

An Economic Assessment of the Costs and Benefits of Natura 2000 Sites in Scotland

Final Report

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Executive Summary

Introduction

In accordance with the European Commission "Habitats Directive" (Directive 92/43/EEC) and the "Birds Directive" (Directive 79/409/EEC), Scotland must contribute to the development of a UK network of protected areas that represent the most important wildlife sites in the European Union, known as the Natura 2000 (N2K) network.

This network is made up of Special Protection Areas (SPAs) classified under the Birds Directive and of Special Areas of Conservation (SACs) under the Habitats Directive. In Scotland, by 31/12/02, 355 N2K sites had been identified, comprising 223 candidate SACs (cSACs) and 132 SPAs, accounting for 9.3% of Scotland's land surface. As 55 sites are both cSACs and SPAs, there are actually 300 separate individual N2K sites.

Various studies have estimated in reasonable detail the likely economic management costs associated with designation and implementation of N2K sites in Scotland and throughout Europe. On the other hand, whilst other studies have explored the types of economic benefits that sites may bring to Scotland, no detailed assessments of such benefits have been conducted. Nor have studies been undertaken into the potential opportunity costs.

This study was commissioned by the Scottish Executive Environment and Rural Affairs Department (SEERAD) in November 2002 to conduct a detailed assessment of the economic costs and benefits of the Scottish N2K sites. Equipped with such knowledge, it is hoped that attempts can then be made to improve the cost-effectiveness of managing these sites, in particular by enhancing the benefits that may accrue and minimizing the costs. The study follows on from an initial investigation of Scottish N2K costs and benefits undertaken by Jacobs (2003).

Objectives

The principal aim of this project was to identify the net economic contribution of N2K sites in Scotland. This was to be achieved by assessing the costs and benefits associated with the N2K conservation designations for a set of case study areas as well as at a national level excluding marine cSACs. Both market and non-market economic benefits were ideally to be covered.

It is difficult to accurately partition N2K specific costs and benefits from other existing underpinning designations, such as Sites of Special Scientific Interest (SSSIs), and from other land management activities. Consequently, the main economic assessment focused on comparing the effects of all forms of conservation protection at the sites (policy-on) compared to no conservation management at the sites (policy-off). An attempt was then made to apportion the costs and benefits specifically to the effects of N2K (i.e. marginal impacts of cSAC/SPA designations).

Types of Costs Considered

This study considered three main types of economic cost, including:

- **Direct costs**, which cover site management costs and policy related costs;
- **Opportunity costs**, which are the maximum alternative return foregone associated with having to adapt or being unable to undertake other economic activities in or near the protected area, and;

- **Indirect costs**; may relate to the impacts of large visitor numbers or result from increasing species populations and their impact on crops, for example. Such impacts are difficult to quantify and value, and were generally considered relatively small, hence they have not been valued in this study.

Types of Benefit Considered

The conventional framework in which estimates of environmental value is expressed is **Total Economic Value** (TEV). This divides the welfare value ascribed to a good, service or system into **direct use**, **indirect use** and **non-use** values.

- **Direct use values** assessed in this study predominantly relate to general (e.g. walking) and specialist (e.g. angling) recreational visits to N2K sites. This value is based on the amount of money individuals are willing to pay for the policy-on scenario relating to their use, over and above what they do pay to visit the sites;
- **Non-use values** can arise irrespective of any such use, relating to the fact that people are willing to pay to protect environmental resources so that other people can use them and just so they personally know the resources will continue to exist. In this study, non-use values were estimated for the general public and visitors to Scotland through WTP questionnaire surveys. Care was taken to exclude the non-use value held by visitors to the sites from their WTP values, so as not to double count non-use value, and;
- **Indirect use values** relate to ecosystem functions such as water storage and flood protection. These were identified but not quantified due to study constraints.

In addition, a number of **other benefits** were identified, which included social, cultural, educational and health benefits. Although part of these values may have been captured in the study's questionnaire surveys, such benefits were assessed separately in terms of their likely magnitude.

Furthermore, **economic impacts** relating to conservation management and visitor use of the sites were also assessed. This includes estimates of expenditure and associated employment in the regional and national economy. These benefits cannot simply be added to the welfare benefits and are covered in a separate report.

The Approach

The economic assessment

Based on recommendations in the previous Jacobs (2003) study, the approach adopted was to undertake a cost benefit analysis (CBA) and economic impact assessment of selected N2K case study areas and all 300 N2K sites in Scotland.

The CBA compares the current and future costs against the current and future benefits identified by this study. The benefit cost ratio (BCR) (the sum of present value benefits divided by present value costs) has been calculated for two periods; 25 years and 50 years from 2003. To convert future costs and benefits into equivalent present day values, a discount rate of 3.5% was applied for the first 30 years and 3% from years 31 to 50, in accordance with the UK Treasury Green Book.

The case study areas

Five reasonably representative case study areas were originally selected in the previous Jacobs (2003) study. However, due to fundamental differences in the location and nature of the sites, for the purposes of this study, the five areas were split into seven (see Table 1 below).

Table 1 Case study areas and sites

Area Name	Location	Individual Site Name	Habitat type	cSAC	cSPA
River Bladnoch	Dumfries & Galloway	River Bladnoch	River	✓	
Clyde Valley woods	South Lanarkshire	Clyde Valley Woods	Woodland	✓	
Waukenwae & Red Moss		Waukenwae Moss	Bog	✓	
		Red Moss	Bog	✓	
Sands of Forvie Area	Aberdeenshire	Sands of Forvie & Ythan Estuary	Coastal	✓	✓
Tips of Corsemaul & Tom Mor		Buchan Ness to Collieston	Coastal	✓	✓
Strathglass Complex	Highlands	Tips of Corsemaul & Tom Mor	Inland hills		✓
Lewis & Harris	Lewis & Harris	Strathglass Complex	Mountain	✓	
		Lewis Peatlands	Peatland	✓	✓
		Harris Mountains	Mountain	✓	✓
		Grimersta River	River	✓	
		Ness & Barvas	Farmland		✓

Data collection and analysis

Data collection was carried out using two approaches. This first involved the use of contingent valuation method (CVM) surveys carried out in 2003. This bottom-up approach was used to generate information and WTP values related to stakeholder preferences and values for conservation of habitats and species in Scotland. A follow-up telephone survey was used to check the validity of the general public responses, which confirmed the relative accuracy of the original responses. The principal stakeholder groups assessed through the CVM surveys were:

- **The general public** including local residents (within 30km of the selected case study areas) and the wider population living across Scotland. The main aim was to elicit **non-use values** in terms of annual household willingness-to-pay (WTP) value for the policy-on scenario. Following a pilot test, a total of 713 responses were obtained from a house-to-house survey. Responses were obtained from a carefully selected representative sample of the population at different distances from the case study areas. Around 80% were within 30km of a case study area, and about 20% were beyond.
- **Visitors' to the seven case study areas** including local residents, other non-local Scottish residents and non-Scottish visitors to the areas. The main aim was to elicit visitor WTP values associated with their **use value** relating to the policy-on protection from each site visit. A total of 275 self-completion questionnaires were returned from the five originally selected case study areas. Despite a successful pilot exercise, the final response rate was disappointing.
- **Non-Scottish visitors.** The main aim was to elicit visitor WTP values per trip to Scotland associated with their **non-use value** for the policy-on scenario. A total of 253 visitors to Scotland were interviewed randomly at a selection of locations around Scotland.

In addition, between October 2003 and January 2004, questionnaires were sent to a large number of stakeholder groups at each site and at a national level. Stakeholder groups were identified as key organisations potentially deriving benefits or incurring costs from conservation designations. The aim was to gain information on their direct, indirect and non-use benefits, and their management, opportunity and indirect costs using a top-down approach.

Results

National level

Current full conservation protection of all 300 N2K sites throughout Scotland (i.e. policy-on) has an overall benefit cost ratio (BCR) of around 7 over a 25-year period. This means that overall national

welfare benefits are seven times greater than the national costs and represent good value for money.

Around 99% of this benefit (£210 million per year) relates to non-use values. Around 51% accrues as non-use value to the Scottish general public and 48% accrues as non-use value to visitors to Scotland. Only around £1.5 million (1%) of the benefits relate to use values (e.g. walking etc). Thus when non-use values are excluded, the BCR over 25 years is only 0.06.

The non-use values have been measured using carefully designed contingent valuation questionnaire surveys. However, such techniques are far from perfect, and can be affected by numerous biases. Despite this, the survey results do indicate that potentially considerable benefit is gained from the continued protection of these sites without people necessarily visiting them.

In addition to the quantified benefits, continued protection of the sites provides significant social, cultural, educational, research, environmental services and health values. These have not specifically been valued as part of this study, although part of these values will be included within the use and non-use value estimates. Furthermore, there are additional intrinsic, non-anthropocentric values. It is for all these reasons that the sites have effectively been designated.

When the costs and benefits associated specifically with N2K designation are considered in isolation, that is the marginal costs and benefits related to the SAC and SPA designations, there is a BCR of 12. When non-use values are excluded this falls to 0.1.

Case study areas

At a case study area level, when non-use values are included, all have a positive BCR, whereas when non-use values are excluded, BCRs are all significantly less than 1 (see Table 2 overleaf). The highest BCR (including non-use value) of 97 for the Tips of Corsemaul relates to a case study area where there are no visitors and low management costs. The lowest BCR (including non-use value) of 3 is for Strathglass where there are significant visitor numbers and very high associated management costs. Their ranking in terms of BCR reverses when non-use values are excluded.

Individual average willingness-to-pay values

The average Scottish household non-use value for protecting all 300 sites was estimated to be £48 per year. This is not that unreasonable when compared to other valuation studies. For example, Hanley et al (1996) derived Scottish household WTP values of £97 per year and £62 per year to maintain Machair Environmentally Sensitive Areas and Breadalbane ESAs respectively, much of which was non-use value.

Table 2 Summary of benefit cost ratios for case study areas

Case study area	25 year BCR	25 Year BCR (excluding non-use value)
River Bladnoch	12	0.07
Clyde Valley Woods	25	0.004
Waukenwae & Red Moss	66	0.001
Sands of Forvie group	7	0.1
Tips of Corsemaul	97	0
Strathglass	3	0.2
Lewis & Harris group	16	0.04

The average non-Scottish visitor to Scotland non-use value was estimated to be £6 per adult visit to Scotland to protect all 300 N2K sites. This is also considered to be a reasonably robust value.

The top down valuation approach adopted for non-use values (i.e. asking a value for all 300 sites and splitting that value down) helped overcome potential aggregation problems. For example, if respondents were simply asked their value to protect a small selection of individual sites, there would potentially have been serious overestimates of value and income constraints if simply multiplied up to a national level.

At a site level, general Scottish visitor use values range from £0.05 per adult visit for more frequent local visits to £1.70 per visit for more distant Scottish visitors. General non-Scottish visitor use values range from £0.60 per adult visit to £1.70 per visit. Specialist values for both Scottish and non-Scottish visitors range from £0.75 to £2.25 per visit. Note that these values do not relate to the full enjoyment gained by the visitor, but the marginal value based on the policy-off scenario. For example, policy-off impacts at Strathglass or the River Bladnoch may have a negligible effect on the enjoyment of some people's visits.

Enhancing values with provision of additional information

The general public and local resident questionnaire survey demonstrated that when reasonably detailed information (i.e. with photos and descriptions) was provided regarding the policy-off impact scenarios, average WTP values increased by 9% (or as much as 28% for respondents living within 10km of the site). This suggests that a public awareness campaign to provide information on N2K sites to the general public is likely to yield significant benefits, particularly when it is targeted at local residents and frequent site users.

Equity of costs and benefits

The main contributor to financing the costs of managing the sites is the Government, through various Government agencies (43% of annual costs). Landowners may contribute around 30% of the policy-on land management costs (although part of this money is likely to be from grant aid). Potential opportunity costs are around 16%, with a range of individuals and organisations losing out, particularly property developers and landowners.

Benefits are almost equally divided between the Scottish general public and the non-Scottish visitor.

Awareness of Natura 2000 designations

Highest awareness of the N2K network was observed amongst site visitors, particularly those at the Sands of Forvie case study area. Awareness amongst members of the general public and non-Scottish visitors was relatively low in comparison, though for the latter, enjoying landscape and wildlife was an important contributory factor behind their decision to visit Scotland.

Average Non-use Willingness-to-pay Values Per Habitat Type

When broken down according to case study area, non-use WTP values were highest for Lewis and Harris amongst the general public, site visitors and non-Scottish visitors alike. Case study areas associated with low non-use values included the River Bladnoch, Tips of Corsemaul and Tom Mor, Waukenwae and Red Mosses and Clyde Valley Woods, though differences were evident between stakeholder groups.

Note that differences in non-use WTP are based on the number of N2K sites within the case study area, as well as the type of habitat and key species being protected. Per habitat type, the differences in non-use WTP are relatively small. Nevertheless, although there are "favourite" habitat types, respondents gain value from protecting all types of habitat.

Attitudes Towards Management Actions

The majority of general public respondents showed satisfaction for, and hence potential WTP for: supporting traditional jobs, provision of information, improved access and visitor centres. The majority also value protecting some areas for wilderness and preventing access to others.

Site visitors showed less enthusiasm and WTP for additional management activities. Around half of visitors indicated that they would be willing to pay at least a little more for additional information, improved access and visitor centres.

The majority of non-Scottish visitors stated that: protecting wildlife of European importance, and provision of information, improved access, visitor centres and wilderness areas were at least quite important.

Attitude Towards Purchasing Natura 2000 Products

The majority of Non-Scottish visitors indicated that they would be interested in purchasing N2K related products, suggesting a potential market for such products if marketed and priced appropriately. Part of the revenues generated could be directed back into management activities within the N2K network.

Accuracy of the results

Caution should be used regarding the precise values determined in this study. At a national level this is because:

- *The user values are simply extrapolated from the case study data. The specialist user values are the least robust values overall.*
- *The general public non-use value and non-Scottish visitor non-use values are based on hypothetical WTP contingent valuation surveys. The values arising are thus indicative, but do indicate a relative order of magnitude benefit.*
- *Due to the difficulty in obtaining more detailed estimates, the site management cost estimates for estate landowners are based on broad-brush assumptions.*

At a site level, inaccuracies exist as a result of the following:

- *At some case study areas, sample sizes were very low for some distance bands, so some estimates of values for general visitors were used.*
- *Robust data on visitor numbers at most sites was not available.*
- *Due to the lack of specialist user survey responses, their WTP values are not based on survey data but less robust estimates from benefit transfers. These are the least accurate values, used in the study.*
- *The approach to splitting the Scottish public and non-Scottish visitor stated WTP non-use values between the different sites was relatively crude with respect to what information was made available to them. This is due to the complexity of different protected area characteristics and interviewing time constraints.*

Use of the Results

The results of this study are potentially useful in a variety of ways, including the following:

- *If the non-use values are to be accepted as a reasonable indication of the benefit gained by the overall populations sampled, it demonstrates that the value for money gained is significant, thereby justifying both the policy-on and N2K programme.*
- *It highlights which stakeholder groups incur the costs and gain the benefits. For example, it shows that landowners currently potentially incur significant costs in maintaining the environment that provides significant non-use benefits to the general public and non-Scottish visitors to Scotland.*
- *By having a better understanding of the nature of the different types of benefit, it is possible to enhance the values. For example, non-use values are partly dependent on the understanding and awareness of the general public and visitors to Scotland. The greater the information dissemination and the more targeted its content, the greater the values will become.*
- *By understanding the nature of the different types of benefit and who they accrue to, it is possible to “capture” or “appropriate” some of the values. For example, visitors to the sites may be willing to donate money towards their upkeep or spend money on buying things at or near the site, (whether it be food and drinks or maps, books and souvenirs). Even non-visitors would be willing to buy associated products (e.g. maps, books and souvenirs), particularly if they knew that part of the money would go towards maintaining the N2K sites.*
- *Understanding which stakeholder groups benefit may also help reduce site management costs if those people are targeted to provide voluntary assistance to help manage and protect the sites.*

Recommendations

- *Consideration should be given to developing a standardised approach at N2K sites for collecting and recording basic data on costs and benefits.*
- *Consideration should be given to developing ways of enhancing N2K benefits and appropriating values. For example, this could be achieved through the use of readily available N2K maps, literature and souvenirs, public awareness campaigns and on-site interpretation facilities.*
- *Investigations should be made into the possibilities of reducing N2K site management costs and obtaining other sources of funds. This could be through, for example, the promotion of voluntary work and corporate sponsorship.*
- *Consideration should be made regarding categorising sites, and managing them accordingly, with respect to whether visitors should be encouraged or restricted.*
- *Site visitor surveys could be re-administered for a longer period in 2004 to obtain more robust use values and expenditure information.*

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Acronyms

BCR	Benefit Cost Ratio
CM	Compliance Monitoring
CPS	Countryside Premium Scheme
cSAC	Candidate Special Area of Conservation
CVM	Contingent Valuation Method
DCS	Deer Commission for Scotland
ESA	Environmentally Sensitive Area
EU	European Union
FC	Forestry Commission
FTE	Full Time Equivalent
GFT	Galloway Fisheries Trust
GIS	Geographical Information System
IUCN	World Conservation Union
LIFE	EU Financial Instrument for the Environment
MFST	Millennium Forest for Scotland Trust
MOD	Ministry of Defence
N2K	Natura 2000
NNR	National Nature Reserve
NPV	Net Present Value
NTS	National Trust for Scotland
RSPB	Royal Society for the Protection of Birds
RSS	Rural Stewardship Scheme
SAC	Special Area of Conservation
SCM	Site Condition Monitoring
SEERAD	Scottish Executive Environmental & Rural Affairs Department
SLC	South Lanarkshire Council
SNH	Scottish Natural Heritage
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
TEV	Total Economic Value
WIFT	Western Isles Fisheries Trust
WTP	Willingness-to-pay

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1 Introduction

1.1 Background

In accordance with the European Commission “Habitats Directive” (Directive 92/43/EEC) and the “Birds Directive” (Directive 79/409/EEC), Scotland must contribute to the development of a UK network of protected areas that represent the most important wildlife sites in the European Union, known as the Natura 2000 network (referred to as N2K hereafter).

This network is made up of Special Protection Areas (SPAs) classified under the Birds Directive and Special Areas of Conservation (SACs) under the Habitats Directive. In Scotland at 31/12/02, a total of 355 N2K sites have been identified (see Figure 1.1 overleaf), comprising a total of 223 candidate SACs (cSACs) and 132 SPAs, accounting for 9.3% of Scotland’s land surface. Since 55 sites are both cSACs and SPAs, there are actually 300 separate individual N2K sites.

The existing and proposed areas for classification as SPAs and cSACs are, to an extent, based on areas already identified as Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981 and other legislation.

This study was commissioned by the Scottish Executive Environment and Rural Affairs Department (SEERAD) in November 2002 to conduct a detailed assessment of the economic costs and benefits of Scottish N2K Sites. The study expands on the work conducted in a previous exploration of Scottish N2K costs and benefits by Jacobs (2003).

1.2 Need for the Study

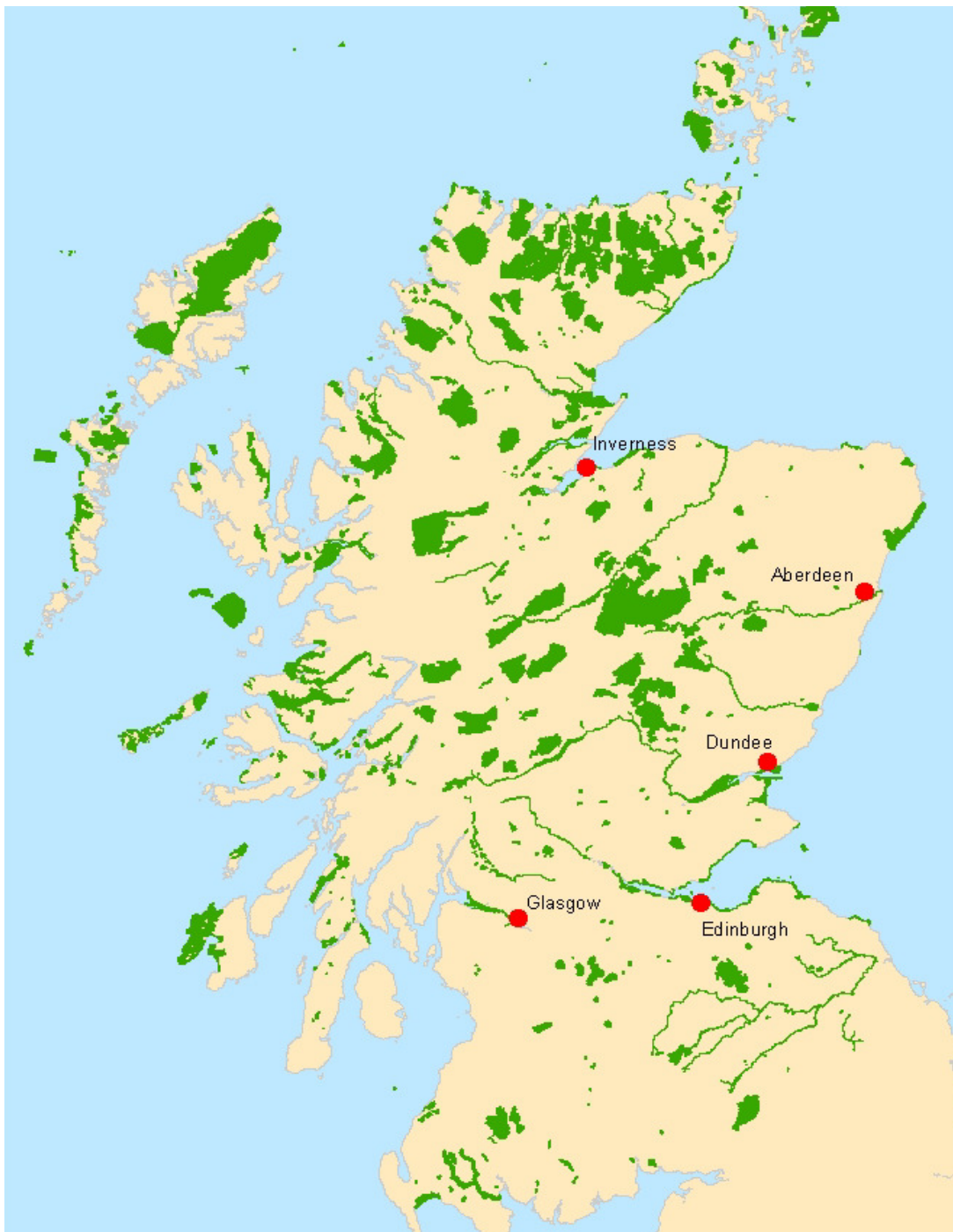
The N2K network will play an essential role in nature conservation, and is expected to bring important benefits to wildlife and people. Proper management of N2K sites is essential to safeguard biodiversity. The network will have a variety of other benefits for people and the environment. It will play an important role in maintaining our landscape and cultural heritage, and providing opportunities for recreation and tourism.

An increasing amount of interest is being paid to local community involvement in land and water management issues, and to the possibilities of communities to derive, along with environmental benefits, social and economic benefits from sound management of their natural resources.

Many recent studies also show that nature conservation can generate other substantial ecosystem services, such as reducing the risk of flood damage, acting as pollution filters and reducing nutrient leaching. N2K has the potential to generate a range of social and economic benefits, such as enhancing recreational values, supporting the advancement of knowledge and supporting direct and indirect employment, notably within tourism and agriculture/forestry/fishing sectors, in what are often peripheral rural areas.

Almost all sites require active management to maintain and often to restore the favourable features of the site. It is essential for the success of the network that sufficient funding is devoted to its management.

Figure 1.1 Location of N2K sites in Scotland (mainland shown only)



However, in some locations there is significant opposition to such designations, particularly relating to fears of restrictions on economic, commercial and development activities (e.g. building houses, hotels, fish farms and wind farms, intensifying agriculture, quarrying for stone and digging for peat) that could result in loss of or deprivation of jobs, incomes, livelihoods and ways of life.

A study published by the Central Research Unit of the Scottish Executive (SE) called 'Natura 2000: A Scoping Study' (Coulthard, 2002) found that direct links could be made between the natural

heritage and socio-economic activities in many areas. However, it noted that the link between designated sites and socio-economic activity is much less clear.

As a result, the SE has commissioned this study, which aims to gain a better understanding of the balance between economic costs and benefits associated with designation and implementation of N2K in Scotland. Equipped with such knowledge, it is hoped that attempts can then be made to improve the cost-effectiveness of managing sites, in particular by enhancing the benefits that may accrue.

1.3 Objectives

Based on the original Terms of Reference and discussions with the Client Steering Group, the principal aim of the project is to:

“Identify the net economic contribution of N2K sites, after assessing in further detail both the benefits and costs of protecting such sites because of the quality of their natural heritage. Both market and non-market economic benefits should be covered.”

The specific objectives of the study are to:

- *Identify, measure and value the various benefits attributable to N2K sites. Both economic welfare and local economic impact type benefits should be included;*
- *Using existing data on costs identify the net economic contribution of N2K sites;*
- *Identify how preferences vary between different geographical areas and different groups of people (e.g. residents, visitors and the general public, or social class/income) within Scotland, and;*
- *Identify what can be done to improve the cost effectiveness/value for money from N2K sites.*

The ToR also states that, the study should be undertaken in the context of a **sample** of N2K sites that would allow the overall position across Scotland to be estimated.

As outlined in Section 3.1.2, the economic assessment has focused on a policy-off versus policy-on scenario, where the latter includes all types of conservation designations and land management activities. This approach was agreed upon with the Steering Group as the main focus of the valuation due to the difficulty in accurately partitioning N2K specific costs and benefits. For example, without N2K, many sites would still retain much of their natural quality as a result of underpinning SSSI or NNR status.

1.4 Types of Costs Considered

This section outlines the main types of cost considered in the study. Dixon and Sherman (1990) identify three main categories of protected area costs: direct costs; opportunity costs; and indirect costs. Broom et al (1999) also highlight that direct costs associated with protected areas can relate to: site management costs and policy implementation (administration) costs. These are briefly outlined below with respect to how they have been dealt with in this study.

1.4.1 Direct (site management) costs

Table 1.1 below details the different types of site management costs considered in this study. The classification is based on the Habitats Directive Article 8 Natura 2000 costing questionnaire conducted across the EU. Note that some of the “designation process” costs are in effect policy implementation costs. Where these costs have been identified at a site level, they have been included as one-off site management costs.

Where possible the site management costs are split into initial one-off designation and start up costs (e.g. for consultation, land purchase and capital works) and on-going annual site management costs (e.g. wardening and maintenance).

1.4.2 Administrative/policy costs

These include general resource costs associated with Government Agencies and others implementing the overall policy (for example of the Habitats Directive). This includes salaries and expenses of staff at SE, SNH and other organisations associated with implementing the overall N2K initiative. In addition other relevant costs such as those for consultancy studies should also be considered. At a local level, these have been included with the site management costs. At a national level, these have been highlighted separately where possible.

Table 1.1 Costs incurred for designating and managing N2K sites

Category	Type of Cost
Designation Process	Administration of selection process
	Survey – inventory; mapping; condition assessment
	Consultation / Preparation of information and publicity material
	Land purchase
Management planning and administration (occasional and annual)	Preparation and review of management plans, strategies and schemes
	Establishment and running costs of management bodies
	Provision of staff (wardens, project officers etc), buildings and equipment
	Consultation – public meeting; liaison with landowners
	Rent and administration
‘Ongoing’ management actions and incentives (where not accounted for above)	Conservation management measures (e.g. maintenance of habitat/species status)
	Fire prevention and control
	Research, monitoring and survey
	Visitor management
	Provision of information, interpretation and publicity material
‘Occasional’ capital investments	Training and education
	Restoration or improvement of habitat or status of species
	Compensation for rights foregone (e.g. mineral or fishing rights), loss of land value.
	Habitat surveys
	Infrastructure for public access

Source: Adapted from Article 8 Natura 2000 site costing questionnaire

1.4.3 Opportunity costs

Opportunity costs are the maximum alternative return foregone associated with having to adapt or being unable to undertake other economic activities in or near the protected area. This can lead to loss of economic output (e.g. agricultural, industrial, fishery, property and tourism yields) and social impacts such as loss of income and employment opportunities.

Opportunity costs vary depending on the characteristics of the site in question. However, costs are generally expected to be low in many remote areas of Scotland due to the lack of alternative viable forms of land use and considerable supply of alternative locations to undertake activities. Issues

such as the likelihood of an alternative activity being undertaken and the availability of alternative sites to undertake such activities need to be factored in.

Furthermore, with respect to agricultural opportunities, it should be recognised that much of Scotland's agricultural production output is heavily subsidised. Price support, subsidies and tariffs need to be excluded from opportunity costs, resulting in potential social costs being a fraction of the financial costs.

Opportunity costs have been assessed at a site level and extrapolated to the national level.

1.4.4 Indirect costs

A range of potential indirect protected area costs exists. This includes for example, environmental impacts such as erosion, trampling, waste and disturbance of animals that may occur if visitor activities are large or require particular management. If management enables some species to multiply unchecked, associated species and ecosystems can also be affected. This can lead to indirect economic impacts such as loss of economic produce (e.g. crops, yields of fish) due to increased populations of some species (e.g. increased numbers of geese). Designation for conservation purposes can also lead to additional costs (e.g. mitigation costs) for nearby developments to minimise the risk of impacts or compensate for potential impacts. In addition, designation can lead to a reduction in permitted intensities of economic activities in nearby areas, for example, reduced forestry output within a river catchment basin.

It should be noted that these impacts can be difficult to quantify and value. In few instances during the study consultation were such costs highlighted. With the exception of reduced forestry costs in River Bladnoch, indirect costs have not generally been valued in this study.

1.5 Types of Benefit

The conventional framework in which estimates of environmental value is expressed is Total Economic Value (TEV). This divides the welfare value ascribed to a good, service or system into direct use, indirect use and non-use values (Pearce & Turner, 1990). Figure 1.2 (end of this section) provides a more detailed breakdown of the TEV components as they relate to designated areas for the protection of habitats and species. A definition of each component is given in the text below the figure. Definitions for each component of TEV are given in the following sections.

1.5.1 Use values

Use value comprises direct (extractive and non-extractive) and indirect uses of a good or service.

1. **Direct use:** such as the direct consumption of a resource and visiting a site can be further split into:
 - **Extractive uses:** the removal of a resource from a system within which it is stored so that others cannot use it, e.g. mining, water abstraction, and;
 - **Non-extractive uses:** the direct use of the resource without excluding future use, e.g. recreational activities when visiting a site.
2. **Indirect use:** refers to the benefits derived indirectly through ecosystem functions and support of other habitats elsewhere, e.g. the support of surface waters elsewhere.

The main use values assessed in this study relate to direct recreational visits to N2K sites. This value is based on the amount of money individuals are willing to pay for the policy-on scenario relating to their use, over and above what they do pay to visit the sites. Visitor use has been split into **general users** (e.g. walkers) and **specialist users** (e.g. angling, hunting and shooting).

In this study, indirect environmental services (e.g. water filtration) are only briefly assessed and highlighted in terms of their likely magnitude.

1.5.2 Non-use values

Non-use values can arise irrespective of any such use, in contexts where an individual is willing to pay for a good even though they make no direct use of it, may not benefit even indirectly from it and may not plan any future use of it for themselves or others. The following are all potential motives for non-use values:

1. **Option value** is connected to the uncertainty about future preferences. This value can be seen as either a use or a non-use value. In effect, it represents an insurance premium value that people may place on guaranteeing that a resource is maintained for potential future use.
2. **Bequest value:** a value attached to preservation or conservation of the environment so that future generations may enjoy the resource.
3. **Existence value:** results from an individual's personal desire to preserve an environmental asset and ensure its continued existence into the future.

In addition, the Jacobs (2003) report identified that "altruistic value" is potentially of great significance. This is the value attached to preservation or conservation of the environment so that other people can enjoy the resource now.

For this study, non-use values derived by both visitors and non-visitors to N2K sites are assessed. The value is based on the amount of money individuals are willing to pay to maintain the policy-on scenario regardless of whether they actually use the sites or not. Note that users of sites have a non-use value in addition to a use value. This study splits user's values into both use and non-use components based on information gleaned from the questionnaire surveys. However, it should be recognised that such a partition is not watertight.

1.5.3 Other types of benefit

Other potential benefits relating to protection of N2K sites include those such as:

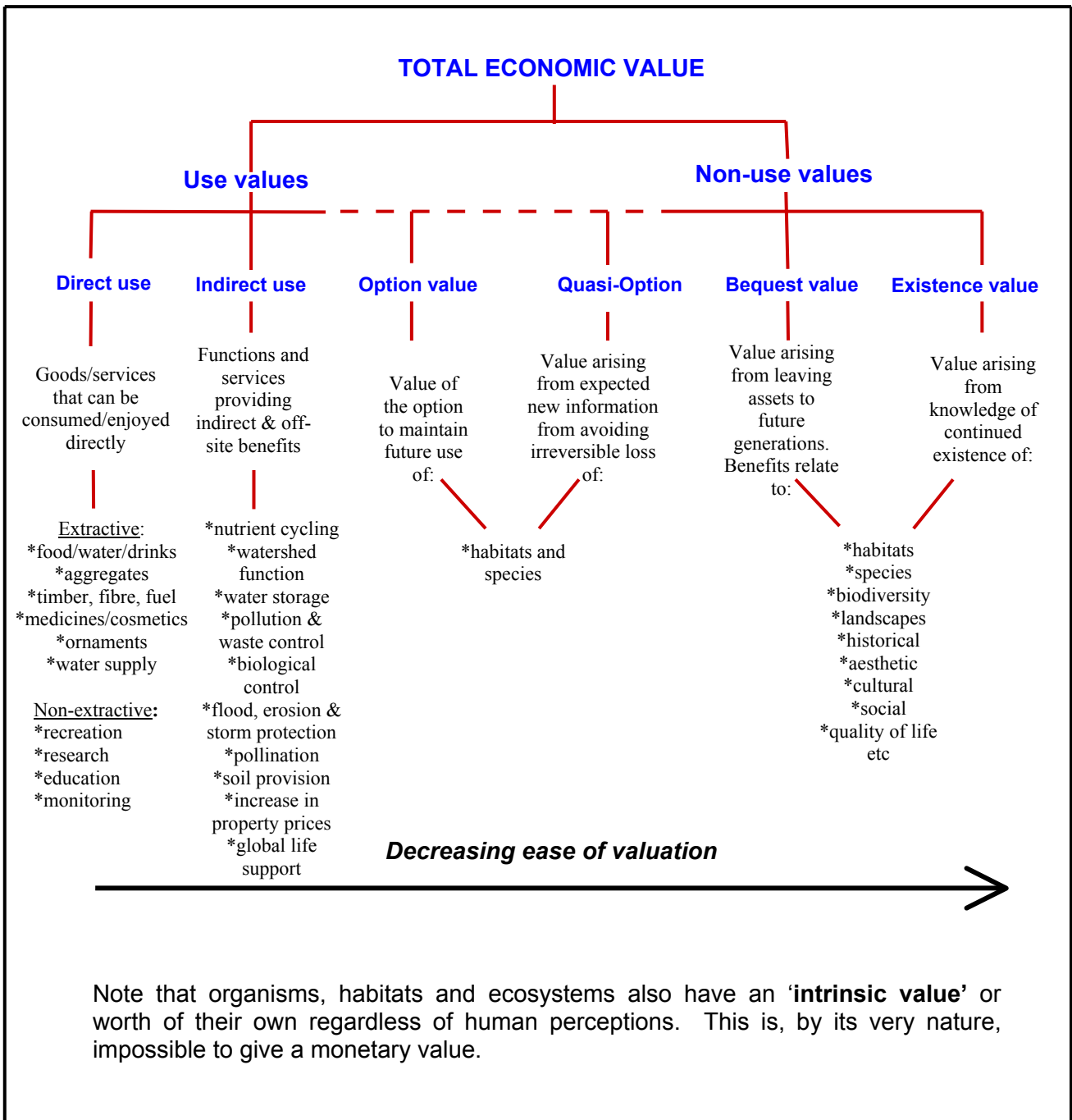
- *Social values (e.g. an improved way of life, improved quality of life, greater economic stability, enhanced social identity);*
- *Cultural values (e.g. maintaining traditional sites and activities);*
- *Education and research, and;*
- *Health*

Some of these components can be accounted for within non-use and recreation values determined through public preference surveys.

In this study, these values are only briefly assessed and highlighted in terms of their likely magnitude.

Figure 1.2 The Total Economic Value of protected habitats and species

Source: Adapted from Barton (1995) for this study.



2 Overview of Previous Study

This section provides a brief summary of the approach and key findings from the previous Jacobs (2003) study.

2.1 Lessons Learned from the Literature

A review of literature on public preferences for natural heritage revealed that the general public, local residents, visitors to the countryside and people residing in other countries can all hold significant values for maintaining habitats and species.

Household willingness-to-pay (WTP) values tend to range from a few pounds (sterling) to several tens of pounds per year for protecting different individual species and habitats in the UK. These values relate not only to people's use of such resources (i.e. use values), but also to the benefit people derive without necessarily ever using them (i.e. non-use values). The Jacobs (2003) report highlighted that non-users of individual conservation sites often had a WTP values of around 40–60% of users WTP values.

Public preference values depend on the context of the valuation scenario, in particular relating to the precise nature of the good, extent of impact and regional socio-economic factors. There is therefore limited scope for using existing values from other studies to estimate public preference values for Scottish N2K sites.

The literature demonstrates that public preference values associated with protected areas are affected by a range of factors including:

- Habitat and species type;
- Number of species protected;
- Rarity of the habitats or species;
- Distance from urban areas;
- Landscape beauty and quality;
- Location;
- The degree of threat;
- How irreversible the threat is perceived to be;
- How well known the resource or site is;
- Size of the site;
- The 'status' of site (if protected or not);
- Number of users;
- Number of nearby substitute sites;
- Extent of local employment;
- Support for the local "way of life", and;
- Relationship of the site with other protected areas.

A review of literature on public preference valuation methods revealed that the most suitable methods relating to valuing natural heritage are contingent valuation and choice modelling. Both have their advantages and disadvantages.

Given the complex nature and diversity of the characteristics at each site and for all sites throughout Scotland, contingent valuation would perhaps be the most appropriate for providing a more reliable site and national level valuation. Careful questionnaire design can allow elicited values to be split in different ways.

Choice modelling is better at determining marginal values, but can only deal with around 4-5 attributes. It is unlikely that this number could realistically capture the essence of the rich mosaic of characteristics that make up Scotland's N2K sites. Furthermore, choice modelling requires extensive pre-survey assessments, which take additional time and money, to determine appropriate attributes and suitable levels for them.

2.2 Review of Economic Impact Assessment Methods

Economic impacts associated with the N2K network are likely to include direct, indirect and induced revenues, incomes and jobs resulting from: conservation payments; visitor expenditure; and other N2K site related product exports and investments.

Various methods exist to measure such impacts ranging from: expert judgement; to transferring values from other studies; to segment analysis; to original survey work. Tools such as satellite accounts, multipliers and input output tables are available to help determine the impacts, in particular the indirect impacts and induced effects.

If an economic impact assessment were to be undertaken, it was recommended that original questionnaire survey work be conducted to generate reasonably accurate direct expenditure estimates and appropriate information to enable use of an input output analysis approach to be undertaken. An input output framework offers the most intuitive and auditable model for tracing economic impacts. Pre-calculated multipliers are unlikely to be adequate, but are regularly used due to budget constraints. The specific geographical level to assess multipliers for depends on a variety of regional factors. The focus and range of local economic impacts also varies depending on site-specific factors. Potentially relevant impact boundaries include regional administrative regions and local areas, for example, within 10-20 km of the sites.

An economic impact assessment framework would ideally take account of the structural differences between rural and average economies, including capacity limitations, and of the particular local economy in which the site is situated. The location of distributors and suppliers would also ideally need to be transparently taken into account, through direct inquiry from the purchasers and failing that through consistent modelling and realistic assumption. Any such assessment should also draw attention to non-linearities, such as fullness of national employment, which may reduce induced effects. In addition, displacement and deadweight effects should be considered.

2.3 A Potential Economic Assessment Framework

An initial framework for assessing the economic costs and benefits of N2K sites in Scotland was developed. As part of the process, it was important to define the policy-on/off situation, identify suitable case study areas and develop an economic accounting framework.

The policy-on and off definitions were identified as follows:

- The **policy-on situation** is where “all 300 N2K sites within Scotland are fully designated and implemented (comprising 223 cSACs and 132 SPAs, with 55 overlapping) over a period of the next 25 years”, and;
- The **policy-off situation** can be defined as “The complete withdrawal of all conservation protection (including SSSIs, ESAs and other conservation and land management related expenditure) within the 300 N2K sites, over a period of the next 25 years.”

For each case study area, the definition is the same. The definition also excludes all marine cSACs, which had yet to be finalised at the time of study.

Five case study areas were selected using a matrix approach to ensure a broad range of site characteristics were covered. The case study areas are: (1) the River Bladnoch, (2) Clyde Valley Woods (including Waukenwae Moss and Red Moss), (3) Sands of Forvie (including the Ythan Estuary, Meikle Loch, Buchan Ness to Collieston Cliffs, and Tips of Corsemaul and Tom Mor), (4) the Strathglass Complex (including Glen Affric), and (5) Lewis and Harris (including Lewis Peatlands, North Harris Mountain, Grimersta and Langavat river catchment, and Ness and Barvas croftland).

Note that in this report, the five case study areas were expanded to seven by considering (a) Waukenwae Moss and Red Moss, and (b) the Tips of Corsemaul and Tom Mor, as discrete case study areas (see Section 3.1.4).

The main economic costs associated with conservation management and N2K include: direct implementation and ongoing management costs, indirect costs and opportunity costs. The latter includes, for example, the economic value of development opportunities foregone as a result of conservation management.

The main economic benefits associated with conservation management and N2K include i) welfare benefits relating to: products, recreational enjoyment, ecological services, education, research, health, non-use values (e.g. people willing to pay even if they do not use a site), and ii) economic impact benefits relating to incomes, revenues, jobs and investments.

Other potential non-monetary benefits include improved way of life, improved quality of life, greater economic stability, social identity, and other social, cultural, educational, research, environmental service and health values etc. Some of these components could be accounted for within non-use and recreation values, and determined through a public preference survey.

Although the policy-on-off scenarios don't directly allow for identifying N2K specific costs and benefits (as opposed to general conservation related costs and benefits), this should ideally be done to the extent possible. Such benefits will generally relate to enhanced visitor and non-use values, increased marketing opportunities and enhanced leverage of funds invested at the sites. Such costs will relate to additional site establishment efforts and increased intensity of management.

Furthermore, efforts should be made where possible to identify which stakeholders contribute to and benefit from such management of the sites.

Provisional ideas for a preliminary economic accounting framework have also been developed that could help account for all the economic impacts associated with implementing and designating N2K sites. The framework incorporates the principles of TEV (i.e. direct and indirect values and user and non-user categories) and social accounting (i.e. activities in GDP, products, incomes, institutions and consumption). However, it must be recognised that welfare benefits and economic impacts are not additive.

2.4 General Public Attitudes

Four focus group sessions were conducted with members of the general public. Two were held in Inverness and two in Edinburgh. The main aim was to establish awareness and attitudes towards N2K.

Awareness of the N2K designation is extremely low amongst the general public. There is also much confusion regarding the many other types of designations with uncertainty voiced regarding their purposes, scale and overlaps between different types.

Respondents generally supported the purposes of designated sites and valued Scotland's habitats and species highly.

Members of the C2D socio-economic groups were more likely to perceive protection as being undertaken primarily to benefit people (visiting sites) whilst BC1s tended to view protection as being undertaken to benefit wildlife with only secondary benefits for people.

BC1s attached equal importance to all types of wildlife habitats (e.g. bogs, moors and mountains), whilst the C2Ds tended to see those with the greatest scenic value as being most important.

Provision of somewhere to visit was seen as one key benefit of N2K, although benefits associated with existence value and future generations were also identified.

The most important attributes for funding sites differed depending on socio-economic class, although the following were all considered to be particularly important:

- *Uniqueness of the habitat to Scotland / Europe;*
- *Degree of wilderness;*
- *Degree of threat from damage;*
- *Number of local people employed;*
- *Number of visitors, and;*
- *Provision of education facilities.*

Although most respondents indicated that protection of habitats and species was worthy of public expenditure, many were unhappy with the idea of increased income taxes to fund it. This mainly related to people's uncertainty as to whether the money would be spent wisely and failure to believe a policy-off scenario.

2.5 Local Stakeholder Attitudes

Semi-structured questionnaires were conducted on eight individuals at each of the five case study areas. Respondents included a mix of landowners, farmers, conservation workers, tourism employees, and the general public. Again, the main aim was to establish awareness and attitudes towards N2K.

The most preferred habitat to visit is coastal areas. However, the local type of countryside is also generally popular to visit.

Most respondents thought it was very important to protect wildlife and the countryside, particularly for:

- *Avoiding loss of the countryside;*
- *Preserving biodiversity/ the landscape;*
- *Maintaining a balanced system;*
- *Public enjoyment, and;*
- *Protecting them for future generations.*

A variety of different species were considered as most important to protect. Specific examples included Atlantic salmon, otters, orchids, birds and wild flowering meadows as well deer and red squirrel, which are not protected under the Habitats Directive.

Almost all respondents were aware that areas of the Scottish countryside were protected for nature conservation, however their level of awareness regarding nature conservation designations was varied. Few respondents (~25%) had heard of N2K, however more were aware of the cSAC or SPA designation (~50%).

Over 75% of respondents said they would be willing to pay to ensure the protection of Scotland's N2K sites. The preferred payment vehicle was found to be taxes. Visitor fees were not generally seen as being a good idea, with several people saying they would actively avoid such areas.

The local stakeholders generally thought that attributes with an ecological basis were more important than human based (*anthropocentric) attributes. The most important included the following:

- *Uniqueness to Scotland;*
- *Degree of threat;*
- *Type of animal/ plant protected;*
- *Uniqueness to Europe;*
- **Number employed;*
- *Number of different habitats protected;*
- **Educational facilities, and;*
- *Number of different animals/ plants.*

2.6 Experts Attribute Survey

In order to help determine what attributes could be used for a possible future choice modelling survey, an email survey was sent out to around 30 people involved in conservation decision-making in the EU. According to the eight respondents, the most important factors/attributes of N2K sites that affect the overall value of a site, particularly in terms of public preferences are likely to be:

- *Type of habitat and species;*
- *Rarity of habitats and species;*
- *Number of species;*
- *Uniqueness of site in relation to national/European natural heritage, and;*
- *Landscape beauty.*

The most important factors/attributes of N2K sites that should affect the extent to which different sites are funded were suggested to be:

- *Importance and role of the site in the local economy;*
- *Extent to which site management combines with other rural development/economic aspects;*
- *Maintaining the balance between protection and use of the areas;*
- *Rarity or conservation priority of habitats and species of the site;*
- *Uniqueness and characteristics of the site;*
- *Number of visitors, and;*
- *Sites where accessibility and information provision is important.*

The key factors/attributes of N2K sites that could best be modified to enhance the value and benefits of a site were as follows:

- *Improved communication (e.g. of the value of habitats and species);*
- *More site information and interpretation;*
- *Enhanced accessibility, and;*
- *Increased visitor numbers.*

2.7 Non-Scottish People

Because no visitors were encountered during the case study area surveys, a small semi-structured review of four English residents was undertaken. This demonstrated that both visitors to Scotland and non-visitors to Scotland can have a strong interest in maintaining key habitats and species in Scotland. Benefits discussed related to likely and possible future use (option value) and existence values.

The concept of visitor fees was suggested as the most appropriate and fair means to help pay for the protection.

The degree of threat and uniqueness to Scotland and Europe were considered very important to most when attributing funding between sites within the network.

2.8 Potential for Improving the Cost-effectiveness of Natura 2000

To obtain maximum benefit from understanding the economic costs and benefits of N2K, one should focus on how the most can be made of any economic assessment results. Key areas should, for example, include identifying means of:

- *Promoting the overall results of any such study;*
- *Maximising the benefits for different stakeholder groups (e.g. through strategically developed and targeted stakeholder information and awareness programmes, targeted re-training programmes, and provision of suitable visitor facilities where appropriate). It is important to bear in mind that increased public awareness of biodiversity and N2K will lead to greater values (e.g. non-use value) and support for N2K sites;*
- *Minimising management costs, for example, through gaining local support and avoiding costs associated with confrontation and delays, and by encouraging voluntary help. Locals and*

visitors helping with provision of footpaths and fences etc., and working in visitor centres can achieve the latter;

- *Determining ways that potential benefits (particularly non-market benefits such as non-use value) can be appropriated by local people and communities, and;*
- *Highlighting how economic benefits can be used to attract additional funding and sponsorship (e.g. through corporate social responsibility, although being aware of any necessary compromises).*

3 Approach

3.1 Introduction

3.1.1 Overview

This section provides an overview of the methodology used in this study to assess the economic costs and benefits associated with 7 N2K study areas and all 300 N2K sites in Scotland. The Jacobs (2003) report provides an overview of current understanding and reviews various techniques that could be used.

Note that this report presents the findings of the welfare benefit assessment. Local economic impacts are addressed in a separate report, though reference is made to economic impacts where appropriate.

The analysis applied in this study is predominantly based on a cost benefit analysis (CBA) approach. Both “bottom-up” (site specific) and “top-down” (national level) questionnaire survey techniques were used to elicit the relevant information required for the analyses. The surveys generally drew upon a “contingent valuation” approach.

3.1.2 Policy-on versus policy-off

For the economic analyses, the policy-on and policy-off scenarios examined in this study were as follows:

- *The **policy-on situation** is where “all 300 N2K sites within Scotland are fully designated and implemented (comprising 223 cSACs and 132 SPAs, with 55 overlapping) over a period of the next 25 and 50 years”, and;*
- *The **policy-off situation** can be defined as “The complete withdrawal of all conservation protection (including SSSIs, ESAs and other conservation and land management related expenditure) within the 300 N2K sites, over a period of the next 25 and 50 years.”*

For each case study area, the definition is the same. The definition also excludes all marine cSACs, which have yet to be finalised.

Note that other existing non-N2K related SSSIs (over 1000) would continue to be protected in the policy-on scenario, in that the owners and occupiers have responsibility for taking care when undertaking potentially damaging operations at the sites. Furthermore, some non-N2K site agricultural and crofting areas would still be protected to some degree by Environmentally Sensitive Area designations, and National Scenic Areas would continue to protect the landscape value of certain sites through specific planning regulations.

3.1.3 Proportion of costs and benefits N2K related

The costs and benefits identified in this study relate to the policy-on status, which includes all land management costs. The proportion of costs and benefits relating specifically to N2K (i.e. the marginal impacts of cSAC and SPA designations) was also estimated. These estimates were based on discussions with key site consultees and an understanding of the nature of land management costs under different designations. Note that the accuracy of these proportion estimates is acknowledged to be relatively poor.

3.1.4 Case study areas

Five case study areas were originally selected in the previous study carried out by Jacobs (2003). However, due to fundamental differences in the location and nature of the sites, for the purposes of this study, those areas have been split, giving seven case study areas. Outline details of the areas and sites are given in Table 3.1 below and their locations indicated in Figure 3.1 overleaf.

Table 3.1 Case study areas and sites

Case study area	Location	N2K site name(s)	Habitat type	cSAC	SPA
River Bladnoch	Dumfries and Galloway	River Bladnoch	River	X	
Waukenwae and Red Mosses	South Lanarkshire	Clyde Valley Woods	Woodland	X	
		Waukenwae Moss	Bog	X	
		Red Moss	Bog	X	
Sands of Forvie group	Aberdeenshire	Sands of Forvie & Ythan estuary	Coastal	X	X
Tips of Corsemaul and Tom Mor		Buchan Ness to Collieston	Coastal	X	X
		Tips of Corsemaul & Tom Mor	Inland hills		X
Strathglass Complex	Highlands	Strathglass complex	Mountain	X	
Lewis and Harris group	Western Isles	Lewis Peatlands	Peatland	X	X
		Harris Mountains	Mountain	X	X
		Grimersta River	River	X	
		Ness and Barvas	Farmland		X

The original five case study areas were selected to be reasonably representative of the wider N2K site network based on: geographical location, habitat type, type of N2K designation (i.e. SPA, cSAC or both), size, visitor use, accessibility and the degree of threat.

3.2 The Main Economic Analyses

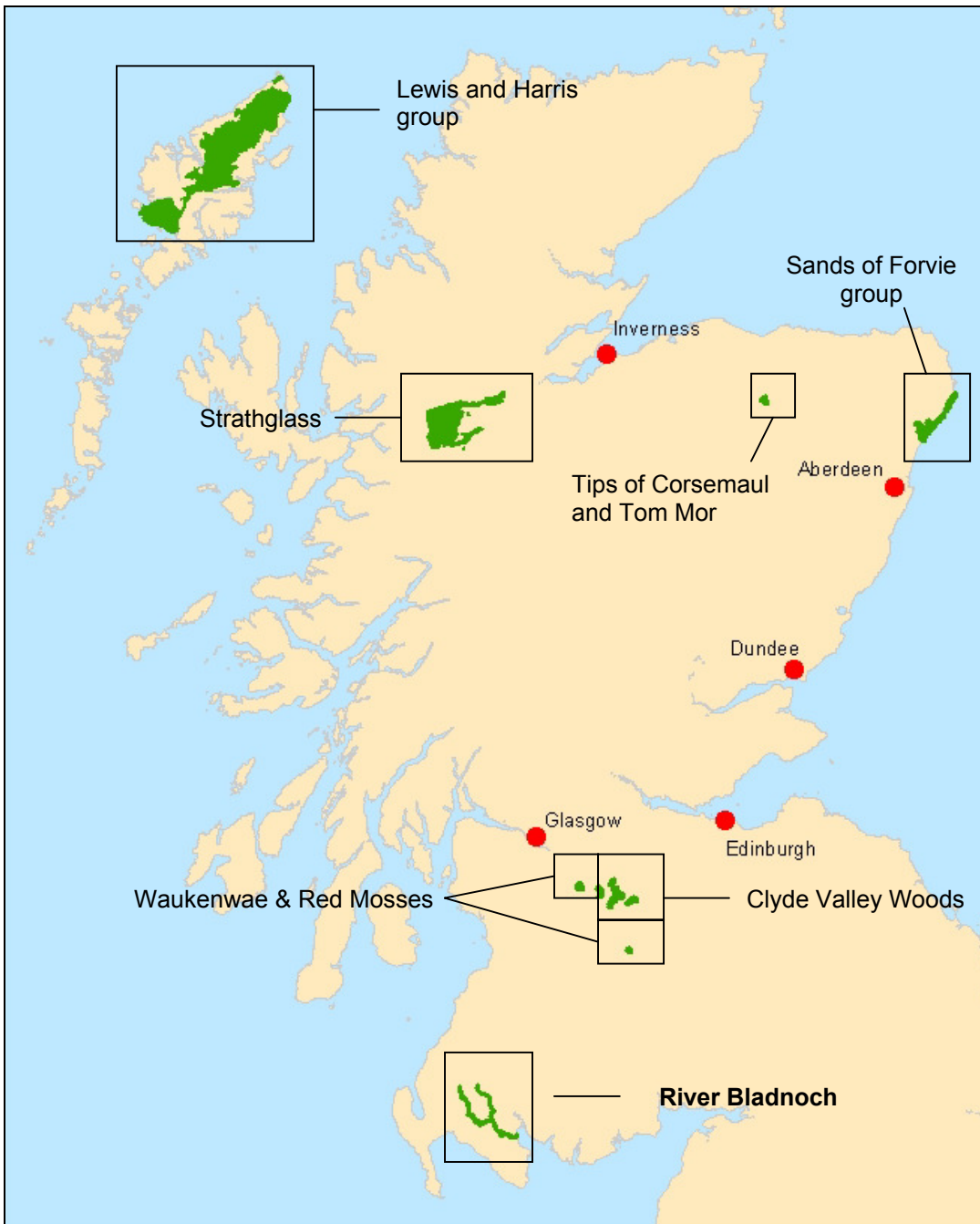
3.2.1 Cost benefit analysis

Cost benefit analysis compares changes in national economic welfare costs and benefits affecting individuals and organisations associated with a particular scheme or policy. In the context of this N2K study, the main types of cost included are management, opportunity and indirect costs (see Section 1.4). The main type of benefits valued are general and specialist visitor use values, and visitor and non-visitor non-use values (see Section 1.5).

The above key stakeholder beneficiary groups have also been split into the following categories based on the distance they live from the N2K case study areas. The distances selected were based on an initial analysis of survey results and a previous detailed use/non-use WTP distance decay study (JacobsGIBB, 2002).

- *within 10km*
- *between 10 – 20 km*
- *between 20 km and the region border (e.g. the Highlands)*
- *the remainder of Scotland*
- *non-Scottish visitors*

Figure 3.1 Location of seven case study areas



The cost benefit analyses cover a period of both 25 years and 50 years from 2003. To convert future costs and benefits into equivalent present day values, a discount rate of 3.5% has been applied for the first 30 years and 3% from years 31 to 50, in accordance with the UK Treasury Green Book. The benefit cost ratio (BCR) is then the sum of present value benefits divided by present value costs.

Note that the costs in this case are based on stakeholder organisations rather than "producers" as should strictly be the case. Note also that there was great difficulty in partitioning costs incurred by stakeholder organizations that were originally sourced from elsewhere (e.g. some SNH and RSPB costs may have originated from EU funds, and some estate land management costs may include elements of SNH or FC grants).

A BCR of greater than 1 implies economically justified investment, with the larger the number the greater the returns. The net present value is simply the present value benefits minus the present value costs. A positive value implies an economically justified investment.

However, the BCR and NPV exclude a whole range of other benefits that are less readily quantified in monetary terms. These include educational, research, social, cultural and health benefits. Such values have been assessed at a broad level, measured in terms of whether they are high, medium or low. This assessment was mainly based on site visits and feedback from the organisation consultation letters.

3.2.2 National level analysis

A “national-level” valuation of the costs and benefits associated with all 300 N2K sites has been undertaken. The results of the cost benefit analysis and economic impact assessment for this are given in Section 4.

The cost estimates for the analyses are based on national level costs determined from the “organisation consultation questionnaire” outlined in Section 3.2.1. Site level costs were also extrapolated to give an estimate of national level costs. The benefits are again based on the results of a variety of questionnaire surveys outlined briefly in Section 3.3.1.

3.2.3 Site level analyses

A “site-level” valuation of the costs and benefits associated with each of the seven case study areas has been undertaken. The results of the cost benefit analysis for the seven areas are given Sections 5-11.

The costs for these are based on actual site costs determined from the “organisation consultation questionnaire” outlined in Section 3.2.1. The benefits are based on the results of a variety of questionnaire surveys outlined briefly in Section 3.3.1.

3.3 Data Collection

3.3.1 Beneficiary CVM surveys

Questionnaire surveys were used to generate information and values related to stakeholder preferences and values for conservation of habitats and species in Scotland. Three discrete contingent valuation method (CVM) surveys plus a telephone survey (see Appendix A-D for a set of the questionnaires) were conducted in 2003 to target the principal stakeholder groups identified in the previous Jacobs (2003) report, namely:

- **The general public** including local residents (within 30km of the selected case study areas) and the wider population living across Scotland. The main aim was to elicit **non-use values** in terms of annual household WTP value for the policy-on scenario. See Appendix E for an overview of the approach and results;
- **Visitors’ to the seven case study areas** including local residents, other non-local Scottish Visitors and non-Scottish visitors to the area. The main aim was to elicit adult visitor’s WTP values associated with their **use value** relating to the policy-on protection from each site visit. See Appendix F for an overview of the approach and results, and;
- **Non-Scottish visitors.** The main aim was to elicit adult visitor’s WTP values associated with their **non-use value** for the policy-on scenario. See Appendix G for an overview of the

approach and results. Please note that benefits to non-Scottish non-visitors have not been assessed.

Although designed to generate specific types of information related to all three stakeholder groups, the generic type of questionnaire used was a “contingent valuation” survey, where people were asked how much they were willing to pay for the policy-on scenario.

In the general public survey, respondents were asked for their household’s annual WTP value for protecting all 300 N2K sites having only been given very “basic information” only. They were then provided with “additional information” describing the potential impacts of the policy-off scenario and shown “before and after” photos. They were then asked to re-confirm or adjust their WTP values.

“Rating” type questions were also asked, whereby individuals were asked to allocate scores between different types of benefit and management action. Depending on the stakeholder group, other types of question included those to generate information on use of the countryside, attitudes towards nature conservation and expenditure related to their use of N2K sites, amongst others.

3.3.2 Telephone “follow up” survey

A telephone survey was undertaken on 109 of the general public survey respondents two months following completion of the general public survey. The aim was to verify their understanding of the questionnaire and to assess the reliability of WTP bids. See Appendix H for an overview of the approach and results.

The results indicated a good understanding of the general public questionnaire, a believable WTP scenario was used and that the values given at the time differed on average by only 0.5% (less) than the values the respondents originally gave for the policy-on scenario.

3.3.3 Organisation consultation letters

Between October 2003 and January 2004 a site-specific questionnaire was sent to a large number of stakeholder groups and individuals at each site identified as potentially deriving benefits or incurring costs. These stakeholders had been identified through initial site visits and consultation with “key informants” such as local SNH site management staff. The aim was to gain information on their direct, indirect and non-use benefits, and their management, opportunity and indirect costs. Those organisations incurring significant costs (e.g. SNH and Forestry Commission) were then consulted further to check the details and assumptions in their costing submissions.

Whilst the site level consultation exercise was underway, a parallel national questionnaire consultation process was also conducted. This was sent to 85 national organisations and representative organisations likely to gain benefits or incur costs associated with the national N2K network. The consultee list was based on Scottish Natural Heritage (SNH) and Scottish Agricultural College databases, and is shown in Appendix I. Again, respondents were requested to provide information on national site management expenditure, opportunity and indirect costs along with information on potential benefits associated with these sites such as visitor expenditure and enjoyment, employment and environmental services gains.

3.4 Cost Data Analysis

3.4.1 Site management costs

Site management costs incurred by different organisations were inserted into a spreadsheet model for each case study area. The costs were categorised as either one-off or annual costs, from which present day value costs over time horizons of 25 and 50 years were determined. The

summary results for each area, identifying the stakeholder group incurring the costs, are outlined in Sections 5 to 11. Further details of the costs for each site are shown in Appendix J.

Key assumptions made for the site management cost model included the following:

- Administrative (policy) costs at a local site level have been included in the case study area site cost estimates as establishment costs. Note that at a national level, these costs are estimated separately;
- An annual average salary for SNH staff time was assumed to be equal to a grade D position at £25,000. This was multiplied by a factor of 1.3 to account for overhead costs associated with that employee;
- For the purposes of this assessment, designation costs borne over the last number of years were considered as one-off costs. Other costs that were funded for only a short term (2-5 years) such as LIFE project funding were also accounted for as one-off costs;
- The costs for buildings and other capital items that are likely to need replacing over time have been converted to annual costs based on the frequency of replacement needed (e.g. visitor related buildings need replacing every 15 years);
- Current management agreement costs were assumed to remain consistent over the period of the assessment, and;
- To cover angling, hunting and shooting related estate land management costs, estimates were made based on average cost estimates (£100/km for angling and £13/ha for shooting and hunting). These costs are ballpark estimates that specifically relate to modifying and improving land features and landscapes, and were provided by the Scottish Agricultural College. The broad-brush nature of these estimates should be recognised. However, obtaining more accurate costs is a major undertaking in itself.

3.4.2 Opportunity and indirect costs

The potential activities foregone as a result of conservation designations were identified through the consultation process. Potential opportunity cost revenues forgone were then adjusted using two factors. Firstly, depending on the likelihood that these activities would go ahead in the area if no conservation designation existed there and, secondly, based on the likelihood that the activity could be undertaken at an alternative site outside the designated area. Details of the site related opportunity and indirect costs and the assumptions made are shown in Appendix K.

3.5 Benefit Data Analysis

After collation of questionnaire datasets in Microsoft Excel spreadsheet format and checking and “cleaning” the data for inconsistencies, a range of analytical steps and techniques were applied, as follows:

- **Basic descriptive statistics** were used to present the more general questionnaire results, such as response rates, stakeholder characteristics and visit details;
- **WTP bid screening** was performed whereby respondent bids were sorted into three categories: (1) positive bids, (2) genuine zero bids (3) and protest bids, and treated accordingly;
- **Econometric modelling** was used to estimate missing WTP values made by protest bidders. To do this, a model was developed based on determinants of positive bids and genuine zero

bids and used to predict the WTP of the protesters (see Appendix L). This data was then added back into the overall dataset for subsequent WTP analysis;

- **WTP analysis** was conducted using regression techniques to assess the validity of WTP responses and identify key respondent characteristics that determine WTP values (see Appendices E, F and G). Patterns of WTP were also assessed to identify trends across sites, regions and stakeholder group, and;
- **Deriving WTP values for the cost benefit analysis.** The modelled WTP data was used as a basis to estimate ballpark WTP values for the use and non-use values for each distance category. The tables developed for this are outlined at the end of Appendices E, F and G.

4 National Level Assessment

4.1 Introduction

This section outlines the results of the national level economic analysis. Appendix M provides further details of the methodology and assumptions used for the cost estimates.

4.2 National Scenario

The national level scenario is effectively the **policy-on situation** described earlier where all 300 N2K sites within Scotland are fully designated and implemented (comprising 223 cSACs and 132 SPAs, with 55 overlapping) over a period of the next 25 and 50 years. An N2K specific assessment has also been undertaken.

4.3 Cost Benefit Analysis

4.3.1 Benefit cost ratios

The appraisal summary tables in Box 4.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by around 7 times, and that N2K specific benefits also outweigh N2K specific costs by 12 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are around 0.1 or less.

4.3.2 Cost estimates

The annual organisational management costs of £22.2 million show the majority of annual costs are borne by SNH and local land, estate and riparian owners, estimated at almost £8 million a year per group. These values are based on the “organisation survey” results, supplemented with data from other sources (e.g. from Scottish Agricultural College for estate management costs, and the Article 8 Group). With the exception of the estate/riparian management costs, this estimate can be considered to be reasonably reliable. The difficulty in identifying the original source of funds (e.g. from EU or grants) should also be noted.

The one-off site management costs of £41 million were obtained from the Article 8 Group survey. These were defined as costs incurred up to December 2003. This figure is not felt to be particularly accurate.

Total opportunity costs of £4.4 million are based on an extrapolation from the case study area opportunity costs. The accuracy of this figure is likely to be relatively poor. The majority of this cost is likely to relate to lost residential and tourism development opportunities. However, in the longer term, other N2K related residential and tourism development opportunities could arise that counteract or possibly even exceed this.

4.3.3 Benefit estimates

General and specialist visitor values accruing to Scottish residents may be in the order of £900,000 and £50,000 per year respectively. Equivalent values for non-Scottish visitors may be around £625,000 and £50,000 per year respectively. The accuracy of these estimates is relatively poor in that they are based on extrapolation of the case study area visitor values (for which specialist user values are merely benefit transfer values).

Scottish general public and local resident non-use value for all 300 sites is £110 million per year. This can be considered a reasonable ballpark estimate given that it is based directly on responses from the general public questionnaire.

Non-Scottish visitor non-use value for all 300 sites is around £100 million per year. Again, this can be considered a reasonable ballpark estimate given that it is based directly on responses from the non-Scottish visitor questionnaire.

4.3.4 Other benefits

In addition to the above welfare benefits, a range of other benefits will accrue. In particular, these relate to social, cultural, health, education, research and environmental service values.

Box 4.1 National appraisal summary tables for all 300 Scottish N2K sites

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	7.3	7.5	11.7	12.0
NPV with non-use	3,022,921,985	4,517,544,827	1,281,310,113	1,911,350,714
BCR without non-use	0.06	0.1	0.1	0.1
NPV without non-use	454,015,255	735,614,059	109,464,783	157,863,104

Economic Welfare Benefits	Adult Pop ⁿ	Units	WTP per unit	Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of annual costs
General Scot visitors use value	1,816,850	visits/yr	0.50	908,425	14,972,207	22,275,853	0.4%
General Non- Scot visitors use value	894,950	visits/yr	0.70	626,465	10,325,083	15,361,799	0.3%
Specialist Scot visitor use value	47,152	visits/yr	1.10	51,867	854,849	1,271,856	0%
Specialist Non-Scot visitor use value	39,172	visits/yr	1.20	47,006	774,736	1,152,663	0%
Gen public non-use value	2,270,000	hrs	48.00	108,960,000	1,795,824,240	2,671,851,744	51.3%
Non Scots visitor non-use value	17,000,000	visits/yr	6.00	102,000,000	1,681,113,000	2,501,182,800	48.0%
Total annual value				212,593,764	3,503,864,115	5,213,096,715	
% of Total							

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of annual costs
Management costs	Scottish Natural Heritage	-	7,960,463	131,200,371	195,201,697	30%
	Other Gov Agencies	-	3,402,815	56,083,495	83,441,788	13%
	Non Gov Orgs	-	3,016,300	49,713,148	73,963,899	11%
	Land & Riparian owners	-	7,913,510	130,426,515	194,050,344	30%
	Mixture	-	4,400,000	72,518,600	107,894,160	16%
Opportunity/Indirect Costs		41,000,000	26,693,088	480,942,130	695,551,888	100%
Total						

Average % Relating to N2K	Over 25 years	Over 50 Years
Of PV Policy On Benefits	40%	40%
Of PV Policy On Cost	25%	25%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Communities	H
Cultural	Local/Reg Communities	M
Education	All Visitors	M
Research	Scientific Community	H
Environmental Services	National & Global Comm	H
Health	Local Users & Visitors	H

5 River Bladnoch

5.1 Site Description

The River Bladnoch case study area (see Figure 5.1 below) comprises the River Bladnoch and its tributary the River Tarff, identified as a single cSAC because they support a salmon population of national importance. The rivers attract reasonable numbers of anglers (including a high proportion of international anglers) and the local economy relies heavily on seasonal angling related tourism. However, salmon and angler numbers have declined significantly over the past ten to fifteen years. Land-use is predominantly agricultural in the lower catchment and commercial forestry towards the upper reaches. The main river is privately owned whilst upper sections are under state or private ownership. The site is not a SSSI and no management agreements are in place at present.

Figure 5.1 The River Bladnoch case study area



Key: Site in case study area shown in green. 10 km distance zone shown by light shading.

5.2 Policy-off

Prior to the N2K designation, the River Bladnoch had no underlying environmental designation and conservation management. Under policy-off (i.e. no future conservation management and no river management for angling) there is likely to be a continued reduction in the size and viability of salmon populations due to the deterioration of spawning grounds and possible unsustainable harvesting. This decrease in the salmon numbers has already been witnessed over the past decade or so, especially during the spring salmon run. There would also be significantly less leverage for attracting EU funds and with less money available for habitat restoration, the decline in salmon numbers may be exacerbated. This would further reduce the number of anglers, negatively affecting the local economy and way of life. Without protective management, permitting agencies such as the local authority and SNH may also be less considerate of river quality issues when assessing development proposals.

5.3 Cost Benefit Analysis

The appraisal summary tables in Box 5.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by around 12 times, and that N2K specific benefits also outweigh N2K specific costs by 13 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are around 0.1.

There are considerable one-off site management costs of £350,000 which predominantly relate to the potential River Bladnoch salmon LIFE bid. Annual site costs of around £80,000 are likely to be incurred (again assuming the LIFE bid is successful). Around £15,000 per year relates to angling management costs incurred by both the Galloway Fisheries Trust and riparian owners, and £9,500 per year relates to potential indirect forestry costs.

Almost all of the annual benefits relate to non-use values, the vast majority of which is derived by Scottish people outside the region and non-Scottish visitors to Scotland. Only around £7,000 per year (0.4%) is likely to relate to general visitor and angler use values. However, it should be noted that if salmon and angling numbers were to increase dramatically due to the LIFE funding actions, angling benefits may be significantly enhanced. Table 5.1 below provides additional details of how the annual welfare benefits are made up.

Table 5.1 Summary of the River Bladnoch case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	4,000	adults/yr	0.05	£/adult/visit	200
	Visitors - 10- 20 km	2,000	adults/yr	0.30	£/adult/visit	600
	Visitors - other regional	1,000	adults/yr	0.60	£/adult/visit	600
	Visitors - national	1,500	adults/yr	0.60	£/adult/visit	900
	Visitors -non Scottish	1,500	adults/yr	0.60	£/adult/visit	900
	Subtotal (A)					
Specialist Use Value	Specialist - < 10 km	408	adults/yr	2.25	£/adult/yr	918
	Specialist - 10-20 km	85	adults/yr	2.25	£/adult/yr	191
	Specialist - other regional	85	adults/yr	2.25	£/adult/yr	191
	Specialist - national	85	adults/yr	2.25	£/adult/yr	191
	Specialist - non-Scottish	918	adults/yr	2.25	£/adult/yr	2,066
	Subtotal (B)					
Non-use value	Residents - < 10 km	4,695	hse	0.25	£/house/yr	1,174
	Residents - 10 - 20 km	8,503	hse	0.55	£/house/yr	4,677
	Other Regional	58,503	hse	0.90	£/house/yr	52,653
	General Scottish public	2,198,374	hse	0.35	£/house/yr	769,431
	Non-Scottish visitors	17,000,000	adults/yr	0.02	£/adult/yr	357,000
	Subtotal (C)					
Grand Total (A+B+C)						1,191,691

Mean general public WTP for the policy-on scenario was £0.55 per household per year and. The majority of local respondents were site users (84% within 10km). Mean user WTP values were over twice as high as those of non-users. However, users had a relatively low use value component (48%) and therefore, the overall mean proportion of non-use value was relatively low compared to other sites (81% of the mean WTP, or £0.45 per household per adult per year).

Mean site visitor WTP at this site ranged from £0.05 per adult visit at <10km from the site to £0.60 per adult visit amongst regional, national and international visitors. The vast majority of respondents there were from elsewhere in the UK, and to a lesser extent from overseas. Mean use and non-use value proportions were each roughly 50% of the total across all distance zones.

In addition mean non-Scottish visitor non-use WTP was found to be £0.021 per adult visit.

In addition there is a high potential social value associated with the possibility of re-invigorating the local economy if salmon and angler numbers were to return.

Box 5.1 Summary appraisal tables for the River Bladnoch case study area

Economic Welfare Indicators	Policy On			N2K related		
	Over 25 years	Over 50 Years	Over 25 years	Over 25 years	Over 50 Years	Over 50 Years
BCR with non-use	11.9	12.8	13.0			14.3
NPV with non-use	17,985,128	26,930,469	18,127,133			27,173,982
BCR without non-use	0.07	0.1	0.1			0.1
NPV without non-use	-1,544,365	-2,457,171	-1,402,360			-1,882,263

Economic Welfare Benefits	Annual Benefits accruing to population (£)						Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)
	< 10 km	10- 20 km	Other Regional	Other Scotland	Non- Scottish Visitors				
General visitors use value	200	600	600	900	900		3,200	52,741	78,468
Specialist visitor use value	918	191	191	191	2,066		3,557	58,629	87,229
Non-use value	1,174	4,677	52,653	769,431	357,000		1,184,934	19,529,493	29,056,245
Total annual value	2,292	5,468	53,444	770,522	359,966		1,191,691	19,640,862	29,221,942
% of Total	0.2%	0.5%	4.5%	65%	30%				

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 50 years (£)		% of 50 year total
				PVC over 25 years (£)	PVC over 50 years (£)	
Management costs	SNH	178,630	46,345	942,465	1,315,074	57%
	Galloway Fisheries Trust	40,400	7,680	166,978	228,683	10%
	LIFE	126,600	8,620	268,671	337,928	15%
	Forestry Commission	6,500	-	6,500	6,500	0.3%
	Riparian owners	-	7,000	115,371	171,612	7.5%
Indirect Cost	Forestry		9,450	155,750	231,676	10%
Total		352,130	79,095	1,655,734	2,291,473	100%

Average % Relating to N2K	Over 25 years	Over 50 Years
Of PV Policy On Benefits	100%	100%
Of PV Policy On Cost	91%	89%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Community	H
Cultural	Local Community	L
Education	Visitors /Anglers	L
Research	Anglers	L
Environmental Services	National	L
Health	Local Users & Visitors	L/M

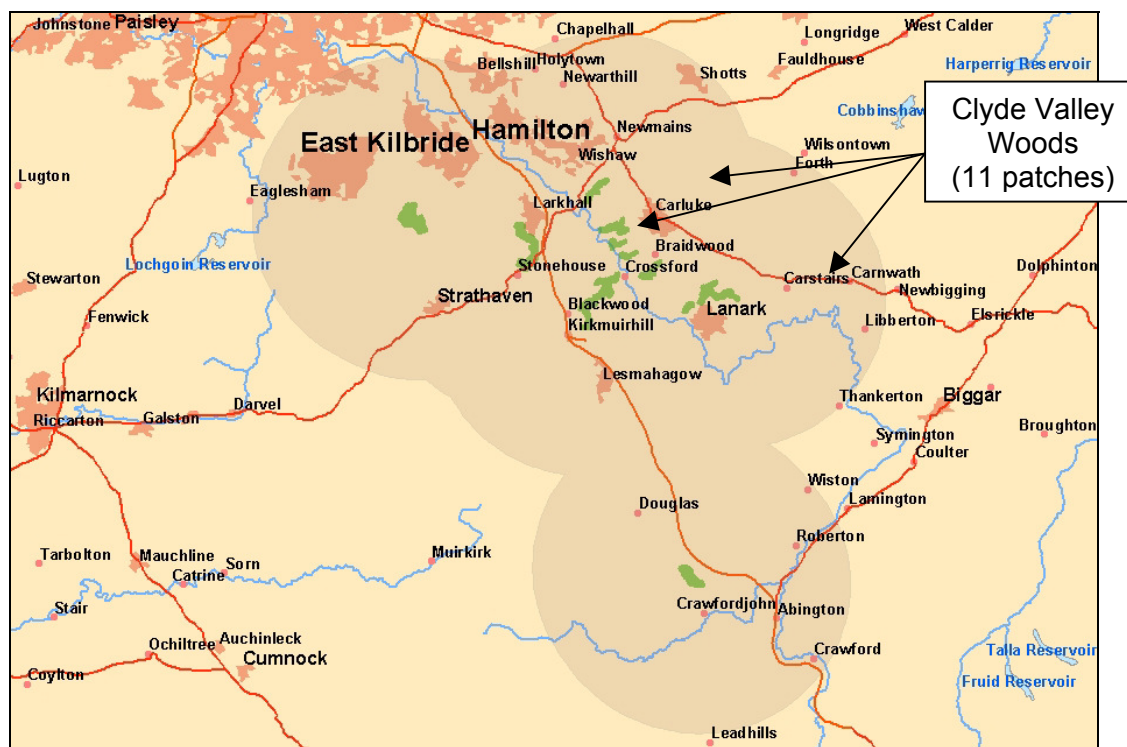
6 Clyde Valley Woods

6.1 Site Description

The Clyde Valley Woods case study area (see Figure 6.1 below), in central-southern Scotland, includes 11 individual broadleaved woodland sites identified as a single cSAC (430ha). Collectively, they represent the most extensive complex of gorge woodland in Scotland and are an important habitat for otters (an EU protected species). All 11 woodland components have underpinning SSSI status.

With poor access and lack of visitor facilities, the woodlands support limited local recreational use. Apart from path clearance and control of invasive species, active woodland management is negligible. However, the 121 private landowners that own 70% of the site area are being encouraged to join management agreements under the Woodland Grants Scheme.

Figure 6.1 The Clyde Valley Woods case study area



Key: Site in case study area shown in green. 10 km distance zone shown by light shading. **Note that this zone also surrounds the nearby Waukenwae Moss and Red Moss N2K sites (see Figure 7.1).**

6.2 Policy-off

Under the policy-off scenario, access to funding for the management of this multi-owner site would be made significantly more difficult; species such as rhododendron, sycamore, beech, bracken and snowberry shrub would continue to spread and displace native trees and ground flora leading to a significant loss of biodiversity. These factors, combined with the cessation of path clearance would also lead to a reduction in access to the site. There would be potential for increased grazing intensity in some parts by sheep and cattle. With no monitoring and enforcement it is also likely that increased dumping of wastes (fly tipping) would result.

6.3 Cost Benefit Analysis

The appraisal summary tables in Box 6.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by around 25 times, and that N2K specific benefits also outweigh N2K specific costs by 5 times, both based on a 25 year time horizon. However, when non-use values are excluded, the benefits are minimal, which provides no economic justification for the policy-on position.

There are considerable one-off site management costs of £935,000, which relate primarily to the Clyde Valley Woods LIFE bid. Annual site costs of around £16,000 are likely to be incurred. Almost £15,000 per year relates to SNH annual management costs with the additional £1,000 being attributable to opportunity costs.

Almost 100% of the annual benefits (around £1.8 million) relate to non-use values, the vast majority of which is derived by Scottish people outside the region and non-Scottish visitors to Scotland. Only around £5,200 per year (0.02%) is likely to relate to general visitors values, this is due to the very low use level at this site. Table 6.1 below provides additional details of how the annual welfare benefits are made up.

Table 6.1 Summary of Clyde Valley Woods case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	1,900	adults/yr	0.15	£/adult/visit	285
	Visitors - 10- 20 km	80	adults/yr	0.30	£/adult/visit	24
	Visitors - other regional	20	adults/yr	0.40	£/adult/visit	8
	Visitors - national	-	adults/yr	0.40	£/adult/visit	-
	Visitors -non Scottish	-	adults/yr	0.40	£/adult/visit	-
	Subtotal (A)					317
Specialist Use Value	Specialist - < 10 km	-	adults/yr		£/adult/yr	-
	Specialist - 10-20 km	-	adults/yr		£/adult/yr	-
	Specialist - other regional	-	adults/yr		£/adult/yr	-
	Specialist - national	-	adults/yr		£/adult/yr	-
	Specialist - non-Scottish	-	adults/yr		£/adult/yr	-
	Subtotal (B)					-
Non-use value	Residents - < 10 km	115,797	houses	0.45	£/house/yr	52,109
	Residents - 10 - 20 km	214,104	houses	0.20	£/house/yr	42,821
	Other Regional	1,245,167	houses	0.55	£/house/yr	684,842
	General Scottish public	1,536,098	houses	0.45	£/house/yr	691,244
	Non-Scottish visitors	17,000,000	adults/yr	0.02	£/adult/yr	340,000
	Subtotal (C)					1,811,015
Grand Total (A+B+C)						1,811,332

Mean general public WTP for the policy-on scenario was £0.55 per household per year. A relatively small proportion of respondents living within 10km of the woods were site users (51%). Surprisingly, 15% of respondents living elsewhere in Scotland (i.e. outside the Central Belt) also considered themselves to be users. However, it is probable that few to zero visitors travel this far to use these inaccessible N2K sites in reality. Most or all of these respondents had probably visited other more high-profile woodland areas (e.g. Clyde Valley Falls NNR) and misunderstood the site boundaries. Users and non-users showed similar WTP values and, overall, the mean non-use value at this site was relatively high at 91% (£0.50 per household per year).

The mean site visitor WTP ranged from £0.15 per adult visit at <10km from the site to £0.40 per adult visit amongst regional, national and international visitors. This relatively small difference is perhaps not surprising given that the area receives few visitors generally, most of whom are local residents.

The mean non-Scottish visitor non-use WTP was £0.02 per adult visit.

In addition some educational and environmental services values are realised at this site and educational values could possibly be increased over time due to the LIFE funded project.

Box 6.1 Summary appraisal tables for the Clyde Valley Woods case study area

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	25.0	33.6	5.0	6.8
NPV with non-use	28,657,834	43,093,801	4,783,061	7,572,590
BCR without non-use	0.004	0.01	0.001	0.001
NPV without non-use	-1,190,417	-1,314,833	-1,186,589	-1,309,137

Economic Welfare Benefits	Annual Benefits accruing to population (£)					Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of 50 year total
	< 10 km	10- 20 km	Other Regional	Other Scotland	Non- Scottish Visitors				
General visitors use value	285	24	8	-	-	317	5,225	7,773	0.02%
Specialist visitor use value	-	-	-	-	-	-	-	-	0.0%
Non-use value	52,109	42,821	684,842	691,244	340,000	1,811,015	29,848,251	44,408,634	99.98%
Total annual value	52,394	42,845	684,850	691,244	340,000	1,811,332	29,853,475	44,416,407	
% of Total	2.9%	2.4%	38%	38%	18.8%				

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of 50 year total
Management costs	South Lanarkshire Council	56,690	-	56,690	56,690	4.3%
	Forestry Commission	151,170	-	151,170	151,170	11%
	LIFE	302,340	-	302,340	302,340	23%
Opportunity Costs	Grazing/livestock		97	1,595	2,372	0.2%
	Extraction for wood		875	14,421	21,456	1.6%
Total		935,370	15,792	1,195,642	1,322,606	100%

Average % Relating to N2K	Over 25 years	Over 50 Years
Of PV Policy On Benefits	20%	20%
Of PV Policy On Cost	99%	99%

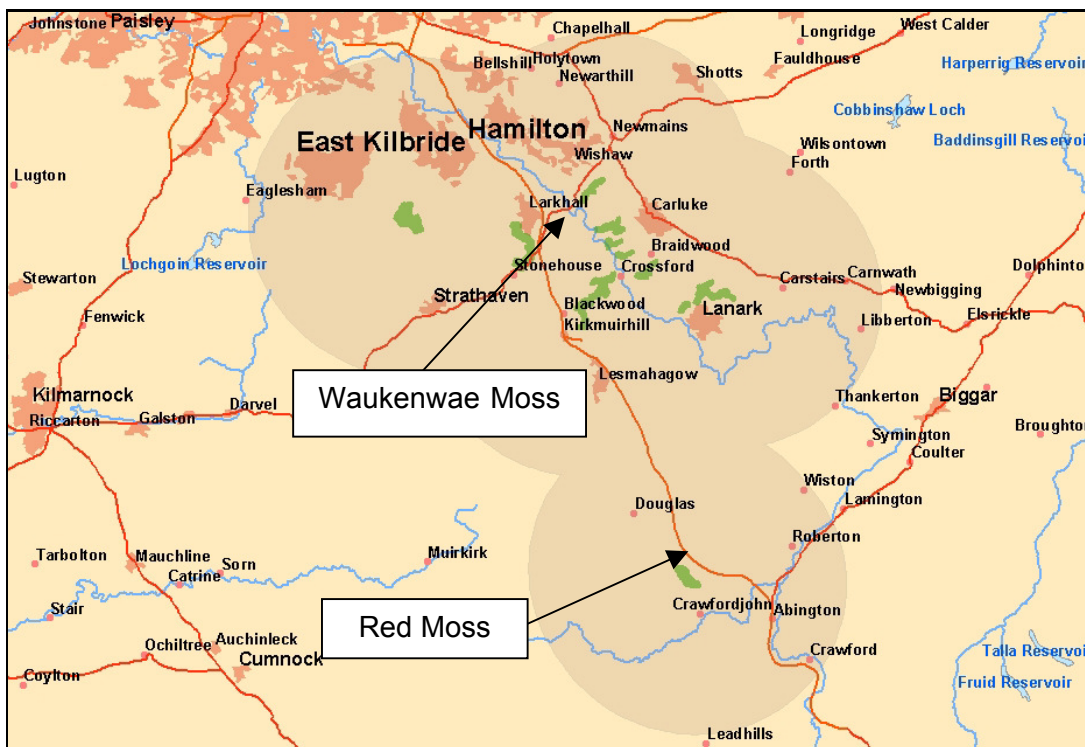
Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Community	L
Cultural		-
Education	Local users	M
Research		-
Environmental Services	Local & Global Comm	M
Health	Local users	L

7 Waukenwae Moss and Red Moss

7.1 Site Description

The Waukenwae Moss (155ha) and Red Moss (75ha) case study areas (see Figure 7.1 below), in central-southern Scotland, are two sites identified as cSACs primarily because they support nationally important active raised bog habitats. Both sites are also designated as SSSIs and Red Moss lies within an ESA. Land-use is limited to marginal livestock grazing (mostly sheep). Recreational use is limited since both bogs are very wet and inaccessible, but does include occasional bird shooting, walking and moss collection. Most of the land at both sites is under management agreement with SEERAD/SNH.

Figure 7.1 The Waukenwae Moss and Red Moss case study area



Key: Sites in case study area shown in green. 10 km distance zone is shown by light shading. Note that this zone also surrounds the nearby Clyde Valley Woods N2K site (see Figure 6.1).

7.2 Policy-off

Under the policy-off scenario, the bogs may be drained for agriculture, development or commercial peat and moss extraction leading to loss of habitat and associated species. A number of other land uses could also expand (e.g. peat extraction and muirburn (heather burning)) and changes in grazing pressure and / or water balance could lead to shift in plant communities and result in colonisation by heather and / or rushes. At Waukenwae Moss there could be a re-application and approval of a golf course in the area and the site could be considered for development of a waste disposal or landfill site. Also, coal extraction could be carried out at the Red Moss site.

7.3 Cost Benefit Analysis

The appraisal summary tables in Box 7.1 (end of this section) highlight that the overall policy-on benefits far outweigh policy-on costs by around 66 times, and that N2K specific benefits also far outweigh N2K specific costs by 58 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are minimal. Note of course that there other values not included in this assessment, and that all the N2K sites have been designated for their “environmental” significance.

There were one-off site designation costs to SNH at these sites of £18,000. Annual site costs of around £8,500 are incurred by SNH as management agreement payments to local landowners. These partially cover the potential opportunity costs that relate to potential peat and coal extraction and a golf course.

Almost 100% of the annual benefits (around 2.5 million) relate to non-use values, the vast majority of which are derived by Scottish people outside the region and non-Scottish visitors to Scotland. Due to the extremely low visitor use, only a few hundred pounds of use benefits are likely to accrue. Table 7.1 below provides additional details of how the annual welfare benefits are made up.

Table 7.1 Summary of Waukenwae and Red Moss welfare case study area benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	140	adults/yr	0.10	£/adult/visit	14
	Visitors - 10- 20 km	60	adults/yr	0.20	£/adult/visit	12
	Visitors - other regional	-	adults/yr	0.30	£/adult/visit	-
	Visitors - national	-	adults/yr	0.30	£/adult/visit	-
	Visitors -non Scottish	-	adults/yr	0.30	£/adult/visit	-
	Subtotal (A)					
Specialist Use Value	Specialist - < 10 km	-	adults/yr		£/adult/yr	-
	Specialist - 10-20 km	-	adults/yr		£/adult/yr	-
	Specialist - other regional	-	adults/yr		£/adult/yr	-
	Specialist - national	-	adults/yr		£/adult/yr	-
	Specialist - non-Scottish	-	adults/yr		£/adult/yr	-
	Subtotal (B)					
Non-use value	Residents - < 10 km	119,382	houses	0.65	£/Hse/yr	77,599
	Residents - 10 - 20 km	367,366	houses	0.30	£/Hse/yr	110,210
	Other Regional	1,176,071	houses	0.40	£/Hse/yr	470,428
	General Scottish public	1,497,441	houses	0.85	£/Hse/yr	1,272,825
	Non-Scottish visitors	17,000,000	adults/yr	0.04	£/adult/visit	595,000
	Subtotal (C)					
Grand Total (A+B+C)						2,526,088

Mean general public WTP for the policy-on scenario was £0.80 per household per year. Few local respondents reported themselves as users (13% within 10km and 3% within 20km). It is likely that the fair proportion of regional and general public “users” may not have actually used the sites concerned and wrongly answered this question (they may have visited Red Moss or passed through the general area). Due to these low levels of use, mean WTP at this case study area showed the highest proportion of non-use value at 94% (£0.50 per household per year).

Mean site visitor WTP here ranged from £0.10 per adult visit at <10km from the site to £0.30 per adult visit amongst regional, national and international visitors (benefit transfer values). Use / non-use proportions were assumed to be 50% each.

The mean non-Scottish visitor non-use WTP was £0.035 per adult visit.

Carbon sequestration at these sites provides some additional benefits to both local and global communities.

Box 7.1 Summary appraisal tables for Waukenwae and Red Moss case study area

Economic Welfare Indicators	Policy On			N2K related		
	Over 25 years	Over 50 Years	Over 25 years	Over 25 years	Over 50 Years	Over 50 Years
BCR with non-use	65.7	66.3	57.6	65.7	65.7	65.7
NPV with non-use	40,999,965	61,009,148	2,045,540	3,050,018	3,050,018	3,050,018
BCR without non-use	0.001	0.001	0.001	0.001	0.001	0.001
NPV without non-use	633,323	933,424	36,124	47,111	47,111	47,111

Economic Welfare Benefits	Annual Benefits accruing to population (£)						Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of 50 year total
	< 10 km	10 - 20 km	Other Regional	Other Scotland	Non- Scottish Visitors					
General visitors use value	14	12	-	-	-	26	429	638	0.0%	
Specialist visitor use value	-	-	-	-	-	-	-	-	0.0%	
Non-use value	77,599	110,210	470,428	1,272,825	595,000	2,526,062	41,633,288	61,942,572	100%	
Total annual value	77,613	110,222	470,428	1,272,825	595,000	2,526,088	41,633,716	61,943,209		
% of Total	3%	4%	19%	50%	24%					

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)		PVC over 50 years (£)		% of 50 year total
				PVC over 25 years (£)	PVC over 50 years (£)	PVC over 25 years (£)	PVC over 50 years (£)	
Management costs	SNH	18,125	8,510	158,383	226,802	24%	24%	
Opportunity Costs	Peat extraction		12,880	212,282	315,836	34%	34%	
	Coal extraction		7,980	131,522	195,681	21%	21%	
	Landfill devel		-	-	-	0%	0%	
	Golf devel		7,983	131,564	195,743	21%	21%	
Total		18,125	37,353	633,751	934,062	100%	100%	

Average % Relating to N2K Of PV Policy On Benefits	Over 25 years	Over 50 Years
Of PV Policy On Cost	5%	5%
	6%	5%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Community	L
Cultural		-
Education		-
Research		-
Environmental Services	Global Community	M
Health	Local Users	L

8 Sands of Forvie

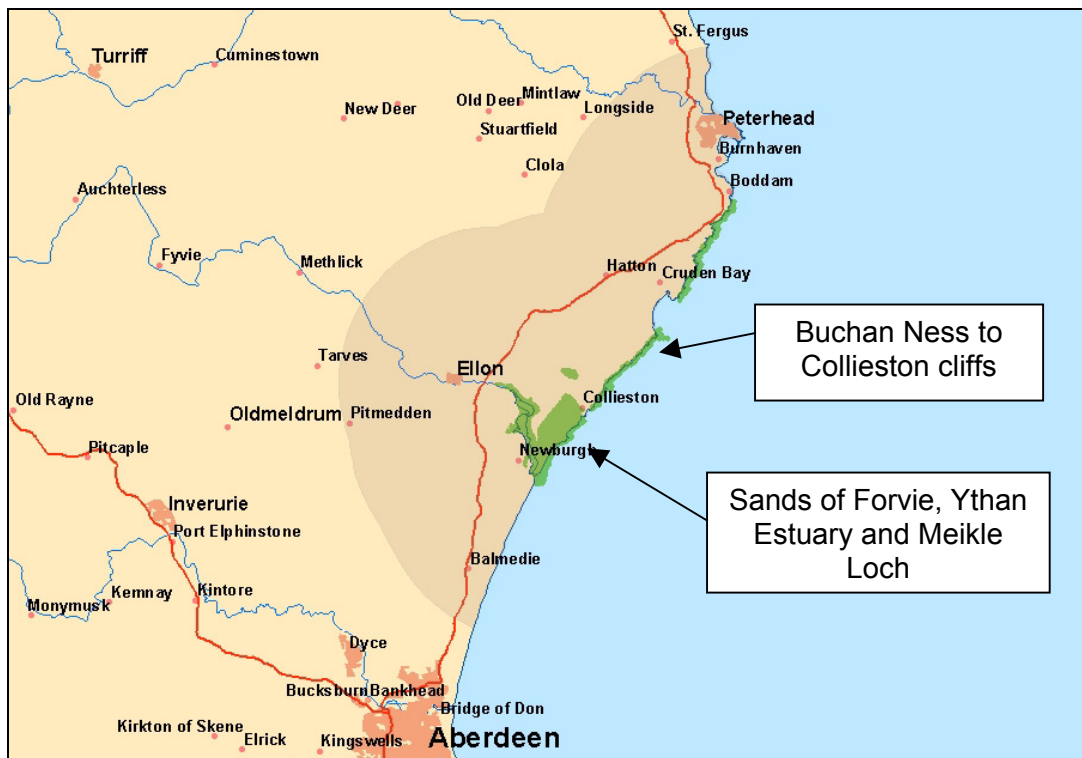
8.1 Site Description

The Sands of Forvie case study area (see Figure 8.1 below), on the east coast Scotland, includes: the Ythan Estuary, Meikle Loch, Sands of Forvie and Buchan Ness to Collieston.

Ythan Estuary, Meikle Loch and the Sands of Forvie are collectively designated as a single SPA because they contain habitats of European importance for breeding and over-wintering of sea birds. The Sands of Forvie is also identified as a cSAC because of the international importance of its sand dune systems. The estuary and dune systems are generally underpinned by SSSI and NNR designations. It is thought to be because of this NNR designation that the majority of the funding for management activities is raised. Land uses include agriculture, livestock grazing, gravel extraction, fishing and bait digging. The estuary and dunes in particular also attract large numbers of walkers, bird watchers and golfers. SNH owns the majority of the NNR and is responsible for its management.

Buchan Ness to Collieston is a series of sea cliffs identified both as a cSAC and SPA because of their important coastal habitats and breeding seabird colonies. Apart from some recreational activity (walking and bird watching), the site is not used for any notable human uses due to its inaccessibility. Ownership of the sea cliffs is mostly private and there are no management agreements in place.

Figure 8.1 The Sands of Forvie case study area



Note: Sites in case study area shown in green. 10 km distance zone is shown by light shading.

8.2 Policy-off

Under the policy-off scenario land-use changes could take place in some areas including, for instance: property development and gravel extraction along the estuary, and grouse shooting, muirburn and grazing on Forvie moor (adjoins the Sands of Forvie). These changes could lead to loss of geo-morphologically important features and ecologically important habitats. Over time, this would lead to the loss of breeding birds of national/international importance in the area. In addition, uncontrolled site access for visitors may lead to a greater level of disturbance to bird life and loss of habitat through trampling. Policy-off consequences at the sea cliffs are likely to be limited due to its inaccessibility.

8.3 Cost Benefit Analysis

The appraisal summary tables in Box 8.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by around 6.5 times, and that N2K specific benefits also outweigh N2K specific costs by 2.2 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are only around 0.1.

There were considerable one-off site designation /land purchase costs of £300,000 borne by SNH at this site. Annual site costs of around £346,00 are likely to be incurred. Around £116,000 per year of this relates to SNH annual management costs with the additional £230,000 being attributable to potential opportunity costs, in particular potential residential and commercial property development.

Over 99% of the annual benefits (around 2.4 million) relate to non-use values, the vast majority of which is derived by Scottish people outside the region and non-Scottish visitors to Scotland. Around £19,000 per year (1%) is likely to relate to general visitors values. Table 8.1 below provides additional details of how the annual welfare benefits are made up.

Table 8.1 Summary of the Sands of Forvie case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value £	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	18,000	adults/yr	0.10	£/adult/visit	1,800
	Visitors - 10- 20 km	8,000	adults/yr	0.35	£/adult/visit	2,800
	Visitors - other regional	8,000	adults/yr	0.75	£/adult/visit	6,000
	Visitors - national	4,000	adults/yr	1.20	£/adult/visit	4,800
	Visitors -non Scottish	2,000	adults/yr	1.65	£/adult/visit	3,300
	Subtotal (A)					
Specialist Use Value	Specialist - < 10 km	48	adults/yr	2.25	£/adult/yr	108
	Specialist - 10-20 km	24	adults/yr	2.25	£/adult/yr	54
	Specialist - other regional	24	adults/yr	2.25	£/adult/yr	54
	Specialist - national	9	adults/yr	2.25	£/adult/yr	20
	Specialist - non-Scottish	195	adults/yr	2.25	£/adult/yr	439
	Subtotal (B)					
Non-use value	Residents - < 10 km	18,358	houses	1.30	£/house/yr	23,865
	Residents - 10 - 20 km	70,701	houses	0.25	£/house/yr	17,675
	Other Regional	154,157	houses	0.35	£/house/yr	53,955
	General Scottish public	2,122,817	houses	0.75	£/house/yr	1,592,113
	Non-Scottish visitors	17,000,000	adults/yr	0.04	£/adult/yr	697,000
	Subtotal (C)					
Grand Total (A+B+C)						2,403,983

Mean general public WTP for the policy-on scenario was £1.00 per household per year. In terms of local resident users (within 10km), Forvie showed the highest overall mean WTP at any of the case study areas (£2.46 per household per year). The proportion of non-use value was relatively low at 90% (£0.80 per household per year).

The site visitor mean WTP ranged from £0.10 per adult visit at <10km from the site to a relatively high £1.65 per adult visit amongst international visitors. Local resident WTP is relatively high

compared to other case study areas, especially given the significant number of trips per they make per year (through daily use of the site in many cases).

Mean non-Scottish visitor non-use WTP was £0.041 per adult visit.

In addition, potentially high social, research, educational, environmental and health-related benefits are being realised by this site.

Box 8.1 Summary appraisal table for the Sands of Forvie case study area

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	6.6	7.0	2.2	2.3
NPV with non-use	33,603,642	53,039,965	2,166,808	3,296,042
BCR without non-use	0.1	0.1	0.02	0.02
NPV without non-use	- 5,698,277.9	- 8,308,372.4	-1,763,384	-2,551,351

Economic Welfare Benefits	Annual Benefits accruing to population (£)				Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of 50 year total
	< 10 km	10- 20 km	Other Regional	Other Scotland				
General visitors use value	1,800	2,800	6,000	4,800	18,700	308,204	481,091	0.8%
Specialist visitor use value	108	54	54	20	257	4,228	6,599	0.0%
Non-use value	23,865	17,675	53,955	1,592,113	2,384,608	39,301,920	61,348,338	99.2%
Total annual value	25,773	20,529	60,009	1,596,933	2,403,565	39,614,351	61,836,028	
% of Total	1.1%	0.9%	2.5%	66%	29.1%			

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of 50 year total
Opportunity Costs	Quarrying	-	-	-	-	
	Wind farm		281	4,635	6,897	0.1%
	Wildfowl activities		4,500	74,167	110,346	1.3%
	Grazing activities		270	4,450	6,621	0.1%
	Resid/Commer Devel		225,000	3,708,338	5,517,315	63%
Water sports		750	12,361	18,391	0.2%	
Total		300,838	346,441	6,010,709	8,796,062	100%

Average % Relating to N2K	Over 25 Years	Over 50 Years
Of PV Policy On Benefits	10%	10%
Of PV Policy On Cost	30%	30%

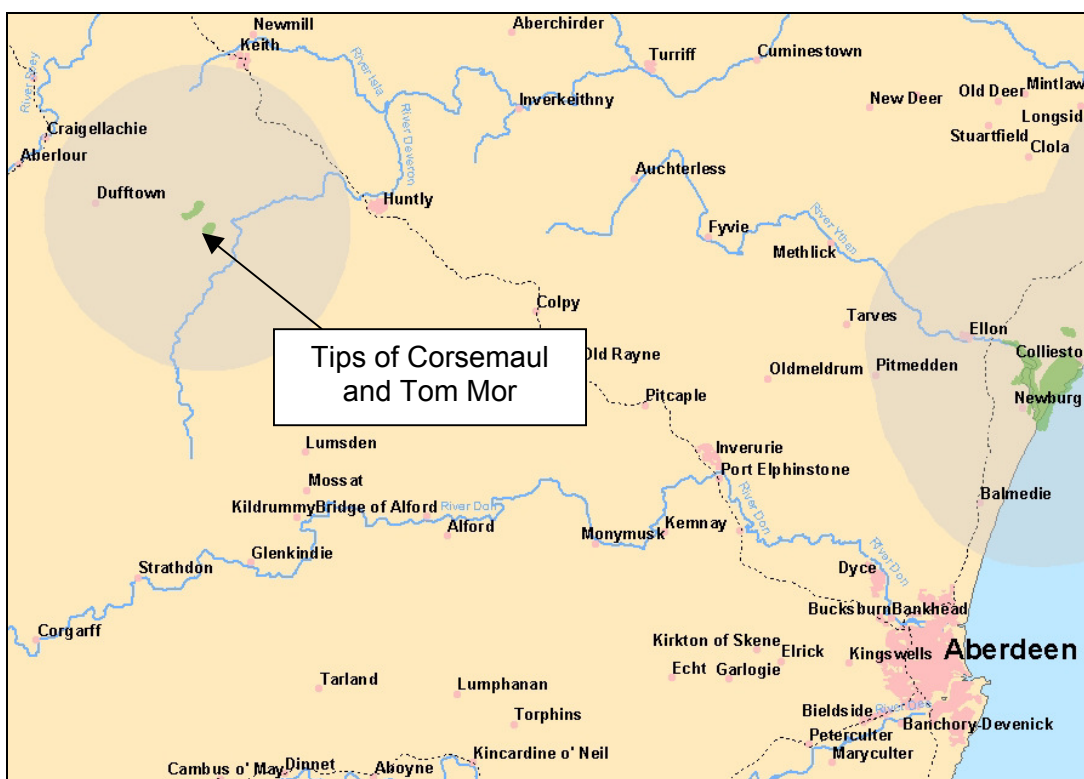
Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Community	H
Cultural	Local Community	M
Education	Local /Reg Comm	H
Research	Scientific Community	H
Environmental Services	Local /Reg Comm	H
Health	Local /Reg Comm	H

9 Tips of Corsemaul and Tom Mor

9.1 Site Description

The Tips of Corsemaul and Tom Mor case study area (see Figure 9.1 below) consist of two inland hilltops in the Grampian Region designated as a single SPA (and SSSI) because they support a breeding population of the Common Gull of European importance. The main land use at this site is sheep grazing. A small number of common gull eggs are collected each year under licence for human consumption. The private owners, owning the majority of the site, manage the site for agricultural and sporting activity, but there is no active management for conservation purposes.

Figure 9.1 The tips of Corsemaul and Tom Mor case study area



Key: Site in case study area shown in green. 10 km distance zone is shown by light shading. Note that this zone also surrounds the nearby Sands of Forvie case study area (see Figure 8.1).

9.2 Policy-off

It is possible that increased livestock numbers could damage the conservation value of the site through trampling. There may also be an increase in egg collection and bird shooting activities at the sites.

9.3 Cost Benefit Analysis

The appraisal summary tables in Box 9.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by almost 95 times, and that N2K specific benefits also outweigh N2K specific costs by 5 times, both based on a 25 year time horizon. However, no significant

visitor related values have been identified at this site, so when non-use values are excluded, the BCR is effectively 0.

There were one-off site designation /land purchase costs of £4,400 borne by SNH at this site. Annual site costs of around £12,600 are incurred annually by SNH mainly for management agreements. The majority is thus attributable to compensation of landowners for potential agricultural opportunity costs. Actual farming opportunity costs are likely to be minimal.

As stated above, all of the annual benefits (1.2 million) relate to non-use values due to the fact that no users of this site have been identified. Scottish people outside the region and non-Scottish visitors to Scotland derive the vast majority of this benefit. Table 9.1 below provides additional details of how the annual welfare benefits are made up.

Table 9.1 Summary of Tips of Corsemaul and Tom Mor case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value £	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	-	adults/yr		£/adult/visit	-
	Visitors - 10- 20 km	-	adults/yr		£/adult/visit	-
	Visitors - other regional	-	adults/yr		£/adult/visit	-
	Visitors - national	-	adults/yr		£/adult/visit	-
	Visitors -non Scottish	-	adults/yr		£/adult/visit	-
	Subtotal (A)					-
Specialist Use Value	Specialist - < 10 km	-	adults/yr		£/adult/yr	-
	Specialist - 10-20 km	-	adults/yr		£/adult/yr	-
	Specialist - other regional	-	adults/yr		£/adult/yr	-
	Specialist - national	-	adults/yr		£/adult/yr	-
	Specialist - non-Scottish	-	adults/yr		£/adult/yr	-
	Subtotal (B)					-
Non-use value	Residents - < 10 km	1,426	houses	0.60	£/house/yr	856
	Residents - 10 - 20 km	8,952	houses	0.45	£/house/yr	4,029
	Other Regional	188,818	houses	0.15	£/house/yr	28,323
	General Scottish public	2,142,209	houses	0.40	£/house/yr	856,884
	Non-Scottish visitors	17,000,000	adults/yr	0.02	£/adult/yr	340,000
	Subtotal (C)					1,230,091
Grand Total (A+B+C)						1,230,091

Mean general public WTP for the policy-on scenario was the lowest of all the case study areas at £0.50 per household per year. This site was considered to have zero local or public use and hence even the low reported user percentages (3-9% per zone) are likely to be incorrect. Again, this implies a level of misunderstanding by respondents. As expected, the proportion of non-use value was the highest of all of the sites at 90% (£0.45 per household per year).

No visitor WTP was calculated as it was assumed that this site receives no visitors. However, a mean non-Scottish visitor non-use WTP was calculated to be £0.02 per adult visit.

No significant additional values have been identified at this site except for the benefit received by the scientific community through researching the resident Common Gull population.

Box 9.1 Summary appraisal table for the Tips of Corsemaul and Tom Mor case study area

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	95.2	95.9	4.8	4.8
NPV with non-use	20,060,859	29,848,960	800,806	1,193,592
BCR without non-use	-	-	-	-
NPV without non-use	212,881	314,586	212,881	314,586

Economic Welfare Benefits	Annual Benefits accruing to population (£)					Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of 50 year total
	< 10 km	10- 20 km	Other Regional	Other Scotland	Non-Scottish				
General visitors use value	-	-	-	-	-	-	-	-	0%
Specialist visitor use value	-	-	-	-	-	-	-	-	0%
Non-use value	856	4,029	28,323	856,884	340,000	1,230,091	20,273,740	30,163,546	100%
Total annual value	856	4,029	28,323	856,884	340,000	1,230,091	20,273,740	30,163,546	
% of Total	0.1%	0.3%	2.3%	70%	27.6%				

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of 50 year total
Management costs	SNH	4,390	12,650	212,881	314,586	100%
Opportunity Costs		-	-	-	-	0%
Total		4,390	12,650	212,881	314,586	100%

Average % Relating to N2K Of PV Policy On Benefits	Over 25 years	Over 50 Years
	5%	5%
Of PV Policy On Cost	100%	100%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social		-
Cultural		-
Education		-
Research	Scientific Community	L
Environmental Services		-
Health		-

the success of the local tourist economy. There may be limited but insignificant property development in the glens.

10.3 Cost Benefit Analysis

The appraisal summary tables in Box 10.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by a factor of around 3, and that N2K specific benefits also outweigh N2K specific costs by 1.6 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are around 0.2.

There were considerable one-off site designation /land purchase costs of almost £900,000 borne by a variety of organisations including FC, LIFE and MFTS. Annual site costs of around £446,000 are likely to be incurred, again by many organisations including those above and SNH and landowners. £13,500 of this annual cost is attributable to potential opportunity costs predominantly relating to potential residential and commercial property developments.

95% of the annual benefits (around £1.5 million) relate to non-use values, with Scottish people outside the region and non-Scottish visitors to Scotland deriving the vast majority of this benefit. Around 5% (£76,000 million) relates to the use value gained at this site by general visitors. Specialist visitors including hunting and fishing relate to around only 0.1% of the benefits. This latter value is relatively low due to the fact that much of the specialist benefits would probably occur irrespective of conservation and land management activities. Table 10.1 below provides additional details of how the annual welfare benefits are made up.

Table 10.1 Summary of Strathglass case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value £	unit of value	Full Designation Benefits £/yr
Visitor Use Value	Visitors - < 10 km	25,700	adults/yr	0.75	£/adult/visit	19,275
	Visitors - 10- 20 km	12,850	adults/yr	0.25	£/adult/visit	3,213
	Visitors - other regional	19,275	adults/yr	0.50	£/adult/visit	9,638
	Visitors - national	12,850	adults/yr	0.75	£/adult/visit	9,638
	Visitors -non Scottish	57,825	adults/yr	0.60	£/adult/visit	34,695
	Subtotal (A)					
Specialist Use Value	Specialist - < 10 km	85	adults/yr	0.75	£/adult/yr	64
	Specialist - 10-20 km	170	adults/yr	0.75	£/adult/yr	128
	Specialist - other regional	170	adults/yr	0.75	£/adult/yr	128
	Specialist - national	425	adults/yr	0.75	£/adult/yr	319
	Specialist - non-Scottish	935	adults/yr	0.75	£/adult/yr	701
	Subtotal (B)					
Non-use value	Residents - < 10 km	481	houses	1.25	£/house/yr	602
	Residents - 10 - 20 km	6,233	houses	0.30	£/house/yr	1,870
	Other Regional	89,074	houses	1.05	£/house/yr	93,528
	General Scottish public	2,187,763	houses	0.45	£/house/yr	984,493
	Non-Scottish visitors	17,000,000	adults/yr	0.02	£/adult/yr	374,000
	Subtotal (C)					
Grand Total (A+B+C)						1,532,290

Mean general public WTP for the policy-on scenario averaged at £0.70 per household per year. The site had the highest levels of reported use of all case study areas (100%, 87% and 75% of respondents within 10km, 20km and the region respectively). WTP was also relatively high at £1.60 in the <10km zone. This site also showed the lowest proportion of non-use overall at 79% (£0.55 per household per year).

Mean site visitor WTP was £0.75 per adult visit at <10km from the site, the highest local WTP of all case study areas and the same as regional visitors to this one. The high local resident WTP was due to a fair number of relatively high-paying trips per year. Lowest WTP at this case study area was for residents within 10-20km from the site (£0.25 per adult visit).

Mean non-Scottish visitor non-use WTP was calculated to be £0.022 per adult visit.

Many other significant benefits occur at this site in part due to the policy-on protection, including health related benefits to the large number of users, as well as educational, social and environmental values.

Box 10.1 Summary appraisal table for the Strathglass case study area

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	3.1	3.2	1.6	1.7
NPV with non-use	17,007,585	25,739,616	1,803,641	3,035,433
BCR without non-use	0.2	0.2	0.1	0.1
NPV without non-use	6,964,648	9,926,597	2,990,805	4,097,810

Economic Welfare Benefits	Annual Benefits accruing to population (£)				Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)	% of 50 year total
	< 10 km	10- 20 km	Other Regional	Other Scotland				
General visitors use value	19,275	3,213	9,638	9,638	76,458	1,260,134	1,874,845	5.0%
Specialist visitor use value	64	128	128	319	956	15,760	23,449	0.1%
Non-use value	602	1,870	93,528	984,493	1,454,493	23,972,232	35,666,213	94.9%
Total annual value	19,941	5,210	103,293	994,450	1,531,907	25,248,127	37,564,507	
% of Total	1.3%	0.3%	6.7%	65%				

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of 50 year total
Forestry Commission		244,500	86,660	1,672,787	2,369,525	20%
LIFE		294,600	1,940	326,574	342,172	2.9%
Millennium Forest for Scotland Trust		350,000	-	350,000	350,000	3.0%
Other Land Owners		580	131,160	2,162,294	3,216,807	27%
Deer stalking		-	187,300	3,086,985	4,592,858	39%
Property development		-	13,500	-	-	0.0%
Total		892,760	445,820	8,240,542	11,824,891	100%

Average % Relating to N2K Of PV Policy On Benefits	Over 25 years	Over 50 Years
	20%	20%
Of PV Policy On Cost	39%	38%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local / Reg Comm	H
Cultural	Local Community	M
Education	Users	M
Research	Scientific Community	M
Environmental Services	Global Community	M
Health	Local/Reg/Nat/Int Users	H

11 Lewis and Harris Group

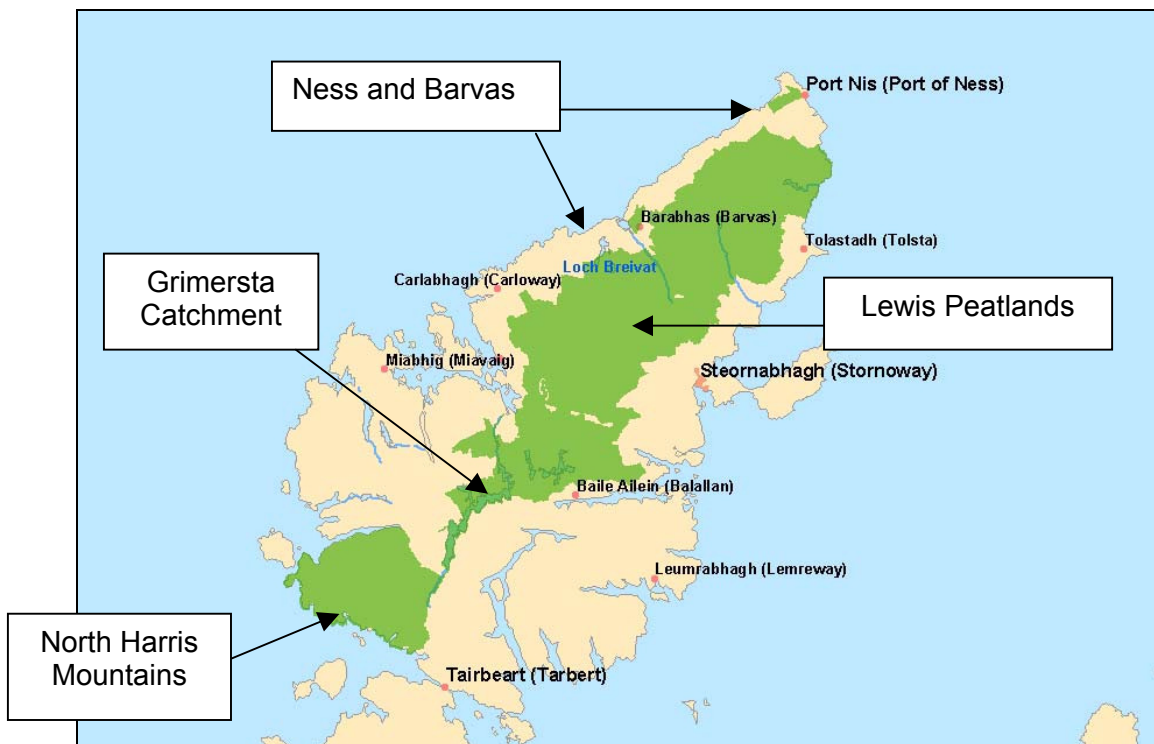
11.1 Site Description

The Lewis and Harris case study area (see Figure 11.1 below), in the Western Isles, includes: (a) the Lewis Peatlands, (b) North Harris Mountains, (c) Ness and Barvas, and (d) the Grimersta / Langavat catchment.

Lewis Peatlands is identified as a cSAC due to the national and European significance of its habitats (particularly blanket bog). The SPA, which is some 50% of the area of the cSAC, is designated because it supports important populations of peatland breeding birds. Human uses include common grazing, peat cutting, muirburn and very small-scale forestry. Recreational activities include walking, angling and bird shooting. The site is entirely owned by private estates, almost all of which operate under voluntary management agreements with SNH. A few small parts of the site are also notified as SSSI. The N2K designation at this site is likely to result in the exclusion of a proposed wind farm for this area, and its relocation to an alternative site on the island.

North Harris Mountains is designated as an SPA and identified as a cSAC because of the European significance of its oceanic wet heath habitat and important populations of breeding birds (raptors). Parts of the site are used for grazing and limited agriculture although human uses are relatively limited due to inaccessibility. The area attracts walkers, climbers and other forms of informal outdoor recreation.

Figure 11.1 The Lewis and Harris case study area



Key: Sites in case study area shown in green.

Following its sale in 2003, the North Harris Mountains is now collectively owned and managed by the island's residents, who are currently in discussions regarding the development of a management agreement. The whole of the site is also notified as a SSSI.

Ness and Barvas includes two small areas of actively managed croftland collectively designated as an SPA because they are of European importance as a breeding area for corncrakes. Land-use is mostly grazing and limited arable cultivation. A proportion of the Ness and Barvas site is managed under voluntary agreement in a manner sympathetic to the breeding corncrakes. A few small parts of Ness and Barvas are also notified as SSSIs.

Grimersta / Langavat catchment is identified as a cSAC because of the river's high-quality Atlantic salmon population. It has no underpinning SSSI. The main human use is for wild salmon angling and commercial fish farming.

11.2 Policy-off

At the Lewis Peatlands, traditional and sustainable crofting practice would be unlikely to change since it has been in place for generations and few significant issues may be expected. However, without management scheme payments that accompany protection other more lucrative land uses such as commercial peat extraction may increase, which would significantly diminish the water storage potential of the peatlands. Proposed developments may also be more likely to proceed without regard to the conservation interest of the site (e.g. road and wind farm proposals).

Due to its remoteness, few significant changes in socio-economic activity may be expected in the North Harris Mountains area. Over decades, there may be some further minor housing or commercial development in places. However, this is dependent on how the new community owners wish to manage this area.

At Ness and Barvas, there could be a slight increase in the level of property development. Without management scheme payments accompanying protective management, agricultural practices would be less well targeted for corncrake conservation and numbers could decline.

In the Grimersta/ Langavat catchment, overgrazing by sheep and deer along the riverbanks could cause erosion and siltation of the river potentially impacting salmon spawning grounds and salmon populations. Various negative impacts associated with increased salmon farming in the area could also arise.

11.3 Cost Benefit Analysis

The appraisal summary tables in Box 11.1 (end of this section) highlight that the overall policy-on benefits outweigh policy-on costs by a factor of around 16, and that N2K specific benefits also outweigh N2K specific costs by 9 times, both based on a 25 year time horizon. However, when non-use values are excluded, the BCRs are negligible.

There were considerable one-off site designation / surveying costs of almost £197,000 borne in majority by SNH. Annual site costs of around £280,000 are incurred by many organisations including SNH, WIFT, the North Harris trust and RSPB. Around £63,000 of this annual cost is attributable to potential opportunity costs at one or more of the N2K sites in this area, predominantly relating to potential aquaculture and afforestation.

Almost 100% of the annual benefits (£4.9 million) relate to non-use values. Scottish people outside the region and non-Scottish visitors to Scotland derive the vast majority of this benefit. The remaining £13,000 relates to the use value gained at this site by both locals and visitors. Table 11.1 below provides additional details of how the annual welfare benefits are made up.

Table 11.1 Summary of Lewis and Harris case study area welfare benefits

Benefit category	Beneficiaries	Relevant population	Unit	Ave WTP value £	unit of value	Full Designation Benefits £/yr
Visitor use value	Visitors - < 10 km	6,045	adults/yr	0.10	£/adult/visit	605
	Visitors - 10- 20 km	455	adults/yr	0.50	£/adult/visit	228
	Visitors - other regional	1,300	adults/yr	1.10	£/adult/visit	1,430
	Visitors - national	2,600	adults/yr	1.70	£/adult/visit	4,420
	Visitors -non Scottish	2,600	adults/yr	1.70	£/adult/visit	4,420
	Subtotal (A)	13,000				11,102
Specialist use value	Specialist - < 10 km	225	adults/yr	0.75	£/adult/yr	169
	Specialist - 10-20 km	25	adults/yr	0.75	£/adult/yr	19
	Specialist - other regional	125	adults/yr	0.75	£/adult/yr	94
	Specialist - national	1,375	adults/yr	0.75	£/adult/yr	1,031
	Specialist - non-Scottish	750	adults/yr	0.75	£/adult/yr	563
	Subtotal (B)	2,500				1,875
Non-use value	Residents - < 10 km	8,173	houses	1.50	£/house/yr	12,259
	Residents - 10 - 20 km	804	houses	1.35	£/house/yr	1,086
	Other Regional	7,178	houses	1.90	£/house/yr	13,638
	General Scottish public	2,222,844	houses	1.60	£/house/yr	3,556,550
	Non-Scottish visitors	17,000,000	adults/yr	0.08	£/adult/yr	1,292,000
	Subtotal (C)	19,238,999				4,875,534
Grand Total (A+B+C)						4,888,511

The mean general public WTP for the policy-on scenario was the highest of all the case study areas at £2.05 per household per year. Levels of use were consistently high amongst respondents from local zones (0-20km) as well as the wider Western Isles region (79-95%). The proportion of non-use was average overall at 85% (£1.75 per household per year).

The mean site visitor WTP ranged from £0.10 per adult visit at <10km from the site to a relatively high £1.70 per adult visit amongst national and international visitors. Few local resident respondents used the area, perhaps explaining the relatively low mean WTP within <10km compared to other distances.

The mean non-Scottish visitor non-use WTP was calculated to be £0.076 per adult visit.

Many other significant benefits are derived at this site including social benefits gained from the open access to fuel and angling resources, cultural values from traditional land practices and environmental benefits relating to carbon sequestration and to water storage and purification.

Box 11.1 Summary appraisal table for the Lewis and Harris case study area

Economic Welfare Indicators	Policy On		N2K related	
	Over 25 years	Over 50 Years	Over 25 years	Over 50 Years
BCR with non-use	16.3	16.5	9.5	9.9
NPV with non-use	75,636,741	112,629,351	36,049,117	53,842,748
BCR without non-use	0.04	0.04	0.02	0.03
NPV without non-use	-4,719,364	-6,925,557	-4,119,987	-5,921,391

Economic Welfare Benefits	Annual Benefits accruing to population (£)				Total annual benefit (£)	PVB over 25 years (£)	PVB over 50 years (£)
	< 10 km	10- 20 km	Other Regional	Other Scotland			
General visitors use value	605	228	1,430	4,420	11,102	182,978	272,237
Specialist visitor use value	169	19	94	1,031	1,875	30,903	45,978
Non-use value	12,259	1,086	13,638	3,556,550	4,875,534	80,356,106	119,554,908
Total annual value	13,032	1,332	15,162	3,562,002	4,888,511	80,569,986	119,873,122
% of Total	0.3%	0.0%	0.3%	73%	26.5%		

Economic Welfare Costs	Organisation	One-off costs (£)	Annual costs (£)	PVC over 25 years (£)	PVC over 50 years (£)	% of 50 year total
RSPB		-	750	12,361	18,391	0.3%
Fisheries Trust		8,130	24,280	408,301	603,510	8.3%
North Harris Trust		-	35,000	576,853	858,249	12%
Renewable Energy		-	2,588	42,646	63,449	0.9%
Forestry/afforestation		-	13,650	224,972	334,717	4.6%
Aquaculture		-	46,875	772,570	1,149,441	16%
Total		196,750	287,383	4,933,245	7,243,771	100%

Average % Relating to N2K	Over 25 years	Over 50 Years
Of PV Policy On Benefits	50%	50%
Of PV Policy On Cost	86%	84%

Other Welfare Benefits	Beneficiaries	Relative magnitude
Social	Local Community	M
Cultural	Local Community	H/M
Education		-
Research	Scientific Community	M
Environmental Services	Local & Global Comm	H
Health	Local Users & Visitors	M

12 Analysis of Selected Questionnaire Responses

12.1 Introduction

This section provides an overview of some of the general values and attitudes to conservation of designated areas in Scotland held by the respondents of the three different questionnaire surveys. More detailed analysis of all the questionnaire survey responses can be found in the Appendices E-H. The analysis here focuses on several selected questions that relate to awareness of N2K, WTP values and attitudes towards conservation management activities.

An understanding of such values and attitudes can potentially help enhance benefits and assist with improving the cost effectiveness of future targeted conservation management activities and expenditure.

12.2 Awareness of Natura 2000 designations

As shown in Table 12.1 below, only 4% of the general public in Scotland interviewed had heard of N2K. Of those who had heard of it, the majority (43%) had heard through the national (25%) or regional/local (18%) media, with a further 20% being made aware through the SNH/N2K consultation process.

Table 12.1 Responses to the question: Before today had you heard of Natura 2000?

Respondent category	% heard of N2K
General Public	4
Site Visitors	21
Non-Scottish Visitors	6

Note: Sample sizes: General public (713); Site visitors (271); Non-Scottish visitors (253)

Around 21% of case study site visitors were aware that the sites they were visiting are N2K designated, although 62% knew they had a conservation designation of some sort. As shown in Table 12.2 below, the relative proportions differed significantly between the sites, with the highest awareness of N2K found at the Sands of Forvie case study area. Lowest awareness levels were found in the Clyde Valley and on Lewis and Harris.

Table 12.2 Site visitor responses to the question: Before today, were you aware that the site was managed as an N2K site and for conservation?

Case study area	% Aware that the site is an N2K site	% Aware that the site is managed for conservation
River Bladnoch	16	48
Clyde Valley	8	54
Sands of Forvie group	30	84
Strathglass	22	58
Lewis and Harris group	10	42
All case study areas	21	62

Awareness of N2K amongst non-Scottish visitors to Scotland was also low, with only 6% saying they had heard of the network. However, when asked how important an aspect of their trip it was to enjoy the landscape and wildlife of Scotland, 94% of respondents said it was very or quite important to them.

12.3 Average Non-use Willingness-to-pay Values Per Habitat Type

Table 12.3 below shows the average WTP values per person and per visitor for each of the case study areas. Note that since the values shown refer to case study areas, individual N2K site value is dependent on the number of N2K sites within them. For the general public, Strathglass has the highest non-use value per Scottish household per N2K site (£0.55 for one site). The difference in values given is based on basic information about the type of habitat and key species being protected.

Table 12.3 Average use and non-use WTP per case study area (£/visit)

Case study area	Habitat type(s)	No of N2K sites	General public (£/adult/yr)	¹ Site visitors (£/visit)	Non-Scottish visitors (£/visit to Scotland)
			Non-use value	Use value	Non-use value
River Bladnoch	River	1	0.45	0.32	0.027
Clyde Valley Woods	Woodland	1	0.50	0.16	0.026
Waukenwae & Red Moss	Peatland	2	0.75	0.13	0.045
Forvie/Ythan/Buchan	Coastal	2	0.80	0.47	0.053
Tips of Corsemaul	Inland hill	1	0.45	-	0.026
Strathglass Complex	Mountain, glen	1	0.55	0.60	0.028
Lewis/Harris	River, mountain, peatland, farm	4	1.75	0.85	0.098

Note: ¹Mean is weighted, based on the number of the number of visitors in each distance category.

Table 12.4 below summarises the different non-use values per habitat type, highlighting only a relatively small variation between habitat types. Although there are “favourite” habitat types, respondents gain value from protecting all types of habitat.

Table 12.4 Average non-use WTP values per habitat (based on 300 N2K sites)

Habitat type	General public non-use value (£/adult/yr)	Non-Scottish visitors non-use value (£/visit to Scotland)
Mountains/glens	0.55	0.028
Coastal	0.40	0.027
River	0.45	0.027
Mountain/uplands	0.47	0.026
Woodland	0.50	0.026
Inland hill	0.45	0.026
Wet Bogs	0.37	0.023*
Peatland	0.47	0.023*
Farmland	0.36	0.023

Note: * indicates that these habitats were not differentiated in the question put to respondents.

Table 12.5 below shows the average proportion of use value and non-use value of visitors' WTP at the seven case study areas. The greatest non-use value proportion occurs at Lewis and Harris, and the lowest at Clyde.

Table 12.5 Average % use and non-use for site visitors in each of the seven case study areas

Case study area	Average % use value of visitors' WTP	Average % non-use value of visitors' WTP
River Bladnoch	50	50
Clyde Valley Woods	52	48
Waukenwae & Red Moss	-	-
Sands of Forvie area	46	54
Tips of Corsemaul	-	-
Strathglass Complex	46	54
Lewis & Harris	42	58

12.4 Attitudes Towards Management Actions

Table 12.6 below shows details of the responses received in terms of how much satisfaction respondents would gain from a variety of management actions. The majority of the general public (80-90%) show satisfaction for, and hence potential WTP for: supporting traditional jobs, provision of information, improved access and visitor centres. The majority (70%) also value protecting some areas for wilderness and preventing access to others.

Table 12.6 Respondent preferences/WTP more for various management actions

Management action at selected N2K sites	General public (a lot/some satisfaction gained)	Site-visitors (willing to pay a little or a lot more)	Non-Scottish visitors (very or quite important)
	%	%	%
Protecting rare European wildlife	-	-	97
To promote traditional jobs	94	-	95
Information - leaflets/maps	91	51	96
Information -boards/displays	91	46	96
Improved access for visitors	89	52	96
Visitor Centres	86	39	87
Some areas protected as wilderness	72	-	89
No visitors allowed in some areas	70	-	-
Protecting rare Scottish wildlife	-	-	66

Notes: - indicates that the question was not asked to the respondents in that group.

General public maximum sample size: 663

Site visitor maximum sample size: 200

Non-Scottish visitor maximum sample size: 244

Site visitors showed less enthusiasm and WTP for additional management activities. On average around 40-50% of visitors would be willing to pay either a little more or much more for additional information, improved access and visitor centres.

The majority (87-97%) of non-Scottish visitors to Scotland stated that: protecting wildlife of European importance, and provision of information, improved access, visitor centres and wilderness areas were quite or very important. Only 66% thought it quite or very important to protect rare Scottish wildlife.

12.5 Attitude Towards Provision of Information

Around 24% of non-Scottish visitors said that they would probably already be visiting one of the sites on their visit. If more information had been available about the N2K sites, 54% others claimed that they may have visited one or more of the sites.

12.6 Attitude Towards Purchasing Natura 2000 Products

Non-Scottish visitors were asked how interested they would be in buying a variety of products if they knew that some of the money from the sale would be put back into wildlife conservation in Scotland. The results, shown in Table 12.7 below, indicate that a majority (80-94%) of respondents would be either very or quite interested in purchasing a variety of different N2K related products listed. This finding suggests that there would be a potential market for such products if marketed and priced appropriately. Part of the revenues generated could be directed back into management activities within the N2K network.

Table 12.7 Non-Scottish visitors' interest in purchasing N2K products

N2K related products	Potentially interested in purchasing N2K products (%)
T-shirts /souvenirs	94
Books	90
Maps	85
Information/leaflets	84
Wildlife products	79

Note: Maximum sample size: 174

13 Summary and Conclusions

13.1 The Results

13.1.1 National level policy-on results

Current full conservation protection of all 300 N2K sites throughout Scotland (i.e. policy-on) has an overall benefit cost ratio (BCR) of around 7 over a 25-year period. This means that overall national welfare benefits are seven times greater than the national costs and represent good value for money.

However, about 99% of this benefit (£210 million per year) relates to non-use values. Around 51% accrues as non-use value to the Scottish general public and 48% accrues as non-use value to visitors to Scotland. Around £1.5 million (1%) of the benefits relate to use values (e.g. walking and angling etc). Thus when non-use values are excluded, the BCR over 25 years is only 0.06.

The non-use values have been measured using carefully designed contingent valuation questionnaire surveys. However, such techniques are far from perfect, and are affected by numerous biases. Despite this, the survey results do indicate that potentially considerable benefit is gained from the continued protection of these sites without people necessarily visiting the sites.

In addition to the quantified benefits, continued protection of the sites provides significant social, cultural, educational, research, environmental services and health values. These have not specifically been valued as part of this study, although part of these values will be included within the use and non-use value estimates. Furthermore, there are intrinsic non-anthropocentric values as well. It is for all these reasons that the sites have effectively been designated.

13.1.2 National level N2K results

When the costs and benefits associated specifically with N2K designation are considered in isolation, that is the marginal costs and benefits related to the cSAC and SPA designations, there is a BCR of 12. When non-use values are excluded this falls to 0.1.

Figure 13.1 Summary of benefit cost ratios for case study areas

Site Area	25 year BCR	25 Year BCR (excl. non-use value)
River Bladnoch	12	0.07
Clyde Valley Woods	25	0.004
Waukenwae & Red Moss	66	0.001
Sands of Forvie group	7	0.1
Tips of Corsemaul	97	0
Strathglass	3	0.2
Lewis & Harris group	16	0.04

13.1.3 Case study area results

Table 13.1 above gives a summary of BCRs for all seven case study areas. As can be seen, when non-use values are included, all case study areas have a positive BCR, whereas when non-use values are excluded, the BCRs are all significantly less than 1 (Corsemaul relates to a site where there are no visitors and low management costs. The lowest BCR (including non-use value) of 3 is for Strathglass where there are significant visitor numbers and very high associated site management costs. Their ranking in terms of BCR reverses when non-use values are excluded.

13.1.4 Accuracy of the results

Caution should be taken regarding the precise values determined in this study. At a national level this is because:

- *The user values are simply extrapolated from the case study area data;*
- *The general public non-use value and non-Scottish visitor non-use values are based on hypothetical WTP contingent valuation surveys. The values arising are thus indicative, but do indicate a relative order of magnitude benefit, and;*
- *Due to the difficulty in obtaining more detailed estimates, the site management cost estimates for estate landowners are based on broad-brush assumptions.*

At a site level, inaccuracies exist as a result of the following:

- *At some case study areas, sample sizes were very low for some distance bands so some estimates of values for general visitors were used;*
- *Robust data on visitor numbers at most sites was not available;*
- *Due to the lack of specialist user survey responses, their WTP values are not based on survey data but less robust estimates from benefit transfers, and;*
- *The approach to splitting the Scottish public and non-Scottish visitor stated WTP non-use values between the different sites was relatively crude (primarily due to interviewing time constraints).*

13.1.5 Individual average willingness-to-pay values

The significant non-use values, in the order of £48 per year per Scottish household for protecting all 300 sites is not that unreasonable when compared to other valuation studies. For example, Hanley et al (1996) derived Scottish household WTP values of £97 per year and £62 per year to maintain Machair ESA and Breadalbane ESAs respectively, much of which was non-use value.

The visitor to Scotland non-use value of £6 per adult visit to Scotland to protect all 300 N2K sites is also likely to be a reasonable value. However, it is not possible to compare this to any other similar type of valuation study due to the lack of similar valuation contexts.

The top down valuation approach adopted for non-use values (i.e. asking a value for all 300 sites and splitting that value down) helped overcome potential aggregation problems. For example, if respondents were asked their value to protect a selection of individual sites, there would potentially have been serious income constraints when multiplying the benefits to a national level.

At a site level, general Scottish visitor use values range from £0.05 per adult visit for more frequent local visits to £1.70 per visit for more distant Scottish visitors. General non-Scottish visitor use values range from £0.60 per adult visit to £1.70 per visit. Specialist values for both Scottish and non-Scottish visitors range from £0.75 to £2.25 per visit. Note that these values do not relate to the full enjoyment gained by the visitor, but the marginal value based on the policy-off scenario. For example, policy-off impacts at Strathglass or the River Bladnoch may have a negligible effect on the enjoyment of some people's visits.

13.1.6 Enhancing values with provision of additional information

The general public and local resident questionnaire survey demonstrated that when reasonably detailed information (i.e. with photos and descriptions) was provided regarding the policy-off impact scenarios, average WTP values increased by 9% (or as much as 28% for respondents living within 10km of the site). This suggests that a public awareness campaign to provide information on N2K sites to the general public is likely to yield significant benefits, particularly when it is targeted at local residents and frequent site users.

13.1.7 Equity of costs and benefits

The main contributor to financing the costs of managing the sites is the Government, through various Government agencies (43% of annual costs). Landowners may contribute around 30% of the policy-on land management costs (although part of this money is likely to be from grant aid). Potential opportunity costs are around 16%, with a range of individuals and organisations losing out, but in particular property developers and landowners.

The beneficiaries are almost equally divided between the Scottish general public and the non-Scottish visitor. In particular relating to non-use benefits, although site visitors also derive a relatively significant degree of benefit.

13.2 Use of the Results

The results of this study are potentially useful in a variety of ways, which includes the following:

- *If the non-use values are to be accepted as a reasonable indication of the benefit gained by the overall populations sampled, it demonstrates that the value for money gained is significant, thereby justifying both the policy-on and N2K programme.*
- *It highlights which stakeholder groups incur the costs and gain the benefits. For example, it shows that landowners currently potentially incur significant costs in maintaining the environment that provides significant non-use benefits to the general public and non-Scottish visitors to Scotland.*
- *By having a better understanding of the nature of the different types of benefit it is possible to enhance the values. For example, non-use values are partly dependent on the understanding and awareness of the general public and visitors to Scotland. The greater the information dissemination, and the more targeted its content, the greater the values will become.*
- *By understanding the nature of the different types of benefit and who they accrue to, it is possible to “capture” or “appropriate” some of the values. For example, visitors to the sites may be willing to donate money towards their upkeep or spend money on buying things at or near the site (whether it be food and drinks or maps, books and souvenirs). Even non-visitors would be willing to buy associated products (e.g. maps, books and souvenirs), particularly if they knew that part of the money would go towards maintaining the N2K sites.*
- *Understanding which stakeholder groups benefit may also help reduce site management costs if those people are targeted to provide voluntary assistance to help manage and protect the sites.*

14 Recommendations

- 1) SNH and other owners and managers of N2K sites should consider developing a cost-effective approach to assessing and recording the costs and benefits associated with managing the sites. There are numerous benefits that could be gained from the data collected.
- 2) Consideration should be given to deciding whether it is worthwhile trying to enhance and “appropriate” any of the “policy-on” and N2K benefits, and how best this may be achieved. There are many ways in which this could be done, including, for example, use of carefully designed free and commercially available N2K posters, maps, books and souvenirs etc. Appropriately designed public awareness campaigns and on-site interpretation facilities can significantly enhance benefits.
- 3) Consideration should also be given to deciding whether it is worthwhile trying to reduce “policy-on” and N2K costs, and how best this may be achieved. Again, there are many ways in which this could be done, including, for example, through increased opportunities and promotion of voluntary work and corporate sponsorship.
- 4) SNH and the SE should consider categorizing different N2K sites in Scotland with respect to whether visitor use should be encouraged or restricted. It may be worth adopting a similar categorisation approach that IUCN has for its protected areas.
- 5) To obtain more robust site visitor values for this economic analysis, particularly for the specialist visitors, the site visitor surveys could be administered again in 2004 for a longer duration. This could significantly boost sample sizes and the degree of accuracy at relatively low cost.

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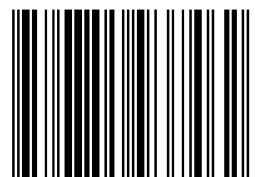
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