SWIM update on critical issues. November 2010

Recent evaluation of the freshwater research proposals has involved a high degree of interaction with regional councils involved in water management. The proposals accepted go a long way in addressing existing research needs, which were identified in the critical issues below. How well that research will answer the issues below is yet to be assessed, as the proposals are refined further gaps are likely to be realised. So in that regard the research needs are still "live". The additional notes give further descriptors to the critical issues.

Four new critical issues are identified

****Emerging contaminants

****Improved flow setting (partly met by this FRST project's "environmental flows" and "Waterscape"

****Beyond integrated catchment management – holistic management framework for regional development

****National/Regional Consistency

Critical Issues and Research Needs Considered to be of Very High Importance (****)

1**Critical Issue: Community change**
Research Need
Comment
Social science research - how to effectively promote highly targeted behaviour changes towards desired ends amongst particular populations, for particular issues. Including a mix of policy options. Investigate impacts on, and ability for communities to adapt /respond to changes in their environment and the distribution of impacts including identification of equity issues and mechanisms to minimise negative consequences on well-beings.
Identify examples co-management models between Maori and Council and evaluate their effectiveness. Identify links between social, economic, cultural and environmental well-beings and evaluate the effectiveness of their inclusion in council and other agencies decision making

Critical Issue Science uptake	
Research Need	Comment
Uptake of existing science – As usual what is lacking is the transferability of research into application, this being more a time constraint issue of the recipients than science providers. A critical issue and probably a social science research need.	

Critical Issue Taking science to the community	
Research Need	Comment
Demystifying science to enable informed water resource debates	

2**Critical Issue: Valuing environmental services**
Research Need
Comment
Research to develop and trial new methodologies and tools to enable RC's to place financial and non-financial values on environmental resource services. Valuing 'natural capital' in a robust, defensible and transparent way that is capable of wide application across all natural resources.
SRU and ECO portfolio

Critical Issue Multivalue criteria analysis	
Research Need	Comment
Multivalue criteria analysis to enable robust water management decisions which enables communities expectations and deliverables to be met (i.e. balance values of communities for multiple protection whilst having regard to national and international requirements)	

3**Critical Issue: Cumulative effects of activities on ecosystem structure, function and resilience**
Research Need
Comment
Improved understanding of natural ecosystem complexity, diversity and resilience, and the cumulative effects of on-site and off-site activities on NZ natural ecosystems (i.e. how to avoid 'death by a thousand cuts' in our ecosystems; are there 'tipping' points and if so, when do they occur?)
ECO and SRU

Critical Issue Providing robust NZ related ecotoxicological data	
Research Need	Comment
Ecotoxic compounds relative to NZ species – provide robust chronic and acute toxicity data relevant to NZ conditions. Includes threshold setting	ANZECC guidelines are deficient in "real" NZ data on species toxicity

and scenario modeling.	

Probably being met by "cumulative stressors" FRST project

******Critical Issue: Understanding the impacts of nutrients and sediments on rivers lakes, wetlands, estuaries and coastal environments – both urban and rural context**
Research Need
Comment
Land use effects on nutrient and sediment generation and transport and effects on rivers, lakes, wetlands, estuaries and coastal environments, including sublethal, synergistic (or antagonistic) effects of multiple stressors and interactions. Needs to be put into wider context with integrated management to avoid "ambulance at bottom of the hill research"
SRU

Include rivers, lakes and wetlands

******Critical Issue: Determine the assimilative capacity of rivers, lakes, wetlands, estuarine & coastal receiving environments and ascribe land-based contaminant management standards and targets**
Research Need
Comment
Need an empirical, evidence-based approach to policy development that integrates management of contaminants at source (land-based) aligned to contaminant fate (transport mechanisms) and environmental consequence (ecological impact).
SRU and ECO

Include rivers, lakes and wetlands

******Critical Issue: Managing primary production systems under increasingly constrained inputs (water, soil, land)**
Research Need
Comment
Techniques and tools for managing primary production systems under constrained inputs; what might 'constrained input' agriculture look like; what new environmental pressures might it bring, or existing pressures might it ease?
SPS
Optimising and integrating existing nutrient management tools e.g., SPASMO etc. Improved agricultural nutrient models e.g., OVERSEER, to manage non-point source discharges and consequent effects, not just on-site nutrient balancing; need for greater reliability under a range of specific conditions.
SPS
Mechanisms for sustainable water management and allocation efficiency and equity; including valuing of water and understanding of social distributive issues etc.

SPS

*****Critical Issue: Environmental performance evaluation including auditing and certification**
Research Need
Comment
Robust defensible protocols for identifying, measuring and evaluating environmental performance, for the benefit of producers (accountability to consumers), their market/consumers (choice); and for environmental regulators (full environmental impact assessment).
SPS, PQA

Critical Issue Performance indicators	
Research Need	Comment
Establishment of "new" indicators for performance	Process developed to ensure success indicators identified for performance effectiveness reporting

*****Critical Issue: Climate change**
Research Need
Comment
Planning for impacts of climate change (GLO, SPS) – adaptation to risks including opportunities presented by climate change.
GLO, SPS
Impacts of climate change on indigenous biodiversity values and change including what are the biodiversity values and resources most at risk?
GLO

NEW

****Critical Issue Emerging contaminants	
Research Need	Comment
How to identify, communicate and set limits that safeguard long term sustainability	

****Critical Issue Improved flow setting.	
Research Need	Comment
Flow setting in relation to Maori values	

and matching to existing scientific processes where appropriate i.e. interoperable models Flow setting in relation to native species (specifically around fish, currently dominated by the information on sports fish)	

Partly met by this FRST project's "environmental flows" and "Waterscape"

****Critical Issue Beyond Integrated Catchment Management	
Research Need	Comment
Integrated area management picking up on ICM. Taking a broader view of management to go beyond catchment boundaries to optimize economic use and social, cultural and environmental gains (especially in relation to biodiversity improvements). Holistic management of water in an area sense (incorporating terrestrial and freshwater beyond just catchments)	

****Critical Issue National/Regional consistency	
Research Need	Comment
Regional council consistency – standards for establishing regional council networks and auditing to ensure consistency between regions. Interoperability of regional council programmes and platform to enable use of vast internal expertise (how do you develop a dispersed science model within region councils to provide future resilience and improved science provider uptake)	

*** Critical Issue Biodiversity	
Research Need	Comment
Biodiversity monitoring procedures for freshwater (current level of monitoring identifies state not biodiversity value but	

is used as a surrogate (should be linked to wider biodiversity portfolio),	