, with a lot of fixed costs and expensive infrastructure. if the operational scale of the business is reduced by taking certain areas out of production, or by reducing stocking rates, their fixed costs will not generally reduce proportionately, so diminishing profit as productive capacity falls. The overall effects could be summarised as a combination of reduced output and increased fixed costs per useable acre. There is therefore a lot of financial pressure to maximise stocking rates, and more extensive (and more environmentally sensitive) systems are often not feasible. Dairy farms do not therefore tend to be particularly focused on environmentally friendly farming, and Dryfesdalegate Farm could not be considered at the leading edge, or an exemplar, in this regard. This meant that there was limited environmental data available to us to inform the NC asset register, and also no obvious examples of work undertaken on the farm that could be converted into case studies. We therefore developed two mini case studies on potential future natural capital opportunities for the farm.

3.28 We explored changes in dairy farming systems with both the farmer and the milk purchasing company, Arla. The farmer was not particularly interested in considering the move to pasture-fed or organic systems. Arla is developing a pilot sustainability scheme - ‘Arla 360’ – but this is restricted to only one or two contracts and is not being
3.29 We did not undertake an assessment of the gross impacts of the farm business on natural capital and ecosystem services, which simplified the process.

3.30 The importance of the scoping stage of the assessment should not be overlooked. It is critical to define, at the outset, the specific objectives of the assessment (i.e. what questions does the land manager/farmer want to answer or what types of decisions is he/she seeking to inform?). Having clearly defined objectives then makes it much easier to determine the appropriate spatial and temporal scope of the assessment.

3.31 As an observation, the Protocol was developed for organisations with industrial processes to understand the impact that they have on natural capital, whether locally or far away, in their upstream and/or downstream supply chain. However the scope of the trial was limited to the ‘farm gate’ (i.e. physical boundary of the farm or estate) (Step 03 of the Protocol). It did not look at the consumption of raw materials in the ‘upstream supply chain’, such as fertiliser and energy inputs and the impact they these have on natural capital elsewhere. Nor did it look at any impacts of the downstream supply chain (e.g. meat processing), such as consumption, pollution and waste. Additionally the project did not get into the level of detail of farm/estate carbon footprint calculations or water use analysis. This would have required additional resources or resulted in a restriction on the analysis which was undertaken.

3.32 The dependency/impact pathway diagrams were helpful and were particularly appreciated by the farmer. They helped to show the ‘logic chain’ from business activity to dependency/impact on natural capital and helped to make these interlinkages more explicit. The guidance provided in the Protocol around impact pathways clearly has more industrial/supply chain focussed businesses in mind, and does not strictly work for land based businesses. In our experience, we have found impact drivers were not necessarily inputs bought into the business - they are more likely to come directly from the land, or be activities undertaken by the land manager. We therefore continued with a more practical approach to what should be considered impact drivers.

3.33 The project-specific case studies worked well. It is easier to assess changes in natural capital and ecosystem services with specific interventions, than more broadly: there was more detail in relation to the activity and the impacts tended to be focused on a smaller number of natural capital assets and ecosystem services. That said, lack of baseline and other data meant that there was a limit to the type and extent of economic valuation that could be undertaken.

Data

3.34 There was limited farm-specific environmental data available for Dryfesdalegate Farm. This was due to a combination of factors, including the availability of the farmer, the

---

1 Pers.Comm. with Hannah Harrison, Farmer Relations, Arla, 2.8.19; see also https://www.arlafoods.co.uk/about-arla/; https://indd.adobe.com/view/72ff1a36-d4a2-4441-82f5-5c0f1e5f464f.

2 https://www.arla.com/company/responsibility/farm-quality/arlagaarden/
fact that environmental issues have not been the farmer’s focus to date, and that there are few environmental KPIs required by dairy companies as part of their contracts.

3.35 There was a lack of publicly available data on the natural capital assets and ecosystem services specifically relating to the farm. Relevant public datasets were scoped and data sourced where possible. For natural capital assets, this applied particularly to condition data. Lack of baseline data also limited the assessment of changes over a time period. Data on ecosystem services and/or their impact drivers was not readily available. Data which was available online without specialist GIS support would have been limited to mainly map data – as opposed to quantitative data – sourced principally via Scotland’s environment web https://www.environment.gov.scot/.
4 Conclusions, recommendations and implications for policy

Conclusions

4.1 We have already seen how the Protocol can be applied to some land-based businesses. The extension of this trial has demonstrated that it is also possible to apply the Protocol to a conventional dairy farm. A lot of the same conclusions can be drawn from this project:

- Integrating the business overview and generic assessment. It was useful to provide a business overview and generic assessment of the natural capital assets and ecosystem services provided on the farm/estate to inform the subsequent analysis. However these elements do not fit naturally into the Protocol stages and steps.

- Gauging which impacts to assess. Assessing the impacts of a farm on natural capital and ecosystem services over a defined time period was more useful for a specific business/enterprise, than assessing gross impacts.

- Impact or dependency? In some instances – and for crops and livestock in particular – it was difficult to distinguish between impacts and dependencies.

- Obtaining the data. There was limited readily available data on natural capital condition in particular, and minimal data on ecosystem services.

- It was much easier to apply the Protocol to a specific project or activity, as set out in the case studies, than more broadly. The logic and Protocol stages and steps worked better for the case studies.

- Based on the feedback received, the Protocol should result in more informed decision-making and new or different activities with the business involved, especially as it is not currently particularly environmentally friendly. There is a range of factors that will influence future direction and investment, including market forces, government funding and, with a let farm, security of tenure.

- Enhanced economic and environmental performance and greater resilience is likely to be supported by improved understanding and awareness. This will strengthen links across to existing agri-environment and assurance schemes, guide future thinking and actions, and help farms and estates get ready for a new policy and schemes and new trading arrangements post-Brexit.

4.2 There are some additional conclusions that are specific to the dairy farm context:

- The Protocol can be applied to different land-based businesses, including a conventional dairy farm. However, with the subject farm, a mainstream dairy farm, a combination of lack of available relevant data and available time, made the assessment a bit more challenging.

- The Protocol is useful for conventional dairy farmers. The farmer’s understanding of natural capital and ecosystem services has certainly grown, even with the
limitations already mentioned. The farmer was interested in and engaged with the assessment, and this grew over the period of the project. He was also interested and enthusiastic about the opportunities identified, but he may require some additional support in the implementation of the findings of the assessment, including specific opportunities. This is due primarily to a lack of time and less familiarity with the subject matter. This could potentially come from the landowner’s side, independent advisor, or dairy company field officer.

- The time required to undertake the dairy trial was a bit longer than anticipated. This is because we needed to familiarise ourselves with the Scottish dairy context, and the fact we invested a lot of time and effort in ensuring the assessment was sector and business focused/friendly.

Recommendations

4.3 The recommendations set out in the overview report produced for the original Trial hold true. However, there are a few additional recommendations for consideration going forward:

- Streamline/simplify the NC assessment further so that it has wide appeal for busy farmers (on the basis that ‘less is more’)
- Integrate the NC assessment into business planning /business strategy i.e. this could be a natural capital assessment ‘plus’ or value added.
- Work with the dairy sector in Scotland to encourage dairy companies to do more and better in terms of taking account of environmental assets and opportunities, in particular ensuring the integration of a NC approach and thinking at farm level into dairy company schemes, conditions, guidance and support, and giving more dairy farmers the opportunity to benefit from such initiatives.

Implications for policy

4.4 The implications for policy are as set out in the original overview report.