SETAC Global Horizons
Australasian Workshop

V Pettigrove
SETAC is a not-for-profit, global professional organization comprised of some 6,000 individual members and institutions from academia, business and government. Since 1979, the Society has provided a forum where scientists, managers and other professionals exchange information and ideas on the study, analysis and solution of environmental problems, the management and regulation of natural resources, research and development, and environmental education.

SETAC's founding principles are:
• Multidisciplinary approaches to solving environmental problems
• Tripartite balance among academia, business and government
• Science-based objectivity

SETAC is implementing this mission worldwide.
Global Horizon Scanning Research Prioritization Project

Aims to collect and prioritize the most important future research questions as recognized by scientists from around the globe working in government, academia and business. The results of this project contribute to the mission of SETAC to achieve Environmental Quality Through Science®.
Why Global Horizon Scanning?

- Numerous global challenges and opportunities exist to achieve more sustainable environmental quality
- Environmental science has responded to many issues, but has not undertaken a prospective activity to identify strategic research needs
- The Global Horizon Scanning Project aims to identify important environmental quality research needs
- Results of this project contribute to the mission of SETAC to achieve Environmental Quality Through Science®
Global Horizon Workshops

- Europe
- Australasia
- South America
- North America
- Asia
- Africa
What was an ‘ideal’ question?

- Address important gaps in knowledge
- Be answerable through a realistic research design
- Have a factual answer that does not depend on value judgments
- Cover a spatial and temporal scale that could realistically be addressed by a research team ($10M € over 5 years)
- Not be answerable by “it all depends” or “yes” or “no”
- If related to impact and interventions, should contain a subject, an intervention, and a measurable outcome
What was the Scope?

- Environmental stressors
  - Ecological, but not exclusively
    - Human Exposure and Health Risks
  - Research based, rather than policy, questions
  - Includes management and remediation
  - Spatial scale: region issues in a global context
Towards Sustainable Environmental Quality: Priority Research Needs for Australasia

Australasia - Key Questions

Solicited priority research questions from SETAC Australasia members in 2015

- www.setac.org/GHSP
- 78 questions submitted
- Partitioned by theme
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Structuring the Input from Australia, New Zealand and Papua New Guinea

25 August 2015
Nelson, New Zealand
The Australasia Workshop

Two breakout sessions each with three concurrent theme groups

Session 1
A. Tools for Improving Risk Assessment
B. Multiple Stressors and Mixtures
C. Contaminants of Emerging Concern
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Two breakout sessions each with three concurrent theme groups

Session 2
A. Risk Assessment, Management and Guidelines
B. Spotlight on Australasia
C. Environmental Chemistry: Analysis, Fate and Exposure
Priority Research Questions

How do we advance ecotoxicology testing to be more relevant to ecological systems?
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Priority Research Questions

How can ecotoxicological information be integrated more closely during interpretation of ecological data?
Priority Research Questions

How can we measure ecosystem resilience to and recovery following exposure to stressors?
What are the combined impacts of various agrochemicals (e.g., veterinary medicines, pesticides) and eutrophication from intensive terrestrial farming operations on the health of aquatic and terrestrial organisms downstream?
Priority Research Questions

What are the most appropriate toxicological approaches to develop regulatory guidelines specifically for contaminants of emerging concern that address multi-modes of action and sub-lethal effects?
Priority Research Questions

What are the effects of short magnitude, frequency and duration (e.g., intermittent, episodic) exposures to contaminants and other stressors, and how can these scenarios be effectively incorporated into water quality guidelines?
Priority Research Questions

Are there differences in toxicological thresholds among native and nonnative organisms, and how can species sensitivity information from non-resident species be used to predict adverse outcomes and protect our unique Australasian biota and ecosystems?
Australasia has unique animals
Priority Research Questions

What water quality guidelines are needed to protect ephemeral waters and associated ecosystems from the influences of development?
Priority Research Questions

How do we incorporate and protect cultural and social values (relating to humans, biota and ecosystems) to empower citizen/societal/indigenous engagement in the research, management and legislation of priority environmental contaminants?
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Next Steps

Pettigrove et al. manuscript in preparation

Engagement with governments and international agencies
Call for more research on health and environmental impacts, especially in indigenous communities and ecosystems. Call for an Australasian research centre?
Next Steps

Plans for Australasia
Thank you!
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Priority Research Questions

How can prescreening techniques (e.g., in chimico, in silico, in vitro, in situ) be developed, advanced and validated to identify and predict whole organism effects?
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Priority Research Questions

How do we exploit, collate and integrate existing environmental toxicology, chemistry and geospatial data to help develop robust risk assessment?
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Priority Research Questions

What are the effects of changing demographics, economic development, consumption patterns and climate (e.g., ocean acidity, water temperature) on chemical emissions, environmental fate and ecotoxicology of contaminants and multiple stressors?
Priority Research Questions

What are the combined effects of very low levels of multiple contaminants (e.g., pesticides, natural resource extraction contaminants, salinity, pharmaceuticals and personal care products, endocrine disrupting chemicals) with different modes of action on aquatic and terrestrial organisms and ecosystems?
Priority Research Questions

How can we identify and prioritize contaminants (traditional and emerging stressors) for sustainable management of ecosystems within different biogeographic regions?
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Priority Research Questions

How can we identify and examine the environmental fate and toxicity of ingredients other than the stated "active" components in commercial formulations individually and in chemical mixtures?
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Priority Research Questions

How can we develop robust chemical assays and models to replace, refine and reduce biological testing?
Priority Research Questions

How do we better understand the linkages between the structural and physico-chemical properties of substances to predictively model fate and bioavailability in different environments?
Priority Research Questions

How do we develop better broad-screening analytical and information processing techniques that do not require pre-selection of target contaminants?
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Priority Research Questions

How do we use chemistry to better design sustainable waste management?
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Priority Research Questions

How can we ensure sustainable supplies of clean water, energy development and food security while simultaneously minimizing ecological impacts and protecting environmental quality?