# Science Counts!

National Strategic Science &
Research Portfolios, Programmes,
Priority Actions

2003/04 AND BEYOND

**Department of Conservation**
*Te Papa Atawhai*

## FOREWORD

In June 2002, the Department of Conservation published its second Statement of Intent (SOI) for the period 2002–05 (accessible on www.doc.govt.nz >Publications >Corporate). While the 10-year National Priority Outcomes have not changed, there are some significant shifts in emphasis that are relevant to the business of the Science & Research Unit.

New strategic decisions have been announced by the Department, and science has played a big role in shaping and promoting them. For example, our innovative work towards measuring conservation achievement underpins a major new integrated programme called 'Natural Heritage Management System' (Natural Heritage Information System in the Statement of Intent). We are helping to provide the Department and the nation with new tools for better management of our indigenous biodiversity. These will assist us to identify with greater certainty places of high biodiversity value, help to prioritise places for enhanced conservation effort, provide new inventory and monitoring practices, and enhance the way we measure the difference that conservation management makes.

The Department has drafted a 'Conservation with Communities Strategy' and revisions to the 'Visitor Strategy' and 'Historic Heritage Management Strategy' are close to completion. These initiatives will create new expectations for research, including more cross-portfolio interaction.

It is therefore timely to update some of the Priority Actions that will encourage and guide new research that helps deliver National Priority Outcomes. Changes can be seen here in the Conservation Assessment, Aquatic Protection & Restoration, and People, History & Conservation Portfolios.

The philosophy behind a nationally focused science approach has been well enunciated in the previous two *Science Counts!* Nevertheless it is worthwhile to reinforce the national strategic context, outlined in the SOI, that the revised Priority Actions support. Research aligned to Priority Actions in earlier *Science Counts!* has assisted the Department in creating measurable indicators for the achievement of outcomes. It continues to be the purpose of *Science Counts!* to provide a clear framework for our own scientists' directions and a way for external science providers to identify future synergies.

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## 1   PORTFOLIO: TERRESTRIAL RESTORATION & PESTS

*Ecosystem Restoration*

### 1.1 Priority Actions

A   Investigate the processes that drive changes to ecosystem structure and function at island and mainland sites.

B   Investigate how native forest and grassland communities change in relation to temporal variation in flowering, fruiting and seeding and determine implications for pest control.

C   Develop and evaluate intensive ecological restoration models for a range of ecosystems to guide current and future management.

*…improve how we set and measure conservation outcomes by researching spatial and temporal changes in ecosystems.*

## Animal Pests and Weeds

### 1.2 Priority Actions

A   Model weed populations to predict future distributions and evaluate the processes that make particular native communities vulnerable to invasion.

B   Develop predictive models of weed response to animal control over a range of control intensities and sites.

C   Undertake risk assessments and develop surveillance systems for new and existing pests, diseases and other biosecurity hazards.

D   Investigate how control of a single pest affects populations of other pests.

E   Review, assess and refine existing tools, techniques and applications to eradicate or control key animal and plant pests.  Develop new tools if required.

F   Test adaptive experimental management and monitoring protocols and quantify relationships between management goals and monitoring indices.

## 2   PORTFOLIO: SPECIES & ECOSYSTEMS UNDER THREAT

## Species, Communities and Ecosystems

### 2.1 Priority Actions

A   Establish guidelines that will enable managers to identify appropriate conservation management units for threatened taxa in order to maximise biodiversity and ensure the survival of these taxa[1].

B   Test  conservation biology principles in the New Zealand context.  Emphasis will be on determining:
  • the role of genetic diversity in maintaining long-term viability of threatened species,
  • the importance of linkages in the landscape as a means of maintaining biological diversity,  and
  • the utility of population viability analysis in conservation planning.

C   Establish, develop and test guidelines and criteria for defining the long-term security of populations and ecosystems under threat.

D   Review and assess current techniques for monitoring threatened species, ecosystem health and trends.  Develop new techniques where no appropriate methods exist. Techniques for monitoring invertebrates are a priority.

E   Develop and test approaches to the management of several threatened species at key sites to maximise return on investment.

F   Identify critical factors limiting the viability of threatened taxa, threatened communities, threatened ecosystems, and threatened ecological processes. Test ways to mitigate such threats. Understanding the effects of fragmentation of threatened lowland ecosystems is a priority.

G   Establish objective methods for identifying outstanding and threatened ecosystem types.

[1]   Guidelines could identify total populations; or geographically, genetically, or behaviourally distinct sub-populations.

## *Classification and Measurement*

# 3 PORTFOLIO: CONSERVATION ASSESSMENT

## 3.1 Priority Actions

A Guide the development, definition, mapping and application of terrestrial, freshwater and marine classifications in ways that account for environmental, ecological and human use patterns. (Lead agencies: MfE, Landcare Research Ltd, NIWA; Stakeholders: DOC, MFish.)

B Develop and refine the 'Measuring Conservation Achievement' (MCA)[2] process. Research priorities are:

a) To develop spatially explicit procedures for defining places and outcomes at places.

b) Improving the measurement of disturbance pressure, in particular:

- human removal disturbances and physico-chemical resource modification, and the natural recovery from such impacts,
- the abundance and spread of introduced animal and plant pests,
- spatial and temporal changes in ecosystems, including the effects of climate change.

c) Exploring ways to measure representativeness that can account for differences made by conservation projects.

d) Exploring ways to map risk, beginning with social risk.

e) Establish functional relationships between native biodiversity condition and disturbance pressures.

C Develop MCA as a tool for use in the Department by designing and testing the management processes and computer support systems necessary for smooth, routine operation by Departmental staff.

D Support the design and testing of a national system to monitor and report on changes in the condition of terrestrial and aquatic indigenous biodiversity; and detect and measure changes in pressure from pests, pest incursions and other forms of disturbance.

[2] The MCA project aims to provide decision support and reporting tools for natural heritage management. It will deliver spatially-enabled tools and procedures to help assess pressure on natural heritage, identify and select conservation priorities, and measure and report on conservation performance. The current focus is on natural heritage assessment, but developments to incorporate historic heritage, cultural and recreational (visitor) aspects, will follow.

## *Marine and Freshwater Protection and Restoration*

# 4 PORTFOLIO: AQUATIC PROTECTION & RESTORATION

## 4.1 Priority Actions

A Develop, validate and refine objective classification and prioritisation systems to identify freshwater, estuarine and marine ecosystems with outstanding, distinctive, representative, threatened, or rare communities and features.

B Identify critical factors and processes limiting the viability of threatened freshwater, marine and estuarine species, populations, communities, and ecosystems. Test ways to avoid, and remedy such threats and biosecurity risks.

C Develop freshwater and estuarine ecosystem restoration techniques.

D Model optimal aquatic reserve design, with an emphasis on size, shape, location, spill-over and direct boundary effects.

E Determine the impacts of marine farms on nearshore ecosystems and protected species.

F Establish the loss in extent and biotic content of freshwater and estuarine ecosystems.

G Quantify critical factors that alter the impacts of water abstraction upon in-stream biodiversity. Model results to determine environmental flow regimes that maximise retention of in-stream biodiversity.

H Develop monitoring techniques and tools that detect changes in key ecological processes following the establishment of aquatic reserves.

## Visitor Use

### 5.1 Priority Actions

A Develop monitoring systems to measure visitor and social characteristics, expectations and satisfactions associated with the use of natural, historic and cultural heritage.

B Increase understanding of social impact processes and values, with development of methods to anticipate and minimise conflict issues between different visitor, community and stakeholder groups.

C Develop information and management systems to identify, classify, prioritise and minimise visitor impacts, predicting cumulative effects from the growing volume and diversity of recreation and tourism.

D Develop methods to monitor and evaluate the effectiveness and outcomes from visitor-related management actions in different situations.

## Community Participation

### 5.2 Priority Actions

A Examine and assess how the Department's culture, style and skills affect the success of work with communities, iwi/hapu and associates, and identify opportunities for improvement.

B Develop better understanding of the diversity of values, expectations and concerns of the public, including communities, iwi/hapu and associates, and their influence on conservation work.

C Measure the effectiveness of public participation in conservation, including the value and outcomes of partnerships and relationships with communities, iwi/hapu and associates, and identify opportunities for improvement.

D Measure the effectiveness of education and awareness initiatives, and information and skills transfer, in increasing the understanding of and commitment to conservation of communities, iwi/hapu and associates.

E Identify national and local community responses to different management practices and to major conservation initiatives.

## Historic and Cultural Heritage Protection

### 5.3 Priority Actions:

A Improve methods for assessing cultural and historical heritage values (including heritage or cultural landscapes) and their significance, and for deciding on appropriate conservation actions.

B Initiate and support area surveys and investigations and develop frameworks and methods for achieving wider representation and a better balance of historic themes on sites in the protected area network.

C Develop the information, methods and processes for improved departmental and public resource management, understanding and interpretation of cultural and historic heritage.

D Develop cost-effective practices to stabilise, restore and monitor cultural and historic heritage.

*…assessing visitor expectations and community responses…*

## NATIONAL STRATEGIC SCIENCE & RESEARCH PORTFOLIOS, PROGRAMMES, PRIORITY ACTIONS, 2003/04 AND BEYOND

**PORTFOLIO:** Terrestrial Restoration & Pests
**Programmes**
- Ecosystem Restoration
- Animal Pests and Weeds

**Science Manager Responsible**: Rod Hay
**Portfolio Leader**: Clare Veltman

**PORTFOLIO:** Species & Ecosystems Under Threat
**Programme**
- Species, Communities and Ecosystems

**Science Manager Responsible**: Don Newman
**Portfolio Leader**: Colin O'Donnell

**PORTFOLIO:** Conservation Assessment
**Programme**
- Classification and Measurement

**Science Manager Responsible**: Rob McColl
**Portfolio Leader**: Theo Stephens

**PORTFOLIO:** Aquatic Protection & Restoration
**Programme**
- Marine and Freshwater Protection and Restoration

**Science Manager Responsible**: Ian West
**Portfolio Leader**: Lindsay Chadderton

**PORTFOLIO:** People, History & Conservation
**Programmes**
- Visitor Use
- Community Participation
- Historic and Cultural Heritage Protection

**Science Manager Responsible**: Paul Dingwall
**Portfolio Leader**: Kevin Jones