

**THE CONTRIBUTION OF CONSERVATION LANDS
TO THE
WEST COAST REGIONAL ECONOMY**

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EXECUTIVE SUMMARY

1 Introduction and background to study

The West Coast conservancy of the Department of Conservation (DoC) is responsible for the management and administration of nearly 80% of the land area of the West Coast.

1.1 The role of economic research in conservation land management

Economic research has an important role to play in the management of conservation lands for the enhancement and preservation of conservation values. In a national context the resources managed by DoC on the West Coast are scarce, in that they are irreplaceable and can be depleted or destroyed. Economic tools may be used to assist operational and strategic management at a theoretical and applied level.

1.2 Goals and objectives

The overall aim of the project is improve local community understanding of the role of DoC within the West Coast economy. This information may be used to address community concerns about the use of land managed by DoC, and for ongoing comparative assessment of DoC's contribution to the regional economy. An important message to be transmitted is that conservation is a valid use of the resource.

1.3 Economic activity

Almost all countries have large differences in prosperity between internal or composite regions. The basis of regional analysis is to select a series of indices that can be used to measure regional prosperity, to select an approach to analyse this information, and then to assess the available data to determine whether it is appropriate and sufficient for the intended purpose.

The three main areas of economic activity associated with conservation lands are: tourism and visitor services, DoC operations associated with its management role, and direct economic production.

The inputs are the physical resources, and labour materials and capital involved in producing the outputs. The outputs are returns to business and staff employed, non financial gains from the use of the park and indirect benefits resulting from DoC management practice.

1.4 The productive base

The West Coast region is bounded by mountains and the sea, and has distinct physical and social characteristics. The region has an open economy and the main productive land-based activities are primarily involved in exporting from the region. The DoC stimulates employment through direct employment of DoC staff and associated servicing requirements, and through tourist and productive industries using the resource as a base.

This project is concerned with the impact of a subset (conservation lands) on the whole of the region. In this instance direct comparison is inappropriate since different economic management regimes are in place. Also, the data available are limited. This research has concentrated on collecting information and evaluating data sources.

Tourism is a major area of economic activity on the West Coast, and the importance of conservation lands can be assessed in terms of activities that attract visitors and make them

stay. Tourists visit the Coast because of the presence of the glaciers, the National Parks, and other wild lands. They are attracted by the natural features of the region. Attracting visitors requires maintenance of the conservation resource. Some of the benefits due to visitors are immeasurable.

1.5 Conservation lands

The DoC is responsible for the management and administration of 80% of the West Coast area or over two million hectares.

2 Methodology

The first objective was:

to identify a set of criteria or parameters to describe economic well-being for the West Coast Regional economy.

The economic measures selected as appropriate parameters or key indicators of the 'well-being' of the regional economy were the number and percentage of the workforce and population in full-time and part-time employment, percentage unemployed and actively seeking employment, the number self-employed, income per head of population, percentage receiving income support, and rating base (private land per head of population).

The second objective was:

to analyse trends in the key economic parameters relating to the different industry groups in the West Coast Economy, including those industries directly related to the presence of the DoC estate.

The data available were insufficient to allow for valid analysis of trends. It was decided to concentrate on assessing the available data, establishing a base position, and instituting a data collection process that could be used to validate trends in the future.

The third objective was:

to derive multipliers from regional input-output tables to analyse secondary benefits resulting from the impact of the presence of the DoC estate on the West Coast.

Regional multipliers based on data from the 1986/87 Census were obtained.

2.1 Data collection

Secondary data has been used throughout this study. Data was collected for sectors where DoC has a direct involvement through licensing, granting of concessions or leasing of land or facilities. A number of visitor surveys have been undertaken on the West Coast over the past 15 years. Information from these surveys has been used where appropriate.

2.2 Multiplier analysis

Three types of multipliers are calculated: output, income and employment multipliers. The most commonly used are Type II multipliers which include direct, indirect and induced effects. In most cases input-output multipliers incorporate backward linkages only. If the output is not going to final demand then forward linkages need to be considered.

3 Demographics and labour force

Census data is used to compare employment and income for the West Coast and total New Zealand. The percentage in employment is similar to the New Zealand average, while income is less than the national average. The percentage self employed varies according to the boundaries selected (West Coast Regional Council area or the Westland Statistical area).

The DoC West Coast conservancy directly employs approximately 200 people, one third of whom are based in Hokitika. This is between 1 and 1.5% of the total West Coast employment.

3.1 Land tenure and rating base

The area of private land per head of population in the West Coast region is 6.7ha; higher than the New Zealand average of 4.6ha per person. The existence of Crown lands including those managed for conservation purposes provide a large number of economic benefits that contribute directly and indirectly to the West Coast economy thus increasing the wealth of the region.

4 Tourism

There have been a large number of studies of tourist behaviour undertaken on the West Coast over the past 15 years. These have mainly concentrated on National Park areas. Some of these studies have considered the negative impacts of tourism.

4.1 International visitors

Approximate 20% of all international visitors to New Zealand visit the West Coast. In 1993, there were 207,000 international visitors to the West Coast. The total number of international visitor nights was 507,000 and total expenditure excluding air fares and prepaid package tours was approximately \$60m. Ninety seven per cent of international visitors to the West Coast visited one or more National Parks.

4.2 Domestic visitors

The number of person nights spent by New Zealanders on the West Coast in 1993 was estimated as 1,000,000. This was a conservative estimate. Domestic visitors spent \$234 per visit (average stay 4 days).

4.3 Combining domestic and international visitor statistics

Combined expenditure for all visitors for 1993 was estimated as \$124m. This is increasing significantly.

4.4 Multiplier effects of tourism

Multipliers can be used to assess the importance of a particular sector to the economy and to quantify the impact of changes in that sector. They are concerned with changes at the margin. Tourism multipliers provide information about the impact of tourist expenditure and the flow-on effects through the economy. Regional economies have higher leakages than national economies: the more autonomous the region, the higher the multipliers.

The Type II tourism output multiplier for the West Coast region adjusted for the year ending March 1992 is 1.7. Only one other region (Southland) has a lower tourism multiplier. The average number of visitors per total job is 570.

4.5 The role of DoC in attracting tourists

Tourism is labour intensive and creates jobs. Ninety percent of international visitors for the year visited one or more National Parks and the results of a 1987 survey are consistent with the hypothesis that most visitors are attracted by the presence of National Parks and the opportunities available through the presence of conservation lands. Therefore a significant proportion of the \$124m visitor expenditure can be attributed to conservation lands.

5 Extractive production

The primary commercial productive operations on conservation lands are grazing, sphagnum moss harvesting, mining, and commercial hunting. The figures given relate to the calendar year 1993 except where otherwise noted.

5.1 Whitebaiting

For a short time of the year whitebaiting is a major activity on the West Coast. The DoC manages and protects spawning grounds. The total value of the catch is unknown but believed to be in excess of \$7m of which a significant proportion can be attributed to DoC because of role in managing both the fishery and the fish.

5.2 Mining

The estimated total value of mineral production on DoC land on the West Coast is \$9.3m. This is 7% of the total output value for the region. Direct employment on DoC land is estimated at 45. Estimates of cost recovery by the Crown are not available. Critical issues are the expansion of mining on the West Coast, and the need to maintain and improve rapport with miners.

5.3 Sphagnum moss

The proportion of New Zealand production of sphagnum originating from conservation lands on the West Coast was estimated as being between 20 and 25%. This translates to between \$3.3m and \$5.0m FOB value of sphagnum output from land managed for conservation purposes. The number employed in sphagnum collection and processing on land is estimated at 75 equivalent full time employees. Many people employed in the sphagnum industry work on a casual or part-time basis.

The revenue to the Crown for 1993 was \$139,000. Licences for sphagnum are based on expected yields and paid for in advance (for several years). Realised revenue appears to be less than would be expected under a pessimistic scenario.

5.4 Grazing, Occupancy and industrial licences

5.4.1 Industrial and occupancy licences

The total value of occupancy and industrial licences is \$10,945.

5.4.2 Grazing licences

The direct output value of grazing is \$5.9m. This has been calculated using estimates of the value of return per stock unit and stocking rates. Forward linkages are applicable to grazing, and the total output including forward linkages is \$11.3m. Direct employment is calculated as 66. The revenue that the Crown receives from gazing licences is \$58,181. The DoC is currently reviewing leases, as revenue is at present well below the estimated market value.

5.5 Commercial hunting

The estimated total direct output of commercial hunting for deer, pigs and chamois is \$1.3m. Including forward linkages raises this to \$2.5m. No estimates of employment could be made. Revenue to the Crown is minimal and no royalties are charged since the animals hunted are considered pests.

5.6 Other activities

Other resource based activities on the West Coast include forestry, fishing, and greenstone mining and collection. There is no commercial logging on DoC land and Maori claim ownership of all greenstone.

6 Operations

Data from the 1993/94 West Coast Conservancy Business Plan is given to provide an overview of DoC income and expenditure.

7 Conclusions and recommendations

The DoC has an important role in a number of sectors of the West Coast economy. The DoC's primary role is as manager and administrator of Crown lands and its mandate is conservation.

Tourism is of crucial importance to the West Coast economy and DoC is a major provider of services to tourists. Increasing the average length of stay rather than increasing the total number of tourists is the key to increasing regional income from tourism.

There are a number of areas where economic research could provide DoC with information to assist in its management role.

PREFACE

Economic analysis is concerned with the efficient use of resources. Different branches of economics use different tools to achieve this purpose. As stated in the Dictionary of Economics (Pass *et al.*, 1988), the “ultimate purpose of economic endeavour is to satisfy human wants for goods and services”, the problem being that scarcity means that we must continually make choices between desired outputs. Public sector goods are goods and services provided by the State for the benefit of the public at large. There are a number of different reasons, generally associated with market failure, why it is considered desirable for the State to undertake this role.

Economic research has an important role to play in the management of the Department of Conservation (DoC) estate and conservation lands. Economic tools can be used to evaluate resources and their use to ensure consistency with the goal of the protection and preservation of conservation lands.

There is a tendency for some sectors of the population to regard land and resources not being directly used for tangible productive purposes such as agriculture, forestry or mining as ‘unproductive’ or ‘under-utilised’ land. This is short sighted as it does not recognise the non-commercial values (Kerr, Sharp and Gough, 1986). Non-market valuation techniques can be used to assess or estimate the use and non-use values of these resources. An example of a non-use value is the value that a person living in Auckland may be prepared to pay for knowing that black stilt survive, yet accepting that they may never see one. Other values are associated with the possible future use of an area.

The DoC has a high profile on the West Coast due to the high proportion of the total land area that it administers. The DoC’s primary responsibility is the protection and preservation of conservation values. This requires DoC to take into account intangible values such as inter-generational equity or the need to take account of the interests of future generations. In its role as manager of State resources and Crown lands DoC makes a significant economic contribution to the economy of the region.

The aim of this research was to identify areas where DoC contributes to the economic welfare of the region. These areas include the direct contribution made to the region through the input of nationally collected revenue for management of the regional resources, the indirect benefits of tourism resulting from the presence of conservation lands, and the management of some extractive uses of conservation lands. The latter is at the discretion of the Regional Conservator and is allowable only when such use does not conflict with conservation management.

This project addresses the role of DoC in the West Coast regional economy. Tourism makes a major contribution to the West Coast economy and is closely linked to the presence of conservation lands.

1 INTRODUCTION AND BACKGROUND TO STUDY

The West Coast conservancy of the Department of Conservation (DoC) is responsible for the management of nearly 80% of the land area of the West Coast. This requires DoC to manage and administer land that is used for a number of purposes ranging from coastal areas used for whitebaiting, fishing, walking and wildlife viewing to high alpine areas used for ski-ing, mountaineering and aircraft sightseeing. The main theme common to all uses is the resource base that DoC is required to maintain.

1.1 The role of economic research in conservation land management

Economic research has an important role to play in the management of the DoC estate, and conservation lands. Used wisely and appropriately, economic tools can be used to evaluate resources and their use consistent with the goal of the protection and preservation of conservation values.

The Conservation Act requires DoC to preserve and protect “natural and historical resources for the purpose of maintaining their intrinsic value, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations”.

Within a national context the resources managed by DoC on the West Coast are scarce, in that they are irreplaceable and can be depleted or destroyed. There are potential conflicts between users of the resources, both active and passive.

Economic research can play a role in the management of resources in two ways. It can be both operational and strategic. It can also be either theoretical or applied research. This project can be characterised as applied operational research since it is directed towards assisting the West Coast conservancy in its management role as well as providing information at a national level.

1.2 Goals and objectives

The original objectives of this study were listed as:

- to identify a set of criteria or parameters to describe economic well-being for the West Coast Regional economy;
- to analyse trends in the key economic parameters relating to the different industry groups in the West Coast Economy, including those industries directly related to the presence of the DoC estate;
- to derive multipliers from regional input-output tables to analyse secondary benefits resulting from the impact of the presence of the DoC estate on the West Coast; and
- to design a communication channel for DoC to use to promote its role in the West Coast economy.

Some of these objectives were modified during the course of the project. For example, the term ‘DoC estate’ was replaced by conservation lands as being more representative of the intent of the project and the scope of the different types of land administered by DoC on the West Coast.

Objective four in the stated form is no longer relevant to the project because of administrative changes over the past year. A separate report addressing this objective has been prepared and submitted to the West Coast conservancy.

The report therefore addresses three different areas. Chapter 4 is concerned with visitors to the region and the contribution of tourism to the regional economy. The question of how much of the regional income from tourism can be attributed to the presence of conservation lands is addressed. Chapter 5 describes the production base of the West Coast and analyses the role of conservation lands within the West Coast economy. Chapter 6 examines the net benefit of the presence of DoC in terms of DoC employees and operations. Appendix A provides details of data sources and the data collection process.

The overall aim of the project is improve local community understanding of the role of DoC within the West Coast economy. This information may be used to address community concerns about the use of land managed by DoC, and for ongoing comparative assessment of DoC's contribution to the regional economy. An important message to be transmitted is that conservation is a valid use of the resource.

1.3 Economic activity

Almost all countries have regional problems in that there are large differences in prosperity between different regions. Over the past 40 years there has been considerable attention paid to analysing these differences, in determining whether or not it is appropriate for governments to intervene to try to reduce the differences, and if so, how to intervene most effectively.

The basis of any such analysis is to select a series of indices that can be used to measure regional prosperity, to select an approach to analyse this information, and then to assess the available data to determine whether it is appropriate and sufficient for the purpose. A balance must be struck between these three activities.

There are a number of different tools available to regional analysts, the most common of which are input-output analysis, multiplier analysis and mathematical programming. These tools require considerable quantities of high quality data that may be difficult and expensive to obtain. The construction of regional input-output tables from national input-output tables has proved one way of getting good comparative information whilst minimising the amount of direct data collection required.

The three main areas of economic activity associated with conservation lands are: direct economic production on conservation lands, tourism and visitor services, and DoC operations associated with its management role.

Following Clough (1993) these can be viewed as the outputs associated with conservation lands. Clough concentrates on economic efficiency, or maximising outputs (returns) for a given set of inputs (resources). It is important to recognise that there will be both financial and non-financial gains, and direct and indirect benefits.

The inputs in this case are the physical resources, and labour materials and capital involved in producing the outputs. The outputs are returns to business and staff employed, non financial gains from the use of the park and indirect benefits such as clear water from catchment control (Clough, *ibid.*). The problem is that unpriced outputs can be easily undervalued.

A number of measures of activity can be identified. These are chiefly the value of production, *licence* fees, and the cost of administering these *licences*.

Secondary data has been used for all analyses. It was hoped that it would be possible to supplement visitor expenditure information using data from a limited survey of visitors to the region. However, given the quality of the data available and the high cost of additional data collection, it was decided that the limited survey possible would not improve on the analysis.

1.4 The productive base

One of the classical difficulties encountered in regional economics is that of defining the region. In this instance the region is defined by geographical and social characteristics. The mountains and the sea provide clear physical boundaries and people who live and work on the West Coast identify themselves with that region. In an economic sense, the West Coast is open in terms of its reliance on external trade and institutions. The main productive land-based activities on the West Coast relate to forestry, mining, farming and sphagnum moss harvesting. Since these are all primarily involved in exporting from the region it is possible to define an economic base.

One of the key issues therefore in considering regional economic activity is in assessing how much of the money spent within the region remains within the region. Most benefits remain within a region if the 'company' is locally owned. Wages are likely to be retained, therefore employment is an important measure of economic input (Stephens and Wells, 1983).

The presence of DoC stimulates employment through the direct employment of DoC staff, and through employment in service or tourist industries using the conservation assets as the attractions.

There are a number of indices that can be used to measure regional prosperity. The first, and most commonly used is income per head of population. This is used to compare differences between regions. Another common measure used when considering regional differences is employment and this can be measured as either the percentage unemployed or the percentage of people of working age currently in employment. In an area such as the West Coast where self reliance and lifestyle choices are important characteristics, the number of self employed people may be important. Other related parameters are the rate of growth of income per head of population, the rate of net emigration from the region, and the rating base of the region. All of these measures can be used to compare differences between regions, or in a time-series form, to assess changes in the economy in a single region.

This project is concerned with the impact of a subset of a region on the whole of the region. Since different economic management regimes are in place for the subset and the whole, a direct comparison is inappropriate. The limited data available means that time series analysis is not likely to produce useful or valid results. This project therefore concentrated on collecting together available data and evaluating data sources.

There are a number of economic issues that need to be considered in this analysis that relate to the overall objective of defining the 'economic well-being' of the community. The net private benefit to an employer from employing an extra person is the increase in net profit that is achieved by the increased output associated with employing that person. The net social benefit to the community (if the person was previously unemployed) is the increase in profit plus the wages received by that person minus any reduction in profit or wages to the rest of the community and any allowances previously received. Net social benefit will therefore almost always exceed net private benefit.

Tourism is one of the major areas of economic activity on the West Coast. Significant increases in income from tourist related activities have been noted over the past ten years. Many visitors make a round trip from the east coast using the Haast Pass from Wanaka and either Arthur's Pass or the Lewis Pass. The popularity of day trips from Christchurch to Greymouth on the Alpine Express is also increasing.

The importance of conservation lands for tourism can be assessed in terms of activities (including sightseeing) that attract visitors to the West Coast and make them stay. Without maintenance of the resources and the means of access to these resources (roads and facilities at glaciers) people would not spend money.

DoC has an important role to play in the area of attracting visitors to the West Coast. Tourists visit the Coast because of the presence of the glaciers, the National Parks (Paparoa, Arthur's Pass and Westland), and other wild lands. They are attracted by the natural features and the wilderness features of the region. The DoC provides access facilities and visitor centres that provide information about the resources, and the tourist facilities and activities available. Thus DoC markets the West Coast.

Some of the benefits due to visitors are measurable and some are not. Examples of measurable benefits are direct expenditure on accommodation, activities and consumer goods. Non-measurable benefits relate to flow-on effects.

1.5 Conservation lands

Land tenure on the West Coast can be broken down into the following approximation¹.

Crown Production Land	12%	Timberlands, Landcorp
Private land	9%	
Unallocated crown land	2%	DOSLI
Conservation land	77%	

This means that DoC is responsible for administering nearly 80% of land on the West Coast. It must be remembered, however, that a significant proportion of the conservation land is unsuitable for productive purposes.

The total land area of the West Coast Regional Council area is 2,665,900 ha. The DoC is therefore responsible for managing over two million hectares of lands area. Information was requested from Landcare on areas above 1000m and 500m. They experienced difficulty in obtaining maps with suitable contours for GIS.

The following table from Watson and Clifton (1987) represents "best estimates" of the features of the West Coast Conservation estate as at 20/8/87. This table also provides an illustration of the diversity of types of land administered or managed by the Conservancy.

Coastline (km)	625
National Parks (National Parks Act)	4
Forest Parks (Conservation Parks) (Conservation Act)	2
Scenic reserves (Reserves Act)	91
Nature reserves (Reserves Act)	2
Ecological areas (Conservation Act)	73
Amenity areas (Conservation Act)	42
Wildlife reserves (Wildlife and reserves Acts)	14
Fisheries reserves	11
Covenants (Reserves Act)	200
Recorded historical areas	490

Table 1: Types of land administered by DoC on the West Coast

Other types of land administered by DoC include Stewardship areas, Crown land, Marginal strips and Wilderness areas.

¹ Up to date information provided by Vijay Narayan, West Coast Regional Council (Narayan, 1995), suggests that private land comprises 11.1% of the total land area of the West Coast.

2 METHODOLOGY

The first objective was:

to identify a set of criteria or parameters to describe economic well-being for the West Coast Regional economy.

This general objective was designed to allow a scoping process to examine the types of economic measures that are most appropriate for evaluating the state of the West Coast economy. Selecting these parameters requires consideration of the social environment.

The specific characteristics of the population that are relevant relate to people who *stay* on the West Coast, and people who *move to* the West Coast. People are attracted to the West Coast because of the isolation, the image of cheap living, the closeness to a wide range of outdoor activities, and a sense that it is possible to 'do-it-yourself'.

The economic measures selected as appropriate parameters or key indicators of the 'health' or economic 'well-being' of the regional economy were therefore the number and percentage in full-time and part-time employment, percentage unemployed and actively seeking employment, the number self-employed, income per head of population, percentage receiving income support, and rating base (private land per head of population).

The second objective was:

to analyse trends in the key economic parameters relating to the different industry groups in the West Coast Economy, including those industries directly related to the presence of the DoC estate.

Early investigations indicated that the data available was not robust enough for valid analysis of trends in these key economic parameters. The best data available is census data and comparisons have been made between the West Coast and the population at large.

Discussion with the Regional Conservator and senior staff of the West Coast Conservancy indicated further that because of major shifts in the economy and changes in administrative and management practice they did not believe that the analysis of past trends would be valid or provide significant benefit. It was confirmed with the Regional Council and other data collecting agencies that a lack of base data would make any form of time series (a) very difficult, and (b) subject to errors. It would therefore be preferable to concentrate on assessing the available data, establishing a base position, and instituting a data collection process that could be used to validate trends in the future.

The data collection process highlighted a number of deficiencies that are detailed later in this report. The main impact of these deficiencies is that it is not possible to combine information for the individual sectors into a single 'figure' representing the contribution of DoC lands. Comparisons can only be made within the individual sectors if full sector data is available on the same basis.

The third objective was:

to derive multipliers from regional input-output tables to analyse secondary benefits resulting from the impact of the presence of the DoC estate on the West Coast.

There have been a number of studies that have been concerned with calculating regional input-output tables that have also been used to derive regional multipliers. One of the difficulties with the use of multipliers derived from input-output analysis is that national tables (from which regional tables are derived) are only calculated every five years, and because of the time taken in calculating the tables they are several years out of date when they are published. Input-output tables represent a static 'time

slice', therefore inaccuracies are involved in applying multipliers derived from these tables to later time periods.

One of the main limitations in deriving regional multipliers is the need to calculate regional input-output tables. Input-output tables require large amounts of survey data. In recent years, however, approximations using non-survey approaches and involving modification of national input-output tables have been developed. Hubbard and Brown (1981) describe the first New Zealand application of this technique using the GRIT methodology (Generation of Regional Input-Output Tables). This was further developed and applied by Butcher (1985). Other studies have used this base to derive multipliers for specific purposes.

The direct benefits due to DoC relate to management and staff *requiring* and *supplying* services to other parts of the West Coast economy. Money is taken in taxes from all New Zealanders and spent on the West Coast. For example, an important area where this occurs is in possum control. DoC undertakes possum control where conservation values are being degraded. General taxpayer money is brought in to the area to control a national problem thus adds to the regional economy.

2.1 Data collection

Secondary data have been used throughout this study. The costs of obtaining primary data were considered to outweigh any benefits that might have been gained. The quantity and quality of the data available have been noted in the discussions for each of the production sectors. The data collection and analysis process have been described in detail, and any assumptions made are clearly outlined so that an ongoing data collection process can be instituted.

Data was collected for sectors where DoC has a direct involvement through management, licensing, granting of concessions, or leasing of land or facilities. Changes are currently being made in the way DoC charges for services and rentals. The information given came from a number of different industry sources.

It was originally intended to supplement secondary tourism data with primary data obtained from a limited survey of visitor expenditure. The intention was to have self-administered survey forms available in visitor centres. After further consideration and discussion with other tourism researchers it was recognised that the information that would be obtained from this limited type of survey would be too inaccurate (and incomplete) to be useful. Surveys conducted by the New Zealand Tourism Department contained adequate information.

A number of visitor surveys has been undertaken on the West Coast over the past 15 years. These are discussed more fully later in this report. Most of these surveys have had quite specific objectives and have been limited to particular areas so that comparisons cannot be made. Information from these surveys has been used where appropriate.

There are a number of difficulties associated with undertaking generalised visitor surveys. Firstly, because the numbers of visitors and their origin vary considerably over the year, it is necessary to sample on a continuous basis throughout the year. Expenditure patterns vary by origin and type of visitor. The West Coast has three main entry points: the Haast Pass, Arthur's Pass and the Lewis Pass/Buller Gorge area. Visitors cannot be sampled at a single location. Most visitor surveys to date have concentrated on a particular site and specific times of the year, and have used summary visitor numbers to extrapolate.

2.2 Multiplier analysis

Early approaches to inter-regional multiplier analysis were closely linked to the concept of an economic base in which certain activities are defined as being exogenous to the region, and the economic base is defined as a group of industries primarily involved in exporting from the region. An empirical multiplier is calculated by analysing export economic activity. Inter-regional cost comparisons can be used to define new export possibilities. The difficulties involved with this type of approach concern the problems associated with determining the economic base, obtaining adequate data, and the assumption that the multiplier coefficients will be stable over time (Meyer, 1963).

Another approach to regional analysis involves the derivation of regional input-output tables. Regional input-output tables suffer from all the limitations of national input-output tables as well as the fact the inter-regional trade coefficients may be even more unstable than inter-industry coefficients. However, their advantages, in terms of their ability to explain differences, outweigh the disadvantages and they provide the most commonly used tool for regional analysis.

Detailed discussion of input-output tables, the estimation of regional non-survey input-output tables and the derivation of multipliers can be found in Hubbard and Brown (1981), Butcher (1985) and Kerr *et al.* (1986). The brief summary included here is derived from these sources, as well as from Department of Statistics publications.

An input-output model of an economy consists of a matrix detailing the *flow* of goods between all the industries represented in the economy. Each industry is assigned a row and a column within this matrix and the element x_{ij} indicates the *volume* of goods flowing as *outputs* from industry i , to be used as *inputs* to industry j . These *inter-industry flows* may be measured as either physical units or dollar values. The latter is more common and more useful since it allows rows and columns to be summed to estimate total industry values. Additional rows are used for *primary inputs* such as labour (household input) and industries outside the economy (imports). Additional columns account for output not consumed by other industries such as exports, household consumption, stock accumulation and government spending.

The input-output matrix X can be used to derive two other important matrices: the coefficient matrix A , and the inverse Leontief matrix $(I-A)^{-1}$. For column j of the coefficient matrix, one unit of output from industry j requires a_{1j} units from industry 1, a_{2j} units from industry 2, a_{3j} units from industry 3 etc. These *direct* requirements need additional *indirect* inputs to produce them. The inverse Leontief matrix coefficients provide the total direct *plus indirect* output requirements for each industry for one unit of output from industry i . Reading column j , the coefficients represent the total output that each of the industries in rows 1 . . . n need to produce so that industry j can produce one unit of output for final demand.

In this way, an increase in final demand for any one product has repercussions through the whole economy, causing increases in output beyond the initial change in demand. Three types of multipliers are calculated: output, income and employment multipliers. Output multipliers (as described above) account for changes in output resulting from a unit increase in final demand. Income multipliers are concerned with the increased input from households required to fulfil an increase in input. Employment multipliers are derived by calculating the employment coefficient for each industry. These represent the number of people directly employed per dollar of output. These coefficients are used to calculate employment multipliers in the same way as income multipliers.

The different types of multipliers and the economic assumptions behind their use are described well in Kerr *et al.* (1986) and Butcher (1985). The most commonly used multipliers are Type II multipliers since they incorporate all effects.

Kerr defines the Type II multiplier as

$$= \frac{\text{direct} + \text{indirect} + \text{induced effects}}{\text{direct effects}}$$

Butcher defines the Type II multipliers as

$$= \frac{\text{initial} + \text{production induced} + \text{consumption induced}}{\text{initial effects}}$$

The reason for the difference is that there can be some problems in defining direct and indirect effects. More recent studies have used the Butcher definition. The initial effect is the assumed initial dollar increase in output of industry j , the increase in employment in industry j , and the increase in the income of employees. The production induced effects are the combination of first round and second and subsequent round effects. Consumption induced effects relate to the increase in output, income and employment associated with the increased demand for goods by households following on from the initial and subsequent rounds of increased production. For these purposes the two definitions of Type II multipliers are equivalent.

Input-output models and hence the multipliers derived from them are based on a number of assumptions. The most important of these are: that the production function is linear, that each sector has a fixed set of products not produced by any other sector, that there is a perfectly elastic supply of labour, and that exports and investment are exogenous (Lim, 1991). In practice, these assumptions generally do not hold.

Input-output tables represent the situation at a particular time. The length of time that usually elapses between collecting the information and calculating the tables and hence regional tables and multipliers may mean that the results do not accurately represent what is currently occurring. Another important point is that multipliers are concerned with *marginal* changes rather than average production status.

As pointed out by Butcher (*ibid.*), differences between the marginal and the average are likely to be greater at a regional level than a national level. There are a number of other qualifiers to the use of input-output tables, however, despite the limitations and assumptions they can provide useful information about likely impacts of changes in production and employment.

A further issue is the difference between forward and backward linkages. Input-output multipliers assume that the product concerned is going in to final demand. The example given by Butcher is that this is valid for dairy *factories* where the output is exported, but not for dairy *farmers* whose output requires further processing (by dairy factories). Butcher describes a process for calculating forward linkages where these are required.

The Department of Statistics calculates national input-output tables for 184 industries from the inter industry study data collected on a five yearly basis. Aggregated tables for 25 industries are also calculated. These tables are generally not published until several years after the data collection. Non-survey regional input-output tables have been calculated from national tables by a number of authors, most notably Butcher (1985). Other authors have calculated input-output tables and hence multipliers for specific regions or subregions. The most commonly used technique has been the GRIT method (or modifications).

3 DEMOGRAPHICS AND LABOUR FORCE

The data described here have been derived from New Zealand Census data for 1986 and 1991. Two sources were used. The first was the New Zealand Department of Statistics data base *SUPERMAP 2* available on CD-ROM, and the second was a report by J.H. Allan (Allan, 1991) published by the West Coast Regional Council. This report examined changes in the West Coast population between 1986 and 1991, using provisional data released from the 1991 Census.

SUPERMAP 2 allows the user to select areas by a number of different means including statistical area and Regional Council area. Smaller units can be selected and aggregated, but less data are available for these. For comparative purposes the West Coast Regional Council Area was used.

Allan (1991) describes demographic changes from 1986 to 1991 and makes some comparisons with national totals and percentages. Table 2 shows comparisons between the West Coast Regional Council area and New Zealand totals.

	West Coast Regional Council	New Zealand totals
Usually resident population	32,652	3,373,929
Total labour force	14,571	1,564,173
Labour force as %age usually resident population	45%	46%
Non labour force	10,353	1,026,114
Non labour force as %age usually resident population	32%	30%
%age labour force gainfully employed	89%	90%
%age labour force self employed	12%	16%
% receiving benefits or income support (excl. family benefit)	49%	43%
Household income of 30,000+	33%	44%
Average personal income	\$11,715	\$12,225
Personal income 30,000+	12%	17%
Private land per head of population (Table 5)	6.7ha	4.6ha

Table 2: Comparison between West Coast Regional Council and New Zealand total labour force statistics (Source: *SUPERMAP 2*, New Zealand Department of Statistics 1991 Census data)

From this table it can be seen that the percentage of people in gainful employment is very close to the national average. If the Westland statistical area is used (that is, Westport and Murchison areas are excluded) then the percentage in gainful employment rises to 90%, above the national average.

Twelve percent of the labour force for the Westland Regional Council area is listed as self employed which is less than the national average of 16%. However, 18% of the Westland statistical area

population is self employed - above the national average. This implies that the belief that people move to the West Coast for lifestyle reasons is valid only for the area excluding Westport and Murchison.²

The percentage of the population on benefits or income support at 49% is higher than the national average of 43%. For Westland statistical area the figure is 47%. From Allan (*ibid.*) the number receiving social welfare payments of any kind is 65% compared with 59% nationally. Thirty three percent of households have an income of over \$30,000 and 12% have a personal income of over \$30,000. These are both less than the national average.

It should be noted that because of the small population of the West Coast region the actual numbers involved may be quite small even though at times percentage differences between regional and national figures may seem high (Allan, *ibid.*). Therefore small seasonal changes in employment, for example, may have significant impact on the percentage employed.

Table 3 provides some industry comparison figures. The primary industries that occur on conservation managed lands are: tourism; agriculture, through leasing land; mining, through granting of licences for operations on DoC land; and sphagnum harvesting, through concessions.

The industry and occupational groupings given within *SUPERMAP 2* are not suitable for deriving any useful information regarding employment in tourist related industries.

	West Coast Region	New Zealand total	West Coast as %age NZ total
Agriculture full-time	1650	117,597	
Agriculture part-time	276	24,516	
Agriculture total	1926	142,113	1.4%
Mining full-time	597	4,287	
Mining part-time	33	213	
Mining total	630	4,500	14%
Total gainfully employed	12,986	1,400,404	< 1%
%age working in agriculture	15%	10%	
%age working in mining	5%	0.3%	

Table 3: Employment comparisons for industries (Source: *SUPERMAP 2*, New Zealand Department of Statistics 1991 Census data)

DoC provides direct stimulus to the West Coast economy through employment of staff and servicing of DoC activities. At December 14, 1993, DoC employed 193 staff, 138 of whom were full-time, with the remaining 55 being either part-time, temporary, Task Force Green or Tourism Green workers. This is approximately 1-1.5% of the total number gainfully employed in the region. In addition there were 10 vacancies due to staff turnover or leave without pay, making a total of 203 positions. Since December 1993 staff numbers have dropped slightly due to non-replacement of some staff.

² The belief that people move to the West Coast for lifestyle reasons has associated with it the expectation that a larger proportion of the population will be involved in craft industries and self reliance type lifestyles, thus leading to a higher proportion of self employed.

The geographic distribution of staff shows that nearly one third of the staff are located in Hokitika, with the remaining two-thirds being distributed between the field centres from Karamea in the north to Haast in the south.

The data are summarised in Table 4. Additional demographic information for the West Coast is provided in reports supplied by the West Coast Regional Council.

The total number of DoC staff dependants listed for the region is 135. This constitutes a significant impact on schools and communities especially in smaller areas.

Location	Total	Part-time	Full time
Hokitika	62	7	55
Karamea	18	10	8
Buller	8	3	5
Punakaiki	14	4	10
Reefton	14	5	9
Arahura	17	4	13
Greymouth	5	2	3
Franz Josef	28	9	19
Fox	14	5	9
Haast	23	6	17
TOTALS	203	55	148

Table 4: Summary of DoC staff demographics

3.1 Land tenure and rating base

In addition to the 77 percent of West Coast land administered by DoC, a further 14 percent is managed by other Government agencies such as Coal Corp, Land Corp and Timberlands. Consequently, the burden of regional and local Government rates falls upon the 9 percent of land on the West Coast which is privately owned.

On this basis, it has been suggested that the high proportion of Crown land on the West Coast unduly limits the Regional and District Councils by restricting their rating base. This, it is claimed, reduces the provision of local and regional government services and disadvantages the citizens of the region. However, these arguments are false on several counts.

The area of private land per head of population in the West Coast region is higher, not lower, than the New Zealand average. The region has an average of 6.7ha of private land per person, compared with a national average of 4.6ha per person (see Table 5). It is the level of population and the level of affluence that determines the region's capacity to pay for the services provided by local Governments, not the area of land held in private tenure.

Any relatively high costs associated with the provision of local and regional Government services on the West Coast can be attributable to the other factors, particularly the geographic shape, population

distribution and climate within the region. Such factors are not related to the ownership of the land in the region. Nor are these factors unique to the West Coast; they are common to many sparsely populated parts of New Zealand, including many areas with a high proportion of private land tenure.

The West Coast regional and local governments do not contribute towards the maintenance or administration costs of the Crown lands or the associated facilities. The argument that the region is disadvantaged by the level of Crown ownership would only hold true if the Councils were required to contribute towards the service or administration of the Crown land without any gain in return. This does not occur³.

A significant proportion of the lands managed or administered by DoC are not suitable for any extractive use. Such areas include most of the areas over 500m in altitude and many areas where access, topography, soil type or vegetation cover prevent extractive activities. Such lands would not provide any additional value to the citizens of the West Coast if they were privately owned. To claim that Crown ownership of such areas is restricting the revenue raising capacity of local bodies is nonsensical as the private ownership would not contribute any greater wealth to the region. Once again, it is the wealth of the region, not the ownership that determines the rating capacity.

The existence of the Crown lands, including those managed for conservation purposes, provides a large number of economic benefits that contribute directly and indirectly to the West Coast economy. By doing so they are increasing the wealth of the region.

It may therefore be concluded that while there is a relatively low level of private land tenure in the West Coast region (as a percentage of the total area of the region), this does not appear to unduly disadvantage its citizens with respect to the provision of services from regional and local Governments. Moreover, the land managed for conservation purposes provides considerable economic benefits to the West Coast economy. These economic benefits are outlined throughout this report. This conclusion is refuted by Narayan (1995). Appendix A presents his counter argument.

	Percentage of Private Land	Area (000's ha)	Population	Private Land Per Person (ha)
West Coast	9	2,666	35,577	6.7
New Zealand	59	27,053	3,434,950	4.6

Table 5: Percentage of private land per head of population (Sources: Statistics NZ, 1991 Census; Narayan, 1991)

³ The West Coast Regional Council contributes towards possum control operations in the areas where conservation lands border on farm land. However, these operations are to control the spread of bovine tuberculosis and not for the purpose of maintaining conservation lands.

4 TOURISM

There have been a considerable number of studies of tourist behaviour undertaken on the West Coast during the past 15 years. The emphasis in most of these studies has been on understanding tourist behaviour and estimating tourist expenditure (examples include: Hayward, 1989; Pearce, 1980; Sandrey, 1987; Stephens and Wells, 1983; and Wilson, 1988). This information has been used to devise strategies to attract visitors to the West Coast, and to make them stay longer. For example, it has been estimated that Shantytown has been very successful in keeping tourists in the region for an extra night.

Most of these studies have concentrated on National Parks, since these are the areas that most visitors identify as the focus of their visit (particularly international tourists). A study of the economic benefits accruing to a region from the presence of a National Park was undertaken in 1986 (Kerr *et al.*, 1986). This comprehensive study identified national and regional benefits. Mt Cook National Park is at a road end, and visitors to the Park can be easily differentiated from visitors to the region at large. Therefore it was comparatively easy to identify those benefits due to the presence of the Park.

The West Coast region has entry/exit points at each end, and access points in the middle. It cannot, however, be used as an access route to other destinations. Although it is not possible to definitively differentiate between visitors who have come to the West Coast because of the opportunities associated with conservation lands and those who have come for other reasons, New Zealand Tourism Board figures show that 97% of visitors to the West Coast visit a National Park. Sandrey (see Table 10) shows that the main motivations for visiting the West Coast are the scenery, to visit parks and reserves, and the perception of an unpolluted/isolated area. Even if there are reasons unassociated with conservation lands, at some stage during their visit all visitors will take advantage of their presence.

The impact of tourism on the resource is another area that has received consideration. As tourist numbers increase it has become obvious that problems of congestion and overcrowding are already having negative ecological and social impacts.

A recent study (Lim, 1991) considered the economic impact of tourism on selected regions in New Zealand. One of the objectives of this study was to allow comparisons to be made between the returns on investment in tourism and alternative uses for domestic resources in competing industries in the regions. This was achieved by calculating regional input-output tables, and assessing the direct, indirect and induced impacts. Although this study is limited - three regions were analysed based on 1981/82 data - it does give some indication of the impact of tourism on the New Zealand economy. For example in the year to February 1989 the tourism industry was responsible for 7.9% of full-time equivalent jobs in New Zealand.

This section discusses some of the economic impacts of tourism on the West Coast. Visitor information has been collected from a variety of sources. There is potential inconsistency between these sources and therefore all statistics have been carefully referenced and potential problems described.

4.1 International visitors

Information on international tourists has been obtained from the New Zealand Tourism Board's International Visitor Survey (IVS) publications for summer 1992/93 (NZTB, 1993a) and the full year ending September 1993 (NZTB, 1993b). Supplementary information other than that published in these reports was obtained directly from the New Zealand Tourism Board.

The International Visitor Survey interviews 5,000 international visitors during the course of a year in the departure lounges of Auckland, Wellington and Christchurch International Airports. Visitors are surveyed as they are leaving New Zealand. For selected flights every *n*th person coming through the security check is interviewed. For 1993, the total number of international visitors to New Zealand (as determined from arrival cards) was 1,011,000.

A *visitor* is defined as a person spending at least one night and less than 12 months in New Zealand: a visitor spending one night in New Zealand generates one *visitor night*.

The total number of international visitors who visited the West Coast was 207,000. This means that approximately 20% of international visitors visited the West Coast. When we consider visitor nights, however, the total number of international visitor nights was 18,611,000 of which only 510,000 or 2.7% were spent on the West Coast. The average number of visitor nights per person (length of stay) for the whole country is 18.4. For the West Coast this figure is 2.5. This compares with 5.5 for Canterbury, 6.9 for Auckland, 3 for Nelson, 4.6 for Otago. The implication is that visitors travel *through* the West Coast but do not tend to stay for long. This suggests scope for strategies to retain visitors for longer periods.

Table 6 shows the number of international visitors to the West Coast National Parks. Only three percent of international visitors did not visit one or more National Parks.

Park visited	Number of visitors	Percentage
Westland National Park	194,000	94%
Paparoa National Park	73,000	35%
Both National Parks	67,000	97%
Neither	7,000	3%

Table 6: International visitors to National Parks

For most international tourists a visit to the West Coast requires a conscious decision, since it is not part of a gateway to the country. It may form part of a tour circuit, however, the lack of a major airport means that it is more likely to appeal to visitors who have a little longer than average to spend in the country.

Domestic air travel was used by 34% of visitors, with private cars also being used by 34%, rental cars by 25% and coach tours by 21%. Most visitors will use more than one form of transport during their trip.

Since the vast majority of international visitors to the West Coast visit a National Park it can be imputed that a major part of the reason for their visit to the West Coast is because of the existence/presence of conservation lands.

The average expenditure per person day for international visitors to the West Coast for year ending September 1993 was \$116. Total expenditure for the same period was \$58,911,267. Note that this total excludes any pre-paid package tour type payments. Since it is not possible to determine what proportion of these costs is likely to be input to the West Coast region these costs should be excluded.

Comparative figures from Duncan *et al.* (1992) give total expenditure for international visitors for the year ending March 1992 as \$80,000,000. This figure includes airfares received by Air New Zealand (and probably pre-paid tour expenses) and this, along with the different year would account for the difference. Air fare expenditure is not relevant to the West Coast economy. Therefore total international visitor expenditure is rounded to \$60m.⁴

4.2 Domestic visitors

Obtaining data on domestic visitors or New Zealand tourists was more difficult than for international visitors because the New Zealand Tourist Board ceased collection of data on New Zealand visitors in 1991. Prior to that an annual survey was conducted using data obtained through the McNair National Omnibus survey.

The source of the data reported here is New Zealand Tourism Department 1991a,b,c.

As a replacement to the annual survey the regions are being encouraged to contribute to the 'Regional Tourism Monitor'. Since this requires local/regional funding, very little information has been received to date by the Tourist Board.

In the context of the domestic tourist surveys, travel is defined as a journey outside the home locality involving a minimum of one night away from home. This eliminates all day tourists from either Canterbury (Greymouth is less than three hours drive from Christchurch), Nelson/Marlborough, or Otago. Since these visitors are unlikely to spend much money during their outing this may not have much net benefit. For future reference, however, it would be useful to survey these visitors to determine their impact.

	1986/87	1987/88	1988/89	1989/90	MEAN
Person nights	1,135,000	1,282,000	983,000	979,000	1,095,000

Table 7: Person nights spent by New Zealanders on the West Coast

Person nights on the West Coast varied considerably between 1986 and 1990 as is shown in Table 7. No trend is obvious, and the significant drop between 1987/88 and 1988/89 suggests that different sampling techniques may have been used.

Expenditure data was calculated using weighted averages for people visiting the region by place of residence. The weighted average expenditure per day for people visiting the West Coast from all regions was \$59, compared with a New Zealand average of \$62 per day. If visitors to the West Coast originating from the West Coast (for example residents of Haast visiting Punakaiki) are excluded then the average expenditure reduces to \$57 day or \$234 per trip. Comparative per trip figures for all visitors to the West Coast and all New Zealand visits are \$241 and \$249 respectively. The average length of stay used is the New Zealand average of 4 days (nights).

Other relevant statistics concerning domestic travel for the year ending September 30 1993 (for the whole country) are that 31% were on holiday, 35% were visiting friends and relations, and 76% were using private cars.

⁴ A recent report in The Press stated that for the year ending June 30 1993, the West Coast earned \$68m from international tourism (New Zealand Tourism Board).

4.3 Combining domestic and international visitor statistics

In 1992 a DoC memo noted that the ratio of domestic to international tourists was 2:1. Statistics for 1991, with domestic visitors from the West Coast to the West Coast excluded, indicate that the ratio of the number of *visits* was 13:7 (domestic to international). The ratio of *person nights*, however, was 3:1, since domestic visitors tend to stay longer (average stay 4 days) than international visitors (average 2.5). Note that Sandrey (1987) reported an average stay of 5.6 days for visitors surveyed at the glaciers.

Two approaches were used to estimate the number of domestic person nights for the 1993 year. The annual average over four years from the domestic visitor survey was approximately 1,100,000 visitor nights (see Table 7). Using the 3:1 ratio of domestic to international derived from the 1991 year's data (DoC memo as noted above), the number of person nights is 1,500,000. If the 2:1 ratio (derived from visitors rather than visitor nights) is used then the number of domestic visitor nights is 1,000,000. Although it is likely to be an under-estimate, this latter conservative estimate is used.

Expenditure on the West Coast by domestic visitors in 1990-91 was \$59/day. Using the CPI to adjust for inflation (all groups all South Island) this increased to \$64/day (8%) for 1993.

The approximate expenditure for domestic visitors is thus \$64m, making a total expenditure for all visitors of approximately \$124. This is consistent with an estimate by Narayan (1991) of total visitor expenditure for 1991 of \$117m. However, Duncan *et al.* (1992) estimates expenditure by domestic visitors (private and business) for 1991 as \$32m. This difference is hard to account for since no analysis is given in the Duncan report (note that is the 3:1 ratio had been used the total expenditure would have been considerably higher).

The combined expenditure for international and domestic visitors was estimated as \$124m. This is a conservative estimate.

4.4 Multiplier effects of tourism

As discussed in section 2.2, expenditure (or production) in a particular sector of the economy has multiplier effects throughout the rest of the economy. Multipliers can be used to assess the importance of a particular sector to the economy and to quantify the impact of changes in that sector. Two points to remember are that multipliers are concerned with changes at the margin (rather than average increase/decrease) and that multipliers calculated from input-output tables are concerned with *backward* linkages, that is, the effect of further processing is not included.

Over the past decade there has been considerable interest in the impact of tourist expenditure on particular regions. For example, if a tourist spends \$100 on accommodation then a certain amount of that money will pass directly outside the region, some will be returned as capital input and the remainder will pass to other suppliers within the region. The money received by local suppliers will have similar paths. If these are calculated then the proportion of that initial expenditure 'leaking' outside the region can be estimated. For small areas that cannot be self sufficient, the proportion 'leaked' will be high, and hence the multiplier effect providing stimulus to local industry low. Regional economies will have higher leakages than national economies, and the more autonomous the region, the higher the multipliers. Tourism multipliers provide information about the impact of tourist expenditure and the flow-on effects through the regional economy.

The difficulties with regard to calculating regional multipliers have been referred to in section 2.2. In addition to this, there are specific difficulties associated with calculating tourism multipliers. As has been stated earlier, national input-output tables are calculated on a full industry categorisation basis (184 industries) and an aggregated 25 industry basis. The calculation of regional input-output tables

from national tables is not trivial, and therefore in most applications the aggregated tables are used. A further reason for reducing the tables for regional analysis is that all industries may not be represented in all regions and hence the required 'location quotients' (related to employment in the industry) cannot be calculated. Butcher (1985) estimated regional transactions for 131 industries and then reduced to 36 industries for the calculation of multipliers. Unfortunately the tourism industry cannot be directly identified from these tables.

Duncan *et al.* (1992) describe the two ways of calculating tourism multipliers from input-output tables. Firstly appropriate industries can be selected and 'split' into tourism and non-tourism components. These new rows and columns can then be aggregated into a tourism sector. The second, simpler approach, applies 'output weightings' to relevant sector multipliers. This assumes that the input mix of the tourism and non tourism components are the same.

In the context of tourism multipliers, the *output* multiplier relates a dollar of tourist spending to the increase in output in the regional economy. The *income* multiplier shows the relationship between an additional dollar of tourist spending and changes in the level of (disposable) income. The *employment* multiplier describes the change in employment generated by an additional dollar of tourist spending. It is important to remember that these multipliers relate to *marginal* or *additional* expenditure.

Kerr *et al.* (1986) calculated regional multipliers including tourism multipliers for the Mackenzie Basin. These multipliers were also used in a study undertaken for the Fiordland area in 1990. The justification for using the same multipliers was that the areas were similar; they are both remote from major cities, influenced by hydro-electric power developments and reliant on agriculture and tourism as the main sources of income.

Table 8 shows comparative Type II tourism multipliers for the Mackenzie Basin, the province of Southland and the country as a whole. These multipliers are all based on 1981/82 input-output tables.

Type II Tourism multipliers	New Zealand	Southland	Mackenzie Basin
direct+indirect+induced output/ direct change	3.6	1.9	1.4
direct+indirect+induced employment/direct change	2.7	1.5	1.5
direct+indirect+induced income/ direct change	2.7	1.6	2.2

Table 8: Tourism multipliers (Source: Kerr *et al.* 1990)

Smaller regions will have greater leakages and therefore multipliers for a subregion will be smaller than for the region itself, and provincial multipliers will be less than national multipliers.

A major collaborative project was undertaken in 1991 by the NZIER and the New Zealand Tourism Board (Duncan *et al.* 1992), funded by the Foundation for Research Science and Technology. This project drew on earlier work by Lim (1991). Geoff Butcher was commissioned to generate updated regional input-output tables based on the 1986/87 inter industry study. Where possible data was incorporated from the 1991/92 study. The basis for expenditure used for the calculation of multipliers was the New Zealand Tourism Board surveys.

Tourism output multipliers (Type II) for the West Coast (Regional Council) area for the year ending March 1992 are (total New Zealand multipliers in brackets):

Total tourism	1.716 (2.788)
Domestic private travellers	1.718 (2.829)
Domestic business travellers	1.739 (2.714)
International travellers	1.715 (2.794)

The accuracy implied by three decimal places is probably not justified, and is shown here simply to indicate relativities.

The only area with a smaller total tourism multiplier than the West Coast is Southland (1.6) with Taranaki (1.7) also very close. This indicates that the three regions have high leakages of production and consumption-induced effects and are less self sufficient in tourism. It should be noted that the 1992 total tourism output multiplier for Southland is the same as the Butcher (1985) multiplier shown in Table 9, whereas the total New Zealand tourism multiplier for 1992 is considerably lower than the earlier one.

The Type II tourism multipliers calculated in the Duncan *et al.* report are: output 1.7, household income 1.6, and employment 2.1.

Using these multipliers and following the analysis in Kerr *et al.* (1990), the total employment effects of tourism (direct+indirect+induced) are outlined in Table 9.

	West Coast
Visitor spending	\$124m
Number of visitors	591,000
Average visitors/total job	441

Table 9: Employment effects of tourism

This implies that a total of 1036 jobs are derived from tourism. This is 8% of the total number gainfully employed, similar to the national average.

4.5 The role of DoC in attracting tourists

The diversity of the area and the variety of experience available makes it difficult to determine with any accuracy what proportion of tourist expenditure can be attributed to the presence of conservation lands. Tourism is labour intensive and creates jobs, however, these jobs do not necessarily go to local residents. In some cases people may be attracted to the area for work, in other cases the jobs may go to people living outside the region. For example, a number of the concession holders for activities such as hunting live outside the region and travel to the region only when taking groups. Other activities such as cycle tours operate in a similar manner, and since they do not require direct access to conservation lands are not recorded by DoC.

Sandrey (1987) asked visitors why they were travelling on the West Coast. Visitors were allowed to choose as many categories as they liked and there was no ranking of importance. Table 10 summarises the most reasons selected most frequently.

Since 1987 there have been considerable developments in the area of adventure tourism and it is therefore likely that the recreational category would now be of greater importance. In the absence of any ranking or cross-tabulation it is not possible to make any further linkages between these reasons for visiting the coast.

Reason for visit	%age
scenery	68
visit parks/reserves	40
new area	29
unpolluted/isolated	26
historical/cultural interest	25
passing through	23
recreational opportunities	17
close to friends and relatives	10

Table 10: Motivation for visit to Coast (Source: Sandrey (1987) Table 17, p15)

Total visitor spending on the West Coast for 1993 has been estimated as \$124m. Spending for international visitors has been estimated at \$60m, and it has also been estimated that 97% of international visitors on the West Coast visit a National Park. This implies that a significant proportion of the \$60m spent by international visitors is directly related to the presence of conservation lands.

Table 10 indicates that 68 percent of all visitors described the scenery as a major reason for their visit, and 40 percent responded that they came to visit parks and reserves. This suggests that more than 70 percent of visitors to the region are attracted by the presence of conservation lands and the opportunities created by them.

5 EXTRACTIVE ACTIVITIES

The commercial operations covered in this section are whitebaiting and eeling, mining, sphagnum moss, grazing and commercial hunting. Where possible estimates of the following economic variables have been calculated:

- the direct value of the output,
- the value of the output including forward linkages,
- the numbers directly employed by those activities, and
- cost recovery or Crown revenue from commercial activities.

In addition there are general notes concerning the data and other relevant aspects of the operations, The sources, reliability and age of the data vary considerably with the data for sphagnum moss and commercial hunting being the most reliable and the value of grazing the least reliable. Difficulties in collection and estimation are discussed within each section. Prices and values are exclusive of GST.

The activities undertaken on DoC land are primary production activities which have low backward multipliers therefore only forward multipliers were calculated. Forward linkages were estimated for commercial hunting and grazing, based on the output of dairy and meat processing.

Total Farming Output for the West Coast		\$96.6m
Total Dairy and Meat Processing for the West Coast		\$90m
Forward Multiplier	<u>Dairy and Meat</u> Total Output	0.9317

Forward linkages were not estimated for mining since they are assumed to be minimal, nor for sphagnum moss since it is nearly all exported and FOB⁵ prices are used. Estimates of backward linkages could be made using multipliers supplied by Vijay Narayan, however, most of the industries are primary industries therefore they are not likely to be significant.

5.1 Freshwater fisheries

In economic terms the most significant freshwater fishery on the West Coast is whitebait. The size of this resource, which is renowned throughout New Zealand, is directly attributable to the existence of the lands managed for conservation purposes. In many areas of the country changes in land use and related activities have lead to the loss or modification of spawning areas with a subsequent decimation of the whitebait resource. By contrast the high proportion of conservation lands on the West Coast has meant the whitebait habitat in the region has remained largely unspoilt. Today, about three quarters of all the catches in New Zealand come from the West Coast (West Coast Conservancy Business Plan, cited in Narayan, 1991).

Whitebait are an indigenous resource and DoC is actively involved in the protection of the whitebait habitat. These conservation activities extend beyond Crown lands with the Department working with private land owners and individuals to ensure that spawning areas are protected.

⁵ FOB (Free On Board) refers to the cost delivered to a New Zealand port as opposed to CIF (Cost, Insurance, Freight) which includes freight, insurance and duties to overseas destinations.

The Department is also responsible for setting the season and declaring 'no-go' areas. Recent changes which saw the season being brought forward to reduce the catches of specific late running species, met stiff resistance from whitebaiters who claimed the consultation process was inadequate. A positive result of this was the establishment of a whitebaiters' association to improve the level of communication between the fishermen and DoC.

Whitebaiting on the West Coast is not a purely a recreational activity. During the season it attracts significant numbers of both commercial and recreational fishermen from within and outside the region. Nor is the economic value of the resource confined to the considerations of tourism. Whitebaiting represents a significant industry in its own right and provides a direct source of income and employment to many West Coast residents and outside visitors.

The value of the resource and the income gained from it is difficult to estimate due to the informal nature of the industry and inter-seasonal fluctuations. Narayan (1991) suggests the value of the catch is well in excess of seven million dollars. As DoC is actively involved in the protection of the fishery and the fish there may be justification in attributing a significant proportion of the catch to the conservation lands.

Eels are another commercial resource that is largely attributable to the conservation lands. The value of this resource is uncertain but is considerably less than that of whitebait. DoC administers much of this resource but is not active in its management.

5.2 Mining

(1) Value of mining operations on conservation land

Note: These may be regarded as very conservative figures due to the lack of data on many licences and under-reporting on returns (see narrative following).

	<u>Output</u>	<u>Value</u>
Gold	61.1937 kg	\$1,162,680
Limestone	3056 t	\$239,020
Rock	14,060 t	\$24,448
Coal	92,436 t	\$7,857,052

Estimated total value of mineral production: \$9,283,200

Sources of Data

The production quantities are based on Ministry of Commerce output statistics for licences known to be on conservation land.

The prices used to compute the values of the output were:

Gold	\$19,000/kg
Limestone	\$17/tonne
Rock	\$8/tonne
Coal	\$85/tonne

The prices of gold, limestone and rock were calculated from the Summary Statistics (1992) supplied by the Ministry of Commerce. The price of coal was estimated based on figures quoted (by telephone) by Coal Corp's sales division in Christchurch. Prices for coal currently range between \$80 and \$90 per tonne.

There were some discrepancies in the Ministry of Commerce data with respect to production outputs. Furthermore, the Ministry admits that the reporting figures for gold may seriously under-estimate the output due to miners wishing to avoid tax. These figures may therefore be considered conservative estimates.

(2) Forward linkages

As most mineral production is exported with very little processing the forward linkages are negligible and so have not been estimated.

(3) Employment

Estimation of mining related employment is problematic as the available employment figures do not distinguish between types of mining. In this case, coal mining may require more labour per dollar of output than gold mining. As coal makes up most of the value of mining on the DoC managed land, the figures here are likely to be conservative estimates.

The percentage of mining on Conservation land (7 percent) is based on the output value calculated above. Mining output from Conservation land has been estimated at \$9,283,200. Total West Coast mining output is \$133,768,458 based on Ministry of Commerce output figures and the prices used above.

Total West Coast Mining Employment (Narayan, 1991)	638
-------------------------------------------------------	-----

Percentage of Mining on Conservation land	7%
-------------------------------------------	----

Total direct employment on Conservation land from mining	45
-----------------------------------------------------------------	-----------

(4) Cost recovery

Fees are charged for licence processing and administration. These are paid to the Crown and the local conservancy is not able to claim any return for managing the administration. Under the Crown Minerals Act 1990, new licence applicants are required to negotiate access agreements with the land owners.

(5) Notes

The mining industry on the West Coast appears to be expanding. There are a number of new mining and prospecting applications being sought under the Crown Minerals Act 1991, which require negotiations with the landowners over access to the land. The proposed Globe Progress mine may be an indication of things to come with respect to gold mining on the West Coast with the mining company, Macraes, undertaking extensive consultation and negotiation with DoC.

The coal industry on the West Coast is also expanding. The 1992 figures showed a record output of 1,026,116 tonnes and there are plans to significantly increase this figure in the next few years (The Press, 25/10/93; David Stapleton, 1994). However, it is not clear as to how much of this intended expansion is on conservation land.

5.3 Sphagnum moss

(1) Value of sphagnum from conservation lands on the West Coast

Total NZ Production 1993:

Quantity: 1,056,840 kg (dry), Value (FOB): \$18,381,417
(Source: Statistics NZ)

Proportion of NZ production from West Coast: 90 percent.

(Source: per comm's with John Chamberlain, Kees van Beek)

Proportion of West Coast Production from conservation lands:

20 to 30 percent, 25% has been used all the following calculations unless otherwise stated.
(Source: NZHEA 1993, and pers. comm. with Kees van Beek, Terry Farrell)

Quantity of output from conservation land: 237,789 kg
(based on 25% from conservation land, $1,056,840 \text{ kg} \times .90 \times .25$)

Total FOB value of sphagnum output: \$4,135,818
(based on 25% from conservation land, being $\$18,381,417 \times 0.90 \times 0.25$)

Min \$3,308,655 (20% from Conservation land)
Max \$4,962,982 (30% from Conservation land)

Note: The FOB values shown here should be treated with caution if they are being compared to the value of the direct output of other sectors in this report. The values shown above include processing costs while the direct output figures for other sectors do not. This arises because the statistics for sphagnum do not make a distinction between collection of the moss and processing of the moss. The statistics for other sectors do make this distinction. For example, agriculture is considered a separate sector from meat and dairy processing.

The FOB value should therefore only be compared with the total values of other sectors *including* the forward linkages.

To allow for comparison with the other sectors estimates of the wet and dry values have been included. However, these estimates are less accurate than the FOB value as the prices vary with quality. In addition, other variables, such as the percentage of production from conservation land, still exist.

Dry Value: \$2,615,679
(based on dry price of \$11/kg x 237,789kg)

Wet Value: \$1,426,734
(based on \$0.40/kg, 237,789 dry kg, wet/dry ratio 15:1)

(2) Forward linkages

As explained above the forward linkages are not applicable as the FOB values have been used. The FOB value of moss may be directly compared with the value of output including forward linkages for other sectors.

(3) Employment

Total Employment in Sphagnum Industry for West Coast: 300
(Source: Narayan, per. comm. 1994)

**Employment from sphagnum collection
& processing on Conservation land: 75**

(based on 25 percent of production from conservation land)

Note: As with the values of output, comparisons of employment compared to other sectors should be approached with caution due to the way in which statistics are collected. The employment figures given here do not distinguish between those employed in harvesting and those employed in processing.

Many people employed in the sphagnum industry work on a casual or part-time basis making the collection of accurate statistics difficult. One estimate of those employed in the West Coast sphagnum industry was over 400 (van Beek), another suggested that it was "up to 1000" (NZHEA), so the figures used here are likely to be conservative.

(4) Cost recovery

(Source: Terry Farrell, January 1994)

Long term Licences:	12,	Value to the Crown approx:	\$120,000
Short Term Licences:	31,	Value to the Crown approx:	\$19,000

Total \$139,000

Note: These are approximate figures as harvest quantities vary between years and licences are based on expected harvest. Long term licences are usually for 5 years, short term licences are for 6-12 months. Also see part 5(c).

(5) Notes/additional information

(a) The Sphagnum Industry in General

Reports from the NZHEA (1993) and Graham McCort (1993) both contain a good description of the industry including biological information and historical data on prices, production and industry costs.

The industry appears to be establishing itself on a more official footing with the formation of the Quality Moss Packers Association (*not* part of the NZHEA) and the introduction in April 1992 of a 25 percent withholding tax for growers or sellers who are unable to supply an IRD number to processors. John Chamberlain believes that the introduction of the withholding tax has also decreased poaching.

(b) Future of the Industry

Although the NZHEA (1993) report predicts growth of 20 percent in export volumes by 1998, Terry Farrell, Kees van Beek, John Chamberlain and David Stapleton all believe that the *harvest volumes* from the West Coast have reached a peak. However, John Chamberlain believes that there will be continuing growth in the *value* of exports. This is supported by the historical data on the export quantities and FOB prices (see Appendix II of NZHEA report).

The growth of other regions of New Zealand also appears to be limited due to both the limited availability of the resource in those areas and slower re-generation rates.

(c) DoC and the Industry

The DoC licences are increasingly tending towards long term leases rather than short term leases. Leases are granted through a tender process in which it is specifically stated that price is not the only factor. There is a perception that longer term leases encourage better management of the resource as short leases encourage over-picking (Terry Farrell, *pers. comm.*).

The major difficulty facing DoC with respect to sphagnum appears to be estimating the harvest volume. This causes problems for the licensing procedure as the licences are based on expected yields and paid for in advance. The returns to DoC vary between \$110 - \$180 per wet tonne depending on the location, quality, etc.

Using a pessimistic scenario (\$110/wet t, 20% from Conservation land) payment to the Crown should be of the order of \$330,000 per annum. While the actual revenues will differ considerably due the varying length of the licences, the revenues currently collected appear to be considerably less than this pessimistic estimate.

(d) Additional Data

(Source: John Chamberlain, Kees van Beek)

Wet/dry ratio: approx 15:1 (This value varies between processors: a range from 12:1 to 16:1 was reported).

Wet Price \$0.40/kg, Dry Price \$10-12/kg.

Royalty to land owners: \$100-150/t (Note: DoC rate estimated at \$110 to \$180 /t).

Approximately two thirds is picked by independent pickers and then sold to processors and exporters.

5.4 Grazing, occupancy and industrial licences

5.4.1 Industrial and occupancy licences

(1) Value of direct output

As industrial and occupancy licences are relatively few, cover only a small area of land and in many cases relate to holiday or recreational use, the rentals received by the Crown have been used a proxy for the economic value of these licences.

This gives the following values:

Total Occupancy Value:	\$5,800
Total Industrial Value:	\$5,145
Total value of occupancy and industrial licences:	\$10,945

The value of returns per stock unit was based on Alexander (1990) and his 1993 update. The assumptions are: that the main output of grazing is beef, the average selling price is \$300 per animal, and the stock conversion rate is six stock units per animal.

An attempt to verify these estimates was made by reference to 1991 Agriculture Statistics for the West Coast Region produced by Statistics NZ. These calculations resulted in figures of approximately 6 SU per ha. Given that many of the DoC licences are on marginal land, the figure of 6 SU per ha appears broadly consistent with the figure suggested by Alexander (1990). In addition, the Statistics NZ figures suggest a return of \$84 per SU which is significantly greater than the gross return given by Alexander (1990).

Further substantiation was therefore sought from the Farm Advisory Unit at Lincoln University (Whatman, 1994) who confirmed that \$50 per SU was reasonable for 1993 but probably a little low for 1994 prices. They were unable to advise on SU per hectare due the high degree of variation between licences.

(2) Forward linkages

Using the West Coast Regional Statistics (Narayan, 1991) a forward multiplier of 0.9317 was calculated. This gives the following values for output:

Estimated Direct Output (as above)	\$5,872,100
Forward Linkages (Multiplier of 0.9317)	\$5,471,035
Estimate total output including forward linkages	\$11,343,135

(3) Direct employment

The total West Coast output and employment figures used here are based on 1991 estimates from Narayan (1992). However, as the 1991 prices were lower than 1993 prices, which were used in section (2) to estimate the value of output, a lower figure of \$40 per stock unit has been used. Using these figures the following estimates were calculated:

Direct Pastoral Output of conservation land (using \$40/SU)	\$4,697,680
Direct Pastoral Output of West Coast (Narayan, 1991)	\$96,600,000
Percentage of Total Pastoral Output from conservation land	4.9%
Total Number Employed in Pastoral Sector (Narayan, 1991)	1347
Estimate of total number employed from pastoral activities on conservation land (4.9% Of 1347)	66

(4) Cost recovery

	<u>Area</u>	<u>Revenue</u>
Grazing	36,778	\$58,181

On first inspection these revenues appear to be well below the market values based on the areas and output. However DoC is currently reviewing its leases and many of these will be increased when they are reviewed. In addition, the quality of the land and the need to protect conservation values also decreases the rental values. It is also worth noting that in many cases

there are no other potential leasers which puts DoC in a weaker bargaining position (Alexander, 1990).

(5) Notes on data

As noted at the beginning of this section, the estimation of the value of grazing output is very complex. The major remaining source of uncertainty is the estimation of output per hectare. As the grazing licences make up such a significant amount of the total value of output of conservation land, further work is required in this area. Any errors in this calculation will be magnified in the forward linkages and will also carry over to the employment statistics.

5.5 Commercial hunting

(1) Values of commercial hunting

Values are based on prices paid to hunters by processing plants. They do not reflect the retail or export prices.

(a) Deer

(Source: Terry Farrell)

Number of animals shot (6297 Mair Venison, 1100 VNZL)	7397
Estimated Average Weight:	50.3kg
Estimated Average Price:	\$2.68/kg

Estimated Total Value of Commercial Deer Hunting: \$997,145

(b) Pigs

(Source: Numbers, Terry Farrell; Weights & prices, Shirley Crowley)

Number of animals shot:	3096
Estimated Average Weight:	45.4kg
Estimated Average Price:	\$1.48/kg

Estimated Total Value of Commercial Pig Hunting: \$208,026

(c) Chamois

(Source: Numbers & Weights, Terry Farrell;

Price, estimated average price from Mair Venison price list)

Number of animals shot:	1310
Estimated Average Weight:	25kg
Estimated Average Price:	\$2.60/kg

Estimated Total Value of Commercial Chamois Hunting: \$85,150

Estimated total direct output of commercial hunting: \$1,290,321

(2) Forward linkages

Using the West Coast Regional Statistics (Narayan, 1991) a forward multiplier of 0.9317 has been calculated. This gives the following values for output:

Estimated Direct Output (as above)	\$1,290,321
Estimated Forward Linkages (\$1,290,321 x 0.9317)	<u>\$1,202,162</u>
Estimated total output (including forward linkages)	\$2,492,483

(3) Employment

No estimates of employment were able to be calculated as hunting was not listed as a separate industry within the employment statistics.

(4) Cost recovery

There are minimal revenues to the Crown from commercial hunting. Each operator must have a licence to operate an aircraft on DoC managed land which costs \$1000 per year and is paid to DoC Head Office, Wellington. An administration fee of \$100 is payable for the processing of the hunting licence. No royalties are charged as the animals hunted are considered pests.

(5) Notes

Goats and possums are not currently considered commercially viable and the hunting of these animals is usually done on a contract basis paid for by DoC.

Sources

Terry Farrell, Senior Conservation Officer, DoC, Hokitika (Pers. comm., January 1994).

Note: Terry's estimates are based on production figures from the only two 'significant' processing plants for the West Coast: Mair Venison, Hokitika, and Venison New Zealand Limited, Mossburn. Figures are for the year ending September 1993. The weights and prices of the deer are from a sample of 2034 deer that Terry took from animals processed at the Mair processing plant. The average weight of chamois is Terry's unconfirmed estimate.

Shirley Crowley, Mair Venison, P O Box 128, Hokitika. Tel: (03) 755 8926 (Pers. comm. with Janet Gough, March 1994).

Note: The weights and prices are the average of the 113 pigs that were processed by Mair Venison in January 1994.

5.6 Other activities

There are a number of other resource based productive activities that are associated with conservation lands on the West Coast. These include forestry, fishing, and greenstone mining and collection.

There is no commercial logging occurring on conservation lands on the West Coast, therefore forestry was not considered. Forestry is a sensitive issue on the West Coast, and there has been considerable effort expended in trying to reach a compromise between commercial interests and conservationists. The commercial limit for forestry is considered to be between 900 and 1000 metres above sea level. Much of the land managed by DoC is above this level.⁶

Ngai Tahu has claimed ownership of all greenstone in the South Island as a treasure guaranteed under the Treaty of Waitangi. In 1991, the Waitangi Tribunal recommended that the government vest ownership on Ngai Tahu, however, this has not yet been done. In the meantime, the Ministry of Commerce and DoC are processing applications to mine greenstone. Ngai Trust Board lawyers have begun action on the High Court seeking a ruling to stop this processing.

⁶ Information from Landcare not yet available.

Possoms are widely spread throughout the West Coast and constitute a potential source of economic benefits, principally through use of fur. Given current circumstances it would be difficult to attribute any positive economic benefits to possums on conservation lands. Firstly, the possum is not native to New Zealand and causes great damage to native flora and fauna. Possum control operations constitute a significant part of DoC operational costs. Secondly, currently possums are rarely commercially hunted for their fur or meat as prices are too low. Hunting usually only occurs when paid for by DoC or other Government agencies (as a control measure). Finally, the possum, along with other feral animals, is a vector for bovine tuberculosis. This imposes a significant negative externality on agriculture which would need to be included if the economic benefits were to be considered.

6 OPERATIONS

Source: Data from the West Coast Conservancy Business Plan for the year 01/07/93 to 30/06/94.⁷

Analysis of the year to date expenditure may be misleading as the rate of expenditure may vary over the accounting period. For example, the pest control monies may be largely spent in late summer when the weather conditions are more suitable for poisoning operations.

Comparison with other years: Due to changes in the format of the 93/94 business plan and the re-classification of some expenditure to different categories, comparison with other years is not readily possible. This prevents changes or trends in expenditure and/or revenue from being analysed.

Detail/Depth of data: The data has been presented in broad categories only. The business plan contains considerable further detail including the distribution of expenditure within the West Coast.

Background Information: The Business Plan consists of three parts: narrative, output information and financial information. The financial section was used in compiling the attached data, but the other sections give interesting, although not necessarily relevant, background information.

Difficulties/Problems: The data does not fully distinguish where the monies were actually spent, only where the benefits are going or the project they are being charged to. For example, vehicles may be purchased via Head Office in Wellington but used and charged to the field centres. Therefore while the running costs may be spent locally, the initial purchase may not be contributing to the West Coast. Accurate data was not available on this allocation.

The cost of supply of services includes the opportunity cost of acquiring the physical resources and the annual operating costs. The total annual cost of supply is therefore the annual return that the resources would have earned in their next best alternative plus the costs of maintenance, upkeep, information programmes etc. Primary benefits include the direct revenue earned from licences and fees as well as the 'satisfaction' received by visitors. For a National Park, the primary benefits may be determined by ascertaining the beneficiaries willingness to pay. Secondary benefits result from economic activity generated in the process of realising primary benefits.

⁷ On a cautionary note, this data has been derived from a single source and has not been verified.

DoC Operations Source: West Coast Conservancy Business Plan, 1993-94		TOTAL Cost (\$)
Policy advice and ministerial servicing (resolution of treaty issues)		66,188
Implementation of legal protection		204,299
Statutory planning and coastal responsibilities under the RMA: Statutory planning Coastal policies	242,395 62,938	305,333
Management services - conservation estate: Fire suppression Animal pest control Plant pest control Restoration Conservation of historic resources Conservancy estate monitoring	316,688 1,276,834 225,940 69,953 225,793 13,349	2,128,197
Management services - protected species and island habitats		659,391
Management of statutory actions, leases, licences & other concessions: Management of commercial recreation & tourism concessions Management of non-tourism or recreational leases, licences & concessions Pastoral leases Land administration	133,505 561,319 0 115,281	810,105
Provision of recreational opportunities: access, facilities and services: Huts and campgrounds Other recreational facilities and services	563,603 2143,357	2,706,960
Management of visitor and public information services: Visitor and public information services Retailing conservation goods	1,343,534 480,087	1,823,621
Conservation management strategies		328,351
GRAND TOTAL		9,032,445

Table 11: Summary of DoC operations budget 1993-94

7 CONCLUSIONS AND RECOMMENDATIONS

The Department of Conservation has a major role in the economy of the West Coast region. The role of DoC on the West Coast is unique because of the high proportion of conservation lands in the region. The DoC has an important role in a number of sectors of the economy including tourism, mining and farming.

- DoC's primary role is as manager and administrator of Crown lands. DoC's mandate is conservation.

This report has considered DoC's role in the productive base of the region in terms of the different sectors. The broad base of DoC's involvement, the limitations of the data available, and inconsistencies in the form of the data meant that sectorial information could not be validly combined, nor could trends be estimated.

- It is recommended that DoC continue the process of collecting economic statistics and refining the information.

DoC has a high profile on the West Coast. Many people are required to interact with DoC as part of their business. At the same time DoC is dependent on the community for support in a number of areas. It is important to DoC that the individuals and agencies that it interacts with should do so on a co-operative basis, otherwise lengthy disputes may arise.

- DoC needs to behave in a consistent fashion, to promote interaction and communication with the community and to provide an environment that encourages individuals and groups to come to DoC for information before conflicts arise.
- DoC needs to ensure that its own internal communication strategy is open and consistent.

Tourism is of crucial importance to the West Coast economy, and DoC is a major provider of services to tourists both directly through provision of services, and indirectly through the management of the resource.

It is estimated that 97% of international tourists and more than 70% of all tourists are attracted to the West Coast because of the presence of natural parks and natural areas. All visitors will take advantage of their presence at some stage during their visit.

- Increasing tourist's length of stay is the key to increasing regional income from tourism. DoC can assist by promoting activities such as nature tourism.

This project constitutes a scoping study. The areas where DoC contributes directly to the West Coast economy have been identified, and an attempt made to quantify this contribution. This did not allow for in depth study of the different sectors, nor could the sectors be aggregated because of inconsistencies in the types of data available. The information, however, provides a useful summary of DoC's role in the West Coast economy.

The West Coast Conservancy derives income from concessions and licence fees. This money is used for operating expenses and hence is important to DoC for assisting in maintaining and enhancing the resources that DoC manages.

Future areas of research

Areas where economic research could provide DoC with information to assist in managing the resources under its jurisdiction include:

- the identification and evaluation of unpriced outputs and indirect benefits associated with the presence of conservation lands, and
- the development of an approach to assessing the conservation values of particular areas.

Another issue that warrants further investigation because of its association with DoC objectives is the question of inter-generational equity, and the need to preserve ecosystems and species for future generations.

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APPENDIX A COMMENT

Vijay Narayan, economist with the West Coast Regional Council has provided the following comment regarding land tenure. He refutes the conclusion reached in this paper that land tenure configuration (especially the low level of private lands) does not unduly restrict local governments in providing services.

The West Coast no doubt is isolated, lightly populated and has geographical disadvantages which together form some of its inherent problems. However, when it comes to governments providing services including planning under the plethora of acts that local governments operate under, the situation is somewhat different. For local services to be provided, the funding needs to be there and this is basically provided from rates. If there are problems relating to funding then that is a problem of rates.

The problem is basically land tenure. Even though the area of private land per head of population is higher on the West Coast (West Coast 8.2ha; New Zealand 4.6ha), the region still has only 11.1% as private land where as for the rest of New Zealand the figure is about 60%. It is obvious that the more land that is in private ownership, the more will be the rates. Total rateable land on the West Coast is 21% where as for New Zealand it is 73% and this is logical as there is more land in private hands in the country than on the West Coast. Recent statistics have also shown that residents on the West Coast are some of the highest rate payers in the country on the basis of regional rates per head of population.

Furthermore, the Regional Council has increased its rates on the few rate payers for the current financial year by almost 10% and this has still not solved the problem in terms of local government services. There is a continuous shortfall of funding and services as a result of lack of rates and this to a large extent is due to the configuration of land tenure system in the region. The Regional Council finds difficulty in adequately fulfilling all its functions under the various acts it operates under due to lack of funding/rates.

The rates increases have been shown not to work. Because the rating base is so constricted the only option is for continual increases and even this option is quickly becoming economically unsustainable. If the base is enlarged then perhaps the perennial problem of funding and provision of local government services to the whole region may become less acute.

APPENDIX B

UPDATING OF INFORMATION - DATA COLLECTION

1 Introduction

One of the objectives of this report was to establish a set of economic indicators that could be used to assess the economic impacts of the lands managed for conservation purposes on the West Coast. This has been done and the values are presented within the report.

For the future it will be important that periodic updating be undertaken to assess trends in the data. This section outlines how this updating may be done. Sources of information used in compiling the report are listed in the bibliography.

Data was collected from many sources including DoC's staff, the West Coast Regional Council, the Ministry of Commerce, Statistics New Zealand and industry sources. Some of the information provided by these sources is regularly updated. This includes the statistics provided by Statistics New Zealand and the Ministry of Commerce. Other sources are one-off or irregular reports such as those provided by the West Coast Regional Council, HEA and Landcorp.

While formal publications provide more rigorous statistics often the most informative and useful information came from direct communication with those involved in each sector. Almost without exception the response of those approached was friendly, polite and helpful. Direct communications do vary greatly in quality depending on the experience and knowledge of individual. They are also interspersed with commercial and political posturing. However, even posturing and the inability or unwillingness to provide certain information can be informative in itself. It is recommended that periodic and informal contact with outside sources be established and maintained to promote the understanding of DoC's objectives and assist in the updating of the report.

The remainder of this section outlines the **how** to update the information in this report. It **must** be used in conjunction with the notes and caveats contained throughout the text of the report. Failure to do so may render any updates as useless.

2 Mining

DoC itself is the primary source of information regarding which mining licences pertain to conservation lands. The greatest difficulty in assessing the value of mining output was obtaining a comprehensive list of mining operations on DoC land. However, this issue has already been raised and is being addressed. It may be possible to obtain this information from detailed analysis of Ministry of Commerce records held at Greymouth but this would be a massive task and a very inefficient method of data collection. Licence information should include the licence number, location, and name of the applicant or licence holder to assist in the cross referencing with the Ministry of Commerce information output.

For updating of output values the Ministry of Commerce is the primary source of information. Data were received from both Mr Ken Townsley in Wellington and Mr Mark Pizey, the Senior Inspector of Mines in Greymouth. The data from Wellington included both summary and detailed mining outputs. The detailed information from Mark Pizey was used to supplement the data from Wellington.

Summary Mining Statistics for the Greymouth Inspectorate are available from the Ministry of Commerce in Wellington. These provide the aggregated quantities and values of the minerals in the

region. From these the prices, and subsequently the values, for the output of the mining on the conservation lands can be determined.

The data obtained from Wellington were more comprehensive but the data from Greymouth may have been more recent. It is difficult to assess the relative usefulness of each source as comparisons with the list of DoC mining operations was a problem for both sources. A better assessment may be made when a more accurate list is available.

Gold quantities on the detailed Ministry of Commerce statistics will be seriously understated. This is widely recognised by both the Ministry of Commerce and the West Coast Alluvial Gold Miners Association. The reported returns may be only between 40-70 percent of the actual returns (pers. comm. Mark Pizey; WCAGMA).

For an idea of magnitude of these under-estimations the West Coast Alluvial Gold Miners Association and the Inspector of Mines in Greymouth should be approached. Only the official (Ministry of Commerce) outputs were used in this report.

3 Sphagnum

The Statistics New Zealand are the principal source of information regarding sphagnum values. Their 'INFOSS' service gives both the quantity and value of exports from New Zealand. The relevant code to ask for is: 0604.10.01.01. The values provided by INFOSS are the FOB values which are the export values of the goods if delivered to the freight company within New Zealand⁸.

Industry sources were the principal providers of other relevant information such as the proportion of New Zealand production from the West Coast and the proportion of West Coast production from the DoC managed lands. These sources included both reports and personal communications as listed the text and bibliography.

The lack of reliable data is noted in the NZHEA report. The results of estimates of values are sensitive to the ratios mentioned above. However, to obtain accurate measures for these would appear to be very difficult and not worth the expense. However, like the grazing updates it may be possible to obtain improved estimates if combined with other tasks. In particular, if it is combined with changes in management of the resource. To obtain better estimates under the present management arrangements would be costly because it would rely on the licencees reporting their harvests, which they would then have an incentive to under-report. The enforcement or checking of these figures does not appear to be a practical option.

4 Grazing

The DoC's computerised records provide detailed information on the land areas of the grazing licences. The estimation of the productivity of the land is the major difficulty in calculating the values of pastoral leases. The estimates were based on information obtained by a limited survey of the licence files held by DoC in Hokitika, and information on stocking rates contained in communications between R.D.E. Alexander, of Landcorp, and the conservancy. Stock prices can be obtained from stock sales in the region.

As the value of grazing licences make up such a large part of the economic value of production further work in this area would be beneficial. In the long run it would greatly improve the accuracy of the

⁸ Export prices are usually quoted either FOB or CIF. For this study CIF is misleading as it includes duties, insurance and freight costs to the country of origin.

estimate if the stocking capacities were assessed and entered on the computer as the licences were issued or renewed. If this was done the value of grazing output could be accurately and readily assessed.

To reduce the amount of work required it is suggested that:

- any updating concentrates on the leases with large areas.
For example, the 57 leases over 100ha cover over 75 percent of the rental areas. A sample of the remaining 400 smaller leases may suffice for the remaining 25 percent.
- updating should be done in conjunction with licence renewals.
Whenever a licence comes up for renewal the annual productivity should be assessed. It is also important to ensure the productivity levels are assessed in a manner which can be readily aggregated, such as stock units per hectare per annum. For example, if the land is grazed in rotation with other pastures an indication of the time spent on the leased land should be sought to allow it to be converted to an annual productivity rate.
- continued computerisation.
This would appear to be extremely beneficial. If the productivity levels are recorded as a 'field' in the computerised lease records, up to date estimates could be readily calculated. Obviously, computer generated estimates are only as good as the input data and periodic data updates would be required, particularly for the large leases.

In addition to productivity levels the type of stock being grazed would also be useful as stock prices will vary between animal types. The prices are readily available for local stock sales.

Significant improvements in assessing the value of grazing outputs should be achievable in the medium term if it is planned for during the licence renewal and computerisation process. It does not appear to be worthwhile devoting resources specifically to extensive manual updating unless the licences are being renewed anyway. The point here is not to underrate the importance of grazing but to recognise that it should be done in conjunction with other tasks to avoid duplication.

5 Industrial and occupancy licences

This study used rentals received by DoC as proxies for the value of output for occupancy and industrial licences. The reasons for this were:

- these licences made up a small percentage of rental numbers, and an even small percentage of land area and revenues.
- the occupancy licences usually related to non-commercial activities whose values cannot readily be accessed.
- the use of output values from the industrial sites would be both misleading and inappropriate unless the inputs or outputs of the industrial activities related specifically to that land or location. This did not appear to be the case and so the value of their output could not reasonably be attributed to the conservation lands.

A central feature of the other uses of the land examined in this study was the immovable nature and geographic location of critical inputs. These may have related to flora, fauna or minerals but were site specific. Most of the industrial activities are not site specific. For example, if the industrial licence related a mill, fish processing factory or saleyard these could be relocated as the site is not generally a

critical input, whereas honey collection from DoC land may be considered site specific. For this reason the value of the output of industrial leases was deemed inappropriate.

Like the grazing licences the use of licence renewals and computerisation would assist in updating this data, however, the low number, value and area of these licences suggest that significant expenditure is not warranted.

6 Commercial hunting

Mair Venison and Venison New Zealand Limited were the principal sources of information on the values, numbers and weights of feral animals hunted for commercial use. Most of the information had already been compiled by Terry Farrell, Senior Conservation Officer at DoC in Hokitika. Verification and limited additional information may be obtained directly through Mair Venison in Hokitika.

For the purposes of this study assessing the value is important, rather than the number of animals. If possible it recommended that data on weights and actual prices paid, be collected for deer, pigs and chamois, in addition to the numbers of animals shot.

Accurate information on recreational hunting did not appear to be available.

7 Whitebait

The limited information on this resource was obtained from communication with DoC staff and the sources quoted in the text, principally Narayan (1991).

8 Economic outputs of the West Coast Region and New Zealand

The West Coast Regional Council and Statistics New Zealand collect considerable information which can be used for comparison with the economic values calculated in this report. Other industry reports and personnel may provide additional information.

9 Operations

The West Coast Conservancy Business Plan provides detailed information on DoC's operating activities. DoC financial staff should be consulted when interpreting the information. Also refer to the limitations of the data that accompany the operations information in Section 6 of this report, particularly regarding the use of actual year to date expenditures and the lack of differentiation between expenditure within and outside the region.

10 Demographics

A survey of conservancy staff can be used to obtain demographic information if required. Statistics New Zealand is able to provide demographic data for the region or New Zealand. section to be added

