

Education

- PhD – Environmental Science, Griffith University, Brisbane, 1994
- M. Sc (Hons) – Zoology, University of Auckland, New Zealand, 1987
- B.Sc. – Zoology and Marine Biology, University of Auckland, 1985
- PRINCE2 Practitioner Certificate in Project Management, 2016
- Making Good Decisions: Certification as RMA Decision Maker, 2014; Recertification, 2017
- GradDipT (Secondary) University of Waikato, 2012

Application of the RMA

Ngaire R. Phillips, PhD.

Independent Commissioner Environmental Science Specialist (Freshwater and Estuarine Ecology and Ecotoxicology)

Dr Phillips is an experienced environmental scientist with specialist expertise in ecology and environmental toxicology. She has gained this experience through roles in consulting, research, science management, project management and education. She has a wealth of knowledge based on practical and extensive experience in a wide range of scientific disciplines, including freshwater and estuarine ecology, customary fisheries management, water quality and land management associated with rivers, lakes and estuaries. Ngaire has considerable experience in leading and participating in multi-disciplinary teams. She is also a registered RMA Independent Commissioner and is an appointed member of the HSNO Committee. Ngaire is also a PRINCE2 practitioner.

Specialty areas:

Freshwater and estuarine ecology

Ecotoxicology

Ecohealth (human health/environmental health links)

Iwi Resource Management issues, especially customary fisheries

Environmental Impact Assessment

Selected Examples of Relevant Experience

Experience on Decision Making Committees

Member, Special Tribunal for the Ngaruroro and Clive Rivers, Hawkes Bay, 2017-current. The purpose of this tribunal is to consider an application for a Water Conservation Order (as defined in Part 9 of the RMA) on Hawke's Bay's Ngaruroro and Clive rivers. The application was made by New Zealand Fish and Game Council, Hawke's Bay Fish and Game Council, Ngāti Hori ki Kohupatiki, Whitewater New Zealand, Jet Boating New Zealand, and the Royal Forest and Bird Protection Society of New Zealand. Chair: Richard Fowler.

Independent RMA Commissioner, Silver Fern Farms consenting, Waikato Regional Council, 2016. Environmental science expert on a 2 person panel considering an application by Silver Fern Farms to renew its discharge consents associated with operation of its Te Aroha meat processing plant. The principal technical issues considered were water quality discharge limits. Chair: Craig Shearer.

Experience Highlights

- Director, Streamlined Environmental since January 2014
- More than 25 years' experience working in scientific consultancy, research, management, education and government roles in New Zealand and Australia
- 7 years as Research Programme Leader, NIWA
- 9 years as Group Manager/Scientist (Freshwater Ecology), NIWA,
- 9 months teaching experience at Liggins Institute (University of Auckland)
- 3 years as Principal Scientist, Aquatic Ecology, NIWA Australia, Brisbane,
- 3 years as Principal Conservation Officer (Aquatic Ecology and Planning), Queensland EPA, Brisbane,
- 5 years as a Senior Environmental Consultant, Natural Resource Assessments, Queensland

Independent RMA Commissioner, Fonterra-Tirau consenting, Waikato Regional Council, 2016.

Environmental science expert on a 2 person panel considering an application by Fonterra to renew its discharge consents associated with operation of its Tirau dairy facility. The principal technical issues considered were water quality and ecology, as well as duration of consent. Chair: Rob Van Voorthuysen.

HSNO Committee member 2015-current Appointed to the Hazardous Substances and New Organisms (HSNO) Committee which makes decisions on applications under the Hazardous Substances and New Organisms (HSNO) Act 1996. This is a standing committee with an appointment term of 3 years. Decision Making Committees (DMC) are formed from a pool of 8 decision makers. Technical risk assessment reports are produced by EPA staff, along with submissions and other relevant technical material, are evaluated for potential risks the substance may pose to the environment, human health, the relationship of Māori to the environment, society, community, and to the market economy. Evaluation and decision making may be via email, teleconference or at a hearing (if submitters wish to be heard) and roles may be as DMC panel member or Chair. Seventy percent of these considerations have involved hearings (examples below).

HSNO DMC member, HFO-1234yf, 2016/2017. HFO-1234yf, a heat transfer fluid to be used for refrigeration and air conditioning, which has a low global warming potential and no ozone depletion potential, but is a flammable gas. Eleven submissions received. Chair: Dr Kerry Lang.

HSNO DMC Chair, Grizly Max, 2016. The purpose for this application was to seek approval for the use of Grizly Max Insecticide for the control of Thrips Tabaci (onions) and Tomato Potato Psyllid and aphids (Potato). Three submissions received. Chair: Dr Ngaire Phillips.

HSNO DMC member, Tamarixia (biocontrol agent), 2016. The purpose for this application was to release from containment the psyllid parasitoid *Tamarixia triozae* into New Zealand to assist with the biological control of the tomato potato psyllid (*Bactericera cockerelli*). Thirty six submissions received. Chair: Dr Kevin Thompson.

HSNO DMC member, Poncho Votivo, 2015/2016. Poncho Votivo is a seed treatment intended to be used for the prevention of insect and nematode damage in cereal, maize, sweetcorn, forage brassica and grass seed. This was a complex and controversial application, as the active ingredient is a member of the neonicotinoid group, which have been implicated in the decline of honey bee populations. Nineteen submissions received. Chair: Dr Kevin Thompson.

HSNO DMC member, Tutsan (biocontrol agent), 2015. The purpose for this application was to introduce the moth *Lathronympha strigana* and the leaf beetle *Chrysolina abchasica* as biological control agents for the weed tutsan (*Hypericum androsaemum*). Thirteen submissions received. Chair: Dr John Taylor.

HSNO DMC member, Moth Plant (biocontrol agent), 2015. The applicant, Northland Regional Council, sought approval to release *Puccinia araujiae* Lév. (moth plant rust) as a biological control agent (BCA) for moth plant (*Araujia hortorum*). Thirty eight submissions received. Chair: Dr Louise Malone.

Application of the RMA

Technical support to s42a Officer, Nelson City Council, 2017. Provided technical advice on an application for resource consents for abberational sewage overflows to the Waimea Estuary, Nelson.

Okura development proposal, Expert Witness, Okura Holdings Ltd, 2017. Presented expert evidence on ecological values of the freshwater systems of a development area north of Auckland, including predictions in changes in values associated with the proposed development.

Healthy Rivers 1 (Waikato/Waipā) - implications for Port Waikato, Waikato Regional Council, 2016.

Think piece on the potential implications of decisions made through the Waikato Healthy Rivers Plan on the estuarine environment at Port Waikato.

Assessment of Ecological Effects on the receiving environment from the discharge of treated wastewater from the Omaha WWTP, Watercare Services Ltd, 2016. Undertook field and desktop investigations to determine the potential effects of population growth on nutrient levels reaching the sensitive Whangateu Harbour, which was integrated into an AEE for resource consent applications by Watercare Services.

Chatham Rock Phosphate deep sea mining proposal, Expert Witness, Ngāi Tahu, 2014. Ecotoxicology expert on a submission by Ngāi Tahu (as submitter) on the application to mine phosphorite nodules on the Chatham Rise. Provided an assessment of potential ecotoxicity associated with the proposal, as well as a review of methods employed by the applicant to determine toxicity.

Waikato Byproducts Re-consenting, Graeme Low Corporation, 2014-2015. Ecology, water quality and ecotoxicology expert for the re-consenting of Waikato Byproducts discharge permit. Prepared an assessment of the current status of the receiving environment, the effects environmental health associated with the plant (including an assessment of mixing zone characterization) and proposed consent conditions, for integration into the AEE.

Te Kahu Mine, Department of Conservation (DOC), 2014-2015. Ecology/ecotoxicology expert on a proposed coal mine west of Westport, which includes a requirement obtain a concession and an easement on DOC land. Reviewed applicants AEE, especially in relation to freshwater ecology, water quality and water management strategies. Advised DOC on other legislative implications.

Freshwater and estuarine ecology

Okura Freshwater Assessment, Okura Holdings Ltd, 2017. Undertook field assessment using the Stream Ecological Valuation (SEV) method to assess ecological functioning under existing and proposed development options.

River Ecology Status and Trends, Auckland Council, 2013. Undertook data analysis and reporting of temporal trends in macroinvertebrate indices derived from Auckland Council's River Ecology Monitoring Programme.

Biological traits: application to regional monitoring programmes, Waikato Regional Council/Auckland Council, 2011. Led an investigation into the response of macroinvertebrates metrics and traits to a gradient of pastoral development (% pastoral) for Waikato streams and in comparison to Auckland streams. Also investigated the potential use of traits as a mechanistic tool.

Interactions between heavy metals, sedimentation and cockle feeding and movement, Auckland Regional Council, 2008-2009. Part of a team examining the effect of cockle feeding and movement on sediment resuspension in heavy metal-impacted estuaries. Undertook field and lab-based experiments to examine the interactions between these components

Ecotoxicology

Interactions between heavy metals, sedimentation and cockle feeding and movement, Auckland Regional Council, 2008-2009. Part of a team examining the effect on feeding and movement estuarine bivalves (cockles) on sediment resuspension in heavy metal-impacted estuaries. Undertook field and lab-

based toxicity experiments to examine the interactions between these components. Contributed to the development of a complex systems model.

Intergenerational responses to stormwater contamination, Auckland Regional Council, 2007 – 2009.

This project aimed to provide a tool for detecting the effects of chronic, low-level contamination in streams on multiple generations of aquatic biota, using changes in genetic structure as a marker. Combining field and laboratory experiments ranging from acute (4 days) to chronic (38 days) exposure periods, the effects on both adult and juvenile populations of a “model” organism (the freshwater clam *Sphaerium novaezelandia*) were examined. Significant chronic effects of stormwater contamination on aquatic organisms were identified.

Estuarine Ecodiagnostics, New Zealand Foundation for Research, Science and Technology, 2006-2010.

Co-led a project that aimed to develop a suite of tools based on multiple levels of biological organisation and used to determine resilience of estuarine communities from contaminant exposure. Undertook field and lab-based toxicity experiments in the Auckland region to examine genetic responses to contaminant exposure in estuarine bivalves.

Ngakawau River Chronic Ecotoxicity Testing, Solid Energy, 2005. Designed and conducted acute and chronic toxicity tests on fingerling Rainbow Trout and stream invertebrates (mayflies, snails) using naturally acidic field-derived water samples. Calculated a site-specific trigger value for aluminium based on these results.

Ecohealth (human health/environmental health links)

Determining the contaminant health risk of kai moana, kai roto and kai awa, Health Research Council of New Zealand, 2007-2011. Led a project aimed at characterising the risks to Māori associated with consuming kai collected from rivers, lakes and coastlines. Using quantitative risk assessment methods, we developed guidelines for safe consumption of a range of aquatic fauna and flora species, focusing on potentially at-risk communities (Rotorua, Temuka) and employing culturally-focused methods. A large part of the role was in building and maintaining relationships with our iwi partners and participants.

[Project website](#)

Scientist (Toxicology) – Department of Health, Wellington, New Zealand, 1987-1989. Provided advisory service on a wide range of toxicological issues, including food toxins, industrial hazards, pesticides, animal remedies and household products. Also closely involved in the pesticide registration process, assessing large quantities of toxicological information and the production of a number of reports on environmentally-related issues (such as levels of pesticides in shellfish).

Iwi Resource Management issues, especially customary fisheries

Recommendations for a Tangata Whenua Values Monitoring (TWVM) Framework, Greater Wellington Regional Council, 2014. Proposed a monitoring framework for Tangata Whenua Values which could be applied at multiple planning scales and which integrated Mātauranga and Western Science approaches to resource management.

Barriers to Environmental Sustainability for Iwi Resource Managers, New Zealand Foundation for Research, Science and Technology, 2008-2011. Led a team investigating the impacts of invasive aquatic plants on koura or freshwater crayfish, a significant taonga for Te Arawa. We also investigated the toxicity of cyanobacterial or blue-green algal blooms to koura and kakahi (freshwater mussels). Their toxicity to these significant taonga species had not been investigated previously. The outcomes of the project were used to guide the development of management plans for customary fisheries being developed by Te Arawa. We worked closely with iwi on all aspects of the research, including using traditional harvesting methods as a monitoring tool for koura (the tau koura).

Sustainability Management framework for Te Arawa Lakes' customary fisheries, New Zealand Foundation for Research, Science and Technology, 2005-2008. Led a team who developed tools and a management framework to support iwi management of 5 native aquatic species (namely, freshwater crayfish or koura, freshwater mussel or kakahi, and the fish species koaro, smelt and eel or tuna) in the Rotorua lakes, which was identified as a need through Te Arawa's settlement process. A major task of the project was a review of existing information of these culturally important customary fisheries species. We also developed a number of scenario-testing tools for use by iwi in their decision-making process around management of water quality in the lakes.

Environmental Impact Assessment

Ecological effects of Tasman Mill on the Tarawera River, AES, 2015, 2017. This project involved the analysis and interpretation of macroinvertebrate and water quality data collected at sites upstream and downstream of the Tasman Mill discharge point. Previous data were incorporated to address two key questions, namely a) what is the significance of changes in macroinvertebrate communities downstream of Tasman Mill and b) how do these changes relate to water and habitat quality? The approach taken was to consider multiple lines of evidence for a relationship between ecological health and water quality downstream of the Tasman Mill discharge.

Kaituna River Hydro Development, Mighty River Power, 2004 – 2005. Led a complex, multi-disciplinary study, which included hydrology, sediment transport and water quality (including algal dynamics), as well as freshwater (macroinvertebrates, plants, fish) and estuarine (invertebrates, kaimoana) ecology. Field surveys of the main river stem and major tributaries were undertaken to augment existing information identified from an initial literature review. In addition, modelling was undertaken to predict potential changes in flow and sedimentation regimes, and was the basis for assessing effects and recommending mitigation strategies for the ecological components of the river ecosystem. An integrated assessment report was prepared. Novel field surveying methods were developed and employed.

Recent Peer Reviewed Publications

Cyr H, Phillips N, Butterworth J (2017) Depth distribution of the native freshwater mussel (*Echyridella menziesii*) in warm monomictic lakes: towards a general predictive model for lakes. *Freshwater Biology* 62, (8) 1487–1498.

Verburg P, Hickey CW, Phillips N 2014. Mercury biomagnification in three geothermally-influenced lakes differing in chemistry and algal biomass. *Science of the Total Environment* 493C:342-354.

Phillips NR, Stewart M, Olsen G, Hickey CW (2014) Human health risks of geothermally-derived metals and other contaminants in wild caught food. *Journal of Toxicology and Environmental Health Part A, Current Issues* 77(6): 346-365.

Clearwater S, Wood S, Phillips N, Parkyn S., Van Ginkel, R, Thompson, K (2014) Toxicity thresholds for juvenile freshwater mussels *Echyridella menziesii* and crayfish *Paranephrops planifrons*, after acute or chronic exposure to *Microcystis* sp. *Environmental Toxicology* 29(5): 487-502.

Wood SA, Phillips NR de Winton M, Gibbs M (2012) Consumption of benthic cyanobacterial mats and nodularin-R accumulation in freshwater crayfish (*Paranephrops planifrons*) in Lake Tikitapu (Rotorua, New Zealand). *Harmful Algae* 20: 175-179.

Wood S, Kuhajek J, de Winton M, Phillips N (2012) Species composition and cyanotoxin production in periphyton mats from three lakes of varying trophic status. *FEMS Microbiology Ecology* 79: 312-326

Stewart M, Phillips NR, Olsen G, Hickey CW, Tipa G (2011) Organochlorines and heavy metals in wild caught food as a potential human health risk to the indigenous Maori population of South Canterbury, New Zealand. *Science of the Total Environment* 409, 2029-2039.

Doledec S, Phillips N, Townsend C (2011) Invertebrate trait community responses to land use effects at a broad spatial scale: a case study in New Zealand. *Freshwater Biology* 56(8):1670-1688.

Wagenoff A, Townsend CR, Phillips N, Matthaei CD (2011) Subsidy-stress and multiple-stressor effects along gradients of deposited fine sediment and dissolved nutrients in a regional set of streams and rivers. *Freshwater Biology*, 56(9):1916-1936.

Reid DJ, Chiaroni LD, Hewitt JE, Lohrer DM, Matthaei CD, Phillips NR, Scarsbrook MR, Smith BJ, Thrush SF, Townsend CR, van Houte-Howes KSS., and Wright-StowAE (2011) Sedimentation effects on the benthos of streams and estuaries: a cross-ecosystem comparison. *Marine and Freshwater Research* 62, 1201–1213.

Magbanua FS, Townsend CR, Blackwell G L, Phillips N, Matthaei CD (2010) Responses of stream macroinvertebrates and ecosystem function to conventional, integrated and organic farming. *Journal of Applied Ecology*, 47:1014–1025.

Phillips NR, Hickey CW (2010) Genotype-dependent recovery from acute exposure to heavy metal contamination in the freshwater clam *Sphaerium novaezelandiae*. *Aquatic Toxicology* 99, 507-513.

Stark J, Phillips N (2009) Seasonal variability in the Macroinvertebrate Community Index: are seasonal correction factors required? *NZ J Mar FW Res* 43: 867-882.

Recent Consultancy Reports

Phillips, N. (2017) Okura Freshwater Assessment. Report TOD1602–1, Streamlined Environmental, Hamilton, 35 pp.

Cooke, J., Stewart, M., Dunsmuir, A., Phillips, N. (2017) Healthy Rivers – Waikato. Review of additional literature relevant to sheep and beef contaminant loads. Report BAL1602–2, Streamlined Environmental, Hamilton, 17 pp.

Stewart, M., Cooke, J., Phillips, N., Freeman, M. (2017) Literature review of the risks and adverse effects from discharges of stormwater, wastewater, industrial and trade waste, and other hazardous substances in Otago. Report ORC1601-FINAL-v2, Streamlined Environmental, Hamilton, 153 pp.

Green, M.O., Phillips, N.R., Cornelisen, C.D., Stewart, M. and Dunsmuir, A.K. (2016) Contaminants in New Zealand Estuaries: Effects, Sources, Current State, Management and Research Needs. Report WRC1601–1, Streamlined Environmental, Hamilton, 210 pp.

James, M., Stewart M., Phillips N, Cooke, J (2016) Assessment of Ecological Effects on the receiving environment from the discharge of treated wastewater from the combined Snells Beach and Warkworth WWTPs. Prepared for Watercare Services Ltd, May 2016.

Cooke, J and Phillips N (2016) Literature review of options for potential reduction of heat and mercury from cooling water discharged from Wairakei Power Station 2014-2016. Prepared for Contact Energy, March 2016.

James, M., Stewart M., Phillips N, Cooke, J (2016) Assessment of Ecological Effects on the receiving environment from the discharge of treated wastewater from the Omaha WWTP. Prepared for Watercare Services Ltd, January 2016.

James, M and Phillips N (2015) Ecological significance of changes in macroinvertebrate communities downstream of Tasman Mill discharge. Prepared for Carter Holt Harvey Pulp and Paper, Norske Skog Tasman and Bay of Plenty Regional Council. CHH1502, August 2015.

Cooke J., Cox T., Stewart M., Phillips N., Pandey S. (2015) Rotokauri ICMP – Phase 2 Broad scale Water Quality Assessment. Prepared for Hamilton City Council.

Phillips, N. (2015) Review of Freshwater Solutions 2015 Tarawera River Ecological Monitoring Report. Prepared for AES, July 2015.

Phillips, N (2014) Graeme Lowe Protein Assessment of Effects on the Receiving Environment. Prepared for Environmental Management Systems, October 2014.

Neale, M.W., Storey, R.G., Rowe, D.K., Collier, K.J., Hatton, C., Joy, M.K., Maxted, J. R., Moore, S., Parkyn, S.M., Phillips, N. and Quinn, J.M. (2011) Stream Ecological Valuation (SEV): A User’s Guide GD2011/001.

Storey, R.G., Neale, M.W., Rowe, D.K., Collier, K.J., Hatton, C., Joy, M.K., Maxted, J. R., Moore, S., Parkyn, S.M., Phillips, N. and Quinn, J.M. (2011) Stream Ecological Valuation (SEV): a method for assessing the ecological function of Auckland streams. Auckland Council Guideline Document 2011/001.