ESR
Science for Communities
He Pūtaiao, He Tāngata

Science to keep our people well, communities safe and environment healthy

Water is a taonga

From drinking water to seawater, storm water to wastewater, and groundwater to surface water, we need to trust the quality of the water we drink, play in and use every day. ESR's focus is on human health and our research and expertise recognise water's intrinsic role in this.

Our research and expertise

HE WAI MĀPUNA

He Wai Māpuna is a novel dual knowledge-based approach providing wai (water) based science delivery to iwi, hapū and whānau. Focused on building impact for Māori, He Wai Māpuna places community at the core of our approach while offering intergenerational support and investment in iwi to grow distinct iwi knowledge.

DRINKING-WATER QUALITY AND MANAGEMENT

Our scientists help clients to understand and manage the risks posed by the quality of drinking water.

With knowledge of:

- public health
- microbiology
- chemistry and toxicology
- environmental radiology and
- regulatory requirements of drinking water quality management.

WE WORK WITH WATER SUPPLIERS AND TAUMATA AROWAI TO:

- prevent water-related disease and manage emergency responses
- provide expert analysis and support for water management and planning
- develop new tools and technologies for monitoring water quality.

With this experience and knowledge, we can advise clients on interpreting the standards and the steps needed to manage their water supply risks and achieve compliance.

Data alone is of little value unless sense is made of it. We offer:

- support for small and very small suppliers in complying with drinking water regulations
- support for large suppliers during emergency responses
- bespoke research solutions for water management and regulatory compliance.

WATER MICROBIOLOGY

ESR's scientists are involved in a range of microbiology research projects. They provide consulting and commercial services related to water quality, the impacts of discharges to the environment and waterborne outbreak investigations.

ESR provides specialist expertise to:

- undertake waterborne outbreak investigations
- identify a range of waterborne pathogens in water
- link faecal contamination to sources such as humans, cattle, sheep or poultry
- determine the range of microbes present in water
- determine the impact of activities, such as discharges, on the health of the microbial community
- Assessment of Environmental Effects, under the Resource Management Act, on the impact of wastewater and biowaste discharges on human health.

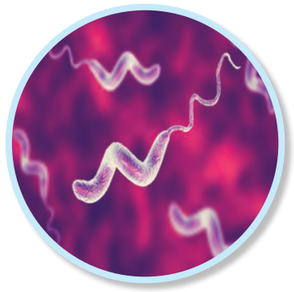
Photo: Maria J Gutierrez-Gines

ESR's biowaste team established two new field trials in the South Island to study how New Zealand's native vegetation could mitigate environmental contaminants, improve water quality and reuse biowaste.

WATERBORNE OUTBREAK INVESTIGATIONS

ESR's water scientists use tools to link waterborne pathogens in water samples to sources. Using our DNA sequencing facilities we can determine the community of microbes present in a water sample. Drawing on our public health surveillance expertise ensures that we understand the wider context of disease outbreaks.

Salmonella



Campylobacter

Giardia

Photo: Bronwyn Humphries

GROUNDWATER QUALITY AND MANAGEMENT

Through an in-depth, research-driven understanding of groundwater contamination processes, our team of groundwater scientists help clients to identify and address issues associated with:

- land-use intensification
- effects on groundwater quality
- drinking water source protection.

We design tools for water managers to enable them to assess, predict and minimise the impacts of land-use, and land-use changes, on groundwater quality.

BIOWASTE AND WASTEWATER

ESR is leading research on novel models of water (wai) and biowaste management towards a circular economy (Ōhanga Āmiomio) guided by tikanga frameworks and underpinned by government objectives of carbon neutrality by 2050.

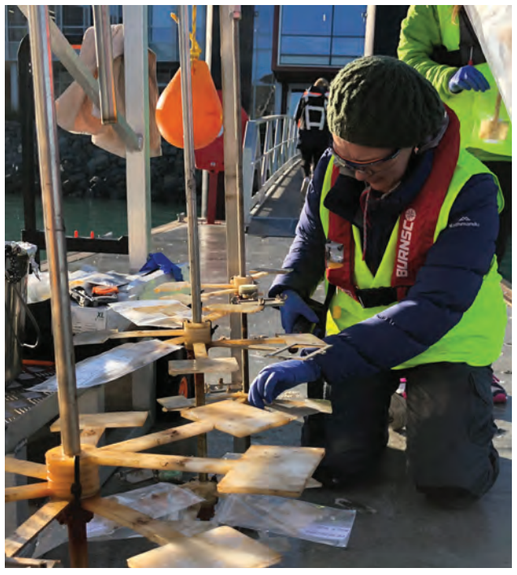
In collaboration with mana whenua and local authorities, ESR investigates innovative solutions for the sustainable reuse and resource recovery of biowaste and wastewater, mostly on land and by using natural systems such as soil, plants, microbes and insects. ESR's expertise includes:

- soil and plant sciences
- ecotoxicology
- microbiology
- ecology
- social and cultural research.

MICROPLASTICS

Microplastics are pieces of plastic less than 5mm in size and there is estimated to be more than 15 trillion of them in the world's oceans. ESR scientists are leading national research to determine the impacts of microplastics on Aotearoa's ecosystems, animals and people. They are looking at:

- how microplastics absorb contaminants and make them bioavailable
- the way different types of plastic interact with the marine environment
- the relationship between different plastics, chemicals and microbes in wastewater.



WATER QUALITY TESTING AND ASSESSMENT SERVICES

Our expert knowledge, research and specialist laboratory services can help ensure that people can trust the supply and quality of the water they drink, play in and use. Our services include:

- identification of waterborne pathogens, including during waterborne outbreak investigations
- regional and national assessments of groundwater quality
- groundwater tracer studies to trace contaminant pathways
- identification of the effects of land use on groundwater quality
- identification of the source of faecal contamination of water
- detection and identification of enteric viruses in environmental water, sewage and biosolids.

WASTEWATER TESTING

ESR's scientists carry out wastewater surveillance to detect drugs and COVID-19.

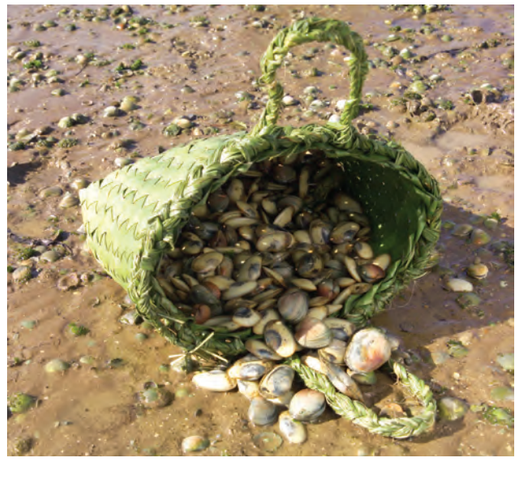
- on behalf of the Ministry of Health wastewater samples from across New Zealand are tested for the SARS-CoV-2 virus to monitor the caseload and spread of COVID-19

- ESR's nationwide drugs in wastewater testing programme provides real-time intelligence of the drugs being used in New Zealand to Police and government agencies.

ENVIRONMENTAL AND FOOD VIROLOGY

ESR's environmental and food virology laboratory offers a range of testing services and can conduct investigations into viral contamination. Samples that can be analysed include:

- shellfish
- sewage
- biosolids
- environmental waters.



ESR CAN PROVIDE ADVICE ON

- noroviruses and other enteric viruses
- recovery and quantitation methods
- use of viruses for faecal source tracking
- identification of viruses from environmental and food samples
- effectiveness of virucidals
- general environmental and food virology topics.

COMMUNITY PARTNERSHIP AND VISION MĀTAURANGA

ESR's social systems team applies extensive expertise and experience to help decision-makers address challenging and intractable problems with high levels of complexity and uncertainty. This team's work covers:

- healthy environments
- sustainable development
- Vision Mātauranga projects
- collaborative cross-cultural Māori community development projects in drinking water and wastewater
- supporting Mātauranga Māori in environmental decision making.

They provide clients with a bigger picture understanding of issues and research-based insights on how to bring about change.

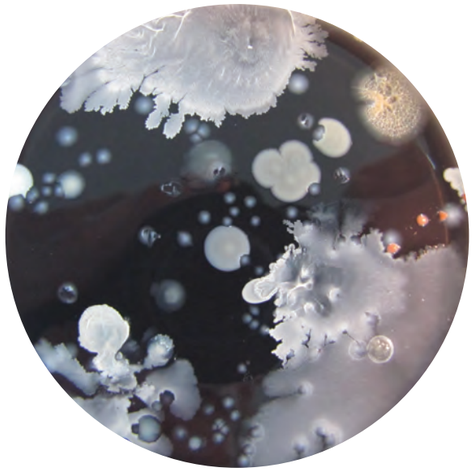
PACIFIC CONSULTANCY

ESR assists the Pacific region with scientific expertise, information and resources to strengthen policy, programmes and practice to achieve healthy, safe and resilient communities.

ESR's focus on water and sanitation in the Pacific is aligned with the UN Sustainable Development Goals, and the Ministry of Foreign Affairs and Trade's strategic intentions for a more stable, secure, resilient and well-governed Pacific. ESR supports climate change and disaster-resilient sustainable development, particularly where public health is at risk from environmental deterioration.

We work in partnership with Pacific Island governments and regional organisations such as:

- The Pacific Community (SPC)
- World Health Organization (WHO)
- UNICEF
- not-for-profit organisations
- New Zealand CRIs and Universities.



LEGIONELLA TESTING

Legionellosis, a sometimes fatal respiratory disease, is primarily contracted after exposure to an environmental source contaminated with *Legionella* bacteria.

Contaminated water systems have frequently been the source for outbreaks of disease caused by *Legionella*.

ESR's world-renowned environmental microbiology laboratory specialises in isolating, detecting, identifying and typing *Legionella* from many environmental sources including water, soil and surface biofilms.

MAHINGA KAI

Te Hāpai Ō is a programme that focuses on mahinga kai (wild food) and food safety practices in customary protection areas. It works with iwi, hapū, mana whenua and tangata tiaki at several locations across Aotearoa and aims to answer the question, is our kai safe to eat?

Types of analyses include:

- chemistry and heavy metals
- bacterial and viral
- environmental testing
- risk assessment based on national safety limits.

RADIATION TRAINING AND CONSULTANCY

ESR protects New Zealand's people, environment and industries by supporting the safe and beneficial use of radiation and radioactive materials.

Our experts work with a wide range of private and public sector clients to provide:

- measurement of naturally occurring low-level radiation and radioactivity, including for Drinking Water standards
- services and research capability on public, occupational and medical exposure to radiation, and radiation safety
- performance assessment of radiation protection equipment.

We have strong working relationships with global agencies including the International Atomic Energy Agency (IAEA) and the International Irradiation Association (iiA). We have contributed to the development of the Comprehensive (nuclear) Test Ban Treaty Organisation (CTBTO). ESR is the preferred supplier of radiological science services to New Zealand's Ministry of Health.

ESR's water and environmental health expertise

ESR specialises in investigating water quality and identifying possible sources of water contamination. We aim to reduce the burden of waterborne illness outbreaks, address public health risks and contribute to the sustainable use and management of water and wastewater systems. We work with Māori and iwi partners to improve how their wai (water) is restored, managed and protected. And we work with Pacific Island countries to support safe water supply as the impacts of climate change intensify.

Photo: Richard Sutton

DIRECTORY OF SERVICES

To find out more about the work we do, and how we can help you, use one of the contact channels below.

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FOR ALL GENERAL ENQUIRIES:

For all general enquiries contact enquiries@esr.cri.nz

ABOUT ESR

ESR is a New Zealand Crown Research Institute specialising in science relating to people and communities. We help safeguard people's health, protect food-based economies, improve the safety of freshwater and ground resources, and the safer use of biowaste, and contribute expert forensic science to justice systems. For more information about ESR visit us at www.esr.cri.nz

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