JAHAMA HIGHLAND ESTATES: FACING THE FUTURE WITH NATURAL CAPITAL

INTRODUCTION

We have been developing a natural capital approach to the management of the JAHAMA Highland Estate over the last two years. This paper describes the estate and summarises the work we have been doing to establish a baseline. It also reviews the difficulties we have encountered and proposes some wider suggestions for further development.

INTRODUCTION TO GFG

The GFG Alliance is a collection of global businesses and investments, owned and led by Sanjeev Gupta and his family. Sanjeev is an international businessman, industrialist and the Executive Chairman of the GFG Alliance. He holds an MA in Economics and Management from the University of Cambridge, and is supported with responsibilities across GFG's industry brands and key functional areas by an accomplished and experienced global leadership team.

GFG's core values are positive change, family and sustainability. The Alliance is structured into three main industry brands: LIBERTY Steel Group, ALVANCE Aluminium Group and SIMEC Energy Group, independent of each other yet united through these shared core values to create a sustainable future for industry and society.

Besides its main industry brands, the GFG Alliance holds investments in financial services, property and other specialist businesses within a Family Office. The Family Office also contains the GFG Foundation, a registered charity founded by Sanjeev and his wife Nicola that aims to develop industrial skills among young people.

The GFG Alliance employs 35,000 people across 30 countries and has revenues of USD $20bn. A leader in sustainable industry, the Alliance has set a mission to become carbon neutral by 2030. Its economically sustainable business model focuses on making industries profitable for the long term, allowing for sustainable development in local communities. The Alliance's strategy is driven by four key trends: increasing demand for steel and aluminium, the urgent need to decarbonise these sectors, the decline of traditional manufacturing industries in developed economies and the need to be competitive in a changing world. Our approach enables us to identify opportunities and drive forward positive change in our sectors.

In practice, this means modernising industrial sites that have been left behind, establishing partnerships with employees to create self-determined change and transforming manufacturing processes by harnessing renewable power and agile production. In turn, this leads to lower costs, reduced emissions and sustainable profits to secure long-term employment within our operational communities.

GFG AND THE JAHAMA HIGHLAND ESTATE – REASONS FOR OWNERSHIP AND OBJECTIVES OF MANAGEMENT

JAHAMA Highland Estates (JHE) is a multi-enterprise rural business extending over 114,000 acres of Lochaber and Badenoch in the Scottish Highlands. Part of the GFG Alliance and owned within the SIMEC industry brand, JHE is managed on the principles of sustainable development for the benefit of local communities, the environment, and the economy.

The landholding now known as JAHAMA Highland Estates was originally brought together to secure the water catchments for a ground-breaking aluminium production system powered by hydro generation. In the early 1900s, the then British Aluminium Company bought large parts of Lochaber from aristocratic owners, including Killiechonate Estate, Inverlair Estate, Inverlochy Estate and Mamore Estate, with the purchase of Glenshero Estate in Badenoch following on in the 1940s as the hydro scheme expanded.

Known at the time as the 'Lochaber Water Power Scheme', this extraordinary example of inter-war engineering saw the construction of a 15-foot diameter, 15 mile-long tunnel running from Loch Treig through the Ben Nevis mountain range to carry the water to Fort William. Along the tunnel are 14 additional intakes, which gather more water, and a now-defunct 23-mile narrow-gauge service railway known as the 'Puggy Line'. This work was completed in 1929, and in 1934 the Laggan Dam, Treig Dam and a connecting tunnel were constructed to increase the capacity of the scheme.

In 1943, with the pressure of World War Two, the scheme was extended with Ministry of Defence support by the construction of the Spey Dam and a further tunnel from Loch Crunachdan to Loch Laggan. This progressive development meant that the final catchment area for the water resource amounted to approximately 304 square miles. This scheme is still operational today, more than 90 years after it first opened, and for the same reason: the GFG Alliance bought the Lochaber portfolio from Rio Tinto Alcan in December 2016 and we now produce sustainable aluminium at the Fort William smelter, a large and crucial local Highlands employer.

At the southern end of JHE, the Blackwater Reservoir scheme began construction in 1905 to provide power to the new Kinlochleven aluminium smelter. This scheme was also established by the British Aluminium Company. The largest British hydroelectric power station of its day not only powered a smelter, but caused Kinlochleven to become the first village in the UK to have every house connected to electricity: 'The Electric Village'. Sadly, the smelter closed in June 2000 as it had become economically unviable. The hydro station in the village remains operational, and we work closely with local community groups in this post-industrial era of the village.

Our direct link between heavy industry and environment is unique in the UK. With JHE's geographic extent encompassing urban land in Fort William to some of the most remote and iconic mountain landscapes in Scotland, we consider that we are privileged to balance such a wide range of competing interests and objectives. From the Pap of Glencoe in the south to the Corrieyairack Pass in the north, JHE's objective is to carry out regional regeneration that meets the needs of the present while ensuring a sustainable future. Although the journey to deliver this objective is complex, our ultimate aim is straightforward: the realisation of thriving communities rooted in a resilient environment.

Sustainable usage of land use and associated natural resources has never been more important. The JHE concept of the benefits arising from land use being simultaneously valuable for both public and private interests is sector-leading, in line with GFG's positively disruptive approach to business. At the heart of this approach is our natural capital.

JAHAMA Highland Estates: Our Vision - What will we become?

JAHAMA Highland Estates is a beacon of inspiration for landscape-based asset management. Driven by our passion for achieving equity across the environment, the economy and the communities that comprise the JHE landholding, we sustain:

- *Thriving and confident communities rooted in an inspiring landscape.*

- *Stewardship of our assets for a viable present and a safeguarded future, mindful always of the past.*
- *Adaptive and cohesive natural resource management within a changing climate.*
- *Connectivity of stakeholders, creating opportunities and facilitating positive change.*
- *An approach that challenges anachronistic narratives of rural asset management.*
- *A strong and participatory culture: our resources and communities feel alive and cherished.*

JAHAMA Highland Estates: Our Strategy – How will we deliver our Vision?

JHE provides the energy catchment for our industrial sister companies Alvance Aluminium (Lochaber) and SIMEC, within the overarching GFG Alliance: this is the catalyst for our existence, but it is only one part of our remit. JHE is a multi-layered landholding with complex strategic goals:

- *The regeneration of our rural asset-based enterprises transforms JHE into an economically sustainable entity by 2027.*
- *We lead the GFG Alliance carbon-neutral 2030 objective, completing our Natural Capital valuation and implementing competent natural resource management decisions.*
- *We facilitate sustainable community endeavours for the greater good of our shared culture.*
- *We enable economic prosperity internally and externally to underpin that shared culture.*
- *We engage proactively with our many stakeholders for positive collaborative outcomes.*
- *We facilitate the reconnection of people and place through natural resource-based recreation, sustenance, employment and habitation.*
- *We take active and holistic management decisions to add value; no single outcome is considered in isolation.*

NATURAL CAPITAL AND ECOSYSTEM SERVICES IN THE CONTEXT OF JHE

Natural capital has been defined in various terms since its emergence as a broad concept in the last ten years. These can all be broadly reduced to the idea of 'what nature does for mankind'. More fully the government's Natural Capital Committee defined natural capital as "The elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, fresh-water, land, minerals, the air and oceans, as well as natural processes and functions" (Natural Capital Committee 2014).

This is the basis for an approach to our relationship with and management of the natural environment, the Natural Capital Approach. This approach is distinguished from other approaches (for example the ecosystem service approach) because it views natural resources as a stock of assets from which service flows are derived. For example there is a stock of vegetation in woodland which sequesters carbon. The asset is the woodland and the service flow is the sequestration of carbon and the production of oxygen. Woodland capital may also provide us with other services. The most obvious is timber as a material for construction or fuel. Less obviously woodland may provide us with valued recreational services.

The natural capital approach is also distinguished because it deals with abiotic as well as biotic resources. Minerals in the ground are an example of an abiotic resource, whereas the woodland already mentioned would be a biotic resource.

A traditional view of rural estate management may well have started with the view that a mixed rural estate is characterised by a number of different enterprises, united under a common ownership (or at least a series of related ownerships) and managed within one administrative structure. The overarching purpose of estate management would vary with the rationale for estate ownership. Utility companies like water companies own extensive areas in order to secure their water-gathering areas around reservoirs for example. The Ministry of Defence owns extensive areas for military training. The Forestry Commission owns areas in order to plant trees and assure timber production. Private ownership may be driven by a number of motives. In some instances it may be a legacy for which current and future generations feel a deep sense of stewardship and responsibility to pass assets on in at least in the same condition they inherited them, and preferably in a better condition. We have already seen that in the case of JHE the prime objective of ownership and management is to secure the water supply for the aluminium smelter at Fort William (and latterly its counterpart at Kinlochleven).

It may not always be possible to identify an overriding prime objective in the management of a rural estate. Whether this is the case or not, there are always likely to be other objectives in the balance as well. For example at JHE the other priorities are concerned with commercial viability and the maintenance and development of the physical and social fabric of the estate. JHE came under its present ownership in 2016, and the estate came with a backlog of maintenance requirements on residential and other property. The prioritisation of this work, and the generation of income to fund it, are important priorities for the estate.

Irrespective of the priorities on a particular estate a future view of rural estate management seems more likely to start with an overall view of the estate as a natural capital asset. We have seen a definition of natural capital, but what are the service flows to which we have already referred? A conventional way to view these flows is to adopt an ecosystem service approach. This approach groups the service flows into four broad groups. They are:

- Provisioning services. These include food production, timber, fibre, energy and the exploitation of minerals. Most of these services are paid for through conventional market mechanisms and are the most familiar to many land managers as sources of revenue.
- Regulating services. Two examples are the carbon and the water cycles. Generally well-known to everybody from their school science studies but historically taken for granted in most industrial and land management activity. Both have become the focus for concern in recent years as we have become more aware of problems associated with global warming (the carbon cycle), flooding and drought (the water cycle). There are other less well-known regulating services, for example the methane cycle.
- Supporting services. Another service from nature which has historically been taken for granted, at mankind's long-term peril. Examples include pollination by insects and soil formation. The loss of insects and other pollinators, and the erosion of soil, are both now major concerns throughout the world.
- Cultural services. These services encompass all the ways in which mankind enjoys and benefits personally by engagement with nature. For some this may be through nature as inspiration for art and creativity; for others nature as a release from the stresses of busy lives and for others this may be realised by for example, the challenge of the mountains. The physical and mental health benefits of engagement with nature and the countryside in one way or another both exemplify natural capital's provision of cultural services.

Natural capital provides the asset base for these services, but it must be mixed with other inputs for the services actually to flow. Extending the idea of capital a little further one view of capital is that it represents a stock which needs to be put to work by being combined with other inputs: financial, social, intellectual and entrepreneurial capital for example.

We have set out briefly a natural capital view of rural estate management. How does this apply to JHE? We have already seen a description of the estate, its rationale and management. Placing this in a natural capital framework we can see that the estate provides the following services amongst others from its natural capital base:

- Provisioning services: The in-hand and tenanted farming enterprises rear beef and sheep from grassland; woodland management yields timber; water management produces energy which is used to power the smelter and to export electricity to the National Grid. It also yields drinking water for most residential property on the estate and some neighbouring property. The management of wild game on the estate produces venison for human consumption, some of which is now sold through a new shop on the estate.
- Regulating services: The estate provides two important carbon stores in its woodland and peatland with grassland a potential third (as the carbon behaviour of extensively managed upland grassland is far less fully researched and described than peatland and woodland). Ongoing restoration of peatland has ensured that the threat of emissions from peatland which might otherwise deteriorate has been arrested. The peat reserves on the estate contain historically sequestered carbon and, looking to the future, it will be more important than ever to ensure that this carbon sink is protected from erosion during changing climatic conditions.
- Supporting services: JHE provides a range of habitat for upland species. The biodiversity of the estate is rich and extensive enough to provide habitat for several pairs of Golden Eagle and the estate has been able to donate chicks to restoration projects elsewhere in Scotland. There are also red squirrels, black grouse, otters and wild cat.
- Cultural services: Munros are mountains in Scotland greater than 3,000 feet in height. Twenty-one of Scotland's 282 Munros are on JHE. The north face of Ben Nevis, the largest of the Munros, is also on the estate and all approaches to Ben Nevis lead through the estate. The area is thus a magnet to walkers and climbers. Less obviously it is also very popular with kayakers and cyclists. Glen Nevis is visited by approximately 500,000 visitors a year, and Ben Nevis itself by approximately 200,000 visitors in normal years.

Over the last 18 months we have been working within this framework to bring new perspectives and insights to the management of JHE, and to reflect these values in the management of the estate.

ESTATE MANAGEMENT AT JHE – NATURAL CAPITAL AND ECOSYSTEM SERVICE DIMENSION

At the outset we knew it would be impossible for a single project to assess and account for every element of natural capital on the estate. From the start we were therefore selective, choosing to focus on those assets which initially seemed the most important ones on the estate. Water came top of this list because of its importance to the functioning of the aluminium smelter. The extent of peatland and woodland on the estate also indicated that the estate may be performing an important function in carbon removal and storage. Recreational use is also extremely important in this area.

How did we establish these priorities for further work? At JHE we chose to work with a small group of people who know the estate very well, and our priority was to draw on their local knowledge and experience. This meeting was facilitated by an external adviser with experience in working with

natural capital and ecosystem approaches. Having set the scene the participants each drew their own sketch plan of the estate highlighting its natural capital assets. These were shared, the observations reviewed and from this process a shortlist of priority topics was identified. This set the focus for our subsequent work. With the national lockdown coming into effect within a week of this meeting the work had to be conducted remotely but nevertheless this has demonstrated the ability to undertake strategic natural capital appraisals of this nature in such a way.

The full findings of this work are due to be reported formally soon, but for the sake of this paper we are able to share the following findings.

Water

Annual rainfall in and around Ben Nevis is approximately 1.5 metres a year (4.35 metres on the summit of Ben Nevis), with approximately 180 rainy days on average a year. A conservative estimate of rainfall on the entire estate is approximately 690 million cubic metres of water a year. To put this in context, this is 127 cubic metres for each person in Scotland (2019 population figures) compared with per capital consumption of 54.75 cubic metres. Much of this water is used to generate electricity, with one flow powering the arc furnaces at Fort William (the Lochaber Hydro Electric Scheme) and the other the Kinlochleven hydro plant. Substantial amounts are also used for domestic, commercial and industrial purposes.

The annual value of this water, based on an approach set out in the National Ecosystem Assessment Follow On Report, is £17.4 million a year. Using the Treasury's Green Book method for capitalising this sum over 50 years, the capital value of the water is £443 million.

These figures are very sensitive to a number of assumptions and we have chosen conservative figures from within the wide range available from previous studies.

Carbon

Work is continuing on a carbon footprint of the estate. We have estimated the ability of the estate to sequester carbon based on the areas of woodland, grassland and peatland (the latter confined to the peatland in good condition based on Scottish government mapping). Again using cautious figures from wide published ranges we have estimated carbon sequestration on the estate at 112,000 tonnes of carbon dioxide a year, equivalent to approximately 30,670 tonnes of carbon. The figure for carbon dioxide does however need to be balanced by a carbon dioxide equivalent figure for methane and nitrous oxide emissions from peatland in good condition or undergoing restoration. A low range estimate once these are taken into account brings the figure down to 62,170 tonnes of carbon dioxide equivalent per year.

Government advice recommends that carbon dioxide equivalents are valued according to a method based on Marginal Abatement Cost. This is an estimate of the cost of reducing emissions to be in line with global warming targets. Using the mid-range figures published by the government the annual value of this natural process on JHE is approximately £1.3 million. Capitalised over 50 and 100 years respectively using the Green Book methods, the capital values are £195 million and £281 million respectively for the estate

In addition we have been able to make a broad estimate of the tonnage of carbon already stored in the existing peat deposits on the estate – an additional 10 million tonnes at a value of £800 million according to the same valuation method.

Public Recreation, enjoyment and tourism

Data on tourism numbers are readily available at the regional level, but the application of these data at a more local level is fraught with difficulties including the danger of double counting. Nevertheless we do know from a counter installed on the Nevis Bridge (footpath to Ben Nevis running through the estate) that this path alone counted nearly 136,000 users in 2019. Another counter installed more recently in Black Parks, Fort William, had recorded over 28,000 users since its installation, an average of 592/day.

There are 19 bothies on the estate and one official long distance footpath, the West Highland Way, crosses the estate. This is reported to receive 120,000 visits a year of whom 36,000 are end to end users of the path. The East Highland Way, an unofficial long distance path, also crosses the estate. The West Highland Way is estimated to generate £5.5 million pa for the local economy.

We have also undertaken our own analysis of excursions recorded on the Ordnance Survey map app for the area. At the time of our analysis 216 excursions had been recorded covering 4,147 miles and taking 580 hours. Most were on foot (walking and running) but there were also significant number of cycle journeys (27% of the total).

Data like these do not lend themselves easily to an assessment of the recreational value of the estate, and further work is planned to gather more and better data. Nevertheless on the following very conservative assumptions we have arrived at an annual recreational value of £0.5 million a year, a capital value of £12.75 million over 50 years:

- 135,860 users in 2019 travelled an average distance of 7 miles to start their expedition.
- Assuming they travelled by car and taking the allowable mileage charge of HMRC for tax purposes of 45p/mile this equates to a simple 'Willingness to Pay' assessment of £427,959 pa.
- Bearing in mind that many visitors to Ben Nevis will come from much further afield by a variety of means of transport, and that the average distance of 7 miles is for all outdoor visits in Scotland the figure of approx. £428,000 is clearly an underestimate, and likely to be substantially under. On the other hand, there is also a question of how much this value can be attributed to the estate or shared with other landholdings and enterprises in the area.
- Nevertheless as a rough and ready starting point for the 'value' of recreation on the estate, allowing for other users who do not pass over the Nevis Bridge a starting point of £0.5 million pa is still likely to be a conservative estimate. This would equate to a capital value of about £12.75 million, capitalised over 50 years using the discount rates recommended by HM Treasury Green Book Guidance.
- The tentative and provisional nature of much on which this is based is clear. Further work in the form of user surveys could go a long way to enhance our understanding of the recreational role of the estate. It would also be useful to collate any data on expenditure by the estate on visitor facilities for free recreational use of the estate, gross and net of external financial support. These ideas will be developed in further detail as the project proceeds.

Summarising these figures for water, carbon and recreation arrives at an annual value of approximately £19 million and a discounted value over 50 years of approximately £640 million. Further details of the calculations behind these figures and their key sensitivities will be set out in forthcoming fuller reports on these aspects of our work.

NATURAL CAPITAL – A COMPLETE ANSWER IN THE CONTEXT OF LAND MANAGEMENT IN THE HIGHLANDS OF SCOTLAND AND ELSEWHERE?

What have we learned from this exercise? We have seen the tremendous value of a selection of natural services provided by the estate. The point needs to be made that these values reflect a broad estimate of 'business as usual' on this particular estate. Simple recognition of these values will not solve wider problems of global warming, biodiversity loss and other pressures facing natural resources. But they do provide a focus for further work and development on these elements. One example of further work is the carbon footprinting work now underway on the estate.

Our more detailed reports will also show the challenge for land managers of finding and working with suitable data for these types of assessment. We have used a combination of scientific peer reviewed and grey literature for these purposes and of course much of this material is heavily qualified and nuanced in its presentation of findings and conclusions. Few estates would be willing to find the resources to develop work in this way, and it would be clearly helpful if more data were to be distilled into formats which are more readily accessible and usable by practical land managers.

We have also realised the potential limitations of focusing too much on a natural capital and ecosystem service approach. The natural capital approach has clearly been helpful despite the difficulty and challenge of obtaining useful practical data, but it does not reflect a lot of other important facets of rural estate management in the 21st century. For example the natural capital approach we have adopted has enabled us to place some very tentative figures on the value of recreation. The broader social value of an estate like JHE is not however well reflected in this.

Indeed there is a danger than an excessive concentration on the natural capital approach may undermine attempts to build social cohesion and values around land management. This is reflected in some of the recent commentary about the arrival of 'green lairds' in Scotland with an apparent intent in managing estates almost exclusively along natural capital and ecosystem service lines. In practical terms this seems to be based on an almost monocultural approach to either rewilding or tree planting. This raises complex socio-economic questions in achieving an appropriate balance between commercial, natural and human, local, regional and national interests in the Highlands.

Reflecting these limitations the estate has also launched its JHEEP project (JAHAMA Highland Estates Environmental Programme), which is a collaborative programme aimed at working with local stakeholders to support small-scale environmental initiatives in collaboration with the local community; bird and bat boxes for example. While these may be small projects in the environmental context of the estate as a whole, they nevertheless have a wider value in the development of stakeholder interest, shared community values and a greater sense of 'place' on the estate.

This perhaps reflects a comment by Aldo Leopold in his famous posthumous 1949 publication A Sand County Almanac, "Conservation is getting nowhere because it is incompatible with our Abrahamic concept of land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." This view has earlier roots, for example Anton Chekhov in 1897: "Man has been endowed with reason, with the power to create, so that he can add to what he's been given. But up to now he hasn't been a creator, only a destroyer. Forests keep disappearing, rivers dry up, wildlife's become extinct, the climate's ruined and the land grows poorer and uglier every day".

The natural capital approach does attempt to capture natural resource externalities that are not traditionally represented in our economic approach to the management of land, and provides a

helpful focus to ensure they are more properly represented in our land use and management decisions.

As land managers we would do well to reflect on the words of Luke (12:48): “For unto whomsoever much is given, of him shall much be required: and to whom men have committed much, of him they will ask the more”.

LOOKING AHEAD – WHAT WE NEED NOW AND IN THE FUTURE

The natural capital approach continues to evolve. We continue to exist in considerable uncertainty about future government action in this area, while new developments are promised from the financial markets to make ‘green’ finance and investment a reality. The amount of guidance on how to apply the natural capital approach has increased and this is welcome.

Nevertheless our work has demonstrated the difficulty of finding and using practical information to arrive at solidly-based conclusions about the presence and value of natural capital assets on an extensive rural estate. This might be compared with the data we routinely take for granted concerning agricultural inputs and outputs, forestry production and so on.

Uncertainty about current and future markets also seems to act as a brake on the potential enthusiasm of the land management sector to pursue new opportunities: the second mouse gets the cheese, rather than the early bird getting the worm.

Some of this needs to be addressed internally within the land management community, with a more serious focus on opportunities and risks in a new era.

There are however a number of ways in which the land management community could be helped. NatureScot has recently commissioned guidance on the opportunities for land managers with green finance. We also need simple and straightforward access to data and tools with which to appraise our natural capital resources. The emphasis here needs to be on the simple and straightforward; perfection being the potential enemy of the ‘just good enough’ in this regard.

The Green Finance Institute (GFI) has recently published its findings on the public funding shortfall which will exist in the next 10 years between our environmental ambitions and allocated public funding, highlighting the need for government and private finance to work together. The Chief Executive Officer of the Institute stated:

> “The data is conclusive that public investment – even if funding commitments increase – will not be enough to fund the UK’s nature recovery ambitions. Private investment is therefore urgently required in addition to public sector funding if we hope to transition to a net zero and nature-positive economy.”

A range was provided in GFI’s report, from £44 billion to £97 billion. The shortfall was largest in England at £21 to £53 billion, but followed by Scotland at £15 to £27 billion. The largest gap between desired outcomes and allocated public funding was for climate mitigation via bio-carbon: £20 billion over 10 years; and the protection and restoration of biodiversity: £19 billion over 10 years. The relevance of these two particular examples to estates like JHE is obvious.

A range of options will have to be developed to address this shortfall, i.e. green finance in the form of commercial loans, community or municipal bonds and investments, environmental impact bonds, corporate and sovereign bonds, mobilisation of investment funds, conventional equity and other forms of private sector investment and funding.

It is better to take a few tentative steps than to stand paralysed by the threats our world faces, to make mistakes on a limited scale if we have to, and in so doing learn and learn quickly from them. In this we will need to be encouraged to get back up when we fall down, and even be rewarded for doing so. An adaptive strategy in the management of JHE has supported this approach, and is something we believe is worthy of wider application in rural estate management more generally. Strong communities of support and recognition from within and without the sector, characterised by open dialogue and the understanding and acceptance of wider responsibilities, is a vital part of this. JHE will be building on all these lessons as we continue with our work on the development of the estate with a view to its natural capital value and beyond.

AUTHOR NOTE

This think piece has been written by Charles Cowap, the estate's natural capital adviser for the work described here, and Julia Stoddart, Chief Operating Officer on the estate. Julia and Charles have been leading our natural capital work on the estate since January 2020.