



Ngaire R. Phillips, PhD.

Director/Aquatic Ecology & Ecotoxicology Specialist

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

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:

Application of the RMA

Independent commissioner

Freshwater and estuarine ecology

Ecotoxicology

Ecohealth (human health/environmental health links)

Iwi Resource Management issues, especially customary fisheries

Selected Examples of Relevant Experience

Application of the RMA and other Resource Management Legislation

Provision of support to s42a officer on potential ecological effects of accidental and overflow discharges of untreated sewerage to the Waimea Estuary, for Nelson City Council (2017 – 2018). Project includes peer review of assessment of effects report submitted as part of resource consent applications, expert conferencing and production of a report to assist development of the section 42a report. Also includes attendance at hearing to provide technical support to the Hearings Panel and contribution to consent conditions.

Okura development proposal, Expert Witness, for 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, for 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.

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

Assessment of Ecological Effects on the receiving environment from the discharge of treated wastewater from the Omaha WWTP, for 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, for Ngai Tahu (2014). Ecotoxicology expert on a submission by Ngai 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, for 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, for 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

Te Awarua-o-Porirua Collaborative Modelling Project, for Greater Wellington Regional Council (2017-ongoing). Leading the development of Bayesian Belief Networks and narrative descriptions to use in making predictions of freshwater and estuarine attributes under different development scenarios. The project outputs will support the implementation of the Porirua Whaitua process.

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

Kaipara Sediment Mitigation Study, for Northland Regional Council (2016-2017). Project Manager and contributor to a study involving a consortium of researchers that has developed a model of Kaipara Harbour and its catchment for assessing costs and benefits of sediment mitigation. The model predicts the extent to which various objectives framed in terms of sediment “attributes” may be achieved by different sediment mitigation strategies, and the associated costs to the public, landowners and sector groups.

Literature review of risks and adverse effects of discharge in the Otago region, for Otago Regional Council (2016 - 2017). Contributed ecological effects expertise to a literature review of the risks and adverse effects to aquatic ecosystems (marine, freshwater) from discharges of stormwater, wastewater, industrial and trade waste, and other hazardous substances in Otago.

Management framework for identifying and prioritizing monitoring in the Waikato Coastal Management Area, for Waikato Regional Council (2016). Led the development of a flexible framework for identifying and prioritizing collection of monitoring data within the CMA, based on an understanding of key drivers in the catchment. The framework integrates a range of interrogation and decision support tools and is able to accommodate variations in data quantity/quality.

Contaminants in New Zealand Estuaries, for Dairy New Zealand (2016). As part of a review of contaminant in estuaries, I undertook a review of metrics and indexes that are in use for quantifying estuary ecological

condition. The review also identified issues and areas where there are deficiencies, especially as they related to the dairy industry.

Assessment of ecological effects of discharge of treated wastewater, for Watercare Services (2016).

Contributed to the assessment of effects on coastal environments associated with re-consenting of discharges from existing wastewater treatment facilities (WWTPs) operated by Watercare Services, including Snells Beach and Warkworth, Clarks Beach, Waiuku and Kingseat WWTPs and Omaha WWTP.

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

Think-piece on the implications of the proposed water quality rules under the Healthy Rivers Plan for the coastal environment at Port Waikato.

Ecological effects of Tasman Mill on the Tarawera River, Aquatic Environmental Services (2015 and 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.

Wastewater and catchment nitrogen sources to Whangateau Harbour, for Watercare Services Ltd (2014).

Undertook an assessment of wastewater and catchment nitrogen sources to Whangateau Harbour and assessed the ecological significance of proposed changes in discharge characteristics associated with an upgrade of the wastewater treatment facility.

River Ecology Status and Trends, for 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, for Waikato Regional Council/Auckland Council (2011-2012). 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, for 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.

Independent Commissioner

Member, Special Tribunal for the Ngaruroro and Clive Rivers, Hawke's Bay, for Ministry for the Environment (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 re-consenting, for 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.

Independent RMA Commissioner, Fonterra-Tirau consenting, for 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, for Environmental Protection Agency (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.

Ecotoxicology

Interactions between heavy metals, sedimentation and cockle feeding and movement, for 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, for 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, for 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, for 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, for 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), for 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, for 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, for 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, for 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 lake.

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 Māori 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

Neale, M.W., Moffett, E.R., Hancock, P., Phillips, N and Holland, K (2017). River ecology monitoring: state and trends 2003-2013. Auckland Council technical report, TR2017/011

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 (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.