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**GLEN COUL ESTATE** 

NATURAL CAPITAL ASSESSMENT

**MARCH 2022** 





### GLEN COUL ESTATE, WEST ROSS NATURAL CAPITAL ASSESSMENT I<sup>ST</sup> MARCH 2022

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#### NATURAL CAPITAL ASSESSMENT



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## GLEN COUL ESTATE: NATURAL CAPITAL ASSESSMENT EXECTIVE SUMMARY

Glen Coul Estate comprises approximately 441 ha (1,090 acres) and is located to the south of Unapool in Assynt, north-west Scotland. The property is typical of the area and comprises largely of wet heath, blanket bog with some open water and native woodland. A significant area of the site forms part of the Loch Glencoul SSSI designated for its exposures of Moine geology and its fragments of upland birchwood.

A Natural Capital Assessment was carried out in 2022 to cover the period 2000-2020. The assessment was carried out using the Natural Capital Protocol. A number of metrics were collated to make the assessment. Broad habitat was mapped and measured. Little change has taken place on the estate over recent years, although a number of potential opportunities have been identified. This assessment provides a baseline from which future changes can be measured and progress quantified.



The property was found to be rich in biodiversity with a high natural capital value, including areas of deep peat, native woodland, freshwater lochs, running water and foreshore. Opportunities were identified that would increase the natural capital value. Primarily, these were in the areas of peatland restoration and native woodland creation. In both cases these also provided the opportunity to increase income to the estate through registering the captured carbon from these schemes.

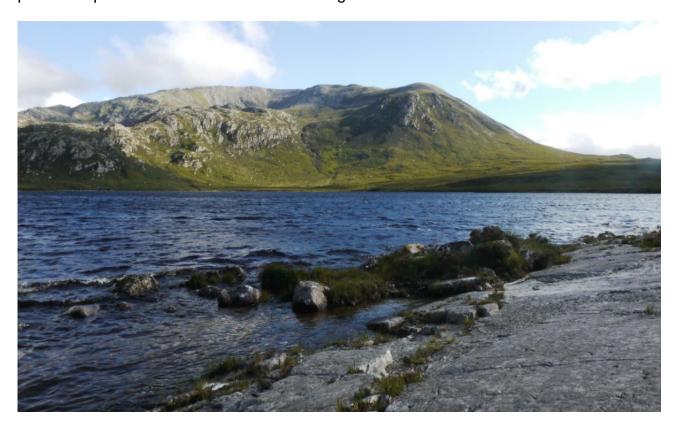
In summary it is estimated that there are opportunities to restore around 30 ha of degraded peat and create 20 ha of new native woodland. This would potentially result in 4,500 tonnes of emissions reduction in terms of peatland carbon and the sequestration of 5,000 tonnes of atmospheric carbon from the woodland creation. Both schemes could be funded to a greater or lesser degree by existing government funding schemes. Using a nominal value of £10 per tonne for carbon sales this could raise an additional £95,000 from carbon sales.



#### I. INTRODUCTION

Glen Coul Estate comprises approximately 441 ha (1,090 acres) and is located to the south of Unapool in Assynt, north-west Scotland. The area sits on the eastern side of the A894 trunk road running from Lairg to Unapool. A significant part of the property is taken up by the Loch Glencoul SSSI which is designated for its exposures of Moine geology and also its assemblage of remnant upland birchwoods.

The topography is typical of the Moine landscape of the Assynt area with a series of low, rounded, craggy hills rising from blanket bogs and smaller lochs. At the side of the A894 is a car park which provides access to the waterfall issuing from Loch Na Gainmhich.



The general patterns of soils are drifts derived from Lewisian Gneisses principally of the Moine Series. These exposures are often close to the surface on the slopes but lie buried deep beneath the peat where the topography levels out.

The general site class of the area at the level of the woodlands is cool, moderately exposed and wet. The area is moderately exposed with a DAMS score of approximately 13. Accumulated temperature is 992.

Informal/



Informal recreational users are welcome in accordance with the Land Reform (Scotland) Act (2003) and the Scottish Outdoor Access Code (SOAC).



It is an aspiration of the owners to measure progress against environmental and financial objectives, and to identify opportunities for optimising both in the future. While the traditional outputs of produce are relatively straightforward to capture, the wider environmental impacts of these practices have been more elusive. To this end, a Natural Capital Assessment has been commissioned. This assessment follows the four stages outlined within the Natural Capital Protocol. More detail on the Protocol can be found at Appendix IV.

#### 2. **STAGE I- FRAMING**

The purpose of this report is to undertake a baseline survey of the natural assets of the property dating from the point of purchase, and to measure progress in the intervening period. The report also considers the property's impact and dependencies upon Natural Capital assets and associated ecosystem services in order to identify associated risks and opportunities in the future. The report concludes with a suite of potential actions based on the strategic objectives of the property and the outcome of this Assessment.

#### 3. STAGE 2 - SCOPING

#### 3.1 Objectives of the Project

The objectives of the owners are:-

To develop and maintain an estate that is financially viable, but which also sees growth in economic and natural capital. There is a consistent move toward land management practices that promote ecological landscape functioning.

3.2/



#### 3.2 Natural Capital Assessment Objectives

The objectives of this Natural Capital Assessment are as follows:-

- identify, locate and quantify the baseline Natural Capital Assets of the property;
- inform decision making for charting future growth in Natural Capital;
- identify opportunities and risks to the property's Natural Capital Assets;
- support the business to be better prepared to take advantage of environmental funding and emerging natural capital markets;
- chart changes in Natural Capital across the property using rigor and replicable data capture techniques.

#### 3.3 Stakeholders

This report is primarily for use within the business of the property and shall be used as a mechanism by which the aspirations and objectives are monitored over time.

A number of stakeholders are identified below. Engagement with these individuals and organisations is fluid and shall be conducted at a level appropriate to their interest and comprehension of the process. There are a number of mechanisms already in place through which these stakeholders have interaction with the functioning of the property.

Table 1 - List of Stakeholders

| Individuals      | Businesses       | Other Organisations           |
|------------------|------------------|-------------------------------|
| Estate owners    | Adjacent estates | Scottish Forestry             |
| Local neighbours |                  | Historic Environment Scotland |
|                  |                  | NatureScot                    |
|                  |                  | SEPA                          |
|                  |                  | The Highland Council          |

#### 3.4 **Scope of the Assessment**

The assessment will cover the whole of the property and seek to identify the broad composition and structure of the key Natural Capital Assets of the property. These are listed in the Natural Capital Asset Register (see Table 2).

#### 4. STAGE 3 - MEASURING AND VALUING

#### 4. | Natural Capital Assets

Following an inspection of the property and using the available baseline data, the key Natural Capital Assets of the property are listed below. A plan showing the location and extent of each Natural Capital Asset can be seen on Map 2 which show the spatial distribution of each category in 2022.



<u>Table 2 – Natural Capital Asset Register as of 2022</u>

| Asset                              | Comment (including area in hectares)             |
|------------------------------------|--|
| Estate landholding                 | 441 ha   |
| Arable                             | None   |
| Permanent pasture                  | None   |
| Hedgerows                          | None   |
| Broadleaved woodland               | 9.9 ha. Upland birchwood fragments - SSSI status |
| Conifer woodland                   | None   |
| Riparian woodland                  | None   |
| Blanket bog (Class 1) <sup>1</sup> | 88 ha  |
| Blanket Bog (Class 2)              | 114 ha   |
| Rough grazing (deer forest)        | 411 ha   |
| Freshwater lochs                   | 31 ha (one at 30 ha and one at 1 ha)             |
| Foreshore                          | 2.4 km   |

To identify the broad composition and structure of the key Natural Capital Assets of the property, this assessment uses quantitative and qualitative assessment of Natural Capital Assets at the property level. This assessment also considers any specific management actions currently undertaken to expand, enhance or improve the Natural Capital Assets of the property and give an indication of their success, e.g. woodland, peatland or agrienvironment schemes.

#### 4.2 Baseline Measurement and Trends over Time

Table 3 - Baseline Summary and future potential

|  | Unit of |      | Future    |
|--|---------|------|-----------|
| Asset  | Measure | 2022 | potential |
| Estate Landholding   | ha      | 441  | 441       |
| Permanent pasture  | ha      | 0    | 0         |
| Broadleaved woodland <sup>2</sup>                              | ha      | 9.9  | 30        |
| Potential UKWCC Registered Carbon <sup>3</sup>                 | tonnes  | 0    | 5,000     |
| Degraded deep peat   | ha      | 32   | 2         |
| Restored deep peat   | ha      | 0    | 30        |
| Potential CO <sup>2</sup> emissions reduction-through peatland | tonnes  | 0    | 4,500     |
| restoration <sup>4</sup>                                       |         |      |           |

<sup>&</sup>lt;sup>1</sup> Classification taken from Nature Scot Peatland 2016 Survey. Classes 1 and 2 as follows

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Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.

Class 2 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential.

<sup>&</sup>lt;sup>2</sup> Includes open space as an integral part of woodland environment.

<sup>&</sup>lt;sup>3</sup> Relates to carbon registered under the UK Woodland Carbon code. This has been in existence since 2015.

<sup>&</sup>lt;sup>4</sup> Calculated using gross area of degraded peat being potentially all restored. Calculations notional based on the Peatland Code Emissions calculator (v. 1.2).



#### 4.3 **Impacts and Dependencies**

The way in which these assets are managed impacts on the ability of those assets to deliver the various "ecosystem services" (see Appendix II). This in turn can impact on the ability of the natural assets to facilitate the business activities of the property, be that farming or sporting, for example.

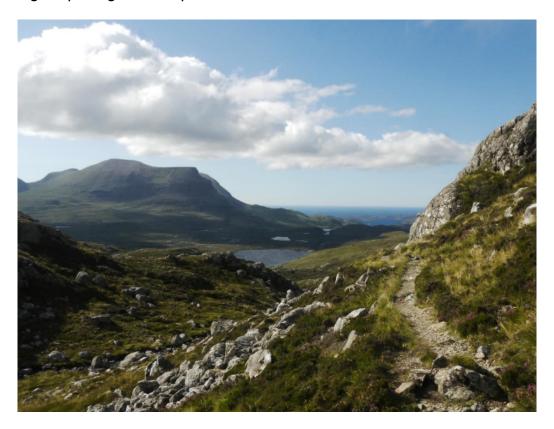


Table 4 below, shows how the management of Natural Capital Assets has an impact on the delivery of ecosystem services. Table 5 turns this concept around and shows how the business activities are impacted by the ongoing provision of these ecosystem services. This allows us to visualise which Natural Capital Assets are most important or most valuable in the context of the property. What becomes clear through this analysis is that key functions of the estate business are inextricably linked with how Natural Capital Assets are managed and the continuing delivery of ecosystem services in the wider environment.

#### 4.4 Review of Natural Capital Assets and Ecosystem Services

Tables 4 and 5 highlight the relationship between the Natural Capital Assets of the property and the services that flow from these. Of particular importance at Glen Coul is potential for the management of peats and blanket bog and also of native woodland management/



management and expansion. In terms of keeping these in balance it is not only the management of each asset which is key, but also the spatial distribution and relationship of each part in relation to the whole. In this instance, increasing the total amount of any one asset will not necessarily result in an overall gain in the ability of the estate to achieve its goals.

Fortunately, the opportunities for proactive peatland management and the expansion of native woodlands are mutually exclusive and entirely compatible. There is now robust legislation and guidance around the establishment of woodland in relation to deep peats. This is actively discouraged and only areas of shallow peats (under 50cm) are considered for grant aid and carbon registration.

Also contributing to the ecosystem services and overall natural capital are the 30 ha freshwater oligotrophic Loch Na Gainmhich from which issues an impressive waterfall. Also noteworthy are the 2.4 km of saltwater foreshore lining the western shores of Loch Glencoul and Loch Beag.

#### 4.5 Measuring Gains via the Biodiversity Metric 3.0

The figures in Table 3 indicate that key elements of Natural Capital on the estate have been increasing or decreasing over the period of evaluation. However, it is not always straightforward to weigh the gain in one habitat in comparison to the loss of another. To address this, the Biodiversity Metric (currently 3.0) has been developed. This tool measures changes across a number of habitats and evaluates the impacts relative to a baseline.<sup>5</sup>

In the case of Glen Coul, the baseline is considered as of 2022. Consideration is then given to the potential for future enhancements in terms of peatland restoration and native woodland expansion as suggested in Table 3.

In summary there is potential to increase the habitat potential of the site. Given that the site already has a significant biodiversity value, the gains are modest. Combining the potential for peatland restoration alongside the opportunities for native woodland creation and enhancements to the existing woodlands, an overall increase of 1.37% to the biodiversity value could be achieved.

| - | <u>Table/</u> |   |  |  |
|---|---------------|---|--|--|
|   |               | • |  |  |

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<sup>&</sup>lt;sup>5</sup> Developed by DEFRA.



## <u>Table 6 potential changes in Biodiversity values: Glen Coul Estate 2022 baseline.</u>

| Net project biodiversity unit<br>(including all on-site & off-site habitat retention/crea           | Habitat units<br>Hedqerow units<br>River units | 49.72<br>0.00<br>0.00   |      |  |  |  |
|---|--|-------------------------|------|--|--|--|
| Total project biodiversity % cha<br>(including all On-site & Off-site Habitat Creation + Retained H | Habitat units<br>Hedgerow units<br>River units | 1.37%<br>0.00%<br>0.00% |      |  |  |  |
| Combined habitat retention and enhancement  Habitats Hedgerows Rivers                               |  |                         |      |  |  |  |
| Total area / length   | 440.90   | 0.00                    | 0.00 |  |  |  |
| Total units   | - J  |                         |      |  |  |  |
|   |  |                         |      |  |  |  |
| Area / length retained  | 381.00   | 0.00                    | 0.00 |  |  |  |
|   | 3181.60  | 0.00                    |      |  |  |  |
| Units Retained  | 5100   | 0.00                    | 0.00 |  |  |  |
| Units Retained  | 0101.00  | 0.00                    | 0.00 |  |  |  |
| Units Retained  Area / length proposed for enhancement  | 39.90  | 0.00                    | 0.00 |  |  |  |
|   |  |                         |      |  |  |  |
| Area / length proposed for enhancement  | 39.90  | 0.00                    | 0.00 |  |  |  |
| Area / length proposed for enhancement  | 39.90  | 0.00                    | 0.00 |  |  |  |



## Table 4 - The impact of natural assets on ecosystem services at Glen Coul Estate

| Impact | Relative   | High | Medium | Low | Not applicable |
|--------|------------|------|--------|-----|----------------|
|        | importance |      |        |     |                |

|                         | Provisioning services |               |        |                  |                            | Regulating services |                     |                  |                 |             |                              | Cultural Services     |                            |                   |          |
|-------------------------|-----------------------|---------------|--------|------------------|----------------------------|---------------------|---------------------|------------------|-----------------|-------------|------------------------------|-----------------------|----------------------------|-------------------|----------|
| Asset                   | Livestock             | Wild<br>foods | Timber | Water<br>quality | Water<br>flow <sup>6</sup> | Climate regulation  | Flood<br>regulation | Water<br>quality | Soil<br>quality | Air quality | Pests and disease regulation | Ecological resilience | Public access & recreation | Landscape quality | Heritage |
| Permanent pasture       |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Broadleaved<br>woodland |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Conifer<br>woodland     |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Riparian<br>woodland    |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Peats and wetlands      |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Rivers/<br>lochs        |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |
| Foreshore               |                       |               |        |                  |                            |                     |                     |                  |                 |             |                              |                       |                            |                   |          |

<sup>&</sup>lt;sup>6</sup> For hydro-electric power generation.



#### 4.6 Summary of Changes in Natural Capital Asset Value

As measured between the current baseline and a potential future state, several areas stand out, presenting an overall increase in the value of the Natural Capital asset.

The site contains a significant area of blanket bog and upland peat. This contains high stocks of carbon as well as having significant biodiversity value. The important Moine landscape also contains important fragments of upland birch woods, although these have become scattered and fragmented.

There are opportunities to restore approximately 30 ha of degraded peat. This will enhance the carbon storage, biodiversity value and ecosystem functioning of this internationally rare habitat.

In addition, there is the opportunity to create new native woodland, albeit on a modest scale. A focussed woodland creation programme would have the twofold effect of reversing the fragmentation of the existing remnants, but also (through fencing) would reduce the deer pressure and create the conditions to promote natural regeneration. In the longer term this would create opportunities for winter deer shelter, which in turn would reduce winter mortality.

Both these projects represent opportunities for grant funding from NatureScot and Scottish Forestry, and could also provide significant opportunities for carbon trading (see below).

Whilst this has not been studied in any detail, consideration might be give to the potential for hydro-electric generation. There is certainly potential from either of the freshwater lochs and potentially from other watercourses across the site.

#### 5. STAGE 4 - APPLYING NEXT STEPS

This assessment has identified the Natural Capital Assets of the property and shown the dependencies on natural capital for the property's business enterprises. Before presenting what further measures might be taken, it is worthwhile reflecting on what risks and opportunities might emerge in the future. In the light of this assessment, the following risks and opportunities have been identified.

5.1/



#### 5.1 Risks and Opportunities

Given the extent of the property and the range of business activities it is engaged in, there are a number of risks and opportunities that may have an effect going forward. These can be considered at the wider scale or at the property level.

As can be seen below, the majority of the opportunities occur at property level, whereas the majority of the risks and uncertainties are those at the national/global level.

<u>Table 7 - Property Level Risks and Opportunities</u>

| Risks                             | Opportunities                             |
|-----------------------------------|---|
| Risk of grant support removal for | Preparatory alignment with the likely     |
| peatland restoration and woodland | direction of travel with agricultural     |
| creation.                         | policy.                                   |
|                                   |   |
|                                   | Opportunities for woodland creation       |
|                                   | and carbon sequestration/trading.         |
|                                   | Opportunity for peatland restoration      |
|                                   | with funding from NatureScot.             |
|                                   | Opportunity to create better winter       |
|                                   | shelter for deer, thereby reducing        |
|                                   | winter mortality.                         |
|                                   | Better pollination through restoration of |
|                                   | peatlands and creation of broadleaved     |
|                                   | woodlands.                                |
|                                   | Private funding could be sourced for      |
|                                   | investment in natural capital, supported  |
|                                   | by initiatives such as the Woodland       |
|                                   | Ćarbon Code.                              |

Table 8 - Wider Level Risks and Opportunities

| Risks                                     | Opportunities                         |
|---|---------------------------------------|
| Changes to farming subsidies arising from | Increasing interest in carbon trading |
| Brexit.                                   | and woodland expansion.               |
| Changes in land management legislation.   | Opportunities to tie into agri-       |
|   | environment schemes with pro-active   |
|   | planning.                             |



| Rise in operational costs arising from Brexit.                                   | Diversification of the estate income across different land use assets will help with economic resilience of the estate.              |
|--|--|
| Impacts of climate change on provisioning services.                              | Future policy is likely to be focused on 'public payments for public goods' — and strongly aligned to the concept of natural.        |
| Economic uncertainty and instability arising as an impact of COVID -19 pandemic. | Payments for ecosystem services, for example in relation to water quality and flood management, may also become available in future. |

#### 5.2 Next Steps

#### 5.2.1 Potential Future Actions

The following list of measures are presented as options for future management. These are not exhaustive, essential, or mutually dependent, but rather represent opportunities for improving the quality of the Natural Capital assets of the property. It is very much the gift of the owner to decide how and which of these options to move forward and what pace.

#### Woodland Creation

While the existing native woodlands form part of an SSSI, they have become fragmented and vulnerable. It is proposed that a new woodland creation scheme could be contrived that would fence in a significant area of the existing woods and into which a younger, complimentary plantation could be established. This would enable the existing woods to be protected from deer, be re-connected ecologically, and be provided with the opportunity to regenerate naturally. It is considered that around 20 ha of new native woodland could be created. This would have the added benefit of improving the quality of the local landscape.

#### • Peatland Restoration

It is calculated that around 32 ha of the peat bogs are showing signed of active erosion. As well as disrupting the ecological functioning of the bog itself, the process also results in the release of carbon into the atmosphere. Through sympathetic/



sympathetic peatland restoration these processes can be reversed. On an initial study it is estimated that around 30 ha of actively eroding peat bog could be restored.

#### 5.2.2 <u>Funding Opportunities</u>

There are a number of funding streams that would offer opportunities for the Glen Coul Estate to further its objectives in terms of Natural Capital.

#### Woodland Funding

There is currently good support for the creation of native woodland in key areas such as this. The regular Forestry Grant Scheme is modest in its support and it is unlikely that any scheme would break even in its own right. The addition of carbon sales would be a key element to bridge the funding gap. In addition to the standard Forestry Grant, use could be made of the SSSI status and the fragments of existing native woodland as cited element of the designation. This opens the gate to additional funding to protect these fragments, particularly with regard to deer fencing. Any potential scheme should certainly look to combine the Woodland Establishment Grant with the Woodland Improvement Grant.

In addition to the normal Forestry Grant Scheme, Woodland Trust offer grant for smaller woodlands. This grant is offered in addition to and irrespective of any Forestry Grant Scheme that might be in place. It takes the form of the supply of trees, tubes and stakes up to 75% of their value. This may not be applicable in all cases but should be explored as part of the overall options.

Any woodland creation projects would be eligible for registration under the UK Woodland Carbon Code. This provides opportunities for the sale of carbon in advance or in the future. Projects need to be registered prior to planting taking place.

#### **Peatland Action Funding**

Funding from the Scottish Government primarily supports on-the-ground restoration activities. This includes installation of peat dams in man-made ditches to increase water levels, allowing the peat-building mosses, called sphagnums, to re-establish. It also supports more novel techniques, such as peat hag re-vegetating, by using the surrounding vegetation to stabilise the bare eroding peat.

Any/

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Any peatland restoration is eligible for registration under the UK Peatland Carbon as with Woodland Carbon. In this case, income from the sales of peatland carbon are likely to be significantly more than that of woodland carbon.

#### 5.2.3 Ongoing Monitoring and Evaluation

Some further investigation and consideration of the options above will be required.

There is an opportunity to use the results to inform scheme applications to fund high-value Natural Capital Assets, and/or enhancements to natural capital.

There will inevitably be a period of evaluation of the proposals and consideration of the options given above. Evaluation, planning, budgeting and implementation takes time, and it may be three to five years before any meaningful progress could be measured where proposals have been taken forward.

Continuity of management at Glen Coul has provided the opportunity to establish a good range of baseline data which is now replicable and may be projected over time. It is proposed that this process is repeated in five years.

In the intervening period, this report should be used as an aide memoire and working document for the exploration of options.

Report prepared by: Ben Lennon Ist March 2022

BL/BL/AM 3900 18<sup>th</sup> April 2022



#### APPENDIX I

## **GLOSSARY**



Where available, definitions are taken directly from the Natural Capital Protocol.

| Baseline                   | In the Protocol, the starting point or benchmark against which changes in natural capital attributed to your business' activities can be compared.  |
|----------------------------|---|
| Biodiversity               | The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (UN 1992). |
| Ecosystem services         | The Millennium Ecosystem Assessment defines these as "benefits people obtain from ecosystems".  |
| Natural capital            | The stock of renewable and non-renewable natural resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people.  |
| Natural capital dependency | A business reliance on or use of natural capital.   |
| Natural capital impact     | The negative or positive effect of business activity on natural capital.  |



APPENDIX II

## **ECOSYSTEMS SERVICES INFO**

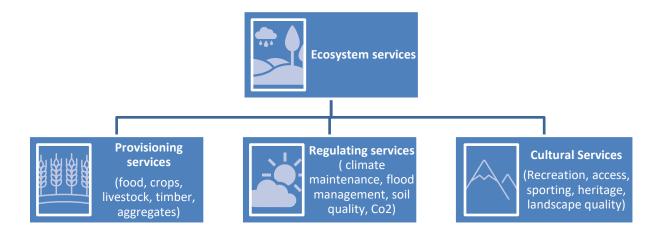


#### **ECOSYSTEM SERVICES**

The assets listed within this report provide a range of ecosystem services that are deemed of value to society. The way in which these assets are managed are directly correlated to their relative benefit. From these assets, the business activities of the estate arise, largely in the form of provisioning services. This in turn gives rise to the financial income of the property. However, these provisioning services form part of a wider range of benefits collectively termed Ecosystem Services. Many of these have no direct correlation with financial value, yet they provide the ecological foundation that allows for the continued provision of the business activities.

These can be divided into three categories;-

- Provisioning Services;
- Regulating Services;
- Cultural Services.



#### a) Provisioning Services

These are the outputs from land management activities that have been focused primarily in the past and represent the produce from the land such as food, timber, raw materials and water. The benefits of provisioning services tend to accrue a specific agent such as the landowner, although the sale of the benefits will extend to all in the supply chain (e.g. sale of food or timber).

b)/



#### b) Regulating Services

These are the services that are provided by the assets in terms of their role in regulating certain aspects of the environment such as flood mitigation, pollination, climate regulation or carbon sequestration. These services may have some localised benefit such as flood mitigation and localised pollination. However, they tend to form part of a wider fabric of ecological interdependencies on which society at large is dependent.

#### c) Cultural Services

These are largely those services that are consumed directly by society through human experience. While there are many types of cultural experience of the natural world, at Glen Coul these are primarily provided by landscape quality and public access to the land. These services generally benefit an individual consumer through direct experience (informal recreation, observation of the landscape). However, there is a wider benefit to culture and society as being conserved an enhanced for future generations.

#### **IMPACTS AND DEPENDENCIES**

Ecosystem services arising from the assets of one particular property may in some cases be readily identifiable, particularly in the case of provisioning services (e.g. crops, livestock, timber). However, in most cases they exist as part of a much wider common poll of services and resources. At the other extreme this is in terms of climate. Therefore, impacts and dependencies are not often found to be equal.

The way assets are managed impacts on the ability of those assets to deliver the various ecosystem services. This in turn can impact on the ability of the natural assets to carry out the business activities of the property. They can also impact on the ability of neighbours to carry out their activities. Collectively these can impact on the ability of society at large to meet its needs.

Table 4 shows how the ecosystem services are reliant on ecosystem services. Table 5 turns this concept around and shows how the business activities of the property are impacted by certain of the ecosystem services. Of these the regulating services stand out as being the most important as these are ones that permit the provisioning services to take place.



#### APPENDIX III

# QUANTITATIVE AND QUALITATIVE ASSESSMENT OF NATURAL CAPITAL ASSETS



## QUANTITATIVE AND QUALITATIVE ASSESSMENT OF NATURAL CAPITAL ASSETS

Table 9 - Quantitative and Qualitative Assessment of Natural Capital Assets at the Property Level

| Asset (Broad<br>Habitat Level) | Quantitative<br>Measure<br>Gross Level | Indicator of Success  | Qualitative<br>Measure   | Justification for Inclusion  |
|--------------------------------|--|-----------------------|--|--|
| Arable land                    | Area (ha)                              | Maintain/<br>decrease | Soil structure and composition survey/Agrienvironment measures | Overall, a conversion to less intensive land use is considered desirable. Focussed in key locations due to nitrogen sensitivity and run-off impacts. |
| Permanent pasture              | Area (ha)                              | Maintain/<br>increase | Soil structure and composition survey                          | An overall increase considered desirable to stabilise soils and reduce CO <sub>2</sub> emissions.  |
| Woodland                       | Area (ha)                              | Maintain/<br>increase | Invasive species present?                                      | An overall increase desirable to increase CO <sub>2</sub> sequestration, improve ecological permeability.  |
| Hedgerows                      | Length (km)                            | Maintain/<br>increase | Composition and diversity                                      | An overall increase desirable to provide pollination source, habitat enhancement and ecological permeability.  |
| Wetlands and ponds             | Area (ha)                              | Maintain/<br>increase | Maintained and undrained?                                      | An overall increase desirable to provide habitat enhancement and ecosystem functioning.  |
| Ponds                          | Area (ha)                              | Maintain/<br>increase | Invasive species present?                                      | An overall increase desirable to provide habitat enhancement and ecosystem functioning   |



APPENDIX IV

## THE NATURAL CAPITAL PROTOCOL



#### THE NATURAL CAPITAL PROTOCOL

The Natural Capital Protocol has been produced by the Natural Capital Coalition. This represents a standardised framework for businesses to identify, measure, and value their impacts and dependencies on natural capital. The framework is designed to help generate trusted, credible, and actionable information about how businesses interact with the environment. Using this information allows business managers to make informed choices about day to day and longer-term management where these may have been absent in the past.

Whereas the protocol avoids being prescriptive regarding outcomes, it focusses on following a series of analytical steps in achieving and understanding of the business/environment interaction. The four stages are:-

#### a) Frame

• Why carry out the assessment?

#### b) Scope

- Define the objective.
- Scope the Assessment.
- Determine the impacts and/or dependencies.

#### c) Measure and Value

- Measure impact drivers and/or dependencies.
- Measure the changes in the state of Natural Capital.
- Value impacts and/or dependencies.

#### d) Apply

- Interpret and test results.
- Take action how to move forward.



### **MAPS**

