UNDERSTANDING OUR GEOGRAPHIC INFORMATION LANDSCAPE

A NEW ZEALAND GEOSPATIAL STRATEGY

A COORDINATED APPROACH TO LOCATION INFORMATION

JANUARY 2007

ACKNOWLEDGEMENTS:

The Geospatial Strategy was developed by Land Information New Zealand in consultation with the State Services Commission, Treasury, Department of the Prime Minister and Cabinet, National Library of New Zealand, Department of Conservation, Ministry of Economic Development, Department of Internal Affairs, Ministry of Justice, Ministry for the Environment, Ministry of Fisheries, New Zealand Defence Force, Ministry of Defence, Ministry of Civil Defence and Emergency Management, Statistics New Zealand, Archives New Zealand, Ministry of Health, Local Government New Zealand, City, District and Regional Councils, Landcare Research, Ministry of Research, Science and Technology, New Zealand Police and New Zealand Fire Service.

A NEW ZEALAND GEOSPATIAL STRATEGY



Contents

1 FOREWORD

We live in an information age in which geospatial information is essential to tackle current issues. Geospatial information (i.e. location-related information) is one of the most critical elements underpinning decision-making for many disciplines.

In the past we used maps to show where people and objects were located. Today this has evolved into a complex digital environment with sophisticated geospatial and related textual databases, satellite positioning, and communication networks like the Internet, as well as wireless applications.[1]

Geospatial information supports a wide range of business, government and community activities – from emergency services response and defence planning to Treaty of Waitangi processes, the provision of health services and finding your local schools.

Geospatial information is crucial to decision-making. For example, the key government datasets provide an authoritative basis for the everyday and extraordinary activities of New Zealanders, all tiers of government and the private sector. Information is increasingly available and there is increasing pressure for it to be used.

Local government has a key role in ensuring the success of a geospatial information strategy, as it is the source of some of the crucial data that forms the basis of national authoritative datasets.

New Zealand's geospatial information industry is supportive of the New Zealand Geospatial Strategy and will be significant players in its implementation. Many geospatial information initiatives and data collection activities are already provided by industry providers. The geospatial information industry is increasingly looking to work together to take advantage of commercial opportunities. The Strategy will facilitate constructive engagement between the industry and government in a mutually beneficial

1 From *Developing Spatial Data Infrastructures* – From concept to reality, edited by Ian Williamson, Abbas Rajabifard and Mary-Ellen F. Feeney, 2003, Taylor & Francis, London, p3.

way. For example the initiatives to implement the Strategy's goals are expected to have considerable industry involvement and will provide commercial opportunities for industry as well as delivering benefits to all New Zealanders.

Until now, New Zealand's geospatial information has been developed on an independent basis by various public agencies and the private sector. Concerns have been raised about the lack of coordination in the management of the public sector's geospatial resources, resulting in higher costs and poorer outcomes than desired. Exploiting the opportunities offered by the new digital environment requires a more integrated and standardised approach to the management and provision of our geospatial resources.

This Strategy sets out the vision, guiding principles and strategic goals that will provide the future direction for geospatial information. The four strategic goals are to:

- establish the governance structure required to optimise the benefits from government's geospatial resources
- ensure the capture, preservation and maintenance of fundamental (i.e. priority) geospatial datasets, and set guidelines for non-fundamental geospatial data
- ensure that government geospatial information and services can be readily discovered, appraised and accessed
- ensure that geospatial datasets, services and systems owned by different government agencies and local government can be combined and reused for multiple purposes.

The Strategy is a national strategy and it aims to benefit all New Zealanders. However, because government is such a significant player in the geospatial sector, the initial focus of the Strategy and the work programme developed to implement the Strategy will be on government. The use of the term 'government' throughout this document is intended to be inclusive of all tiers of government, i.e. local government and relevant Crown entities through to the major central government geospatial information-producing and consuming agencies.

This Strategy provides the context and overall guidance for the future development of geospatial resources. Additionally, it will provide a basis for all sectors of New Zealand society to take advantage of current and projected geospatial information-related technologies.

Hon David Parker

Minister for Land Information

2 INTRODUCTION

2.1 What is geospatial information?

Geospatial information is information relating to the location and names of features beneath, on, or above the surface of the earth. Most human activity depends on geospatial information – on knowing where things are and understanding how they relate to one another. It is part of our daily lives, essential for making decisions on social or environmental issues, for running an election, responding to emergencies, or finding our way across town. Information about people and places is vital for informed government and its citizens.

In today's increasingly complex society, geospatial information and services need to be easy to access across regional and local boundaries. Problems such as invasive species, disease epidemics, and national security threats do not respect borders. To help address these issues, policy-makers, front-line emergency response staff and the general public need the right geospatial information at the right scale and accuracy, and it needs to be current.

The government has invested heavily in the collection of geospatial information, but using it to its full potential is often difficult. For example, linking together separately collected pieces of information relating to the same location is sometimes impossible because of the different ways in which the location is described.

If organisations across all tiers of society collaborate on the collection, management and use of geospatial data, it is possible to build a common base of geospatial data that can be used by many people for many applications. For example, government topographic data forms a common base layer for a large number of land-related datasets used by government and non-government agencies and individuals. Having a common reference set of geospatial data gives us the ability to assemble data to make more informed decisions that can improve our quality of life.

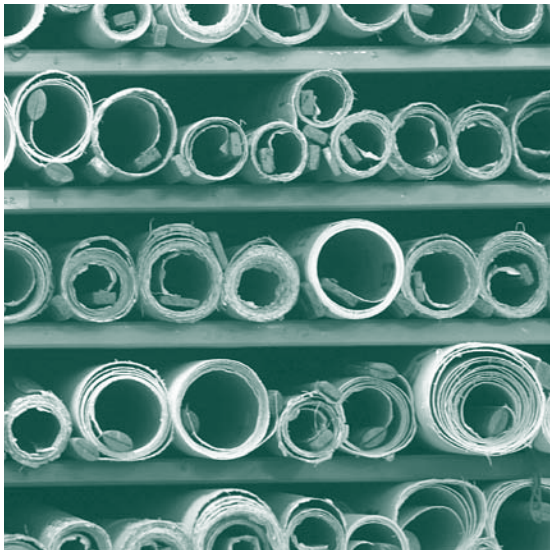
In line with the New Zealand E-government Strategy 2003, achieving a common vision of attaining accurate, accessible geospatial information for New Zealand will help to transform the way that agencies and individuals address complex issues and will contribute to the economic transformation of New Zealand.

WORKING WITH GEOSPATIAL INFORMATION – LANDCARE RESEARCH (CROWN RESEARCH INSTITUTE)

As an environmental research company, Landcare Research is always exploring new ways of building models that describe the way the environment behaves. Many of these models depend heavily on spatial data or have spatial relationships as a core component. Landcare's offices are widely spread across New Zealand and its scientists often collaborate with scientists from other Crown Research Institutes (CRIs) and overseas, so management of spatial datasets that are widely distributed across many sites is important to Landcare's spatial data strategy. Landcare has had to implement many of the technologies that are core to distributed Geographic Information Systems (GIS) internally, and so it is natural that they are leaders in distributed GIS in New Zealand.

A few examples of recent application illustrate the diversity and complexity of Landcare's use of geospatial information.

- After the February 2004 floods in the lower North Island, Landcare researchers developed a model for identifying slip scars that was used to create a map of the percentage of damage for every hectare throughout the region. This model depended on satellite imagery from multiple dates, a 15m digital elevation model created in-house to ensure that it had appropriate aspect and slope characteristics, a sun illumination correction algorithm, and field work to check the results.
- Working with the Ministry of Agriculture and Forestry (MAF) and National Institute of Water and Atmospheric Research (NIWA), Landcare soil scientists are developing a national nitrate leaching model that has produced a first estimate of nitrate leaching risk for the whole country. Data requirements included land use distinguishing many different farm types, climate surfaces and soil data surfaces, and a detailed understanding of how nitrate moves through the soil profile and into waterways.
- Working with the Department of Conservation (DOC) and MAF, Landcare researchers are developing a model that predicts the likelihood of various insects surviving in New Zealand. The model analyses the insect's native environment and areas where it has successfully established overseas and compares it with New Zealand's environment, to produce a risk of survival in New Zealand. Data for this model includes worldwide climate, vegetation, soil and insect distribution observations, albeit at relatively low spatial resolution and high resolution equivalent information for New Zealand.
- Working in collaboration Antarctica NZ, Gateway Antarctic (Canterbury Univ.), Land Information New Zealand (LINZ), United States Geological Service, GNS Science and NIWA are establishing a distributed Antarctic GIS portal containing data gathered by scientists primarily in the Ross Sea Region of Antarctica that it is expected to be a test-bed for collaborative GIS in New Zealand. The portal will help data-sharing among scientists and also become a core part of the management of the McMurdo Dry Valleys Specially Protected Area.



2.2 Background

In October 2004, government noted its increasing reliance on geospatial information for a wide range of activities and at the same time noted there was no coordinated geospatial strategy across government. It therefore approved the release of a discussion document on government geospatial information issues for external consultation.

Following the release of ***Geospatial Information – The Future Role of Government Discussion Document*** in November 2004, a programme of consultation took place which included workshops in the four main centres with participants from central and local government, Crown entities, academia, Māori and industry.

The workshops were designed to stimulate discussion on key issues and to facilitate the development of written submissions by attendees. The discussion document was widely distributed and included a questionnaire to solicit feedback, which was also replicated as an online questionnaire.

There was widespread support from those engaged through the consultation process, and in associated submissions on the discussion document, for the development of a coordinated approach and strategy for geospatial information.

Government noted in 1995 that "the Spatial Data System is of great importance to the New Zealand economy". Since 1996 an Officials' Committee for Geospatial Information (OCGI) convened by LINZ has undertaken several cross-government collaborative initiatives that involved geospatial information. Members included representatives from a wide range of government agencies including local government. The OCGI attempted to take a broad, all-of-government approach to key geospatial issues in addition to its role to advise LINZ on the development of New Zealand's national topographic and hydrographic infrastructure, but lacked the authority to ensure that the wider actions were properly resourced and aims achieved.

The OCGI identified the need to obtain official endorsement from government to take a more collective approach to geospatial information matters, and provided the early drive for the development of a formal geospatial strategy. The proposed new governance arrangements in this Strategy will formalise and strengthen consultation and collaboration on a much wider geospatial front.

2.3 Who is the Strategy for?

Effective implementation of a strategy depends on the commitment and partnership of key stakeholders.

The New Zealand Geospatial Strategy is a national strategy and it is intended that the Strategy and the work programme developed to implement the Strategy will benefit all New Zealanders. However, because government is such a significant player in the geospatial sector, the initial focus of the Strategy and the work programme will be on government agencies. The use of the term 'government' throughout this document is intended to be inclusive of all tiers of government, i.e. local government and relevant Crown entities through to the major central government geospatial information-producing and consuming agencies.

The geospatial information industry is also a significant player in the geospatial arena and their involvement will be critical to the success of the Strategy. A partnership approach is needed from all these major stakeholder groups to help ensure the successful implementation of the Strategy.

The New Zealand Geospatial Strategy is therefore initially aimed primarily at:

- public agencies that develop and maintain significant or national geospatial datasets
- public agencies that rely on geospatial information.

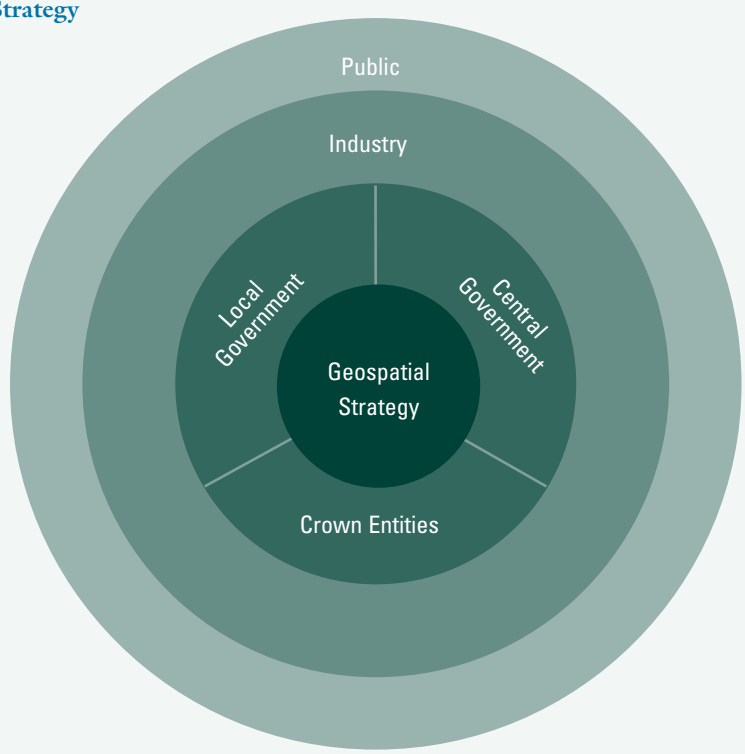
Clarifying the future direction of government with respect to its geospatial resources will also provide a firm basis on which the private-sector geospatial industry can develop their strategic business plans for contracting to government and for developing value-added products and services.

WORKING WITH GEOSPATIAL INFORMATION – NZ POLICE

The Police's key objectives are Community Safety and Crime and Crash Reduction, through integrity and capability.

GIS helps deliver the capability to locate and verify emergency events when making an initial response. It is also the basis for Police crime analysis, using location-based queries to map crime, in an Intranet application. An Intranet-based map viewer is planned for the future to enable all operational police to easily access GIS data and use it in the field.

Scope of the Strategy



WORKING WITH GEOSPATIAL INFORMATION – NEW ZEALAND FIRE SERVICE

The New Zealand Fire Service relies on many other organisations to supply geospatial information for use in fire operations and fire management. At incidents, the quality and availability of spatial information affect the performance and safety of operational staff. Spatial datasets are also managed internally. Large-scale national datasets of roads, addresses and place names are primarily used for locating an incident in order to dispatch resources. A lot of effort goes into ensuring the quality and accuracy of this data:

- Cadastral and topographic datasets are used to establish Fire Authority jurisdiction.
- Road data is used to establish optimal sites for fire stations.
- Demographic data is used to establish relationships between people and incidents (which are recorded spatially).
- Weather data is collected and modelled for presentation in map form over the Internet each day.
- A national Wildfire Threat Analysis methodology requires organisations to operate collectively to carry out this spatial analysis project within their region.

Within the Fire Service, geospatial information is provided to staff by an internal web-based mapping system and published cartographic products. Analysts carry out modelling, research and system development with some specialists maintaining data.

3 THE CASE FOR CHANGE

3.1 Issues

Until now, New Zealand's geospatial information has been developed independently by various agencies. In order to exploit the opportunities offered by the new digital environment for efficiencies in the collection, management and provision of geospatial information, new approaches are required to its collective management.

A more integrated and structured approach in New Zealand is needed for managing our geospatial information in order to address geospatial problems, including:

- a lack of knowledge of, and access to, the geospatial information assets owned, maintained or used by government. It is difficult to know what geospatial data exists as there is no easily accessible geospatial metadata service providing discoverability of geospatial datasets. This also leads to duplication of information, fragmentation of effort and inconsistencies among data, systems, standards and processes
- the inability to combine geospatial information to help address the issues of the day. This is caused by proprietary data and systems technology not allowing complete interoperability and the lack of agreed, and available, standards for facilitating geospatial interoperability
- little standardisation of maintenance procedures and mechanisms for assessing how well our geospatial datasets meet collective business requirements. This leads to varying levels of data quality and authoritativeness of geospatial data
- a lack of geospatial capacity within some public agencies and a lack of education about the potential application of geospatial information. This limits the effective use of the spatial systems that are built to support the business activities of government
- the lack of effective governance over geospatial information and systems across the public sector is constraining the contribution that geospatial information is making, and can make, to the day-to-day business activities of all government agencies, as well as making geospatial information less effective in solving the increasingly complex problems facing society. Leadership and coordination of government's geospatial activities is considered essential for the development of an integrated geospatial information environment which can better assist government to undertake its business

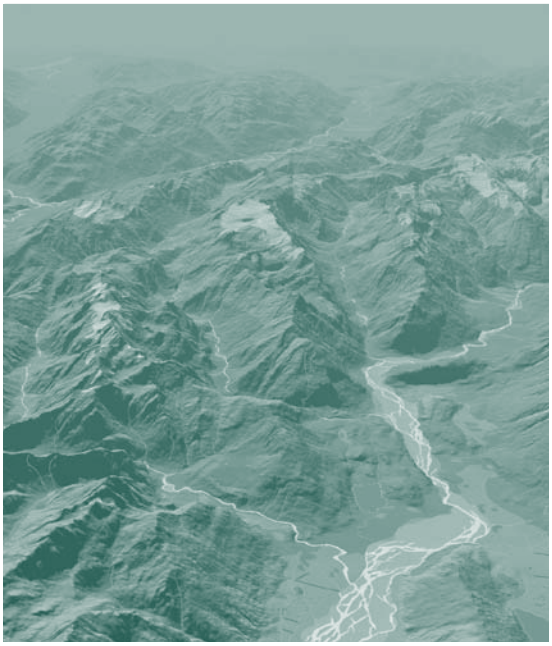
- the lack of close connections between content creation, sharing and preservation. This relates to the requirements of the Public Records Act 2005 (administered by Archives New Zealand) and electronic legal deposit administered by the National Library, as well as the practical need for agencies to hold snapshots of particular datasets to allow the compilation of information for historical investigations
- the lack of a mechanism for joint purchasing of geospatial content. Poor coordination leads to inefficiencies through the duplication of purchasing geospatial products and services.

3.2 Opportunities

Information and communications technologies are transforming business by providing new ways to collect, maintain, access, share and use geospatial information.

Internationally there is a high degree of uniformity in the way that governments are attempting to manage and use their geospatial resources. Most western countries have developed geospatial information strategies with remarkably similar aims and goals around improving coordination, access, sharing and usability of geospatial information.

The Western Australian Land Information System (WALIS) provides the vision and framework to coordinate the state of Western Australia's geographic information, and establish policies and standards to ensure the effective management of this vast collective resource. WALIS's goal is to make it easier for everyone to find and use quality geographic information over any part of the state for their needs



and interests. *The Value of the Western Australian Land Information System* was an assessment of the value contributed by WALIS and the Western Australia Geographic Data Infrastructure. The study yielded estimates of the value contributed by WALIS of $14 and $15 million a year, respectively, to the Western Australia economy.

Another international example of adopting a coordinated approach to geospatial information is the Neighbourhood Statistics Service (NESS), developed by the Office for National Statistics in the United Kingdom. NESS involves a variety of public bodies, and its aim is to provide a wide range of geospatial datasets through its Internet site to inform the National Strategy for Neighbourhood Renewal. The development of NESS acknowledges the importance of having quality, up-to-date information at the appropriate scale. Benefits of this approach include better identification of issues and more effective, targeted solutions.[2]

Along with the strategic opportunities offered by technology, significant benefits can also be gained from taking a coordinated approach to the governance of geospatial resources, as this provides the opportunity to:

- better meet the collective business needs of a wide range of agencies by establishing common agreed standards for fundamental (i.e. priority) geospatial information
- reduce duplication of capture and maintenance processes of geospatial datasets
- enhance the discoverability of, and access to, the authoritative sources of geospatial information.

Geospatial information is also one of the building blocks for information and communications technology innovation. Increasing the availability, access and interoperability of geospatial information will assist this innovation and contribute to the economic transformation of the New Zealand economy. A number of private sector geospatial firms use government geospatial information as a basis for their value-added products and services.

2 http://neighbourhood.statistics.gov.uk/dissemination

WORKING WITH GEOSPATIAL INFORMATION – MINISTRY OF FISHERIES (MFish)

The Fisheries sector, responsible for revenues of well over $1 billion, is New Zealand's fourth largest export earner. With more than 26,000 people employed directly and indirectly, the sector makes a huge contribution to national and regional economies. MFish makes a key contribution to the overall health of the sector, working closely with other government agencies, iwi/hapū, stakeholders and the public.

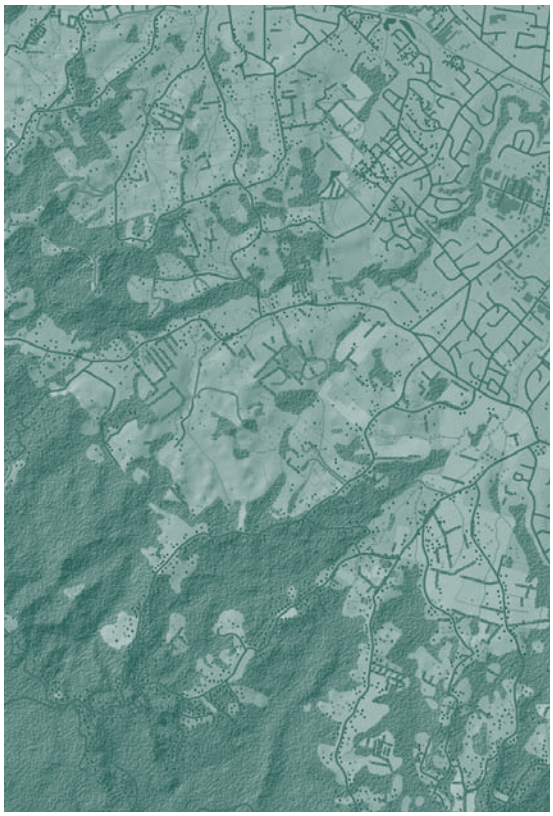
In addition to ensuring sustainable fisheries, MFish has responsibilities for protecting the aquatic environment and managing biosecurity risks. Location information underpins most MFish activities.

MFish is also responsible for allocating rights to undertake fishing activities, for monitoring how people and organisations keep to their responsibilities and for taking action against those who do not.

MFish sources geospatial data from a variety of organisations and uses it to:

- allocate fishing rights (which have specific boundaries)
- track and monitor fishing activities (such as the 'real-time' positions of larger vessels)
- analyse fishing activity information to determine if fish are being taken lawfully
- investigate and prosecute offences
- determine the health of fish stocks (i.e. a genetically unique species or sub-species which inhabits a given spatial boundary) and the total allowable catch limits and management strategies of fish stocks
- manage threats to the health and safety of staff, especially fishery officers
- ensure international obligations are met
- support the new web-based application – the National Aquatic Biodiversity Information System (see www.nabis.govt.nz).

While MFish's interest is the sea, it has significant requirements for land-based spatial data for compliance activities and managing relationships with stakeholders.



3.3 Contribution to government goals, policies and strategies

Geospatial information is considered to be directly relevant to the government's goals of economic transformation and national identity. Geospatial information provides part of the infrastructure that supports emergency services, community safety, biosecurity, environmental management and defence activities.

Access to geospatial information increases the ability of citizens to participate in the democratic processes of government by providing information to enable them to consider and comment on proposed government decisions. For example, having readily available information about ownership of land around the coast of New Zealand has provided a common platform for public input into decisions on this issue.

Links with other government initiatives include:

- ***The Growth and Innovation Framework*** is the Government's policy framework for economic development. It focuses on four areas:
  - Enhancing New Zealand's innovation framework
  - Developing New Zealanders' skills and talents
  - Increasing New Zealand's global connectedness
  - Focusing innovation initiatives in areas that will have maximum impact across the economy: biotechnology, information and communications technology and the creative industries.

  Geospatial information is relevant to many aspects of the Growth and Innovation Framework. It underpins some information and communication technologies and a more structured approach

GEOBASE – CANADA'S ONLINE GEOSPATIAL PORTAL – WWW.GEOBASE.CA

GeoBase is a federal, provincial and territorial government initiative overseen by the Canadian Council on Geomatics. The Council has provided Canada with access to a common, up-to-date and maintained base of quality geospatial data. Through the GeoBase Internet portal (www.geobase.ca), users with an interest in the field of geomatics have access to quality geospatial information for nominal fees and with unrestricted use.

GeoBase, a response to Canadians' requests for access to geospatial data at no cost to users, is built on partnerships and innovative technology. By working together, multiple levels of government are increasing their efficiency in collecting and maintaining geospatial data. This also reduces duplication of efforts amongst agencies. By creating the GeoBase portal the partners are also improving Canadians' access to:

- administrative boundaries
- the Canadian Digital Elevation Network
- the Canadian Geodetic Network
- geographical names of Canada
- Landsat and Orthoimages and Control Points
- the national road network.

GeoBase data has been produced and is available in accordance with established national standards and includes explicit metadata to facilitate its use. GeoBase data provides reference, context and underpinning to a wide variety of key data for government, business and individual applications. Canadians will not only benefit from access to data, but also from ongoing geospatial data updates that will be delivered through the GeoBase portal.

should help create innovation opportunities for the sector by improving the access and usability of geospatial information. A more coherent approach to the management of geospatial resources should also enhance the innovation and skills of New Zealanders involved in the sector.

- ***The E-government Strategy*** – the New Zealand E-government Strategy 2003 Update states:

  "E-government delivers better results by adapting government to the environment of the information age and Internet. The public has invested hugely in the information, technology, and processes used by government. E-government makes the best of this investment to deliver improved services to New Zealanders."

  One of the purposes of the Geospatial Strategy is to maximise the collective benefit from public investment in geospatial infrastructure by taking an e-government style approach to the people, policies and systems.

- ***The Digital Strategy*** is aimed at ensuring New Zealand is a world leader in using information and technology to realise our economic, environmental, social and cultural goals. The Digital Strategy is not just about technology; it is about people and their ability to connect to the things that matter to them. As geospatial information provides the core spatial components of digital information, it is one of the key information components between people and the things that matter.

- ***The Review of the Centre*** – identified three priorities for change within the public sector:

  - Better integrated, more citizen-focused service delivery.
  - Addressing fragmentation and improving alignment in the state sector.
  - Enhancing people and culture.

  The Geospatial Strategy and its goals are aimed at ensuring that decisions across the geospatial sector are better aligned and less fragmented. It will also allow a more focused and integrated approach to geospatial-relevant service delivery to citizens through the use of enabling technologies, policies and practices.

- ***The Geo Access project*** – a scoping study led by LINZ to identify the best means of improving discovery of, and access to, geospatial information resources. There is currently no integrated system that enables organisations and citizens to discover or access geospatial resources.

- ***New Zealand's environment-based classifications*** – computer-based mapping of the variation in both the physical and biological characteristics of New Zealand's land, freshwater and marine areas to inform resource and conservation management. To date, Land Environments of New Zealand, the River Environment Classification and the Marine Environment Classification have been developed by Crown Research Institutes and funded by the Ministry for the Environment (MfE), with support from the Department of Conservation (DOC) and MFish.

- ***Standards Development*** – a work stream of the New Zealand E-government Interoperability Framework (e-GIF). Current projects underway within this stream that relate to the geospatial strategy include:

  - *Emergency Services and Government Administration (ESA) Standard* – this standard is focused on improving the quality of data that is commonly used to define location, anywhere in New Zealand. The emergency services were a key driver of the ESA standard, although the development of the standard also involved a number of other key government stakeholders to ensure their requirements were met. This standard is currently recommended under e-GIF.

  - *New Zealand Government Geospatial Metadata Standard (NZGMS)* – provides a structure for official stewards and custodians of authoritative geographic information to describe their data resources to a minimum standard. This standard is currently recommended under e-GIF.

- *Metadata Harmonisation Project* – harmonisation of geospatial metadata standards between New Zealand and the Australian Government and States. New Zealand's main aim is to leverage from this project a free, open, extensible, online metadata creation and editing tool that works with NZGMS (led by LINZ).

- ***National Address Register (NAR) proposal*** – the development of a business case is currently being led by LINZ which will assess whether the NAR proposal would improve location (address, road and place name) information through implementation of the ESA standard and provide an authoritative, fully maintained, accessible repository of this location data, available to a quality standard that meets the collective business requirements of government agencies.

- ***Ocean Survey 20/20 (OS20/20) Data Management Stream*** – OS20/20 is the government initiative for surveying New Zealand's oceans, led by LINZ. A significant part of the project is to learn how existing marine data and data collected during ocean surveys should be managed. It is proposed that a federated approach to marine data management be adopted which emphasises cooperation among agencies in the use of agreed data and metadata standards, and improving access to data.

- ***Review of the New Zealand Police 111 Communications Centre*** – everyday emergency services need adequate geospatial information to ascertain locations accurately. Increased coordination is needed across agencies through the use of identical base geospatial information, maintained to the same base data standards. This would reduce the risk of location ambiguity arising among organisations.

4 AIMS OF THE STRATEGY

Vision, Principles and Work Programme Diagram

4.1 Vision

Trusted geospatial information that is available, accessible, able to be shared and used to support the:

- *safety and security of New Zealand;*
- *growth of an inclusive, innovative economy; and*
- *preservation and enhancement of our society, culture and environment.*

To achieve this vision, government needs to lead the development of appropriate ongoing interventions and incentives for consistent creation, exchange and maintenance of geospatial information.

4.2 Purpose

This Strategy provides the principles, goals and governance structure required to achieve the vision. It aims to:

- define the approach needed to ensure New Zealand's geospatial information infrastructure meets the ongoing business needs of government
- provide the framework for the leadership and direction needed for managing geospatial information
- optimise the collective benefit from public investment in geospatial infrastructure
- ensure quality fundamental (i.e. priority) geospatial data is available to all.

4.3 Key principles

The key principles that have been identified to guide decision-making for achieving the vision are:

- Geospatial information is collected once to agreed standards to enable use by many.
- Discovery and access of geospatial information is easy.
- Within the appropriate context, geospatial information is easy to understand, integrate, interpret, and use.
- Geospatial information that government needs is readily available, and its use is not unduly restricted.
- Geospatial content is appropriately preserved and protected.

WORKING WITH GEOSPATIAL INFORMATION – STATISTICS NEW ZEALAND

Statistics New Zealand leads and coordinates New Zealand's Official Statistics System. Official statistics provide:

- information for government, government departments, local authorities and businesses to use in making policy decisions
- measures of New Zealand's economic, social and environmental situation for the general public, government, local authorities and businesses.

Official statistics are defined in the Statistics Act 1975 as statistics derived by government departments from:

- statistical surveys
- administrative and registration records, and other documents from which statistics are, or could be, derived and published.

All the statistics collected by Statistics New Zealand are based on a defined geographic pattern. This pattern defines areas such as regional councils, territorial authorities, electorates and urban areas. The entire pattern is built from meshblocks. A meshblock is the smallest area used to collect and present statistics. The size of the meshblock depends primarily on the number of people and type of area covered. Generally meshblocks in rural areas have a population of around 60 people, while in urban areas the meshblock is roughly the size of a city block and contains approximately 110 people. The meshblock pattern changes slightly every year, but for most statistical purposes a five-year update of meshblocks to coincide with each census is generally sufficient. Meshblocks are used as building blocks, aggregating to larger areas such as area units, urban areas, territorial authorities and regional councils.

5 GEOSPATIAL STRATEGIC GOALS

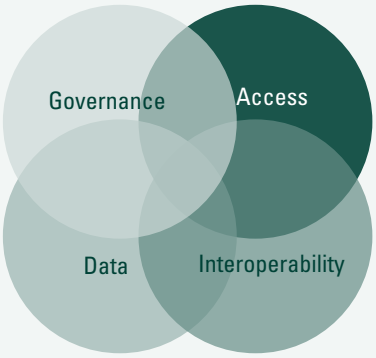
Four key goals have been identified to provide a coherent approach to addressing geospatial information issues and optimising the collective benefit from public investment in geospatial resources. In line with international best practice these goals can be seen to form the basis of New Zealand's future geospatial data infrastructure.

5.1 Four strategic goals

Four Strategic Goals

I.
Governance –
establish the governance structure required to optimise the benefits from government's geospatial resources.

II.
Data –
ensure the capture, preservation and maintenance of fundamental (priority) geospatial datasets, and set guidelines for non-fundamental geospatial data.



III.
Access –
ensure that government geospatial information and services can be readily discovered, appraised and accessed.

IV.
Interoperability –
ensure that geospatial datasets, services and systems owned by different government agencies can be combined and reused for multiple purposes.

5.2 Governance

Goal **Establish the governance structure required to optimise the benefits from government's geospatial resources**

"Assigning the mandate and appropriate funding to govern the implementation of a proposed strategy is critical to success."[3]

While individual agencies have taken advantage of technological advances to develop and implement a range of geospatial initiatives, these have mostly been independent activities that have not considered the benefits of a collective approach. Without a coordinating mechanism it has not been possible to optimise government investment in geospatial information.

Consequently, there is a need for a strong central coordinating approach to drive the other three strategic goals (Data, Access and Interoperability) and ensure effective participation in decision-making by the key geospatial participants – local government, relevant public sector agencies, Crown entities and industry.

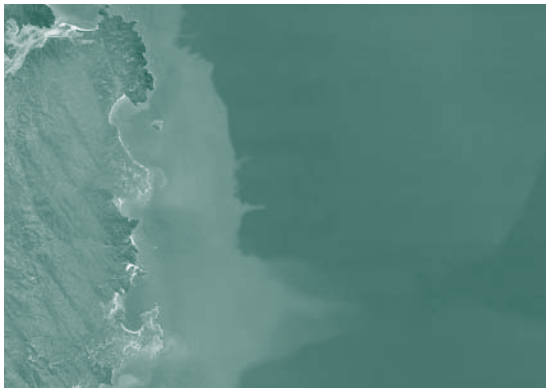
An appropriate governance arrangement with good leadership and support is needed for the development of quality, prioritised data strategies, access initiatives, and appropriate interoperability programmes. Leadership and sustained coordination are essential to maintain the momentum for any government intervention in this area.

It is also vital to communicate the implementation of the Strategy, so that agencies and individuals are able to contribute to the various strategic goals and initiatives. Given the scarcity of geospatial capability and capacity within some public agencies, an education/promotion role is also an important part of any governance arrangement.

5.2.1 Actions

a) Develop and implement an appropriate range of governance structures to enable effective and sustained leadership and coordination across the government geospatial sector.

b) Coordinate the implementation and management of the Strategy, strategic goals and the associated work programme.



c) Advise on any cross-government geospatial information requirements, such as for fundamental geospatial dataset management, access and interoperability.

d) Monitor delivery of each strategic goal, including surveying the principal stewards and customers of government geospatial information.

e) Report on Strategy implementation and progress towards achieving the vision.

f) Inform and educate users on the use and benefits of geospatial information and activities taking place as part of the Strategy programme.

g) Encourage the full participation of local government in the Strategy.

h) Provide a mechanism for joint purchasing arrangements for geospatial content.

3 Dunedin City Council submission.

WORKING WITH GEOSPATIAL INFORMATION – MINISTRY FOR THE ENVIRONMENT (MfE)

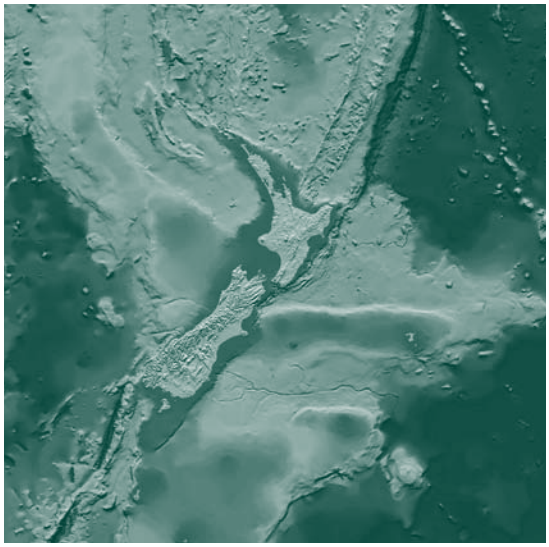
MfE has helped lead the development of key national geospatial datasets in recent years for use by government agencies, local government and those involved in environmental management in New Zealand.

The New Zealand Land Cover Database (LCDB) translates satellite images of New Zealand into information on the different types of land cover on the ground. This information can be used, over time, to monitor and report on the changes to the state of our environment and provide the basis for better resource management decisions (more efficient use of natural resources and improved environmental management). Development of the LCDB 1 and 2 has been led by MfE as part of a consortium of government agencies.

The Ministry has developed a set of environmental classifications that use physical parameters to map environment types across New Zealand. Two classifications have been released and a third is in development:

1) Land Environments of New Zealand (LENZ) is a classification of environments mapped across New Zealand's landscape – a classification that is nationally consistent, works at a range of scales and comes complete with information about climate, soils and landforms. It has been produced in partnership with Landcare Research New Zealand Ltd.
2) The River Environment Classification (REC) has been developed for MfE by NIWA, with the involvement of some regional councils. The REC is an ecosystem-based spatial framework for river management purposes and provides a context for inventories of river resources, and a spatial framework for effects assessment, policy development, developing monitoring programmes and interpretation of monitoring data and state-of-environment reporting.
3) The Marine Environments Classification is being developed for MfE by NIWA.

Looking ahead, the Ministry's role in geospatial information will focus on the requirements of key policy initiatives including, but not limited to: climate change, specifically the carbon accounting system; Oceans Policy; Sustainable Development Programme of Action; and National Environmental Standards. Most of the geospatial information required to support these initiatives will need to come from other agencies, including central and local government, Crown research institutes and potentially industry.



5.3 Data

Goal **Ensure the capture, preservation and maintenance of fundamental (priority) geospatial datasets, and set guidelines for non-fundamental geospatial data**

"…Government must acknowledge that certain geospatial datasets are critical to the effective running of the country..." [4]

Identifying geospatial data priorities is a key aspect of the effective management of public agencies' geospatial data resources. Issues such as biosecurity, counter-terrorism, and emergency response demand higher quality, and sometimes new types of, geospatial datasets and services.

Creating a fundamental geospatial dataset framework provides a mechanism for prioritising required geospatial datasets and to recognise any changing needs for that data. This framework will provide a means to enable a consistent, distinct approach to be taken for those fundamental geospatial datasets that are used by businesses and multiple agencies and levels of government to provide services and products to citizens.

'Fundamental' geospatial datasets are defined in three layers, as follows:

- *Geospatial Reference Datasets* – such as cadastral, topographical and geodetic datasets.
- *Geospatial Measurement Datasets* – descriptions of various physical phenomena, with measurement related to a physically defined part of the earth's surface (above, on or below that part).
- *Tenure Information* – a large range of data that should not be considered to fall within the definition of a geospatial dataset *per se*, but which would be able to be represented in a geospatial context through one or more geographic data attributes, for example health and education statistics.

As well as identifying and prioritising the development and management of fundamental geospatial datasets, there is a need to address dataset stewardship, and the funding of data capture, preservation and maintenance programmes, products and services.

Similarly there is a need to provide guidance on best practice around the management of non-fundamental geospatial datasets, as these make up a large proportion of the geospatial assets.

Local government currently has a range of approaches to funding their geospatial datasets, from their baselines to user pays, and any changes to access provisions will need to address potential funding implications. Businesses and geospatial industry participants usually sell value-added geospatial products, rather than the fundamental geospatial data.

WORKING WITH GEOSPATIAL INFORMATION – DUNEDIN CITY COUNCIL

The Dunedin City Council (DCC) makes extensive use of geospatial information to support a wide range of functions including property, asset management and administration. Geospatial information provides a spatial view for information enquiries and data maintenance and is key for analytical decision-making (e.g. the effect of rating changes, roading network changes and monitoring the district plan). Geospatial technology provides integration between otherwise poorly related material like property, asset, topographic, administrative and regulatory information.

All staff have Intranet enquiry access to property-based geospatial information, which is important as 80% of public enquiries are property based. The DCC has a public website to display rates-based information for properties in various map contexts, a key one being aerial photographs.

The DCC is also developing access to geospatial data for staff in the field.

Geospatial data is managed in a central repository. Key geospatial datasets are cadastral, topographic/environmental, asset, administrative and regulatory.

- Cadastral: LINZ cadastral land parcels updated monthly; a critical link to property data.
- Topographic/environmental: aerial photography sourced by contract.
- Asset: Council-maintained geospatial data relating to reticulated services, roading and reserves.
- Administrative: Statistics NZ meshblock data used to define electoral boundaries and for statistical analysis.
- Regulatory: Council-maintained district plan information.

4 Wellington City Council submission.

5.3.1 Actions

a) In consultation with the principal geospatial information stewards and customers, confirm/determine the fundamental geospatial datasets that New Zealanders need, in priority order.

b) Identify stewardship, custodianship and service principles and responsibilities for each fundamental geospatial dataset.

c) Evaluate each fundamental geospatial dataset against an agreed standard/quality, and define its base data or the starting point for collection.

d) Ensure fundamental geospatial datasets meet the ongoing collective needs of New Zealanders. This will include metadata requirements, maintenance processes, change authorities, required quality standards, preservation requirements and privacy constraints that may encumber use.

e) Develop and promote best practice policies, guidelines and practices for the management and use of non-fundamental geospatial datasets.

5.4 Access

Goal **Ensure that government geospatial information and services can be readily discovered, appraised and accessed**

"This is a priority intervention. It will promote greater use of geospatial information by agencies and the community, and this will help build greater awareness of (and support for) improved data management, including the application of common standards."[5]

A key component of the Strategy focuses on taking a structured approach to the discovery of, and access to, both fundamental and non-fundamental geospatial datasets. Access arrangements should be geared to maximise the ability to discover, access and use the geospatial resources that public agencies hold. The access arrangements implemented will need to make explicit any constraints on use (privacy constraints, licences, distribution, costs etc).

WORKING WITH GEOSPATIAL INFORMATION – INSTITUTE OF GEOLOGICAL AND NUCLEAR SCIENCES (GNS)

GNS is a geospatial organisation. GNS data has a spatial context and GNS uses Geographic Information Systems extensively for analysis of geospatial data.

GNS develops spatial datasets, such as the QMAP 1:250,000 geology, and has a number of spatial datasets available via the Internet. GNS is reliant on topographic data provided by LINZ to put these datasets into context and the 1:250 000 topography is published with our QMAP products. From the LINZ topographic data GNS has developed digital elevation models and these are used extensively in conjunction with other data, such as demographics, lifelines and assets, to produce hazard and risk assessments. This information can be related to cadastral information at a parcel level and currently this service is provided by PropertyInsight, a joint venture between GNS and Quotable Value. GNS geological and hazard mapping utilises aerial photography from LINZ and high resolution ortho-photography and digital elevation models provided by other organisations, such as developers and territorial authorities or regional councils.

More and more there is a demand for higher resolution topographic information, to derive more precise hazard and risk models integrating physical spatial data with demographics and the built environment.

5 Local Government New Zealand and the E-Local Government Strategy Project Team submission.

This is in alignment with e-government initiatives which state the need to develop consistent ways of describing place information across New Zealand agencies, thus making it easier to find location-related information through the government Internet portal (www.govt.nz).

Increasing the discovery of, and access to, the government's geospatial assets also provides a basis for the development of products and services by the innovative and competitive value-adding geospatial industry. In addition, there is a need to access important historic geospatial information, in both digital and hard copy formats.

5.4.1 Actions

a) Develop and maintain metadata in accordance with an agreed geospatial metadata standard, and align with international standards.

b) Make fundamental geospatial datasets discoverable and accessible according to agreed policies and standards.

c) Encourage public agencies to make their non-fundamental datasets discoverable and accessible according to best practice policies and standards.

d) Enable industry to access fundamental geospatial datasets and add value.

5.5 Interoperability

Goal **Ensure that geospatial datasets, services and systems owned by different government agencies can be combined and reused for multiple purposes**

"The e-Government Interoperability Framework should be the umbrella for all geospatial initiatives to allow for greater mandate for compliance across agencies such as central and local government and Crown entities."[6]

The New Zealand E-government Strategy states that common data and information technology policies and standards are integral to the success of that strategy. When systems are interoperable, people and agencies can combine a range of information and apply it in new and often unforeseen ways to help address any number of complex issues.

Similarly with geospatial information, moving towards interoperable systems saves money and resources by enabling the reuse of geospatial data.

At present, the data and software interfaces used by different systems are often incompatible and systems frequently have unique software and hardware platforms. Therefore, data needs to be carefully manipulated so that it can be transferred or shared. Geospatial interoperability standards, specifications for data formats, and application interfaces can overcome these obstacles to system interoperability, leading to the state where all have access to the exact same data, without needing to recreate it.

In an interoperable environment with adequate data quality, one organisation can operate its system or application without the need to hold a separate copy of data such as street addresses, since this data can be obtained in real time directly from a single authoritative source. The use of common standards can reduce transaction costs for sharing geospatial data and improve data quality.

Interoperability is also a key to making geospatial information widely and easily discoverable and accessible. The e-Government Interoperability Framework (e-GIF) provides the umbrella infrastructure for any geospatial interoperability initiatives.

5.5.1 Actions

a) Under the umbrella of e-GIF, establish a framework of policies (including any legislative obligations), standards and guidelines for discovering, accessing and using geospatial information, according to best practice.

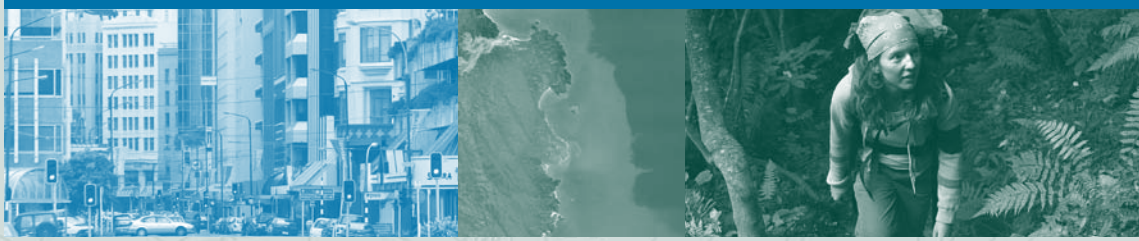
b) Promote the adoption of this aspect of the e-GIF framework through education, dissemination of information and advice.

c) Provide technical support, where requested, to agencies around interoperability best practice.

d) Promote the adoption of interoperability specifications and technologies through targeted pilot schemes and case studies.

6 Standards New Zealand Submission.

6 GOVERNANCE STRUCTURES REQUIRED TO MAKE IT HAPPEN



6.1 Who will be responsible?

The first step towards achievement of the vision is to establish the governance structures required to enable the delivery of its goals and actions. Clarity around the roles and responsibilities for the coordination of geospatial information activities will help to make the Strategy happen.

The governance structure proposed to drive the implementation of the Strategy includes:

a) A *Joint Ministerial Group*, consisting of the Ministers for Land Information and Information Technology, responsible for approving Strategy-related geospatial policy. The Minister for Information Technology is included given the links between the Geospatial Strategy, the Digital Strategy and E-government Strategy.

b) A *Geospatial Executives Group (GEG)*, chaired initially by the Chief Executive of LINZ, consists of chief executives or direct reports of key public agencies. The GEG includes representatives from local and central government and Crown entities to ensure that the wider geospatial interests of government are addressed. The GEG's collective accountability is for the implementation of the Strategy. It also **collectively**:

- leads policy and strategy development and provides inter-agency governance
- makes decisions to achieve the geospatial vision, without compromising the accountabilities or outputs of individual agencies. Each member of the GEG is responsible for executing the Group's collective decisions by incorporating them into their agency's work programmes
- considers and coordinates all new budget initiative proposals that affect the delivery of the geospatial work programme
- reports annually to the Ministerial Group on progress towards achieving the Strategy's goals
- provides leadership and direction for the Geospatial Advisory Committee, Geospatial Office and any ad hoc agency working sub-groups and sub-committees.

c) A *Geospatial Advisory Committee (GAC)*, chaired initially by LINZ, is made up of geospatial technical and policy experts from key agencies. Their role is to advise the GEG and facilitate the interagency implementation of the decisions of the GEG and Ministers. The Committee will include Crown research institute and university

representatives and representatives from an industry forum which will be established to obtain a wider input from the New Zealand geospatial industry.

Key focus areas of the GAC include:

- identifying opportunities to achieve the Geospatial Strategy vision
- developing and recommending sectoral work programmes, including key milestones and deliverables, for approval by the GEG and Ministers
- coordinating budget initiative proposals
- coordinating the implementation of projects and programmes across relevant agencies which contribute to the Geospatial Strategy goals
- reporting on the implementation of the Geospatial Strategy goals to the GEG. The Chair will attend the GEG meetings and provide a report of the achievements and activities of the GAC, and a report of risks to, and opportunities for, progressing towards achieving the goals of the Geospatial Strategy
- contributing to the annual report of the GEG to the Joint Ministerial Group
- sharing best practice geospatial information management approaches across agencies and working with the Geospatial Office to evaluate initiatives.

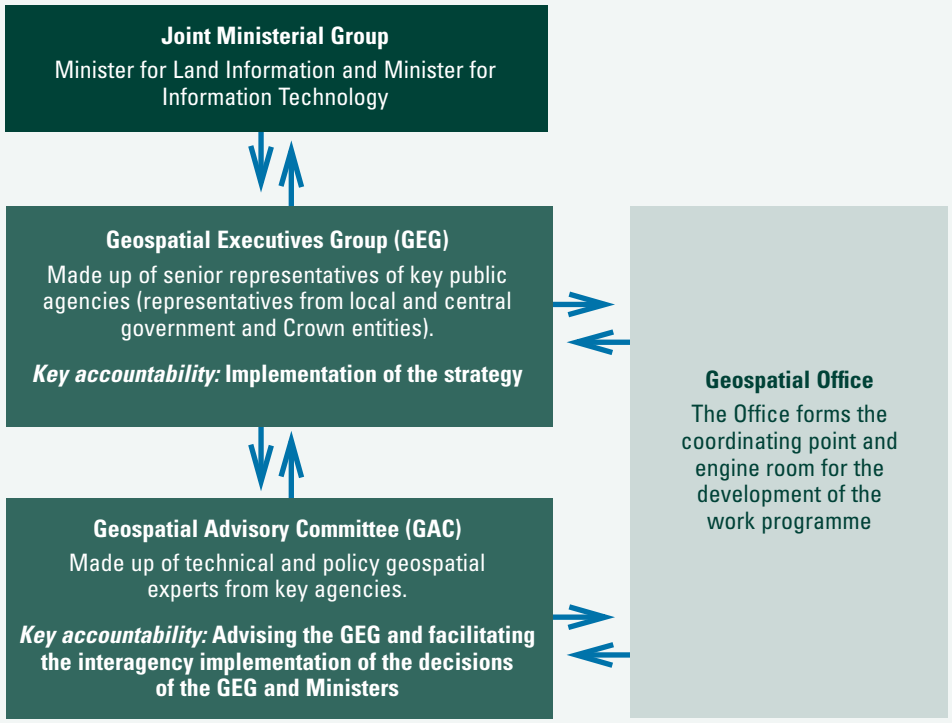
d) A *Geospatial Office*, whose role is to provide support for the above governance structures and development of the work programme.

The Office will be physically located within LINZ, but it will be accountable to the Geospatial Executives Group, in order to maintain a sectoral approach.

The Office:

- forms the coordinating point to facilitate the individual initiatives
- supports the initiatives where required
- provides secretarial services and support to the GEG, GAC and any ad hoc agency working sub-groups and sub-committees
- liaises with ANZLIC council[7] and provides a communication conduit to New Zealand agencies
- works with GAC to develop and undertake evaluation of initiatives
- facilitates an industry liaison forum.

Geospatial Strategy Governance Structure



7 The Chief Executive of LINZ is a member of ANZLIC. ANZLIC's role is to provide leadership in spatial policy and strategy for the governments of Australia and New Zealand.

Land Information New Zealand's Role

As government's pre-eminent source of advice on land information-related matters, LINZ is responsible for the leadership of the Strategy. Therefore, the Geospatial Office will be located within LINZ and the Chief Executive of LINZ will initially chair the Geospatial Executives Group.

Industry's role

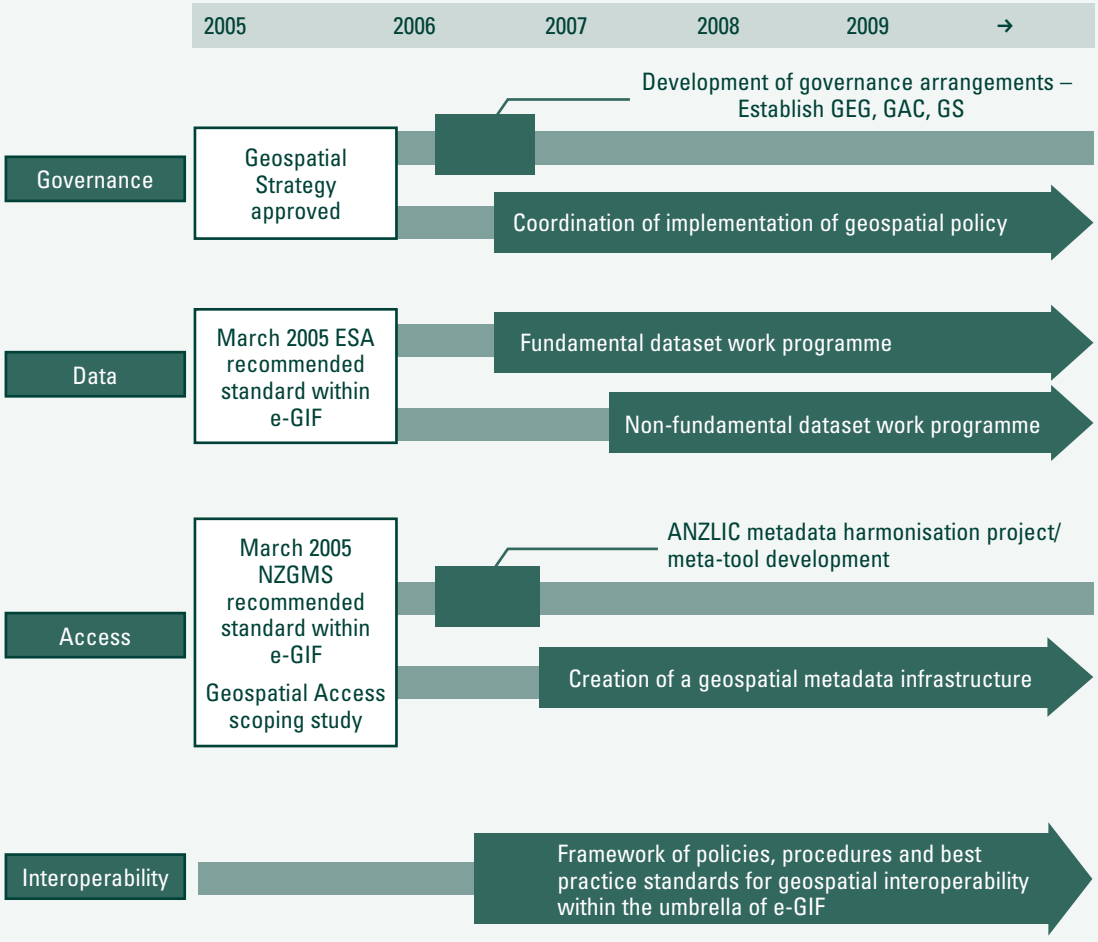
New Zealand's geospatial information industry are supportive of the Geospatial Strategy and will be significant players in its implementation. Many geospatial information initiatives and data collection activities are already provided by industry providers. The geospatial information industry is increasingly looking to work together to take advantage of commercial opportunities. The New Zealand Geospatial Strategy will facilitate constructive engagement between the industry and government in a mutually beneficial way and will provide commercial opportunities for industry as well as delivering benefits to all New Zealanders.

Work programme

The work programme developed to implement the Strategy will initially be focused on developing a more coordinated approach to the management of government's geospatial information resources. However, the work programme will take into account the importance of active engagement with industry and the desirability of expanding the work programme over time to meet wider national geospatial information requirements.

7 HIGH LEVEL WORK PROGRAMME

Geospatial Strategy Governance Structure



8 EVALUATING PROGRESS TOWARDS THE VISION


This section contains criteria and indicators that will enable the progress that is being made towards achieving the vision for geospatial information to be assessed.

These include:

- Fundamental geospatial datasets are clearly identified.
- When an agency that uses geospatial information needs a new source of information, or when an agency starts to collect a new dataset, there is a clear process to determine whether the new geospatial dataset will be considered fundamental.
- Information about New Zealand geospatial datasets is easily found.
- Information about the geospatial datasets, services, standards, policies, guidelines, and initiatives is readily available and is actively promoted.
- Fundamental geospatial datasets are easily obtained.
- A single authoritative source exists for each fundamental dataset.
- Fundamental datasets are maintained to consistent, defined specifications that meet collective needs.
- Geospatial information from different sources can be used with ease in one application.
- Local, regional, and central government agencies can all readily exchange geospatial information.
- Significant government functions/services interoperate with fundamental geospatial data without the need to copy or duplicate that data.
- Organisations that produce or maintain geospatial information are aware of and follow all relevant standards and guidelines.
- Government agencies can obtain technical support for geospatial information activities.
- People with an interest in geospatial information and services have a forum where they can share information and develop ideas.
- The government receives regular reports on the status of geospatial information and the goals of this strategy.

There will be a need to further develop these indicators and criteria into an evaluation programme.

APPENDIX 1 – LINKAGE WITH OUTCOMES DIAGRAM

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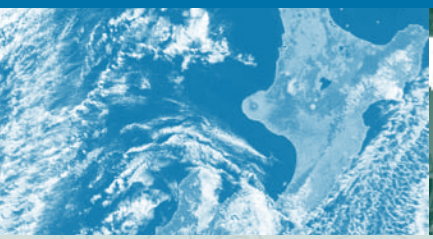

The next diagram illustrates how the building blocks of a geospatial framework are connected. A standards-based approach to the data, access and interoperability is the key mechanism for ensuring an integrated approach to achieving the vision and addressing the geospatial problems New Zealand is facing. For this to occur, a coordinating body is needed to provide the leadership, direction and priority-setting to enable a focused approach to the vision for geospatial information:

Trusted geospatial information that is available, accessible, able to be shared and used to support the:

- safety and security of New Zealand
- growth of an inclusive, innovative economy
- preservation and enhancement of our society, culture and environment.

The diagram also provides a summary of linkage logic on how working towards the vision will contribute to some key government outcomes for New Zealanders – ensuring the country is safe and secure, growing an inclusive and innovative economy, and protecting and enhancing the environment.

Linkages between Geospatial Strategy Interventions and Government Outcomes