## NZ's Conservation and Environment Science Roadmap

Ken Hughey, Chief Science Advisor, DOC, Wellington

Presentation to the Our Land and Water Symposium - Let's Talk Solutions, Lincoln University, 11-12 April 2017



Conservation and Environment Science Roadmap

New Zealand Government

# Can a scientist please explain the following & help me develop policy to fix <u>it</u>, whatever <u>it</u> is?



From Apr 5, 2017 To Apr 12, 2017 Zoom 1d 1w 1m All ㅈ 0.175 0.15 0.125 0.1 0.075 0.05 12:00 12:00 12:00 12:00 10. Apr 12:00 11. Apr 12:00 12. Apr 12:00 6. Apr 7. Apr 8. Apr 9. Apr

Selwyn at Whitecliffs – last week peaked at 75m<sup>3</sup>s<sup>-1</sup>: more than an annual flood event & half a 10 year flood event; more than the Waimakariri is flowing at today!

Yet the Selwyn at Coes Ford – peaked at 'nothing'!

## Background to the Roadmap

- More demand than ever for evidence-based decision making
- Seemingly ever changing science system
- Multiple funding mechanisms & providers
- Despite NSSI removal of 'ring-fencing' left a gap in 'direction'
- Recognition good science takes time
- Questions about growing / maintaining expertise & infrastructure
- Govt increasingly joined up in NRS thinking yet not in setting science direction

## The task, the challenges, the product ...

#### <u>Purpose:</u>

map out a shared vision of NZ's future science priorities & capability needs, the work from which will inform future policy making

#### • Jointly prepared by:

DOC & Ministry for the Environment, sponsored by Ministers & Sir Peter Gluckman

• <u>Timeline</u>:

➢ Feb 2016, completed Feb 2017 − amazing!

- Independent <u>Strategic Advisory Group</u> chaired by Sir Peter
- Officials Working Group:

CSAs of DOC & MfE & other key govt departments including MPI

• Resulted in around 60 priorities & 16 for the next 5 years

### Groupings & Themes – taxonomies drove us to distraction

- Process themes support all areas of research & are interwoven into all other themes, but also stand as themes in their own right.
  - Theme 1: Environmental monitoring and data management
  - Theme 2: Mātauranga Māori
- **Pressure themes:** cross-cutting issues across the biophysical domains.
  - Theme 3: Climate change
  - Theme 4: Biosecurity
- Domain theme: relates to interactions between ecosystems & processes across all domains
  - Theme 5: Integrated ecosystems & processes: Data, understanding & tools to inform integrated management of the environment as a whole, involving complex interactions between sub-themes
    - Land: Data, understanding & tools to guide policy & management approaches to improve conservation & environmental outcomes, including mitigating the potential impacts &/or threats from disturbance, climate change, land use, & natural hazards.
    - Fresh water: Data, understanding & tools to support policy & management approaches that achieve healthy & resilient ecosystems & habitats, meet cultural & recreational needs & avoid adverse human health impacts, while enabling efficient, equitable & productive use of water.
    - Coasts & oceans
    - Urban
    - Species & populations
- Human dimensions theme: relates to the 'human' factors affecting the environment, including links between values, beliefs & environmental attitudes, environmental knowledge, social licence issues, & engagement in governance & decision-making.
  - Theme 6: Social & economic factors

## Indicative research priorities for the next five years – what a job this was on Xmas eve!

- Environmental monitoring New & improved tools for gathering & reporting data on condition & trends for our land, freshwater, air & marine environments.
- Climate change Adaptation & mitigation scenarios that test & demonstrate the sensitivity of New Zealand's environment, economy, & society to climate-related impacts & extreme events; Technologies & practices for reducing greenhouse gas emissions; Models that help us better understand how changes to land-based activities that affect greenhouse gas emissions also influence freshwater quality & quantity & biodiversity.
- **Biosecurity** Widely accepted & affordable solutions to invasive pests, weeds & diseases that have high-risk conservation, economic or health implications.
- Integrated ecosystems Models that assess the effectiveness of interventions, particularly freshwater restoration programmes, including whitebait fisheries; Improved understanding of how our use of land affects freshwater quality & ecosystems; Predicting environmental thresholds & tipping points so we can look after our natural ecosystems better; Models & data that help communities make resource management decisions that have implications across our land, freshwater & marine ecosystems.
- Freshwater A better understanding of how contaminants, including excess sediment, affect ecosystems, human health, & recreation to inform how we manage urban & rural land & water use.
- Coasts & oceans Identifying key marine habitats that provide for the values we hold for biodiversity, traditional food gathering (kaimoana), recreation, & commercial fisheries; Understanding present & future threats to these habitats, including from climate change, & assessing management options.
- Species & populations Cost-effective technologies to manage the threats to native species, particularly to help achieve the 'predator-free New Zealand 2050' goal; Improved tools for completing taxonomic inventories of coastal & oceanic species & land-based invertebrates.
- Social & economic factors How to build social & cultural capital to manage the environment more effectively (including the acceptance of new technologies); Comprehensive models of New Zealanders' values, beliefs & understanding of conservation & the environment.

## Anticipated Roadmap Outcomes – I will later look ahead 10 years and tell you what I think we will have achieved

Clarified priorities for environmental & conservation science for:

- Optimising internal agency funding
- Aligning cross-agency funding
- Informing external funding & research
- Identifying ongoing needs for research capacity, capability & infrastructure
- Assist MBIE, other science funders, national science challenges, CRIs, in their priority setting & decision making
- Integrating overlapping research needs

## The biggest challenge by far

- IMPLEMENTATION
- IMPLEMENTATION
- IMPLEMENTATION
- IMPLEMENTATION
- IMPLEMENTATION
- •IMPLEMENTATION

## IMPLEMENTATION

### Understanding the playing field – a game of more than 2 halves!

#### CONSERVATION & ENVIRONMENT SCIENCE ROADMAP & NRS LINKAGES

NR5 Domains	Our Land	Our Water	Our Oceans	Our Climate & Energy	Our Biodiversity
Outcomes	Our land is sustainably used to its best value and in away that maximizes its future potential	Thiving communities are for and get what they need from their freshwater	New Zealand malian the full potential of its marine maximum in a systemable and involution way	New Zealand is a more productive, low emissions economythet is mailiant to achanging dimete	Our management of natural reported programs for traditionity deliver according activity delivery according activity of tradition
Collective Priorities	<ul> <li>Improve resource allocation, planning aptima &amp; management of the rest/uniter interface</li> <li>Improve productively offer white reducing choremental impacts and presenting occurre productively and floobility</li> </ul>	Improve featiwater quality and cocaystem feat/bit     Increase value from more efficient use of featiwater     Isonomic growth based on good environmental practice	<ul> <li>Improve costing manne management regimes</li> <li>Develop a scoredinated approach to improving the quality of the maine environment and allocation of maine resources</li> </ul>	<ul> <li>Transition to a lower emissions contemp</li> <li>Improve mailments frazouro- related industries to the contemp and environmental impacts of climate change</li> </ul>	<ul> <li>Install in and grow Do casilons: and Peakly of ND a complement crabbing scalamatic primary production which manifering and orbanizing considers health and producting values buildentity.</li> </ul>
Roedmep Domein	Integrated Ecosystems Land	Integrated Ecosystems: Fresh water	Integrated Ecosystems: Coasts and Oceans	Climate Change	Integrated Ecosystems: Species and Populations
5-year Priorities	<ul> <li>Models and data that assit resource management decears</li> <li>improve understanding of here land-upp affects instituate quality and scraptions</li> </ul>	<ul> <li>How contaminants effect occupations, human health, and recreation to inform heavier mange urban/runal land and water use</li> <li>Increase understanding of heaviliand-use affects feel/water quality and cocapations</li> </ul>	<ul> <li>Identify key matrix fabilitis that provide for the values we hold for brockvesity, kamaana, recruiten, and commercial fabores</li> <li>Understand Thesis to these habilitis, and assess management options</li> </ul>	<ul> <li>Adaptation and mitigation scenars to tast sensitivity to climate impath and extense works</li> <li>Technologies and practices to reduce CH3 emissions</li> <li>Models Statesces have during to land-based activities that affect OH3 emissions, and foreast feathwater quality and quantity and biodiversity</li> </ul>	<ul> <li>Scholans to means and a second set of a second set of the second second second set of the second second</li></ul>
National Science Challenges	Our Land and Water • Land-Line Surbbibly • Sources and Source	Our Land and Water Land-Lat Suitability Source and Source	Sustainable Seas • Dynamic Seas • Managed Seas	Resilience to Nature's Challenges & Deep South I match and molecular Bath system modeling and prediction	Biological Heritage • Assassing our biological Portlage • Reducing solar and Treads • Suchering and rectoring convisions
System Enablers &	Sim of the Treaty partne	n of Improve engagement with Māari Mātauranga Engra	Better provision of information to inform decisions Social	Advance collective priorities with local government & business & 1. Data & tools	mprove data & pols required to pport NRS goals & priorities Coordinate, grow and maintain taxonomic
Common Customers	Goad Tag Priority Mistanauga Mi	Māori Colleboretionu interdisoplinery partnerships, cituen science	Develop comprehensive models of New Zeslanders values and beliefs	TS Build soce i & culture: cepitel to menage the environment effectively	vew tools for sethering and porting data on condition and trends for our Domains

### Which is trying to influence ...



### By providing and further influencing ...



## Leading to ...

roblem definition	Short-term outcomes	Medium-term outcomes	Long-term agency outcomes	
. Stakeholders lack a shared view of New Zealand's future science priorities and capability needs		The Deciderate are living		
. Multiple funding agencies and processes – so alignment and leveraging of investments is not optimised	The Roadmaps communicate key stakeholders' <b>shared view</b> of New Zealand's future science research and development needs and priorities	fine Roadmaps are living documents that remain fit-for-purpose over time	New Zealand has a highly dynamic science system that enriches New Zealand, making a more visible, measurable contribution to our productivity and well-being through excelle science (MBIE Vision for Science System, 2025)	
. Risk that critical science won't be available to meet		New Zealand has the		
future needs	Needs/gap analysis clearly identifies the science <b>knowledge</b> , <b>tools</b> and <b>capability</b> that New Zealand requires and results	right science research and development <b>capability</b>	The <b>primary sector</b> is agile, resilient and operates within sustainable environmental limi while maintaining and improving productivity and enhancing value	
Cey activities		New Zealand produces	The capacity for the <b>environment to sustain</b> <b>itself</b> is safeguarded and the use of the environment, including natural resources,	
. Development of Conservation and Environment Science Roadmap	in plans to address future needs	the right science <b>knowledge</b> and <b>tools</b>		
. Development of Primary Sector Science Roadmap	Science funders, providers and end users align funding		is <b>optimised</b> for the betterment of society and the economy now and over time	
. Needs/gap analysis		Improved uptake of knowledge		
. Implementation planning (eg, public engagement processes, regular Roadmap refreshes, monitoring and evaluation)	decisions and capability building activities with Roadmap priorities	and <b>tools</b> enhances decisions and protects end users	New Zealanders gain environmental, social and economic benefits from healthy functioning ecosystems	

People in New Zealand make and implement decisions that benefit society, the economy, and the environment

# With work to date which, since February, has involved ...

- Participating on MBIE's SSIF Advisory Panel and deliberating on all CRI core funding – <u>fascinating</u>!
- Briefing NRS CEs and others on an implementation strategy <u>in progress</u>
- Getting out there a traveling road show around NZ <u>in planning</u>
- Working closely with MBIE to ensure Roadmap considered as part of 'Impact' in Endeavour and Smart Ideas rounds in progress - <u>encouraging</u>
- Working with DOC Science team to assess all external Endeavour etc proposals asking for our support against the Roadmap priorities and against the Department's 2025 Stretch Goals (which includes one for freshwater) - <u>challenging</u>
- Internally, in DOC, asking all Science Directors to ensure budget bids are aligned with the Roadmap and with the 2025 Stretch Goals: <u>hugely challenging</u>

Looking ahead 10 years into the Roadmap – what have we achieved & what was different?

- Irrespective of who the Govt of the day was/is the discipline of working collaboratively within Govt is successful – I am nearing retirement!
- In DOC this meant SAW (self assigned work) went out the door 9 years ago & all science staff were/are working to the strategy leading to integrated step change research & management
- Because we were working strategically & together we were able to engage New Zealanders' 'hearts & minds' & have a healthy dialogue about new technologies & social licence – this resulted in step change research: as a result wasps have been eradicated from NZ & we have a technology for rats & possums
- Mātauranga Māori & western science are feeding off each other & the synergies are leading to huge changes in how we practice business & nurture the environment
- Apart from the ongoing & huge legacy effects of climate change we have turned huge corners already – NZ is indeed the envy of the world & has a thriving economy & environment

## Thank you



### Kia ora