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Financial values of five important marine/coastal wildlife areas in England

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Financial values of five important marine/coastal wildlife areas in England

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Financial values of five important marine/coastal wildlife areas in England

Contents

Section 1 Introduction

1.1 Background

1.1.1 In October 1995, English Nature commissioned Posford Duvivier Environment to carry out a study to establish broad-brush financial values of certain important marine/coastal wildlife areas in England.

1.1.2 The overall aim of the study was to obtain an overview of the financial value of five coastal sites recognised as being important for marine wildlife. The five sites were selected because of their importance, their diverse nature and their geographical spread. Figure 1.1 shows their location. The sites were as follows:-

- Lundy
- Holy Island and the Farnes
- Morecambe Bay
- North Norfolk Coast
- Isles of Scilly

1.1.3 One of the main objectives of the study was to provide information on financial and economic factors as an important component of establishing an understanding of the total value of the sites in order to ensure a realistic approach to management.

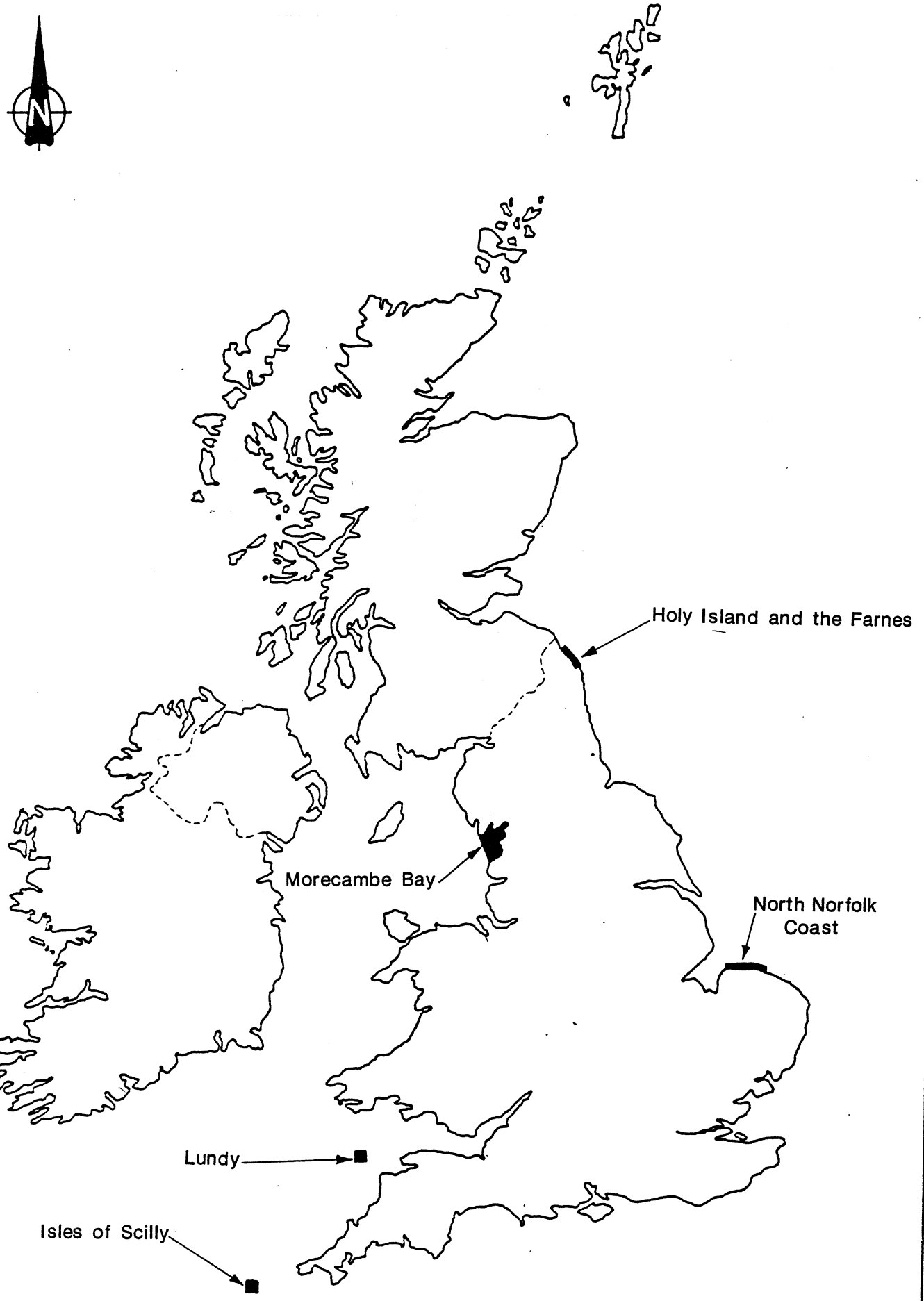
1.1.4 A second objective was to identify the key sectors and organisations with a vested (financial) interest in the sites and their future sustainable management.

1.1.5 A third objective was to determine broad-brush financial values accruing from the coastal environment, thereby highlighting its importance to users and regulators.

1.2 Methodology

1.2.1 The study was a relatively brief desk study aimed only at obtaining "ball-park" figures. Contact was initially made with the relevant local English Nature offices to identify what coastal-related activities take place at each site, and to determine their relative significance. To help achieve this, a summary matrix of coastal activities was created (see Section 4). Suitable study area boundaries were also agreed.

1.2.2 Key consultees were then identified as a potential source of further information. Selected consultees were contacted by letter, fax and/or telephone in order to gather relevant information. Generally, a letter and map was sent out to each consultee describing the study and asking for specific information. A one page questionnaire was used to help elicit the required information and is shown in Appendix 1. Where appropriate, the source and general reliability of the recorded values are mentioned in the text.



PROJECT	TITLE		
VALUES OF IMPORTANT MARINE WILDLIFE SITES	LOCATION OF STUDY SITES	POSFORD DUVIVIER ENVIRONMENT	DATE FEB 1996 SCALE DRAWN TD CHKD FIGURE 1.1

1.2.3 As anticipated, various problems were encountered throughout the study in trying to obtain relevant information. These are reported in the conclusions.

1.3 Report Structure

1.3.1 Section 1 has outlined the background to, and objectives of, this study. Section 2 provides a brief introduction to the financial and economic aspects of the environment. Section 3 outlines the main activities and uses related to the marine and coastal environment and indicates those financial values which can, and have been, measured.

1.3.2 Section 4 comprises a summary of the coastal activity matrix which shows the extent to which these activities take place at each of the five study sites. Sections 5 to 9 in turn provide financial details of the key activities for each of the five selected sites. The conclusions and recommendations are dealt with in Sections 10 and 11 respectively.

Section 2 Economics and the environment

2.1 Introduction

2.1.1 The environment, in particular the coastal and marine environment, provides a variety of uses or benefits of value to mankind. These can be categorised as follows:-

- **Direct Uses.** These include all uses of the environment such as the harvesting of natural resources, or "goods", and recreational activities.
- **Indirect Uses.** Benefit can be gained indirectly from the environment, usually through support and protection of other economic activities (eg. biological support and physical protection (see Section 2.3)). They are often referred to as natural functions or environmental "services".
- **Non-Use Values.** Value can be derived by humans from the environment without any current human use. These include Option, Existence and Bequest values (see Section 2.3).

2.1.2 The "Total Economic Value" of a habitat can thus be derived by valuing all of these use and non-use values (Barbier, 1989 and Spurgeon, 1992).

2.1.3 All of the above use and non-use values give rise to economic benefits or values. This includes an element of financial value which is generated, in particular, from direct uses of the environment.

2.2 Financial values

2.2.1 Financial values can be considered as measurable flows of money generated by the use of resources. Such flows are expressed in terms of income and expenditure and generally result from transactions carried out in the market-place. In this study, financial values are generally reported either in terms of gross expenditure by visitors and recreational users, or as gross income (revenues) to commercial operations. The only exception is agriculture, for which gross margins are used (ie: revenues less variable costs).

2.2.2 There are various ways that financial values can arise. They may accrue directly (on-site) from an activity, for example, from selling products or from recreational charges. There are also indirect expenditures relating to activities. For example, this includes expenditure on equipment, maintenance, clothing and insurance which are directly related to carrying out an activity, but not necessarily related to the site in question. This additional value is important, but it has not been possible to include it within this study. There is also indirect expenditure on food, accommodation, travel etc. which is often associated with carrying out activities. This has been included (less travel costs) in this report as local "visitor expenditure (indirect)".

2.2.3 There are further related financial benefits generated as a result of what is known as the multiplier effect. Initial expenditures incurred by individuals and firms carrying out activities (eg. buying equipment, paying wages etc.) will generate further flows of revenue through the local, regional and national economy. Financial benefits accruing in this way are relatively complex to identify and have not been considered further by this study.

2.2.4 Jobs are a critical aspect of any economy and are created by the various coastal activities taking place. Further jobs are also created as a result of the multiplier effect, following the same principle as above. However, employment *per se* has not been considered further in this study.

2.3 Economic values

2.3.1 Economic values measure the net benefit to society of using resources. They include the economic benefit accruing from all uses (direct and indirect) and non-use values. The main difference between economic values and financial values is that economic values are not necessarily based on market values (although, in some cases, market values can provide a good indication of economic value). Economic values are based on human preferences and are generally measured in terms of an individual's "willingness to pay". The economic value of a product may therefore exceed the market price for that good if individuals are, in theory, willing to pay more for it. For many environmental goods and services there are in fact no market values at all, but such goods and services still have an economic value.

2.3.2 As set out below, there are many important and potentially valuable economic values relating to the coastal zone. The main reason that they are not "financial values" is because of certain "market failures" which mean that there is no obvious market price for them. Market failures arise, for example, when there is open access to resources, lack of property rights and when off-site impacts are uncompensated for.

2.3.3 Coastal related economic benefits which accrue to individuals and society as a whole can be substantial. They include the following:-

- **Biological Support:** Coastal habitats such as salt marshes can act as important nursery and feeding grounds for fish caught commercially offshore.

- **Physical Support:** Coastal habitats such as salt marshes can afford physical protection from wave action to other coastal activities.

- **Option Value:** Benefit can accrue to individuals by retaining the option of using a resource in the future by protecting or preserving it today.

- **Existence Value:** Benefit can accrue to individuals by ensuring that a resource will continue to exist in the future even though they may never wish to use that resource themselves. When the motive is for the benefit of future generations; this is referred to as "bequest value".

2.3.4 In addition to the above economic values, there is what is known as "intrinsic value". This refers to the rights of organisms to exist, regardless of any value they may have for humans. As such, this is not an economic value, but it is nevertheless an important concept.

2.3.5 There are several environmental valuation techniques available to place estimated monetary values on the above economic values. Such techniques include the replacement cost approach, avertive expenditure, the travel cost method, hedonic pricing and the contingent valuation method (see Department of the Environment, 1991). However, these economic values have neither been investigated nor included within this study.

2.4 Actual versus potential values

2.4.1 The financial values recorded in this document all relate to the current or existing values at the site (generally 1995/96). It is possible that the value of some activities could well be increased in the future, whilst the value of others may decline. The report does not attempt to forecast changes to current values.

2.5 Benefits of economic valuation for coastal management

2.5.1 Identifying and evaluating financial and economic values of the environment can greatly assist in the management of coastal zone resources and activities. Some of the main reasons include:-

- To improve decision-making. By revealing the true value of environmental activities and impacts in terms that decision-makers can relate to (ie, monetary terms), better decisions can be made regarding the allocation of resources.

- To assist in achieving sustainable development. Only by appreciating the true value of the use of resources, both now and in the future, is it possible to maximise net benefits accruing to society and achieve sustainable development (see Appendix 2).

- To encourage initiatives to maintain the quality of the coastal environment. Activities such as fisheries and certain recreational activities (in particular angling, wildlife related activities and SCUBA diving), are dependent on the continued quality of the environment. By maintaining the quality of the environment, these income generating activities can be continued.

- To promote the importance of the marine/coastal environment. Establishing and highlighting monetary values for the environment should engender greater respect from coastal users and regulators.

- To justify greater expenditure on managing coastal resources. If the true value of the environment is established, there will be greater justification for more appropriate levels of expenditure to manage the environment and its resources.

- To assist in natural resource damage assessments. If the value of the environment is better understood, compensation claims for damages to the environment (eg. from oil spills) can be more appropriately and comprehensively assessed.

- To assist in developing market-based instruments. A better knowledge of the value of the environment and values of environmental costs is required to make better use of market-based instruments (such as user and waste emission charges) to help manage environmental resources (see Appendix 2).

- To assist in the development of environmental accounts. Again, to help achieve sustainability, the creation of a systematic means of accounting for natural resources is being widely advocated (see Appendix 2).

Section 3 Financial values of marine/coastal wildlife areas

3.1 Introduction

3.1.1 This section briefly describes the main marine/coastal related activities taking place within the study areas. Details are provided as to the financial information collected for these activities as part of this study. The sub-sections used in Section 3 directly relate to those used for the activity matrix in Section 4 which summarises the extent to which the activities take place within each of the study sites.

3.1.2 In Sections 5 to 9, only the more important activities (from a financial point of view) are detailed under separate sub-headings. In these latter sections, the activities are generally ordered in descending order of magnitude.

3.2 Financial values of coastal activities

3.2.1 Fisheries

Fishery activities include the fishing of fin fish, crustaceans and molluscs. The actual income from fisheries generated at each specific site is extremely difficult to determine. Data was obtained from various sources, primarily through the regional Sea Fisheries Committees, and from MAFF. Most of the data available and reported in this study relates to the value of landings at individual ports and harbours, or groups of ports and harbours within or close to the study areas. The actual marine area from which those landings originate is often not known. The fishermen may have fished close to the shore, or perhaps many miles out to sea or further along the coast. The precise area from which the catches are obtained are generally known only by the individual fishermen themselves. Due to the highly competitive nature of their business, fishermen are often reluctant to divulge the source of their catches, let alone any financial information.

3.2.2 Another problem with fisheries data is that it is particularly variable from year to year, with overall fishery output generally in decline throughout the country. It is also reasonable to believe that the information revealed is very much on the conservative side, since not all landings are necessarily recorded.

3.2.3 Although financial value of landings are stated in this report, it is important to bear in mind that the significant additional economic value generated as a result of the "multiplier effect" has not been included. This would encompass, for example, the value of all the support services and onshore facilities such as ports, chandleries, boat builders/repairers, markets, transport and processing facilities. These can contribute enormously to the local and even regional economies. Furthermore, the values provided are only for the first point of sale. There is considerable "value added" from processes such as purification, shelling prawns, canning, etc. Such processes significantly increase the financial value of the raw product and provide further employment. However, these processes often occur a long way from

the first point of sale and it can be difficult to disaggregate the benefits from other activities.

3.2.4 Aquaculture

Financial information for aquaculture should be relatively easy to determine on a site specific basis, at least in terms of value of landings. However, little data was forthcoming for this study due to the time constraints and sensitivity of the information. Any values obtained are included under "fisheries".

3.2.5 Agriculture

Farming activities sometimes take place on the landward fringe of coastlines. For example, grazing by sheep and cattle often occurs on saltmarsh and sand dune habitats. Where appropriate, approximate values for this activity have been calculated based on: the area of land in question; an idea of the quality or intensity of grazing; and use of standard agricultural financial data from the Farm Management Pocketbook (Nix, 1995). For particularly sensitive and important environmental habitats, it is acknowledged that this provides an extremely crude estimate. More accurate information could be readily obtained by further consultation.

3.2.6 Cultivation of crops is somewhat limited on strictly coastal related habitats. However, it does occur in some places for example, cropping of reeds, *Salicornia* and turf. Values for these activities were not sought for this study.

3.2.7 Aggregates

Coastal sites are often the source of sand and gravel aggregates used in the building and construction industries. The aggregates will generally have a readily identifiable market or financial value.

3.2.8 Other Products

The marine and coastal environment is a source of numerous other products of use to humans. They include, for example, curios and souvenirs, such as pebbles and shells picked up off the shore. Financial values can be obtained if such items are then sold. This financial value can be added to significantly by converting the raw materials into more attractive products. Economic value accrues to those visitors picking up and keeping the items as mementos.

3.2.9 Although only just being recognised, the coastal environment could also be the source of numerous pharmaceutical and genetic resources for the future. The value accruing from these resources could potentially be significant. However, no such values are provided for any of the sites for this study.

3.2.10 Beach Use

General beach use is popular, but since beaches in the UK are free to use, this does not yield direct financial revenues. It does, however, contribute significantly to the local economy as a result of general visitor expenditure on accommodation, food, beverages and car parks etc. (See visitor expenditure in Section 3.2.29 and later in the report).

3.2.11 Snorkelling

Snorkelling is limited in the UK due to relatively low sea temperatures and the current perceived lack of appeal of underwater life in Britain. Revenue can, however, be generated if there is some form of guide and/or equipment to hire (eg. wetsuit, mask, snorkel and fins). (See visitor expenditure).

3.2.12 SCUBA Diving

Significant levels of income can be derived by commercial operators offering SCUBA diving trips. Charges include hire of the boat or equipment and recharging air cylinders, etc. In addition, numerous club divers use coastal sites, often with their own equipment. Club divers may generate some income through launching fees and recharging of cylinders. Some of the dive operators approached provided financial information, although the accuracy of this may be questionable. Other relevant data can be extracted from harbour revenues. (See visitor expenditure).

3.2.13 Boat Trips

Visitors to the coast may go out on commercial boat trips to see wildlife or be taken to nearby islands, etc. However, boat operators are not keen to divulge commercial information. In some cases it is relatively straight-forward to calculate estimated total incomes where the fares and estimated visitor numbers are known. (See wildlife and visitor expenditure).

3.2.14 Sailing

Sailing is popular throughout UK coastal waters, but it is difficult to determine the direct financial or economic value at any one site. Sailing clubs with paying members sail at many locations around the coast. Marinas and harbours may have annual and visiting mooring fees, along with land storage fees and launching fees. In addition, there is considerable off-site expenditure related to sailing (eg. purchase of boats, repairs, equipment, clothes, training courses, insurance etc.). There is also potentially considerable visitor expenditure.

3.2.15 Even a rough overview of the sailing activities and sailing clubs at each site was hard to obtain. The main source of information was from the Royal Yachting Association (RYA), but they only have access to information regarding RYA affiliated clubs. (See visitor expenditure).

3.2.16 Windsurfing

Only a small amount of income is directly generated by windsurfing. Most people use their own boards and there are only a few places with launching fees. Little data was revealed during the course of this study. (See visitor expenditure).

3.2.17 Motorised Water Sport

Motor boating, water-skiing and jet-skiing do not often generate much direct income on site, although there are associated launch fees, and some larger boats may pay mooring fees. However, significant indirect (off-site) expenditure is incurred on equipment, clothing maintenance, fuel, insurance etc. Little information was obtained on these activities for this study. (See visitor expenditure).

3.2.18 Angling

Like sailing, angling is popular but its value is extremely difficult to quantify. There are numerous clubs with members who may pay annual subscriptions and pay to enter competitions. In addition, there are angling charter boats which are available to groups or individuals to hire. However, there are also huge numbers of anglers (both members and non-members of clubs) who either go out in their own boats or fish without any payment from the shore. Relatively significant indirect (off-site) sums may be spent on tackle, bait, clothing, fuel etc. (See visitor expenditure).

3.2.19 Wildfowling

Wildfowling takes place on numerous coastal sites throughout the UK. Financial revenues generally accrue through subscriptions to clubs and for licences and rights to shoot. There is also financial expenditure on the equipment and ammunition required to carry out the shooting, with an annual estimated value of around £100 per wildfowler per year. Data for this study was obtained from the British Association of Shooting Clubs' head office. (See visitor expenditure).

3.2.20 Baitdigging

Baitdigging is an increasingly common activity on large mudflats, it takes place both on a commercial basis (ie. for selling) and for personal use. However, quantified data, in particular, relating to both financial and economic benefits from baitdigging is lacking. Little data was obtained for the purpose of this study.

3.2.21 Rambling

This includes all people who visit a site for general walking purposes. Walking on the beach (including beachcombing) would fall under this category. There are rarely any charges made for walking, other than through car park charges (see visitor expenditure), or access to private land such as

National Trust property (see wildlife). Rambling is a particularly important activity at coastal sites and can significantly benefit the local economy through indirect visitor expenditure.

3.2.22 **Wildlife**

For the matrix in Table 4.2, this heading covers all people visiting and carrying out activities related to the flora and fauna at the site. However, in terms of financial revenues generated, as covered in Sections 5 to 9, it only relates to income generated specifically for purposes of enjoying wildlife. For example, where it is possible to restrict access to people, individuals are sometimes charged for visiting popular managed wildlife sites. These include county wildlife sites, RSPB reserves and National Trust land.

3.2.23 However, it is important to note that much of the income identified under other headings in this report, such as boat trips, transport (especially with respect to Lundy and the Isles of Scilly) and visitor expenditure is often very much related to the wildlife (and environmental quality) at each site.

3.2.24 **Archaeology/Heritage**

Although there may be some archaeological/heritage sites of importance within a study area, there are not generally any financial charges made to people appreciating them (see visitor expenditure). It should be noted that there may, however, be marine or coastal-related archaeological or heritage sites elsewhere along the UK coast where charges are made (eg. by English Heritage).

3.2.25 **Golf**

The areas of land directly behind sand dune systems and other coastal habitats are sometimes used for golf courses. Financial values are generated by membership subscriptions, lessons and visiting green fees. Bars, restaurants and golf shops are frequently provided on-site, from which further revenues accrue. In addition, the presence of golf clubs can bring in much to the local economy through employment and further visitor expenditure. (See visitor expenditure).

3.2.26 **Cycling**

Cycling frequently occurs along the coast of England, but there are rarely any charges made. (See visitor expenditure).

3.2.27 **Caravans and Camping**

Caravanning and camping sites abound at coastal sites, generating revenues from people staying at them. Most, but not necessarily all, of the visitors using the site will be there because of the coastal location. Specific financial data could be collected on this use, but not within the time available for this study. Unless stated otherwise, for the purposes of this study, income from caravanning and camping is included within "visitor expenditure".

3.2.28 Aerial Recreation

Aerial recreational activities include microlighting, parachuting and parasailing. Coastal sites are often ideal for these because of the open air space, plus the visually impressive coastal scenery afforded. Income is generated through purchase and hiring of equipment, and from lessons. The degree of income related to the coastal environment will depend on how influential the coastal nature of the site is when individuals select the venue to carry out these activities. (See visitor expenditure).

3.2.29 Visitor Expenditure (Indirect)

For the above mentioned recreational activities, there is a degree of direct expenditure on the activities. However, potentially more importantly from a financial and economic point of view, individuals visiting a site to carry out any one or more of these activities will incur additional (indirect) related costs. These include expenditure on food, drink, accommodation, transport etc. When aggregated, total visitor expenditure in the immediate vicinity of the coastal site can be significant. However, there are difficulties in determining overall visitor expenditure, and in determining what proportion is actually dependent on the coastal environment.

3.2.30 To calculate a broad-brush estimate of the value of visitor expenditure related to the coastal environment requires the following information.

- Total visitor numbers to the area.
- Average daily visitor expenditure.
- The proportion of people visiting because of the coastal environment.

3.2.31 An element of travel costs incurred in getting to the coastal site can also be eligible for inclusion as associated visitor expenditure. However, other than those identified for Lundy and the Isles of Scilly (see transport in Section 3.2.40 and later in the report), such values have not been included in this study.

3.2.32 Relevant information for this study was primarily obtained from local authority tourism departments and regional tourist boards.

3.2.33 In this report, values determined for visitor expenditure (indirect) are calculated both including and excluding the direct recreational expenditures. There is a danger otherwise that "double counting" of expenditures may occur. However, in most instances the values given for indirect visitor expenditure are large and broad-brush and the direct expenditure from activities is proportionally small, such that any impact from such double counting will be minimal.

3.2.34 Ports Trading

Ports can generate significant financial and economic benefits through the import and export of goods, and by providing passenger services. However, obtaining relevant information can be difficult due to the highly commercial

nature of port operations. Where possible, data was elicited from individual ports, in particular with respect to the value of trade and annual turnovers. Other publicly available data was obtained from Department of Transport statistics, and from Associated British Port's annual yearbook.

3.2.35 The true value of ports is nonetheless difficult to determine. Ports often have other businesses operating on site and the value to the ports of the goods imported may only be a fraction of the value to the economy they are being brought into. The multiplier effect is therefore of great significance.

3.2.36 **Energy**

Energy related activities include the exploration and production of oil and gas reserves within the study area, and the location of refineries and power stations (gas and nuclear powered) on the coastal fringe (see industry in Section 3.2.37).

3.2.37 **Industry**

The coast is a popular location for numerous industries (including the energy industry) and many of these make use of coastal waters as part of their operations. Coastal water may be used as: a raw material in an industrial process; as a coolant and then discharged back into the sea; or as a receiving body for diluting and dispersing waste discharges. Coastal waters are therefore critical to many industries. The whole turnover of the business and the employees may be dependent on the continued use of coastal waters. In addition, considerable further financial and economic benefits will accrue indirectly as a result of the multiplier effect associated with a coastal based industry.

3.2.38 **Sewage Disposal**

Coastal waters have historically been used to discharge domestic wastes. The degree of treatment required, and thus the strength of effluent discharged, depends on the size of population being served. No direct financial benefits are gained, but economic benefit is gained, assuming that money is saved by avoiding the costs of alternative disposal methods, such as treatment and disposal on land. This issue was not considered at any of the sites.

3.2.39 **Transport**

Some modes of transport are located on coastal sites and habitats. For example, causeways, roads and railway lines running through or along the edge of salt marshes, and bridges between land and across rivers. Financial values can be generated if tolls are in operation.

3.2.40 There may be a need for specific transport links within the coastal site. For example, boat or air transport to islands. Financial charges are usually made for such journeys. Depending on the circumstances, these transport links are covered in this study under transport or boat trips. (See visitor expenditure).

3.2.41 Military Operations

Numerous coastal sites in the UK are used for either land based, marine based or aerial military operations. (For example, the low flying fighter jets which practice over the North Norfolk Coast). Relatively wild open spaces are preferred. Potentially large financial costs are incurred in carrying out the operations, as opposed to income generated.

3.2.42 Research

Some coastal areas are valuable sites for a wide variety of research purposes. For example, research into fisheries, ecology, geography and coastal defence techniques. In carrying out such research activities, expenditure is incurred within the local economy. Although levels of research expenditure can be identified (especially where there are research laboratories) this item has been aggregated within visitor expenditure for the purpose of this study. Other less readily identifiable, but nevertheless potentially significant, financial and economic benefits can also accrue based on results from the research.

3.2.43 Education

As with research, coastal sites are also valuable for educational purposes. The economic assessment of educational activities is also similar to that for research. Although there may be some particular educational facilities, most financial expenditure is difficult to separate from general visitor expenditure, and for this study has therefore generally been included within estimates for visitor expenditure. In addition, potentially enormous economic value may result from this use, for example, from the better informed and more environmentally aware business persons and decision-makers of the future.

3.3 Costs incurred in carrying out coastal activities

3.3.1 Introduction

Whilst this study concentrates on reporting the financial benefits occurring from activities taking place within the selected study sites, it is important to recognise that there are also various costs associated with these activities. As described below, such costs include production and operating costs, management costs and environmental costs. The only costs considered further in this report are management costs. Selected examples only are detailed for each study site in Sections 5 to 9.

3.3.2 Production and Operating Costs

In order to yield financial benefits from the above activities, financial production costs are invariably incurred. For example in the fishing sector, expenses incurred in catching fish include purchase of boat and equipment, fuel, employee wages, etc. In the port industry, operating costs include maintenance dredging, to allow boats to continue to use the port. The

purchase and operation of the vessel is essential in all boat based recreational activities, and so on. These costs are not considered further in this study.

3.3.3 Management Costs

In addition to the above costs, further financial costs may be incurred by organisations in managing a particular type of activity. Such management may be needed to coordinate different organisations and individuals carrying out that activity, or to reduce any conflicts that may occur between rival operators, and between other activities (eg. Sea Fishery Committees). Other management costs incurred include those needed to manage specific sites, such as nature reserves. A variety of associated management costs, for example for controlling access and providing information, may be incurred (eg. by English Nature, local authorities and others).

3.3.4 Environmental Costs

In addition to the production and management costs, an important but commonly overlooked cost is the environmental damage caused by some uses and activities. Most activities will have some kind of effect on the environment (and wildlife in particular), the significance being quite variable depending on the location and type of activity. This may include damage on-site, or damage occurring well away from the activity responsible. An example is that dredging may affect fishery output particularly if there is a fish nursery ground nearby.

These environmental costs can increasingly be translated into economic values through environmental valuation techniques. They are not, however, considered further in this study.

Section 4 Summary of coastal activities in the study areas

4.1 The summary matrix

4.1.1 Table 4.1 below is the key to the summary matrix overleaf (Table 4.2) which illustrates the extent to which those marine and coastal activities described in Section 3 take place within each of the five case study sites. As seen by the definitions below, the level of activity does not only refer to the direct financial values generated, but also to the general level of activity.

Table 4.1 Key to Summary Matrix of Coastal Activities

Key	Description	Definition
-	Not present	This is where a use/activity does not take place at all.
P	Potential for activity	There is potential for this use/activity to provide revenues in the future
✓	Minor activity	The use/activity does take place, but only on a very limited basis
✓✓	Moderate level of activity	The use/activity takes place on a moderate basis. It can be defined as being neither minor nor major
✓✓✓	Major activity	The use/activity is major and is generally of financial or economic significance to the site. This may be because many people perform the activity or benefit from it, or it may generate a relatively significant amount of direct income for site

4.1.2 This table provides a relatively crude assessment, based primarily on discussions with local English Nature offices. It was nonetheless useful for this study in identifying the activities to be targeted for collecting financial data on.

4.1.3 For the study sites in Sections 5 to 9, financial values have generally only been obtained for those activities taking place on a major or moderate level. The activities are detailed in the text in these sections in descending order of financial value generated.

Table 4.2 Summary matrix showing extent of coastal activities

Activity	Lundy	Holy and Farnes	Morecambe Bay	North Norfolk	Isles of Scilly
FISHERIES					
Finfish	✓✓	✓✓✓	✓✓	✓✓	✓✓✓
Crustacea	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓
Molluscs	-	✓✓	✓✓✓	✓✓✓	-
AQUACULTURE	-	-	✓✓	✓	-
AGRICULTURE					
Grazing	-	✓	✓✓✓	✓✓✓	✓
Crops	-	-	✓	✓	-
AGGREGATES	-	-	✓	-	✓
OTHER PRODUCTS	P	P	P	P	P
RECREATION					
Beach Use	✓	✓✓✓	✓✓	✓✓✓	✓✓
Snorkelling	✓✓	✓	-	✓	✓
SCUBA Diving	✓✓✓	✓✓✓	✓	✓	✓✓
Boat Trips	✓✓✓	✓✓✓	✓	✓✓	✓✓✓
Sailing	✓	✓✓	✓✓✓	✓✓✓	✓✓
Windsurfing	-	✓	✓✓	✓	✓
Motorised Water Sport	-	✓✓	✓✓	✓	✓
Angling	✓✓	✓✓✓	✓✓✓	✓✓	✓✓
Wildfowling	-	✓✓✓	✓✓	✓✓	-
Bait Digging	-	✓	✓	✓	-
Rambling	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Wildlife	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓
Archaeology/Heritage	✓✓	✓✓✓	✓✓	✓	✓✓
Golf	-	✓	-	✓✓	✓
Cycling	-	✓	✓	✓	✓
Caravans/Camping	✓	✓✓	✓✓✓	✓✓	✓✓
Aerial Recreation	-	-	✓✓	-	-
VISITOR EXPENDITURE (Indirect)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
PORTS TRADING	-	✓	✓✓✓	✓	✓
ENERGY	-	-	✓✓✓	✓	-
INDUSTRY	-	-	✓✓✓	✓	-
SEWAGE DISCHARGE	✓	✓	✓✓✓	✓	✓✓
TRANSPORT	✓✓✓	✓	✓✓✓	✓	✓✓✓
MILITARY OPERATIONS	-	-	-	✓	-
RESEARCH	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓
EDUCATION	✓✓	✓✓	✓✓	✓✓	✓✓

See Section 4.1 for explanation and key

Section 5 Lundy

5.1 Site description

5.1.1 Lundy is a predominantly granite island with some shale outcrops. It is located in the Bristol Channel, 18km off the North Devon Coast. It has an area of approximately 400 ha, is 4.9km long, 1.3km across at its widest point and has a coastline approximately 15km long. The west coast is highly exposed to prevailing weather and currents whilst the east is relatively sheltered. It is the only Marine Nature Reserve in England. A map of the study area is shown in Figure 5.1.

5.2 Study area limits

5.2.1 The seaward boundary for the study area is that of the Marine Nature Reserve as shown on Figure 5.1. Land based activities for the study in the assessment include all those associated with, or influenced by, the coastal and marine environment. In effect, this includes all land based activities, with the exception of most of the farming activity.

5.3 Main financial values of the study area

(In descending order of financial value)

5.3.1 Visitor Expenditure (Indirect)

Most visitors to the island spend money in the shop and bar on the M.S. Oldenburg (ferry), at the island shop, and in the island tavern. The combined average value of income over the past two years from these sales is approximately £350,000 per year.

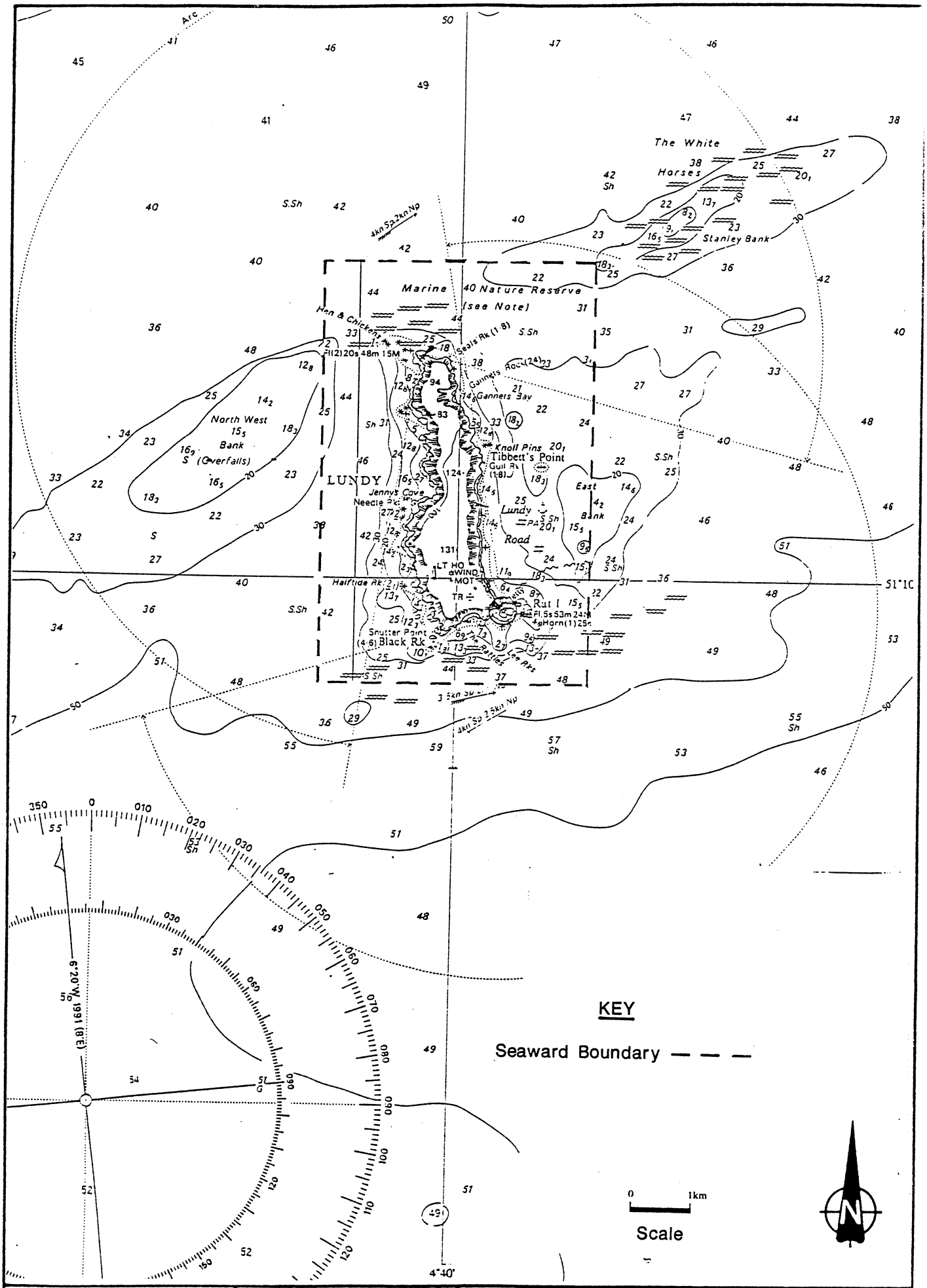
5.3.2 The Landmark Trust manage the 23 properties offering accommodation on the island. Income over the past two years has been just over £200,000 per year, which includes just over £10,000 per year for camping (Landmark Trust, 1995).

5.3.3 The indirect visitor expenditure for Lundy (for sales and accommodation) is therefore in the order of £550,000 per year. If direct recreational and visitor related transport expenditures are included, total visitor related expenditure comes to approximately £900,000.

5.3.4 There is further related expenditure on the mainland by the 18,500 visitors. A proportion of this can be said to be due to the existence of Lundy as a popular tourist attraction. No attempt has been made to value this.

5.3.5 Transport

The M.S. Oldenburg ferries most of the estimated 18,500 visitors each year from Bideford and Ilfracombe to the island. It carries up to 250 passengers and has a crew of 5 to 8. In 1994/95 the M.S. Oldenburg had an income of almost £300,000 from passenger fares (Landmark Trust, 1995).



PROJECT: VALUES OF IMPORTANT MARINE WILDLIFE SITES	TITLE: LUNDY	POSFORD DUVIVIER ENVIRONMENT	DATE FEB 1996 | SCALE DRAWN MJM | CHKD FIGURE 5.1

5.3.6 SCUBA Diving

Lundy is a relatively popular dive site. In addition to the dive boat operated by the Landmark Trust, there are several other dive operators who use Lundy as one of their diving sites. There are two main commercial operators, but several others have recently been established and are expanding. There is an estimated annual income of £2,500 from one operator (Private Operator, personal communication, 1996) and a share of the £3,500 to £7,000 income from chartering the Landmark Trust's own dory (small boat) for diving (see boat trips below). There is also a basic income of about £4,000 from divers filling air cylinders on the island. Total diving income may be in the order of £20,000 plus per year. In addition to this, numerous dive clubs use the site. Income would also accrue to mainland harbours from launch fees.

5.3.7 Boat Trips

Various pleasure boat trips operate around the island. The Landmark Trust runs a dory which has generated an annual income of between £3,500 to £7,000 (shared with diving) over the past two years. Other commercial operators based on the mainland also provide a pleasure boat service. One operator estimated an income of about £2,500 per year. The M.S. Oldenburg is also used as a charter boat for pleasure cruises, bringing in a revenue of approximately £15,000 per year. However, only a small proportion of this is related to trips around Lundy. Total income for pleasure boat trips could be in the order of £10,000 to £20,000 per year.

5.3.8 Angling

There is a limited amount of angling taking place around the island, with several boats operating from the mainland. One operator has an approximate annual income of £2,500 from angling. Total angling income could be in the order of say £10,000 per year.

5.3.9 Fisheries

There is a lack of quantified fishery information for the waters around Lundy. Five vessels are known to fish within the main reserve, however, they are based on the mainland and also fish elsewhere. No records are held of any catches. Due to the rocky nature of the seabed, the main techniques used are pots, fixed nets and fixed lines. Crabs and lobsters are likely to be the main catch, in particular on the west side of the island. According to the Devon Sea Fisheries Committee (DSFC), fishing intensity on the eastern side has been reduced as a result of the Marine Nature Reserve designation. DSFC are, over the next few years, endeavouring to obtain more detailed information on fisheries in the area. Based on the above information, the value of catches in the study area may be estimated to be in the order of say £10,000 per year.

5.3.10 Sailing

The number of yachts visiting Lundy are relatively small. There are no anchorage fees, although there are landing fees. Landing fees collected by the Landmark Trust over the past two years are on average £6,500 per year.

5.3.11 Snorkelling

There is a snorkel trail managed and led by the Landmark Trust warden. According to the warden, in 1995 there were approximately 200 people snorkelling the trail, which at £5 per head generated about £1,000.

5.3.12 Other Activities (see Table 4.2)

Other activities taking place on Lundy include general beach use, rambling, enjoying the wildlife and archaeology, rock climbing, education and scientific research. There is no obvious income directly arising from these. However, a significant amount of related indirect visitor expenditure will result from these activities.

5.4 Management costs incurred

5.4.1 Coastal related management costs are mainly incurred by the Landmark Trust, English Nature and Devon Sea Fisheries Committee. The island is managed by the Landmark Trust who employ a number of staff including a full time land agent and, particularly in relation to the Marine Nature Reserve and SSSI, a warden in association with English Nature and Devon Sea Fisheries Committees as appropriate. English Nature incur costs of approximately £24,000 for the warden's salary, plus a further £10,000 on average per year on maintenance and equipment such as boat and vehicles for use by the warden (English Nature, personal communication, 1995). Costs are also incurred by English Nature officers on the mainland for general administration and island management purposes.

5.4.2 The total annual turnover of the Landmark Trust at Lundy is in the order of £1 million. When all costs of sales, overheads and asset depreciation are accounted for, however, overall net margins for the past two years average out at about £20,000 per year (Landmark Trust, personal communication, 1995).

Section 6 Holy Island and the Farnes

6.1 Site description

6.1.1 Holy Island and the Farnes lie off the Northumberland coast, approximately 15km south of the Scottish border. The Farne Islands are a group of over 20 small islands and rocky outcrops situated south-east of Holy Island and between 2 and 6km offshore. The Farnes represent the only rocky island complex on the North Sea coast of England. Holy Island, a large inhabited island lies off the linear coast that stretches between Berwick-upon-Tweed and Bamburgh. It is cut off from the mainland at high tide and encloses extensive mud and sand flats within a well developed "barrier-built" type estuary. A map of the study area is shown in Figure 6.1.

6.2 Study area limits

6.2.1 The seaward and landward boundaries of the study area are shown on Figure 6.1. The landward boundary includes all coastal SSSI's. Land based activities for this study include all those associated with or influenced by the coastal and marine environment.

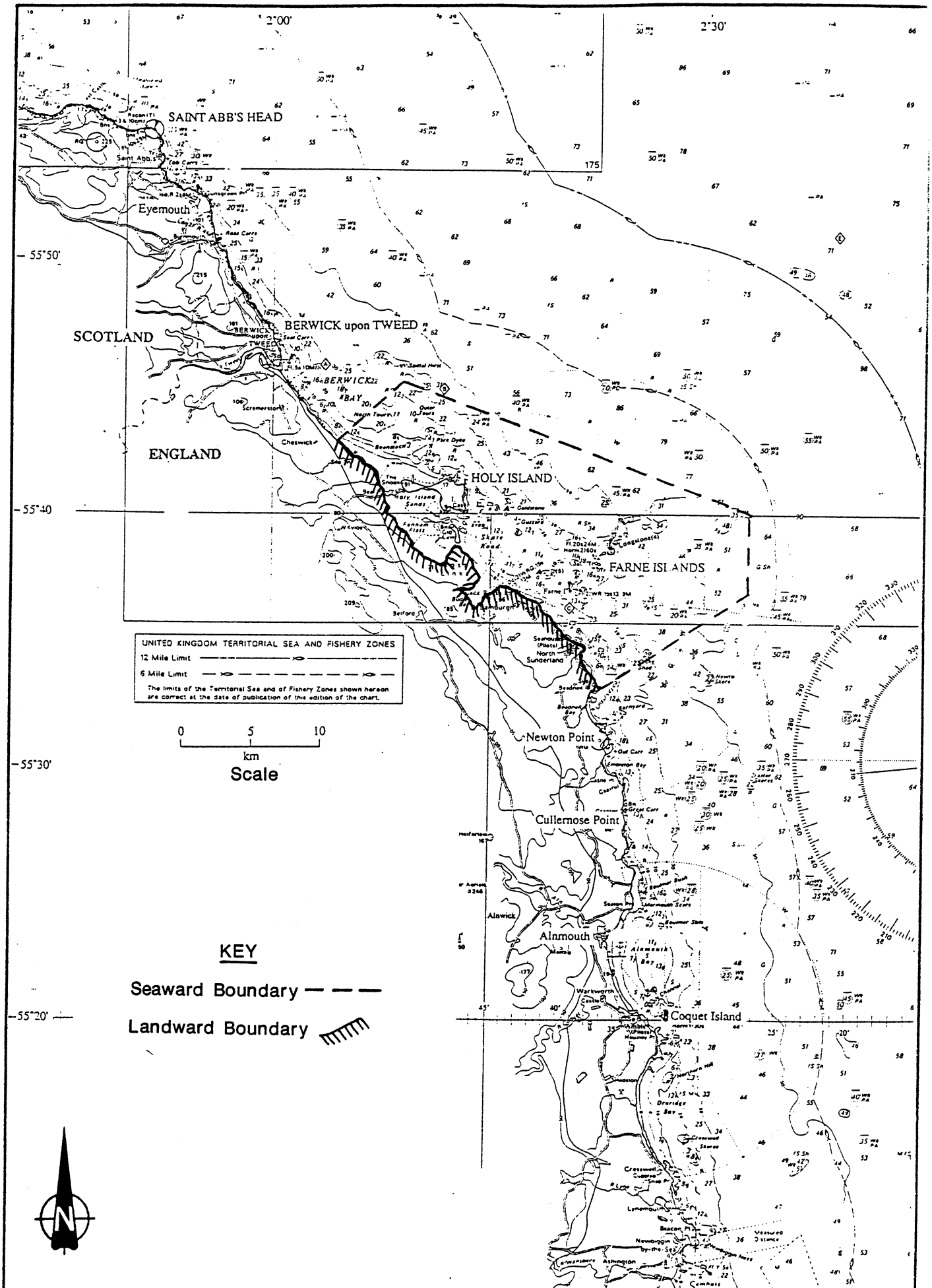
6.3 Main financial values of the study area

(In descending order of financial value)

6.3.1 **Visitor Expenditure** (indirect)

Estimated visitor numbers for many of the key attractions in the study area were provided by the Northumbria Tourist Board. They reveal that there are 75,000 visitors to Lindisfarne Priory each year. Based on car park surveys carried out by Berwick Borough Council, this figure is likely to be exceeded. Other visitor numbers to attractions include Seahouses Marine Life Centre (20,000), Farne Islands (40,000) and Bamburgh Castle (120,000). Assuming say 250,000 people visit the study area each year because of its coastal features and spend an average say £10 per day (excluding all direct recreational expenditure), a total of £2.5 million would be generated.

6.3.2 An alternative estimate can be determined based on the total estimated visitor expenditure of £101 million for the whole of Northumberland in 1994. Assuming say 2 to 10 percent of all visits are related to the coastal environment within the study area, total visitor expenditure could be anywhere between £2 million to £10 million per year. If direct recreational expenditure is excluded, this gives an estimate of £1.5 million to £9.5 million. These estimated visitor expenditure values are clearly very subjective.



PROJECT	TITLE		
VALUES OF IMPORTANT MARINE WILDLIFE SITES	HOLY ISLAND AND THE FARNES	POSFORD DUVIVIER ENVIRONMENT	DATE FEB 1996 SCALE As Shown DRAWN MJM CHKD FIGURE 6.1

6.3.3 Fisheries

MAFF statistics are available in the area for the three groupings of ports as shown below in Table 6.3. The combined landings of fish and shellfish have a value of almost £1.3 million. However, the location at which fish have been caught is not known, much of it probably being caught outside the study area.

Table 6.3 Value of Fish Landings in 1994[1]

Type of catch	Berwick, Holy Island and North Sunderland £	Seahouses £	Beadnell, Craster and Boulmer £	Total £
Crabs	9,000	28,000	17,000	54,000
Lobster	84,000	71,000	82,000	237,000
Nephrops	1,000	598,000		599,000
Other Shellfish[2]	-	4,000		4,000
Total Shellfish	94,000	701,000	99,000	894,000
Total Demersal Fish	10,000	363,000	1,000	374,000
TOTAL	104,000	1,064,000	100,000	1,268,000

[1] Source MAFF (1995)
[2] The other shellfish are primarily scallops.

6.3.4 Broad brush data provided by Holy Island Parish Council (personal communication, 1995) revealed that the five fishing boats operating from Holy Island had a combined annual income in 1995 in the order of £60,000. However, catches are extremely unpredictable year to year and potentially come from relatively far afield.

6.3.5 According to the harbour master at Seahouses, the total value of landings for 1995 was again about £1 million (see Table 6.3). In 1986/87, it was about £2 million.

6.3.6 Boat Trips

Various boat operators work from the mainland offering boat trips either to the Farne Islands or around the islands. Those that land on the island pay a landing fee. Total annual income generated from boat charges and landing fees amounts to almost £190,000 per year. This assumes 40,000 visitors at £5 per adult and £4 per child, and also assumes that a quarter of visitors are children. In addition, approximately the same number of boats sail from the mainland to and around the islands without landing. They generate in the order of £160,000, assuming 40,000 people at £4 per ticket. Total direct income from these boat trips is therefore in the order of £350,000 per year.

6.3.7 Wildfowling

Wildfowling takes place around the mudflats between Holy Island and the mainland. Total income in 1994/95 from permits and stamps came to almost £7,000. (Lindisfarne Wildfowlers Management Group, 1995).

6.3.8 Research

Research into the feeding and reproductive habits of waterfowl is being undertaken around Lindisfarne by Sunderland University. They have a £30,000 budget to be spent over a three year period. (Lindisfarne NNR Warden, personal communication, 1996).

6.3.9 Angling

There are 10 local angling clubs, each with about 40 members, that fish within the study area. Roughly 30 fishing charter boats operate from between Berwick and the Tyne to the study area. Charter boat fees vary from £200 to £300 per trip. Private launches are also made from along the coast, in particular from Seahouses and Beadnell. Direct revenue from angling could run into tens of thousands of pounds.

6.3.10 SCUBA Diving

SCUBA diving is very popular around the Farne Islands. Some income is generated at Seahouses, where there are launching fees for boats. The launch fee for a boat and two people is £6 for 24 hours, with an extra £2 per extra person. Of the £7,000 annual harbour fees at Seahouses, most of this is for dive boats. There are also launch fees which generate £11,000 per year at Beadnell, some of which may be related to dive boats visiting the study area (Berwick Borough Council, personal communication, 1996). Direct revenues from diving may be in the order of £10,000 plus.

6.3.11 Sailing

There is a small local boating community on Holy Island and a small, but significant, visiting population of yachts. During the summer there may be around twelve cruising yachts at anchor and 6 permanently moored yachts, together with a few dinghies and small powered craft.

6.3.12 There is an RYA affiliated club at Budle Bay which has 12 members. Yachts also use Seahouses harbour where there is the Marina Club (with 30 permanent boats) which pays a harbour ground rent of £500 per year. Visiting yachts contribute a little towards the £7,000 launch revenues at Seahouses. Part of the £11,000 launch fees generated at Beadnell may be attributed to sailing in the study area as well. Total direct income generated by sailing activities could be in the order of £10,000 per year.

6.3.13 **Other Activities** (see Table 4.2)

Numerous other activities such as sheep grazing, beach use, snorkelling, windsurfing, motorised water sport, bait digging, rambling, wildlife, archaeology and heritage, golf, cycling, limited port trading and education also take place. These activities do not generate much in terms of direct revenues related to the marine/coastal environment. However, some are likely to generate a considerable amount of income through related indirect visitor expenditure, in particular wildlife and rambling.

6.4 Management costs incurred

6.4.1 Coastal related management costs are incurred by a wide range of organisations which include Northumberland County Council, Berwick Borough Council, MAFF, the Northumberland Sea Fisheries Committee, the National Trust, the National Rivers Authority (NRA), English Nature and British Association for Shooting and Conservation (BASC).

6.4.2 Costs of around £45,000 per year are incurred by English Nature on the management of Lindisfarne NNR, with additional staff and administrative input from their local office (English Nature, personal communication, 1996).

6.4.3 Management costs for the Lindisfarne Wildfowlers Management Group come to almost £19,000 for 1994/95 (BASC, personal communication, 1996).

Section 7 Morecambe Bay

7.1 Site description

7.1.1 Morecambe Bay is a large embayment (45,462 ha) and an estuarine complex of 5 rivers. It includes a vast expanse of intertidal sandflats, large mussel beds on stony outcrops, sand and shingle around South Walney, and a large area of saltmarsh fringing the site, dissected by creeks and channels. The sand and mud banks are separated by shallow channels that feed into the steeply sided Lune Deep which drops to a depth of 82m. The coastal zone around the Bay supports many industries, large human settlements and much agricultural grazing land. A map of the study area is shown in Figure 7.1.

7.2 Study area limits

7.2.1 The seaward and landward boundaries of the study area are shown on Figure 7.1. The landward boundary effectively includes all coastal ecosystems and all coastal SSSIs. Land based activities for the study include all those occurring within the study area plus those associated with, or influenced by, the coastal and marine environment.

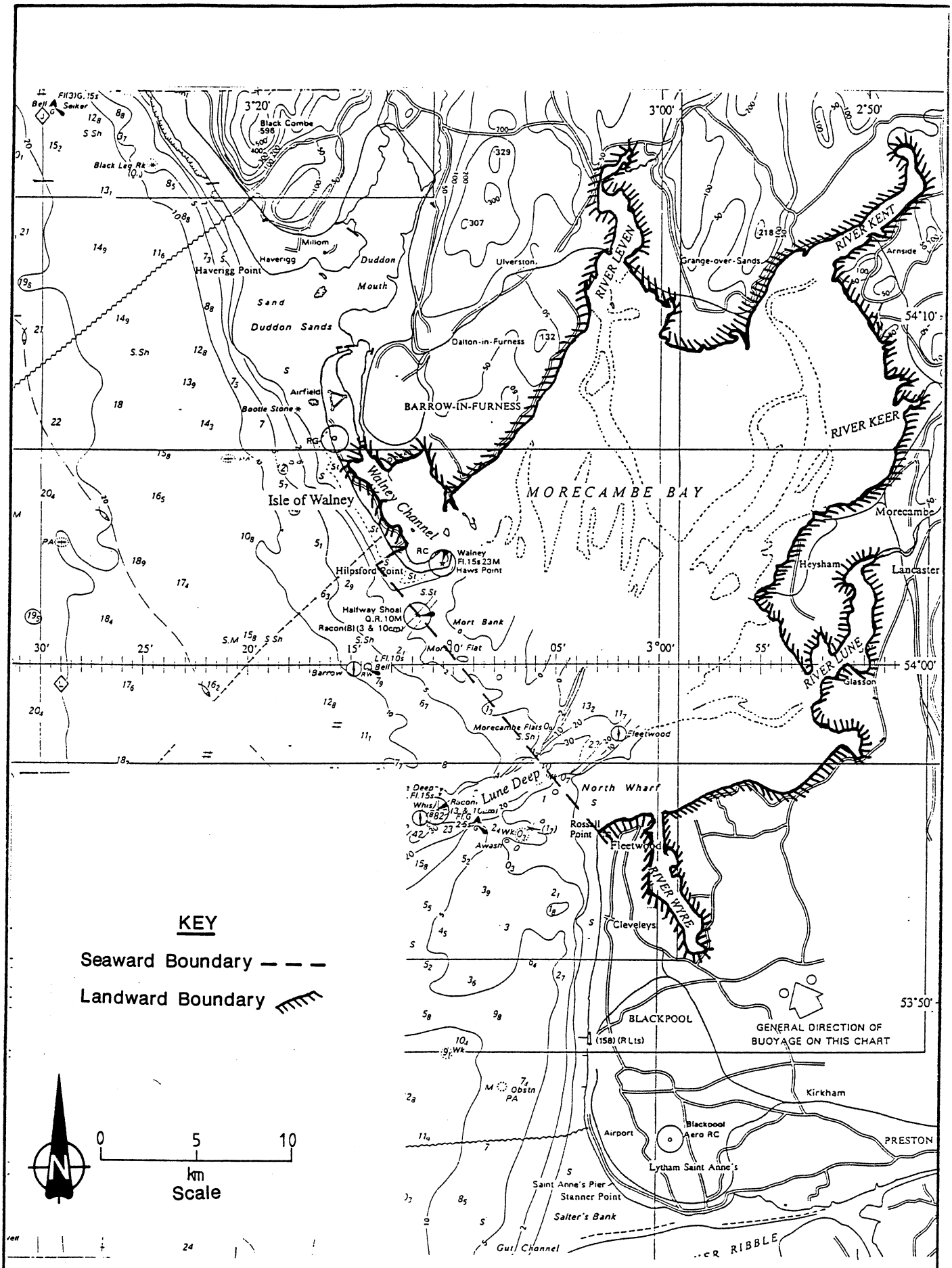
7.3 main financial values of the study area

(In descending order of financial value)

7.3.1 Industry and Energy

There are a huge number of industries, including those which are energy related, located around Morecambe Bay. Many of these are dependent in some form or other on the Bay itself. Such industries include a Nuclear Power Station at Heysham, gas fired power stations (eg. at Barrow), Vickers Shipyard in Barrow, ICI (making plastics) at Wyre, Glaxo at Ulverston and numerous small industries in Lancaster and Fleetwood.

7.3.2 These industries are dependent on the marine environment within Morecambe Bay to varying degrees. Some use the bay as a source of cooling water, releasing thermal discharges, others simply discharge waste effluents. Others such as the Vickers Shipyard are dependent on the Bay for its maritime location. The combined value of these industries is likely to run into several hundred millions of pounds in direct annual turnover, with several hundred thousand people being directly employed. In addition, the multiplier effect will be significant.



PROJECT	TITLE		
VALUES OF IMPORTANT MARINE WILDLIFE SITES	MORECAMBE BAY	POSFORD DUVIVIER ENVIRONMENT	DATE FEB 1996 · SCALE As Shown · DRAWN MJM · CHKD · FIGURE 7.1

7.3.3 Visitor Expenditure (Indirect)

Total visitor expenditure to Morecambe Bay as a result of the coastal environment could be in excess of £150 million per year (even excluding direct recreation expenditure). This is based on the estimated visitor expenditure in 1994/95 in Morecambe of £105 million and in Fleetwood of £52 million (P.A. Economic Consultants, 1995). The total estimate assumes that visits to Morecambe and Fleetwood may account for only say 65% of all visits to Morecambe Bay, and that between 50% to 75% of these visitors come because of the coastal environment.

7.3.4 Ports Trading

There are four ports within the study area. These include two managed by Associated British Ports at Fleetwood and Barrow, and two others at Heysham and Glasson. These ports provide valuable services in terms of transporting passengers and importing and exporting millions of tonnes of goods. Table 7.3a below shows the tonnage of all foreign and domestic traffic for 1994.

Table 7.3a Total Port Traffic for 1994

Port	Tonnes (000's)
Fleetwood (ABP)	1,198
Lancaster (Glasson)	148
Heysham	2,809
Barrow (ABP)	284

Source: Department of Transport, (1995).

7.3.5 Lancaster Port Commission at Glasson have annual revenues in the order of £400,000 per year (Lancaster Port Commission, personal communication, 1996). However, Glasson Grain Ltd., the main company operating from the port importing and exporting animal feed and fertilizer, have an annual turnover in excess of £20 million. Little financial information was made available by the other ports. Combined direct revenues are likely to be in the order of 10's of million of pounds per year.

7.3.6 Fisheries

The value of fish landings was provided by the North Western and North Wales Sea Fisheries Committee (NW & NWSFC) and MAFF for landing sites within Morecambe Bay. Total shellfish catches, as shown in Table 7.3b, total over £600,000 whilst for demersal fish the total is over £1.6 million. Together they give a combined value of almost £2.3 million. However, there is little information as to the proportion of these fish and shellfish caught within Morecambe Bay itself.

Table 7.3b Value of Fish Landings

Type of Catch	Fleetwood (1994) [1] £	Flookborough Coast Road and Barrow (1994) [1] £	Morecambe (1993) [2] £	Total £
Cockles	-	2,000	-	2,000
Mussels	-	312,000	125,000	437,000
Nephrops	91,000	18,000	-	109,000
Queens	6,000	-	-	6,000
Scallops	5,000	-	-	5,000
Shrimps/Prawn	-	28,000	11,000	39,000
Squid	29,000	-	-	29,000
Total Shellfish	131,000	360,000	136,000	627,000
Demersal fish	1,581,000	89,000	-	1,670,000
TOTAL	1,712,000	449,000	136,000	2,297,000

Source [1] MAFF (1995)
Source [2] NW & NWSFC (1994)

7.3.7 According to NW & NWSFC, the landing values shown above could be underestimated by as much as 50 percent due to non recorded landings.

7.3.8 There is also a salmon and sea trout fishery operating in Morecambe Bay. The average value of fish caught is £26,000 per year (NRA source: from English Nature, 1996).

7.3.9 NW & NWSFC (Personal Communication, 1996) have estimated that potential annual average fishable mussel stocks alone could be worth in the order of £30 million and potential average fishable cockle stocks £16 million. These figures assume an average price of £300 per tonne.

7.3.10 The existing oyster beds to the west of Foulney Island have a potential annual harvestable value of £2 million. This assumes a stock of 30 million with a three year life and landing value of £0.20 each (NW & NWSFC, personal communication, 1996).

7.3.11 Wildlife

There are ten main coastal wildlife reserves in the study area. Details of ownership/management and estimated visitor numbers are given in Table 7.3c below. Together they generate an income of approximately £330,000. This total is made up from visitor changes, sales, rent, grants and sponsorship. Income from the RSPB sites make up almost two thirds of the income.

Table 7.3c Details of Wildlife Reserves with Morecambe Bay Study Area

Reserve	Organisation	Approximate Visitor Numbers
Foulney Island Nature Reserve	Cumbria Wildlife Trust	1,180 (April-July 1995)
Humphrey Head Nature Reserve	Cumbria Wildlife Trust	Not known
South Walney Nature Reserve	Cumbria Wildlife Trust	4,475 (1995)
Warton Craig Barnaby Sands Burrows Marsh Heytham Nature Reserve Rossare Point	Lancashire Wildlife Trust	Not known
Lieghton Moss Morecambe Bay Reserve	RSPB	75 - 80,000 per year

Sources: Cumbria Wildlife Trust, personal communication, 1996
Lancashire Wildlife Trust, personal communication, 1996
RSPB, personal communication, 1996

7.3.12 Agriculture

There are 3,253 ha of saltmarsh on the fringes of Morecambe Bay. Much of this is grazed, with the notable exception of Barnaby Sands and Barrows Marsh (67 ha) on the Wyre Estuary. Assuming that grazing is of relatively low output for both cattle and sheep, gross margins (sales less variable costs) could be in the order of £275,000. This is based on average sheep and cattle grazing gross margins of £337.50/ha (Nix, 1995) reduced by half to allow for saltmarshes being less productive, and by half again for the area of saltmarsh grazed.

7.3.13 Sailing

Most yachting and sailing activity in Morecambe Bay is local, with visiting boats mainly from the Lancashire and Cumbria coast. There are five RYA affiliated clubs in the Bay, with over 600 members. There are various mooring areas within the study area, including two substantial marinas, located at Glasson Dock (200 plus yachts use the marina each year) and Fleetwood (300 berths). Although no financial data was collected from sailing clubs or marinas, direct revenues may be in the order of tens or even hundreds of thousands of pounds per year from mooring fees and club membership.

7.3.14 Wildfowling

There are five BASC associated wildfowling clubs in the Morecambe Bay study area, with a total of around 360 members. Given average annual subscriptions of about £70 (BASC, personal communication, 1996) total subscriptions come to an estimated £25,200 per year.

7.3.15 Education

The Knott End Sea Centre operates in and around the Wyre Estuary. It is involved in educating students and visitors about marine ecology, but also carries out sailing and powerboating activities. The centre is subsidized, but generates an income in the order of £40,000 per year.

7.3.16 Angling

Information available on angling in the study area was somewhat limited. However, given that 4 to 5 commercial angling boats operate from Fleetwood, each with a possible income of around £10,000 per year, based on 75 trips per year at £120 per trip (North West Federation of Sea Anglers, personal communication, 1996) it is likely that total direct income from commercial angling in the whole Bay may be in the order of £50,000 to £100,000 per year.

7.3.17 In addition, there are many anglers who fish from the shore and along the rivers. There are probably several thousand anglers on the River Lune alone. Radford (1984) estimated the value of the Lune salmon rod fishing to the local economy (ie. including indirect visitor expenditure) to be approximately £2.4m per year. Adjusted for inflation this may now be in excess of £4m per year.

7.3.18 Other Activities (see Table 4.2)

There are numerous other coastal related activities taking place in Morecambe Bay, but with less direct financial revenues generate than the above detailed activities. These include agricultural cropping of *Salicornia* and turf, aggregates, recreational activities such as beach use, SCUBA diving, pleasure boat trips, windsurfing, motorised water sports, bait digging, rambling, archaeology and heritage (eg. Fleetwood museum), golf, cycling, caravanning and camping, and aerial sports such as microlighting and parachuting. In addition there is much waste discharge, transport (eg. rail lines and roads) and a great deal of research (eg. by Lancaster University). It is important to note that many of these will generate a considerable amount of revenue through related indirect visitor expenditure.

7.4 Management costs incurred

7.4.1 Coastal related management costs are incurred by a wide range of organisations. For example, the North Western and North Wales Sea Fisheries Committee incur management costs of roughly £100,000 - £120,000 per year in the area. The NRA and MAFF will also incur management costs

relating to fisheries and coastal defence. English Nature incur various costs relating to managing the environmental aspects of the Bay. Costs for managing the various wildlife sites run into several hundred thousand pounds, (Cumbria Wildlife Trust, Lancashire Wildlife Trust and RSPB, personal communication, 1996).

7.4.2 Each local authority around the Bay will have a budget for managing the coastal environment and visitor related facilities. For example, Morecambe City Council (personal communication, 1995) have a total annual budget of £280,000 (1994/95) to manage the promenade, foreshore, lifeguards, promenade gardens, shelter, park, etc.

Section 8 North Norfolk coast

8.1 Site description

8.1.1 This is one of the finest natural coastlines in the British Isles and is one of the few examples of a barrier coast in Europe. It comprises a complex of saltmarshes, generally but not always developing behind sand dunes and shingle structures with extensive areas of intertidal sand and mudflats. Scolt Head Island and Blakeney Point are particularly notable features. About 50% of the saltmarsh had been reclaimed in the eighteenth and nineteenth centuries and is now mostly grazing marsh, with some arable and also areas of reed bed. The area extends for a distance of about 35km and in a belt often 2km wide. The total extent of saltmarsh exceeds 3000 ha. In addition there are approximately 6000 ha of intertidal mud and sand flats and more than 1500 ha of reclaimed grazing marsh. A map of the study area is shown in Figure 8.1.

8.2 Study area limits

8.2.1 The seaward and landward boundaries for the study area are shown on Figure 8.1. The landward boundary includes all coastal SSSIs. Land based activities for the study include all those occurring within the study area, plus those associated with or influenced by the coastal and marine environment.

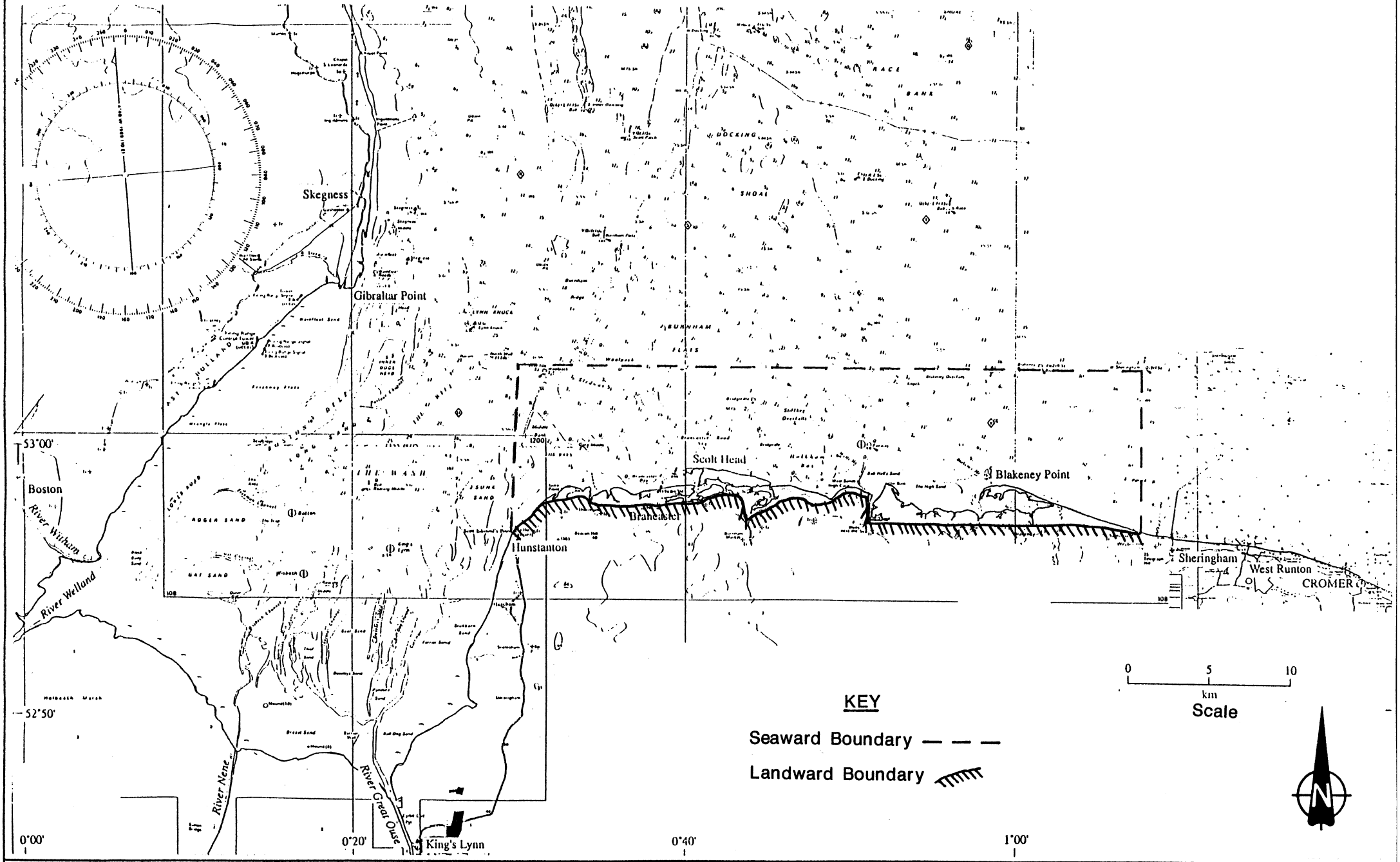
8.3 Main financial value of the study area

(In descending order of financial value)

8.3.1 Visitor Expenditure

Domestic and overseas tourists spent approximately £537m in the whole of Norfolk in 1994 (East Anglia Tourist Board, 1995). This study has assumed that between 1% and 5% of all Norfolk's visitor expenditure is related in some way to people visiting the North Norfolk coastline to carry out coastal related activities. This is not unreasonable given that the study area coastline comprises approximately 33% of Norfolk's whole coastline. The estimated total visitor expenditure for this section of coastline is therefore estimated at between £5 million and £27 million per year. These estimates would include direct visitor expenditure, roughly in the order of £0.5 million.

8.3.2 Various visitor surveys have been carried out for the North Norfolk coastline (Norfolk Coast Project, 1993 and West Norfolk District Council, 1990) establishing the importance of the coastal environment to the visitors and their average expenditure (averaging £8.61 per head per day). However, the questions asked in these studies do not assist in determining total visitor numbers to the coast.



Project: VALUES OF IMPORTANT MARINE WILDLIFE SITES	Title: NORTH NORFOLK COAST	POSFORD DUVIVIER ENVIRONMENT, Head Office PETERBOROUGH	Date FEB 96 · Scale As Shown · Drawn MJM · Chkd. · Drg. FIGURE 8.1

8.3.3 Fisheries

The Eastern Sea Fisheries Joint Committee (ESFJC) provided information on shellfish landings in the harbours within the study area. Reported catches of shellfish landed at Brancaster, Wells and Blakeney for 1994 came to £925,000, as shown in Table 8.3a below.

Table 8.3a Value of Fish Landings in 1994

Type of Catch	Combined locations (1 & 2) £
Mussels	81,000
Oysters	11,500
Shrimp	23,500
Crab	591,000
Lobster	139,000
Whelk	71,000
Cockles	8,000
Total Shellfish (1) (3)	**925,000**
Total Demersal fish (2)	**37,000**
TOTAL	**962,000**

(1) Shellfish figures are for landings at Brancaster, Wells, Blakeney, Thornham, Titchwell, the Burnhams, Stifkey and Moreston (ESFJC, 1994).

(2) Landings of demersal fish are for Brancaster, Staithe and Wells (MAFF, 1995).

(3) Values for aquaculture are included with the shellfish data.

8.3.4 The value of recorded fish catches from set nets along this stretch of coast was £9,000 in 1994. This included landings of bass, mullet and flat fish (ESFJC, 1994). Landings of demersal fish at Brancaster, Staithe and Wells had a value of £37,000 in 1994 (MAFF, 1995). The total combined recorded landings of finfish and shellfish in the study area for 1994 was over £960,000.

8.3.5 Golf

Total income generated by two coast related golf clubs in the study area come to in excess of £600,000 per year.

8.3.6 The Royal West Norfolk Golf Club is situated on converted marshland. The club employs around 12 staff and generates income of approximately £70,000 per year from visitor green fees, and a further £200,000 per year from members subscriptions. Other income is generated from the bar and from catering, and there is an undisclosed income from the golf shop. Income from the car park (£30,000-40,000/year) is shared with the National Trust and Parish Council, part of which is included in wildlife and visitor expenditure. The Club is effectively a non-commercial facility for locals and

visitors, and gives rise to significant amounts of indirect expenditure in the local economy (Secretary of the Royal West Norfolk Golf Club, personal communication, 1996).

8.3.7 Total income for Hunstanton Golf Course was almost £320,000 for 1994. This comprises £281,000 golf related plus £38,000 of other income (eg. bar related) (Hunstanton Golf Club, 1995).

8.3.8 Wildlife

There are seven main wildlife reserves in the study area. Details of each one, including ownerships and estimated visitor numbers are given in Table 8.3b below. Together they generate an income of approximately £260,000. This total includes any shares of car park income, profits (not turnover) from sales at visitor centres, permits/entrance fees where applicable and farm rents where applicable. It also includes some income from filming and memberships sold at RSPB and NWT reserves.

Table 8.3b Details of Wildlife Reserves Within North Norfolk Study Area[1]

Reserve	Organisation	Approximate Visitor Numbers
Holkham NNR	English Nature	500,000 (includes visitors to Wells & Holkham beaches)
Scolt Head Island NNR	English Nature (but owned by National Trust)	6,000 (70% by boat)
Brancaster	National Trust	200,000 (includes beach, quay and harbour visitors)
Blakeney Area properties (Blakeney Point NNR, Stiffkey, Morston & Blakeney Freshes)	National Trust	60,000 Blakeney Point 6,000 Stiffkey Marshes[2]
Cley Marshes Reserve	Norfolk Wildlife Trust	90,000 (includes 40,000 reserve visitors)
Holme Dunes NNR	Norfolk Wildlife Trust	100,000 (includes beach visitors)
Titchwell Marsh Reserve	RSPB	105,000

(1) Source: Norfolk Coastal Group, personal communication, 1996.
(2) Source: English Nature, personal communication, 1996.

8.3.9 Agriculture

There are some 2,130 ha of saltmarsh within the study area. Much of this is grazed to a limited extent, primarily by cattle. Assuming half of this was grazed by single suckling cattle, and assuming half the average yield stated in Nix (1995), a gross margin value (sales less variable costs) of around £250,000 could be expected.

8.3.10 **Boat Trips**

Ferries operate from Blakeney and Morston, taking visitors to Blakeney Point where common seals congregate. Total revenues may be in the order of £150,000 per year, which was determined (following discussions with the North Norfolk Coast Project), by assuming 45-50,000 passengers per year, adult and child fares of £3.50 and £2.50 respectively, and a ratio of adults to children of 2:1.

8.3.11 **Wildfowling**

These are three BASC associated wildfowling clubs with total membership of around 385. Given an average cost of subscription of £70 per year, total subscription revenue amounts to almost £27,000 per year.

8.3.12 **Sailing**

The physical coastal characteristics of the North Norfolk coast make it a popular area for the local use of (mostly small) boats. The difficult tidal and harbour entrance conditions make it less attractive as a visitor destination for yachts. There are over 1,700 members of the five Royal Yachting Association affiliated clubs in the study area.

8.3.13 Blakeney Harbour area has in the region of 1,250 to 1,500 non commercial craft using the water at the height of the season (RYA, personal communication, 1995). However, there are no charges for boats in Blakeney Harbour. Burham Ovary has an income from boating of around £2,000 per year (Harbour Master, personal communication, 1996). Wells Harbour have boating charges, but no information was made available. Total direct sailing revenues may be in the order of £10,000 plus per year.

8.3.14 **Other Activities** (see Table 4.2)

There are numerous other activities which take place in the study area. These include cropping of reeds, beach use, windsurfing, motorised water sports, angling, bait digging, rambling, archaeology and heritage, cycling, limited port trading, energy (eg. searching for oil), industry (eg. boat builders) military (eg. aircraft flying over) and much research and education. Many of these may contribute significantly towards indirect visitor expenditure.

8.4 Management costs incurred

8.4.1 A wide range of organisations incur coastal related management costs in the North Norfolk study site. These include North Norfolk District Council, Kings Lynn and West Norfolk Borough Council, Norfolk County Council, English Nature, the Countryside Commission, MAFF, NRA, RSPB, National Trust, Norfolk Wildlife Trust, BASC, the Eastern Sea Fisheries Joint Committee and several other fishery and shellfishery organisations.

8.4.2 Excluding the Norfolk Wildlife Trust and RSPB sites, direct management costs of £280,000 are incurred (1994-95) for the wildlife sites. These costs cover staffing, management and maintenance etc. but not capital works. In 1994, the Eastern Sea Fisheries Joint Committee had a total expenditure of £690,000 for the whole of their area, of which £280,000 was provided by Norfolk County Council (ESFJC, 1995). A certain proportion of this will be related to the North Norfolk Coast.

Section 9 Isles of Scilly

9.1 Site description

9.1.1 The Isles of Scilly are an oceanic archipelago of granite lying 40km south-west of Land's End. The coastline has a length exceeding 110km. The predominant sediment around and between the islands is medium to coarse sand. There are also areas of rock and boulders. The islands are subject to a wide range of conditions from very exposed to sheltered between the islands. Five of the islands are inhabited, with a total resident population of a couple of thousand people. A map of the study area is shown in Figure 9.1.

9.2 Study area limits

9.2.1 The seaward boundary is as shown on Figure 9.1. Land based activities for this study include all those associated with, or influenced by, the coastal and marine environment.

9.3 Main financial values of the study area

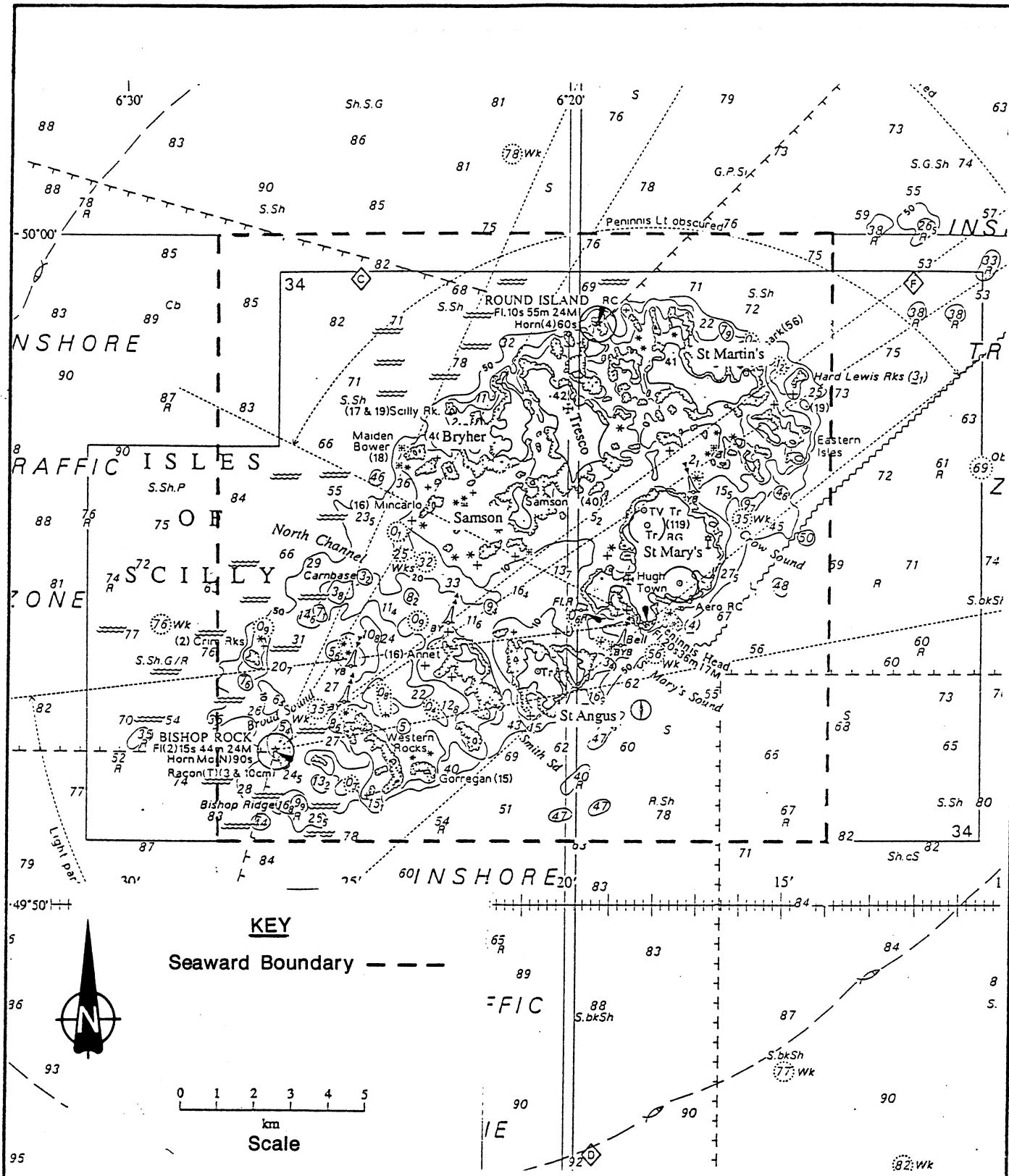
(In descending order of financial value)

9.3.1 Visitor Expenditure

Tourism is the dominant economic sector in the Isles of Scilly, employing approximately 85% of the economically active population, either directly or indirectly (Atlantic Consultants, 1995). In 1990, tourism was estimated to earn gross revenues of £30 million per annum (Council of the Isles of Scilly, 1991). Adjusted to take into account inflation, using retail price indices, this would now be in the order of £37.5 million for 1995.

9.3.2 A visitor survey was carried out in 1994 by the Council of Isles of Scilly. Of interest to this study are the main "likes" expressed by visitors, which included 63% for peace/quiet/tranquillity, 45% for beauty/scenery, 20% for boating and 11% for wildlife/nature. Without specific questions relating to the coastal environment, it is difficult to determine what proportion of visits are related to this factor. However, given that the coastal environment encapsulates all of the aforementioned categories, that the islands are essentially coastal by nature, and based on discussions with the Council Tourism and Development Officer, it can be assumed that roughly 80-90 percent of all visitor expenditure is related to the coastal environment. This gives an estimated coastal related visitor expenditure of £26 to £29 million per year. With all direct recreation and transport (of visitors) expenditure taken out, these figures are reduced to about £19 to £22 million.

9.3.3 Some expenditure incurred on the mainland by visitors, either prior or subsequent to their visit to the Isles of Scilly, will be related to their trip to the Isles. In theory, therefore, a proportion of this could be deemed to accrue as a result of the coastal environment on the Isles of Scilly. This additional benefit has not been estimated.



PROJECT	TITLE		
VALUES OF IMPORTANT MARINE WILDLIFE SITES	ISLES OF SCILLY	POSFORD DUVIVIER ENVIRONMENT	DATE FEB 1996 SCALE As Shown DRAWN MJM CHKD FIGURE 9.1

9.3.4 Transport

Total expenditure on travel to and from the islands can be estimated based on up-to- date numbers of passengers and current fares. Using data provided by the Tourism and Development Department of the Isles of Scilly Council, the estimated 1995 revenues from all visitors was about £6.5 million. This comprised around £2 million for day trips and £4.5 million for staying visitors. These figures are based on the assumed ratio of adults to children of 2:1.

9.3.5 Fisheries

The fishing industry in the Isles of Scilly is predominantly small scale and involves potting, netting and trawling. There are 32 registered fishing boats and about 50 full and part time fishermen, although the numbers employed are somewhat higher in the summer.

9.3.6 As shown in Table 9.3 below, the total value of all recorded landings of shellfish and finfish in 1994 was almost £0.5 million. This comprises shellfish worth £293,000 and demersal fish worth £172,000. The actual locations where these shellfish and fish were taken from is not recorded and could therefore be from far afield.

Table 9.3 Values of Fish Landings in 1994 (1)

Type of Catch	Isles of Scilly £
Crabs Lobster Other shellfish(2)	79,000 77,000 137,000
Total shellfish	293,000
Total Demersal fish	172,000
TOTAL	465,000

(1) Source: MAFF statistics according to Atlantic Consultants (1995).
(2) Mainly crawfish

9.3.7 Boat Trips

Inter island launches are operated by about 20 passenger boats. These act not only as ferries between the islands, but also as sightseeing trips, especially to see seals. They cater for all visitors to the islands. Numbers of visitors average around 110,000 per year. Given an average fare of £3.70 (Tourism and Development Department, personal communication, 1995) and assuming that say between 50-75% of visitors take at least one trip, total revenues could be in the order of £200,000-£300,000.

9.3.8 SCUBA Diving

There are three diving businesses on the islands and at least six charter boats from the mainland that make visits. In addition there are numerous clubs and individuals which bring their own boats and diving equipment over from the mainland. The 1994/95 revenue from one of the diving business located in the Isles of Scilly was approximately £20,000. Total revenues could be in the order of £50,000 - £100,000. Much of the diving occurs around, rather than within, the seaward boundary indicated.

9.3.9 Sailing

There are few resident yachts due to the lack of any natural or built harbours on the island archipelago which are safe in all weathers. However, the Isles of Scilly are a relatively popular destination for visiting yachts, with numerous anchorages and sailing and boating clubs on St. Mary's. There are in the order of 2000 visiting yachts per year (Acting Harbour Master, personal communication, 1995). Given an average daily visitor fee of £7, and assuming that some yachts stay longer than one day, there could be an income of tens of thousands of pounds per year.

9.3.10 Other Activities (see Table 4.2)

In addition to the above activity, numerous other marine/coastal activities take place but generate less in the way of direct revenues. These include aggregate extraction (at Bar Point, St. Mary's), beach use, snorkelling, windsurfing, motorised water sports, rambling, wildlife, archaeology and heritage, golf, cycling, port trading, waste discharge, research and education. Many of these activities will generate revenues from indirect visitor expenditure. This is particularly the case for rambling and wildlife. In October each year, for example, hundreds of visitors arrive purely to see the influx of migrating birds.

9.4 Management costs incurred

9.4.1 Various coastal related management costs are incurred by the Isles of Scilly Environmental Trust, English Nature, the Council for the Isles of Scilly, the Duchy of Cornwall etc. For example, the Isles of Scilly Environmental Trust incur operational costs of around £50,000 per year, up to £20,000 of which is funded by English Nature (Isle of Scilly Environmental Trust, personal communication, 1996).

Section 10 Conclusions

10.1 Introduction

10.1.1 There is now increased interest in assessing the financial and economic value of the environment. This interest has been encouraged by the Earth Summit (1992) which promotes greater integration of economics and the environment to achieve sustainable development.

10.2 Summary of financial values

10.2.1 This study has revealed that there are a wide range of different marine/coastal related activities taking place in the five selected study areas. Many of these activities have significant financial values associated with them. Table 10.2 overleaf summarises the financial values for each of the main categories of use for each site. As can be seen from the table, the values vary considerably from site to site.

10.2.2 The summary table reveals the relative importance of the fishery and recreation sectors. These bring in significant contributions to the local and regional economies at all sites. It is important to recognise the dependence of these activities on the quality of the environment, and to encourage continued/improved management of all activities at such coastal sites.

10.2.3 Lundy is the smallest site, and accordingly generates less revenues than the other sites. The vast majority of revenues accrue as a result of recreational activities such as rambling, wildlife related activities, diving, pleasure boats, angling, sailing and visitor transport. These are all largely dependent on the quality of the environment.

10.2.4 Holy Island and the Farnes site significantly generates direct expenditure, much of which relate to boat trips to see the Farne Islands and seals. Visitor related expenditure is by far the greatest revenue carrier, although fisheries are also important.

10.2.5 Morecambe Bay generates by far the most revenue from coastal related activities. Not only are recreational activities important (especially sailing, angling and wildlife related) but also fisheries, agriculture, port and industrial activity.

10.2.6 Of all the study sites, direct recreation expenditure is the highest at North Norfolk Coast. Over half of this is golf related. Visitor expenditure is the most important source of revenues, although both fisheries and agriculture are also important.

10.2.7 Coastal related revenues for the Isle of Scilly are dominated by that accruing from visitors, with a significant amount (>25%) related to transporting visitors to and from the islands. Fisheries provide a further but significantly smaller source of income.

Table 10.2 Summary of Main Financial Values Accruing at Each Study Site[1]

Sector		Lundy £/year	Holy and Farnes £/year	Morecambe Bay £/year	North Norfolk £/year	Isles of Scilly £/year
Visitor Related Expenditure	Direct Recreation[2]	>50,000	>400,000	>400,000	>1m	>300,000
	..... Visitor Expenditure[3] (Indirect)	>550,000	>1.5-9.5m	>150m	>5m-27m	>19m-22m
	Transport[4] (Visitor related)	300,000	-	unknown	-	6.5m
Total Visitor Expenditure[5]		**>900,000**	**>2m-10m**	**>150m**	**>6m-27m**	**>26m-29m**
Fisheries		**10,000[6]**	**1.3m[7]**	**2.3m[7]**	**962,000[7]**	**465,000[7]**
Agriculture[8]		**-**	**-**	**275,000**	**250,000**	**-**
Ports[9]		**-**	**some**	**>10m**	**some**	**some**
Energy/Industry[10]		**-**	**-**	**>100m**	**some**	**-**

(1) Values are all broad-brush and are for 1995 unless stated otherwise.
(2) Values include direct expenditure on all recreational activities (including SCUBA diving, sailing, angling, wildlife related etc.).
(3) Values are indirect expenditure, including food and accommodation, but excluding all visitor travel (see note 3) and excluding all direct recreational expenditure.
(4) Visitor related transport to reach the destination, but only from the mainland to the islands in question.
(5) The sum total of direct recreation expenditure[2], indirect visitor expenditure[3] and visitor related transport[4].
(6) Estimate based on little information.
(7) Values are for 1993 or 1994 and are simply values of landed catches recorded at sites within or near the study areas.
(8) Values are gross margins (sales less variable costs).
(9) Direct port revenues from handling cargo etc.
(10) Revenue accruing to industries dependent on the coastal site.

10.3 Limitations of the results

10.3.1 Although this study set out only to obtain broad-brush values, it is acknowledged that there are still various limitations to the data presented in this report. In particular, these relate to the accuracy and completeness of the results. The limitations have arisen for a number of reasons, many of which were anticipated at the start of the study. They include:-

- The wide range of activities taking place in the coastal zone at each site, and the relatively short period of time available to conduct this desk study.
- The relatively short length of time available for consultees to gather information.
- The lack of readily available information on values for different activities, particularly on a site specific basis.
- The time consuming nature of gathering relevant financial related information from so many organisations.
- The difficulty in obtaining sensitive financial information from organizations for potentially public disclosure.
- The complex nature of the different financial values generated by human activities. For example, there are not only direct revenues generated, but various other related indirect expenditures such as equipment, clothing, food, accommodation and transport.

10.3.2 Despite these limitations, the results presented are nevertheless of use in providing a broad overview of the financial values relating to activities in the coastal environment.

10.4 Other financial values

10.4.1 In addition to the direct financial revenues reported in this study, there are various other financial benefits accruing as a result of activities taking place at each site. These include other indirect but related expenditure, and further financial benefits accruing to the economy through the "multiplier effect".

10.5 Economic values

10.5.1 In addition to financial values, this study recognises the presence of other marine/coastal related economic values accruing to each study site. These values are generally measured in terms of individual's willingness to pay, and are not generally traded in the market place. However, they may give rise to potentially significant benefits. They accrue from indirect uses, such as coastal protection and biological support, and from non-use values such as "option values" and "existence values".

10.5.2 It was also recognised that many coastal activities have associated environmental costs. It was not within the brief of this study to identify or measure any of these other economic values or environmental costs.

10.6 Benefits of economic valuation for coastal management

10.6.1 As detailed in Section 2.5, and repeated here, identifying and evaluating financial and economic values of the environment can greatly assist in the management of coastal zone resources and activities. Some of the main reasons include:-

- To improve decision-making. By revealing the true value of environmental activities and impacts in terms that decision-makers can relate to (ie, monetary terms), better decisions can be made regarding the allocation of resources.

- To assist in achieving sustainable development. Only by appreciating the true value of the use of resources, both now and in the future, is it possible to maximise net benefits accruing to society and achieve sustainable development (see Appendix 2).

- To encourage initiatives to maintain the quality of the coastal environment. Activities such as fisheries and certain recreational activities (in particular angling, wildlife related activities and SCUBA diving), are dependent on the continued quality of the environment. By maintaining the quality of the environment, these income generating activities can be continued.

- To promote the importance of the marine/coastal environment. Establishing and highlighting monetary values for the environment should engender greater respect from coastal users and regulators.

- To justify greater expenditure on managing coastal resources. If the true value of the environment is established, there will be greater justification for more appropriate levels of expenditure to manage the environment and its resources.

- To assist in natural resource damage assessments. If the value of the environment is better understood, compensation claims for damages to the environment (eg. from oil spills) can be more appropriately and comprehensively assessed.

- To assist in developing market-based instruments. A better knowledge of the value of the environment and values of environmental costs is required to make better use of market-based instruments (such as user and waste emission charges) to help manage environmental resources (see Appendix 2).

- To assist in the development of environmental accounts. Again, to help achieve sustainability, the creation of a systematic means of accounting for natural resources is being widely advocated (see Appendix 2).

Section 11 Recommendations

11.1 Further studies

11.1.1 The following further studies could provide useful information to help obtain a more detailed overall appreciation of the total financial and economic value of coastal sites, and could help to achive sustainable management and development of coastal resources:-

- Further consultation, based on that undertaken for this study, to obtain a more complete and accurate picture of the financial values described in this report.
- Studies to identify and obtain order of magnitude valuations of important economic values accruing from indirect uses and non-use values. In particular, use should be made of carefully designed and implemented contingent valuation studies for valuing the economic value of non-marketed recreational activities and non-use benefits.
- Studies into the additional financial benefits accruing from coastal activities to local, regional and national economies from the multiplier effect.
- Studies into visitor expenditure related to recreational benefits. Whilst various visitor surveys have been carried out at the coastal sites, insufficient information was generally obtained to help determine the specific value of coastal related visitor expenditure.
- Studies into the economic impact of environmental damages caused by various coastal activities.
- Studies into the potential use of market-based instruments and environmental accounts to help achieve the sustainable use of coastal resources.

11.2 Collection of information

11.2.1 The collection of existing financial data could be improved, but may be difficult and contentious in some sectors. Examples of what could be done in this respect include:-

- Encourage improved and more comprehensive methods of recording of financial data and statistics relating to different coastal activities, in particular on a more site specific basis.
- Encourage further surveys by organisations, clubs and students to collate more user statistics.

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Appendix 1

Coastal activity questionnaire

This questionnaire was used to help elicit relevant financial information for this study.

VALUES OF IMPORTANT MARINE WILDLIFE AREAS IN THE ENGLAND

REPLY FORM REGARDING THE VALUE OF ACTIVITIES

ORGANISATION (ADDRESS):

ACTIVITY:

DESCRIPTION OF ACTIVITY:

Please include details on where the activity takes place, both within the study area and in the surrounding vicinity, using the map provided.

FINANCIAL INFORMATION:

Please include details if appropriate on:-

Revenues - annual income generated, eg total sales, subscriptions etc.

Expenditure - relevant annual fees/royalties etc.

- approximate annual fixed and variable costs for obtaining output.
- approximate annual management costs, both capital and operating costs.

Please supply any relevant recent annual reports/accounts etc.

OTHER RELEVANT QUANTITATIVE INFORMATION REGARDING THE ACTIVITY:

For example, numbers of people/craft carrying out the activity, estimated outputs (eg. tonnes of fish per year) etc.

RELIANCE OF ACTIVITY ON THE MARINE/COASTAL ENVIRONMENT WITHIN THE STUDY AREA:

Is the activity detailed above totally dependent on the marine/coastal habitat, or only partially? Does the data relate to just the study area, or to a much wider area?

Appendix 2

Environmental economics and the earth summit

To help achieve the concept of sustainable development, Chapter 8 of Agenda 21 of the United Nations Conference on Environment and Development (Earth Summit, 1992) calls upon countries to undertake activities to meet three fundamental objectives. These activities relate to increased use of environmental valuation. The objectives are as follows:-

> *"To incorporate environmental costs in the decisions of producers and consumers, to reverse the tendency to treat the environment as a "free good", and to pass these costs on to other parts of society, other countries, or future generations."*
>
> *"To move more fully toward integration of social and environmental costs into economic activities, so that prices will appropriately reflect the relative scarcity and total value of resources and contribute toward the prevention of environmental degradation."*
>
> *"To include, whenever appropriate, the use of market principles in the framing of economic instruments and policies to pursue sustainable development."*

There are also various references in Chapter 17 of the Earth Summit (1992) which relate specifically to the protection of coastal areas through use of economic factors, natural resource accounting and developing economic incentives.

The UK Government strategy for sustainable development (HMSO, 1994) responds positively to Agenda 21. Various recommendations and statements are made concerning the environment and economic factors including:-

> *"Better decisions about sustainability could be taken within government and in industry if the full economic costs of environmental considerations were taken into account. Research into environmental accounting is being promoted in many countries. There are major difficulties, however, including fundamental questions of methodology. The best hope in the short term lies in making better measurements of the quantities of environmental pollution or the use of resources, whether or not costs can be added. Nonetheless, the Government will take forward work on constructing environmental accounts for the UK."*
>
> *"The market is the most effective mechanism for maintaining the momentum of development, sharing its benefits, and for shaping its course towards sustainability; but it cannot give proper weight to environmental considerations unless the costs of environmental damage or the benefits of environmental improvement are built up into the prices charged for goods and services."*