workingpaper

Evaluating the Biodiversity Dataset

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About the Resource Project Team

The Resource Project Team comprises of Jessica Prendergast, Nicola Bradshaw, Chris Aitken, Lisa Bazalo, Jean-Charles Perquin, and Steph Versteeg. Each team member has placed a significant amount of time and effort into each Working Paper and the corresponding datasets.

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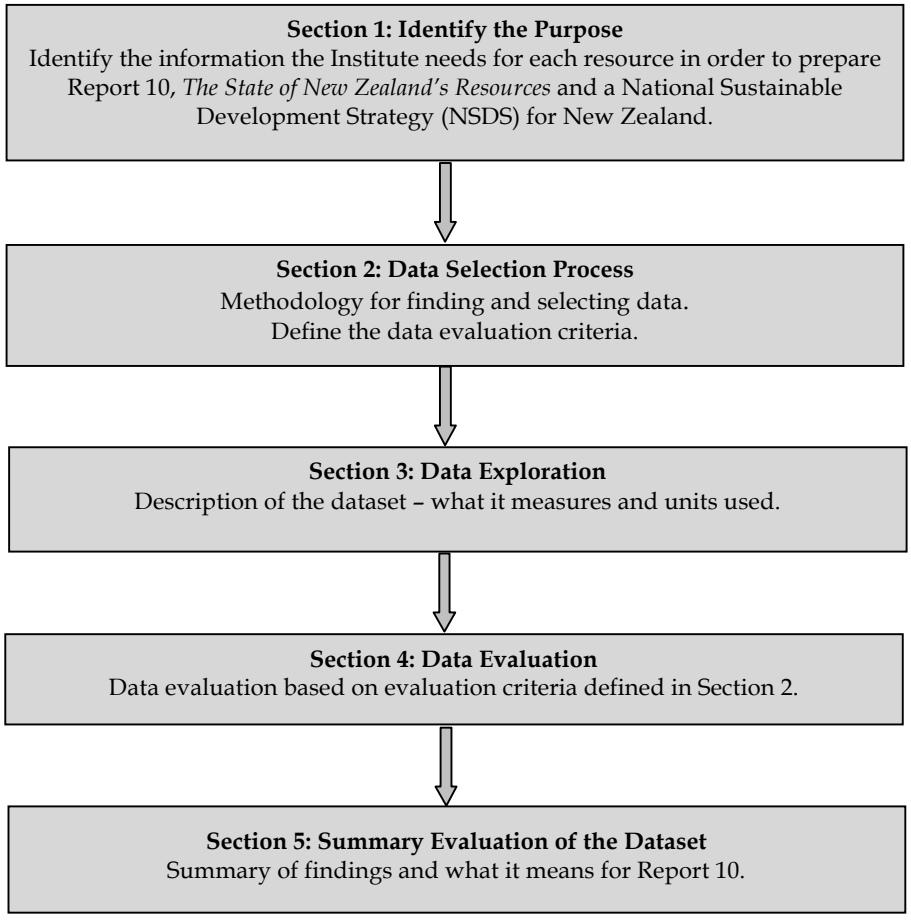
1. Purpose

This Working Paper is one of a series of 11 papers prepared as background to the Sustainable Future Institute's Report 10, *The State of New Zealand's Resources* (SFI, in press). Report 10 aims to provide an overview of available data and information covering a range of resources, and to discuss the use, availability and appropriateness of the data in the preparation of a National Sustainable Development Strategy (NSDS).

The purpose of this Working Paper is to describe the process by which the Institute collected, collated and presented a selection of biodiversity data. The datasets are summarised and evaluated for completeness, accuracy, relevance, appropriateness of sources and public availability. This paper also discusses the purpose for which the data was collected by its custodians, and why the Institute has selected this data for its reporting. The content of the dataset is not interpreted or analysed; rather, our purpose is to evaluate the usefulness of this dataset for the purposes of Report 10.

Following this evaluation any gaps and resulting limitations in using the selected data are assessed, as well as the data's relevance and reliability in relation to the Institute's purpose of using the comprehensive series of datasets to inform the development of an NSDS for New Zealand.

Figure 1 The Five-step Process for Evaluating the Institute's Datasets



1.1 The Sustainable Future Institute

The Institute is an independently funded think tank based in Wellington, New Zealand. Earlier work by the Institute has indicated that New Zealand is well behind other developed countries on its international obligations to develop and implement a National Sustainable Development Strategy (NSDS) (SFI, 2007). It is hoped that *Project 2058* will help inform ministers, policy analysts and members of the public about key events and trends in New Zealand's past, and alternative strategies for the future. With this in mind, this Working Paper is a step towards the Institute's goal of preparing an NSDS for New Zealand in 2011.

1.2 Project 2058

The strategic aim of *Project 2058* is to promote integrated long-term thinking, leadership and capacity building so that Aotearoa/New Zealand can effectively seek and create opportunities, and explore and manage risks, over the next 50 years. In order to achieve this aim, the *Project 2058* team is working to:

1. Develop a detailed understanding of the current national planning landscape, and in particular the government's ability to deliver long-term strategic sustainability thinking;
2. Develop a good working relationship with all parties that are working for and thinking about the 'long-term view';
3. Recognise the goals of iwi and hap□, and acknowledge te Tiriti o Waitangi;
4. Assess key aspects of New Zealand's society, asset base and economy in order to understand how they may shape the country's long-term future, such as government-funded science, natural and human-generated resources, the state sector and infrastructure;
5. Develop a set of four scenarios to explore and map possible futures for New Zealand;
6. Identify and analyse both New Zealand's future strengths and weaknesses, and potential international opportunities and threats;
7. Develop and describe a desirable sustainable future in detail, and
8. Prepare a *Project 2058* National Sustainable Development Strategy. (SFI, 2009: 3)

The culmination of *Project 2058*, the creation of a National Sustainable Development Strategy, depends on having an accurate assessment of key aspects of New Zealand society. Earlier reports have dealt in particular with points 1, 3, 5 and 6 above,[1] and this Working Paper is designed to help progress the fourth point: 'Assess key aspects of New Zealand's society, asset base and economy in order to understand how they may shape the country's long-term future …'

1.3 Biodiversity Resources within an NSDS

Below we ask six strategic questions that drive this research. These are then expanded upon to discuss the use, availability and appropriateness of the data in the preparation of an NSDS.

[1] For a detailed list of published and upcoming reports, see *Project 2058 Methodology: Version 3* (SFI, 2009: 7).

Without accurate, comprehensive, relevant and accessible data to answer the following questions, it will be difficult to develop and execute an informed NSDS for New Zealand.

- **What** are the issues facing New Zealand's biodiversity? Are New Zealanders clear on exactly what these issues are? Does New Zealand have quality data and information to enable us to understand these issues as fully as possible? Are New Zealanders able to establish an informed understanding of the priorities?

- **Why** does New Zealand need to confront issues affecting our biodiversity? Are there improvements that can be achieved; or practices that need to change? Are current indicators relevant and meaningful to benchmark changes over time? What is the purpose and the benefit in taking action?

- **When** should New Zealand start to address issues which impact on New Zealand's biodiversity? Is now the right time? Are current economic, social and environmental conditions conducive? Would it be beneficial to wait and monitor events as they evolve? Are current measures and indicators appropriate to monitor developments? Is there a risk of rushing into short-term action when a long-term approach is needed?

- **Where** do New Zealanders most need to concentrate their efforts to address New Zealand's biodiversity issues? Which aspects of the issue should be focused on first? Where should New Zealanders begin to ensure the most beneficial and sustainable outcome? Does New Zealand have sufficient knowledge, based on accurate and appropriate data, to assess outcomes?

- **Who** must be engaged to effectively address issues facing biodiversity in New Zealand? Who needs to be involved if New Zealand is going to successfully tackle these issues? Is data on biodiversity in New Zealand accessible and transparent to allow those interested to be accurately informed? Are data ownership issues affecting public involvement?

- **How** should New Zealand ensure we have effective management of our biodiversity? What is the best approach? What skills or techniques are needed? Does New Zealand have comprehensive and accurate information to enable effective management? How can New Zealand learn from international experience to assist in the maintenance, protection and improvement of biodiversity?

This working paper does not attempt to answer the above overarching questions. These overarching questions do however inform our purpose for Report 10 and in progressing an NSDS. Data collected for inclusion within this dataset has enabled us to understand the level of accuracy, relevance, comprehensiveness and issues of ownership that exist surrounding publicly available data in New Zealand. The above questions function as a bridge between the dataset, this Working Paper and Report 10; specific questions pertaining to how the selected Institute's dataset will inform the development of an NSDS are outlined in Table 1.

2. Data Selection Process

2.1 Methodology

Report 10a, *Designing a Framework to Monitor New Zealand's Resources* (SFI, 2010a) outlined the process through which the Institute developed the framework for collecting and presenting the data. With this framework in place, the steps towards the completion of Report 10 are: (i) building the datasets for the 11 resource types studied; (ii) evaluating the selected datasets, and (iii) reporting on the findings in relation to the Institute's aim of defining an NSDS for New Zealand. The datasets developed in Step (i) are available on our website.[2] This Working Paper is one of 11 that form Step (ii), the data evaluation. Step (iii) will be published in Report 10.

The source data for the Institute's Biodiversity Dataset was reproduced from a variety of static tables extracted from the Ministry for the Environment (MfE) *Environment New Zealand 2007 Report* (MfE, 2007) and the Organisation for Economic Co-operation and Development (OECD) *Environmental Performance Reviews: New Zealand* (OECD, 2007). The tables used are listed on the Institute's website under Project 2058 Publications and State of New Zealand's Resources. The Institute has taken the original data and reformatted it in an Excel spreadsheet to facilitate use and analysis. The original data values have been preserved.

2.2 Sources of Data

The Institute supports the free availability of data relating to environmental statistics. With this in mind, we deliberately used only openly accessible data so that we were able to report on its availability and identify potential gaps. This enables us to report on the implications of using only freely available data, and to evaluate the information that can be extracted from these data sources.

We acknowledge that many sources of information exist on New Zealand biodiversity that may or may not be publicly available or easily discoverable. Crown Research Institutes (CRIs), universities, national and local government, and other private and public organisations also collect and hold data on biodiversity.

For various reasons including privacy, commercial sensitivity, cost of dissemination or commercial sale price of the data, there are many datasets on New Zealand's resources that are inaccessible to the public. Without extensive research, funding or expertise to assist in the interpretation of the data, many others remain unavailable. The Institute has focused on open data; therefore no efforts have been made to retrieve the other datasets. This is a limitation of this project as gaps identified by the Institute could potentially be filled by these other data sources.

The Institute also recognises that using only two databases (MfE and OECD) might suggest that New Zealand does not have extensive biodiversity data, particularly within the context of using this data to help inform a NSDS. The Institute searched for and compiled its dataset

[2] www.sustainablefuture.info

in 2009. What we have selected and discuss within this report reflects data fitting our purpose within the environmental data landscape at the time of research.

We recognise that, particularly since 2007, the range of publicly available biodiversity databases has grown considerably, as has interest in developing public policy in this area; the latest iteration of which is the Proposed National Policy Statement on Indigenous Biodiversity. Other programmes and institutions such as the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme and the Foundation for Research, Science and Technology (FRST) provide funding for biodiversity research and accessible output from these can be reasonably expected to become increasingly available. Other databases have recently become digitised and made available online, such as the National Vegetation Survey (NVS), available through Landcare Research and Global Biodiversity Information Facility (GBIF), that provides a significant amount of time series and spatial data[3].

As data availability increases rapidly on an ongoing basis, it would not be practical to include within this Working Paper all datasets relevant to biodiversity in New Zealand. Because of the recent developments in biodiversity databases, the information reviewed in this paper is intended to be a useful snapshot of some key biodiversity indicators at around 2005. Report 10 investigates the past, present and future of the environmental data landscape in New Zealand. It also provides a list of alternative sources of information pertaining to New Zealand resources. Where appropriate, we have mentioned complimentary data sources in this Working Paper.

Data on New Zealand resources is often produced and targeted to industry experts. This makes a thorough analysis and evaluation of datasets a complex task for the uninitiated. We have referred to the original source documents to support our evaluation of the datasets.

2.3 Biodiversity Dataset Evaluation Criteria

The Institute has developed a series of criteria to support the effective evaluation of its datasets and to consider the data in the context of our wider work programme. Each criterion is supplemented with questions to direct attention to relevant areas for consideration. The aim is to structure the analysis of each dataset in a way that is consistent and replicable across the 11 datasets. In this Working Paper, these criteria are applied to the Biodiversity Dataset as a whole and to the different indicators and sources that comprise the dataset.

The criteria and guiding questions are outlined in Table 1 below.

[3] Spatial data is geographic information that looks at topography and can be mapped and accessed through Geographic Information Systems.

Table 1 Criteria for Evaluating the Institute's Datasets

Criteria for evaluation	Guiding questions
Comprehensive time series	For how long has the data been collected? Are there gaps in the records? Are data/indicators consistent and comparable over time?
Quality data	What is the scope and range of indicators; are there any gaps? Is data comprehensive and detailed? How is data classified/categorised? Is the data local/regional/national? Is the data internationally comparable and valid? Is the data accurate – is there any sampling bias? Are error bars calculated? Is the data relevant and able to be interpreted with meaning?
Appropriate sources	How many sources are drawn on, and what are they? Who owns the data? Why, how and where is data collected/measured? Is the data original data, self-reported/obtained by survey? Is the data collection and analysis informed by sound assumptions? Is data reliable, independent, verifiable and/or of international standard? Is the data subject to (external) review?
Publicly available	Is the data easy to access? Is the data located online, in publicly available reports or databases, or within institutions? Is the data freely available?

2.4 Selected Sources

In order to find possible sources of biodiversity data to establish a baseline portrait of biodiversity in New Zealand, the websites of agencies and organisations with relevant links to New Zealand's biodiversity were reviewed for all publications which provided relevant information and data. A search was undertaken to find online datasets and statistics, documentation on the data collection and its uses, and specific publications on biodiversity, as well as general publications such as annual reports. The New Zealand organisations whose websites were searched included, but were not limited to, the Ministry for the Environment (MfE), the Department of Conservation (DoC), New Zealand Organisms Register, New Zealand Biodiversity, and Royal Forest and Bird Protection Society of New Zealand. International organisations which correlate data on New Zealand's biodiversity such as the Organisation for Economic Cooperation and Development (OECD) were also searched.

Data within the Institute's Biodiversity Dataset was sourced from two sources. The data for the number of known native species, number of threatened species and land area under pest management were collected from MfE's *Environment New Zealand 2007* report (MfE, 2007). Data on protected natural areas, both land and marine, came from the OECD report *Environmental Performance Reviews: New Zealand* (OECD, 2007). This data is intended to be a useful snapshot of some key biodiversity indicators at around 2005.

2.5 Purpose for which the Data was Initially Collected

MfE Environment New Zealand 2007 report

The *MfE Environment New Zealand* 2007 report (MfE, 2007), in particular the Biodiversity section in Chapter 12 which is the main source of the data presented by the Institute, uses a set of environmental indicators to report on key aspects of the New Zealand environment and to track how these aspects have changed over time. This report is the second national state of the environment report and follows the first published in 1997 (MfE, 2007). It aims to:

- provide useable and constructive information to foster informed decision-making on matters that affect the environment and encourage appropriate management approaches
- increase New Zealanders' understanding about the state of, and pressures on, our environment
- highlight the aspects of the environment that have come under particular pressure and those that require priority attention
- motivate all New Zealanders to take action to protect and conserve the environment.

(MfE, 2007: 4)

This Working Paper draws on the contribution of many agencies that provided expertise, data and information on the topics explored. The original data, reproduced by the Institute, was mainly provided by DoC researchers but also adapted from other sources. The Institute trusts that the data presented in the MfE's *Environment New Zealand 2007* report is reliable and accurate.

OECD Environmental Performance Reviews: New Zealand

This report examines the progress made by New Zealand since the previous OECD Environmental Performance Review (1996) relative to its established domestic objectives and international commitments to the environment and sustainable development (OECD, 2007). It also reviews progress in the context of the OECD Environmental Strategy, a strategy which aims to aid OECD countries to create the right conditions for environmental sustainability. The Environmental Strategy hopes to achieve this through a combination of economic and information-based instruments, regulations, and voluntary agreements (OECD, 2001).

This publication is an output of the OECD Environmental Performance Reviews Programme which conducts peer reviews of environmental conditions and progress in each member country. Their analysis was supported by a broad range of economic and environmental data

and lead to recommendations for further environmental and sustainable development progress.

The data table selected for inclusion in the OECD's report was sourced from a previous OECD report and from DoC. The original data from DoC was unable to be obtained by the Institute.

2.6 Additional sources

The Institute's 11 working papers, prepared as background papers to Report 10, *The State of New Zealand's Resources,* are selective in their use of specific information and data from within a broader pool of information. The boundaries set for these working papers were tightly focused on openly accessible online data available as at February 2009, the original time of data collection for the Institute's accompanying datasets, and met the criteria outlined above. For further reading and comparisons which fall outside of our collection strategies we suggest the following additional sources.[4]

New Zealand Biodiversity Strategy
The Department of Conservation (DoC) is coordinating the implementation of the New Zealand Biodiversity Strategy, alongside seven other government departments who are also involved. The Strategy establishes national goals to 'turn the tide' on the decline of our biodiversity, and to maintain and restore a full range of our remaining natural habitats and ecosystems and viable populations of all native species. The Strategy sets out a comprehensive range of actions that we need to initiate or improve progress on, to achieve these goals. The Strategy provides a directory to a range of data sources relating to biodiversity. The data available through this directory is spatial and thus not suited to the Institute's needs.

National Vegetation Survey Databank (NVS)
The NVS, made available through Landcare Research and GBIF, is a physical archive and computer databank containing records from approximately 77,000 vegetation survey plots – including data from over 19,000 permanent plots. NVS provides a unique record, spanning more than 50 years, of indigenous and exotic plants in New Zealand's terrestrial ecosystems.

New Zealand Organisms Register (NZOR)
Additional to the data included with the Institute's Dataset, an extensive amount of work is being carried out by Landcare Research, in collaboration with National Institute of Water and Atmospheric Research (NIWA), Te Papa Tongarewa Museum of New Zealand, DoC, Ministry of Agriculture and Forestry (MAF) Biosecurity, Environmental Risk Management Authority (ERMA), the Ministry of Fisheries, the Ministry of Research, Science and

[4] Please note that the findings of these databases have not been included within this working paper due to the reasons outlined above, but that references to these additional sources are included in the reference list at the back of this paper.

Technology, Local Government agencies, museums, universities and NGOs on the New Zealand Organisms Register (NZOR).

The NZOR project is a three year project which commenced on 1 March, 2009. The aim is to create an accurate, authoritative, comprehensive and continuously updated catalogue of taxonomic names of all New Zealand biota and other taxonomies of importance to New Zealand. The project is funded by the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme. Although of interest, this data will not exist in its entirety until the official completion of the project, therefore the Institute has not been able to incorporate the information within the datasets produced for this project.

Terrestrial and Freshwater Biodiversity Information System (TFBIS)
Additional datasets are available through TFBIS to support the conservation of New Zealand's indigenous biodiversity by increasing awareness of and access to fundamental data and information about terrestrial and freshwater biota and biodiversity. The Programme is one of a number of initiatives introduced in July 2000 to assist in implementing the Government's commitment to achieving the goals of the New Zealand Biodiversity Strategy (NZBS) (New Zealand Biodiversity, 2010).

Census of Marine Life project
The Census of Marine Life was a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans. The data provides a useful snapshot of marine life in New Zealand's Exclusive Economic Zone. The project was officially completed in October 2010 and therefore was not complete within the timeframe of data collection for this paper.

The New Zealand biota: What do we know after 200 years?
A biodiversity inventory was undertaken as part of the former National Museum's 1980 symposium on New Zealand's biota. The resulting report, *The New Zealand biota: What do we know after 200 years?* is publicly available, however the information in it is considered incomplete. The report represents an attempt to stimulate the collection of data on biodiversity rather than a comprehensive review in itself. The inventory has therefore been omitted from this project (MfE, 1997).

3. Data Exploration

The definition of biodiversity adopted for this Working Paper and Report 10 is that used by the Millennium Ecosystem Assessment:

> … the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part.
>
> (MA, 2005: 1)

New Zealand's biodiversity is interconnected with the well-being of all other resources. Therefore, a comprehensive understanding of the state of the country's biodiversity and any trends is vital for future planning. To help achieve this understanding, the Institute has

provided data on New Zealand's biodiversity under four sub-categories: (a) known native species; (b) threatened species; (c) land area under pest management, and (d) protected natural areas.

Number of known native species

This dataset provides a count of the number of known native species in New Zealand. Counts are divided, though not exactly, into biological kingdoms. Data is present from only one point in time. Data was obtained from the MfE *Environment New Zealand 2007 report* (MfE, 2007). Original data collection dates are not precise in the references. The Institute has chosen to reference 2007 as the source date for this data in line with the report's publication date. An excerpt from the Number of Known Native Species Dataset is provided in Figure 2.

Figure 2 Excerpt from the Known Native Species Dataset
Source: SFI, 2010b

Indicator	Attribute		2007	Data source table #
6.1 Number of known native species	bacteria	marine	40	6a
		land-based	309	
		freshwater	341	
		total	**690**	

Number of threatened species

This dataset is a count of native species classified according to DoC's threat classification system.[5] This system has three groups for organisms considered threatened to some degree and one group for those species where data is insufficient for classification. Categories are provided based on a variety of taxonomic levels from order to phyla. At the time the Institute's research was conducted data was reported for 2005 only, although this data is expected to be updated every three years. An excerpt from the Number of Threatened Species Dataset is provided in Figure 3. Data is not provided for species considered to be at no risk.

Figure 3 Excerpt from the Number of Threatened Species Dataset
Source: SFI, 2010b

Indicator	Attribute		2005	2006	2007	Data source table #
6.2 Number of threatened species	bats	acutely threatened	4	..	..	6b
		chronically threatened	0	..	..	
		at risk	1	..	..	
		data deficient species	1	..	..	

Land area under pest management

This dataset provides information on the spatial area of conservation land under management for a range of invasive species. Data is measured in hectares and was available for 2005 only. An excerpt from the Land Area Under Pest Management Dataset is provided in

[5] For more detail on the classification system see *New Zealand Threat Classification System Manual*, available from http://www.doc.govt.nz/upload/documents/science-and-technical/sap244.pdf.

Figure 4.

Figure 4 Excerpt from the Land Area under Pest Management Dataset
Source: SFI, 2010b

Indicator	Attribute			2005	Data source table #
6.3 Land area under pest management	area managed on conservation lands	rodents	hectares	312,676	6c
		mustelids/cats		417,618	
		pest herbivores		4,859,498	
		weeds		2,635,405	
		possums		1,078,053	

Protected natural areas

This section of the dataset presents information on the spatial area of public land in New Zealand protected under the following legislation: the National Parks Act 1980, the Conservation Act 1987, the Reserves Act 1977, the Wildlife Act 1953, the Marine Reserves Act 1971 and the Marine Mammals Protection Act 1978. A separate category is used for privately held land protected under these Acts. Under each Act, land may be designated as protected according to a variety of definitions; data on how much land is contained within each definition is also presented. It should be noted that all marine mammal sanctuaries are located within marine reserves, so their areas are not cumulative when calculating total area protected. Area is measured in hectares and is available for the years 1995 and 2005 at the time when our research was conducted. An excerpt from the Protected Natural Areas Dataset is provided in Figure 5.

Figure 5 Excerpt from the Protected Natural Areas Dataset
Source: SFI, 2010b

Indicator	Attribute			1995	2005	Data source table #
6.4 Protected natural areas - terrestrial	protected under National Parks Act	national parks	ha	2,165,448	2,694,010	6d
		specially protected areas		55,176	55,701	
		wilderness areas		205,260	335,180	
		total[5]		**2,425,884**	**3,084,891**	

4. Data Evaluation

In this section we evaluate the data presented in the Biodiversity Dataset based on the evaluation criteria set in Table 1.

4.1 Comprehensive Time Series

Lack of time series data

A consistent problem across all the indicators reviewed in this paper is the absence of data over a significant duration to allow time series analysis and to assess changes over time. For each category, data is only available for one or two points in time. Original data sources and further research is necessary to establish time series analysis for all of the variables. Time series data may exist if the original data sources are consulted as opposed to the data

published for the purposes of the MFE and OECD reports. Sources not included in this dataset, such as the National Vegetation Survey, do provide significant time series and spatial data.

A measure of our knowledge on biodiversity
As further biodiversity research is undertaken and our knowledge increases, additional species will be included in the biodiversity records. All data selected represents the state of our knowledge of biodiversity in New Zealand at the time the data was collected rather than the actual number of native species. Thus, even if data were available to complete a time series analysis it would not provide information on the actual state of biodiversity in New Zealand. Following the recent increase in biodiversity databases and research funding in New Zealand it is reasonable to expect that the measure of our knowledge on biodiversity will change significantly as new information becomes available and any corresponding information gaps become apparent.

Movement of species between categories can give false impressions
Species may be moved from the data-deficient category into, for example, the at-risk category. This might give an impression of an increase in the number of species at risk when the data would more likely reflect an increase in our knowledge of the state of certain species.

Absence of data
A large proportion (57%) of the species that are included within the threatened species dataset are categorised as data deficient. Problems concerning the lack of data also extend to land area under pest management. Since pest management can encompass a very wide range of control strategies, it would be useful for planning and analysis if data was provided on the areas that are subject to different methods and levels of control rather than solely supplying information on pest control for certain species.

4.2 Quality Data

Incomplete dataset
The Biodiversity Dataset as a whole is incomplete. Further research by the Institute is necessary to fill the gaps in the Biodiversity Dataset and consultation with NZOR, DoC and other organisations involved in biodiversity work will be an essential part of this process.

National data coverage
All information included within the Biodiversity Dataset is national in coverage; there is no regional breakdown of any information in the tables presented by MFE and the OECD. More specific location and species distribution information is necessary to best target future research. The National Vegetation Survey Databank is a good example of how specific regional research information and survey locations can be made publically available.

Sampling bias for known native species
The number of known native species in 2007 was 54,745. These have been placed in the following categories: bacteria, protozoa, chromista, plants, fungi and animals. The class with the highest number of species recorded was animals, at 35,384 species. By habitat, known native species are found in the following numbers: land-based species 33,421; marine species

15,824; and freshwater species 5,500 (SFI, 2010b). It is likely that these numbers, in which animals and land-based species are the most numerous within their respective categories, are strongly influenced by sampling bias. The species within these categories are those that are most easily observed, this discrepancy is gradually being rectified through information databases such as the recent Census of Marine Life project.

Data on protected land and marine areas is detailed and specific
For planning and assessment it is important to have accurate knowledge of the current state of the protection of our environment. Data on the protected land area under each relevant legislation is detailed, specific and comprehensive. Arranging the data into categories according to the relevant Act and type of protection offered is as practical a resolution as can be expected for such information without regional data also being included.

4.3 Appropriate Sources

Inaccessibility of original sources
The Institute has used data reported by third party organisations and not the original sources of data for all of the variables included within the Institute's Dataset. Original sources were cited, but not published freely and openly, or could not be found at the time of data collection without extensive further research. This prevents the methods and purposes of data collection being examined with extra detail.

4.4 Public Availability

All data publicly available and well documented
It is the aim of this project to assess publicly available data, i.e. data that is able to be accessed by parties independent of those who collect or present it. Both MfE's and the OECD's reports fit this criterion; the reports are freely available to the public via each agency's website.

5. Summary Evaluation of the Dataset

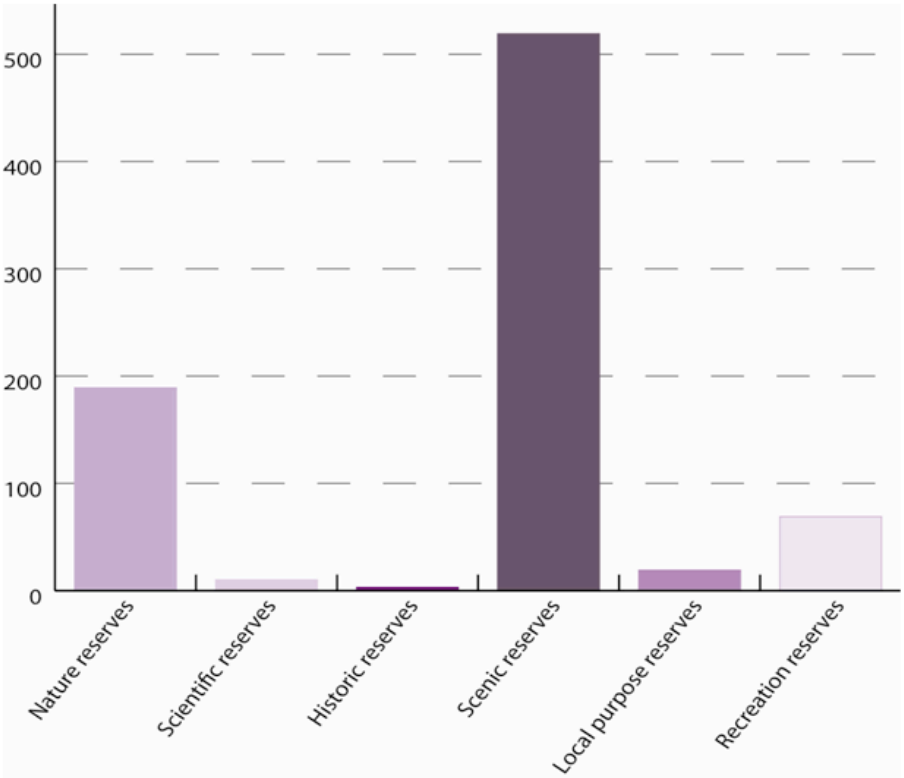
The Institute chose the MFE and OECD reports to inform its upcoming Report 10 and an NSDS. However, analysis of the dataset has shown that publicly available information is incomplete and deficient in many areas, specifically due to the lack of access to the original data presented in the report tables. Table 2 below summarises the Institute's evaluation of the dataset.

Table 2 Summary of Biodiversity Data Evaluation

	Strengths	Weaknesses
Comprehensive time series		▪ Lack of time series data: data only available for one or two points in time for all variables ▪ A measure of our knowledge on biodiversity: data is not an actual representation of number of species ▪ Movement of species between categories can give false impressions ▪ Absence of data: data deficiencies hinder comprehensive understanding, planning and analysis
Quality Data	▪ Data on protected land and marine areas is detailed and specific	▪ Incomplete dataset ▪ National data coverage: more specific location and species distribution data would be a benefit for effective management of native species ▪ Sampling bias for known native species: easily observed species are reported in higher quantities
Appropriate Sources	▪ Inaccessibility of original sources: the Dataset uses data reported by third party sources	
Publicly available	▪ All data used is publicly available and well documented	

The Institute acknowledges that there are many other sources of biodiversity data available and that databases of New Zealand biodiversity have developed significantly in recent years. In order to complete a comprehensive overview of biodiversity in New Zealand consultation with many of these other available sources is required (see additional sources at section 2.6). However, the available data within our selection parameters at the time of research provide a useful snapshot of the biodiversity data around 2005. The Institute's Dataset does not answer all the questions outlined in Section 1.3, but can provide background statistics to support some of the reporting, analysis and argumentation. Specific detail on the gaps and limitations in the datasets, and recommendations on how to overcome these problems, will be presented in Report 10. An example of how the data may be used is presented in Figure 6.

Figure 6 Area of Reserves Established under the Reserves Act 1977 as of 2005
Adapted from: SFI, 2010b



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