we are ESR

KEEPING COMMUNITIES **SAFE, HEALTHY** & **PROSPEROUS**

2016 ANNUAL REPORT

Science New Zealand

New Zealand's
Crown Research Institutes

Science
working for New Zealand

Michelle Christensen
Team Leader
Workplace Drug Testing
ESR

ESR is proud to be a Crown research institute. Together we represent the insight and commitment of 3,500 people – using science for a more prosperous, sustainable and innovative New Zealand.

agresearch

E/S/R

GNS SCIENCE TE PŪ AO

Landcare Research
Manaaki Whenua

NIWA
Taihoro Nukurangi

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

SCION
forests · products · innovation

contents

PURPOSE

ESR is a Government-owned Crown Research Institute (CRI) that specialises in science relating to people and communities. We contribute to four outcomes for New Zealand.

Public health

Safeguard the health of New Zealanders through improvements in the management of biosecurity and threats to public health

Forensic science

Increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes

Food safety

Enhance protection of New Zealand's food based economy through the management of food safety risks associated with traded goods

Water and the environment

Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes

Our mission is 'keeping communities safe, healthy and prosperous through smart and sustainable science'.

At ESR we develop innovative science solutions that meet New Zealand's needs and are sought after around the world.

All of our activities are aligned to the scope of operations outlined in ESR's Statement of Core Purpose.

We manage a range of national science assets and facilities as part of New Zealand's science system:

- National Centre for Biosecurity and Infectious Disease
- National Influenza Centre and Polio and SARS Reference Laboratories
- National DNA Profile Databank
- Notifiable Disease Database
- New Zealand Reference Culture Collection (Medical section)
- Database of organisms present in pristine and contaminated groundwater systems
- National Centre for Radiation Science.

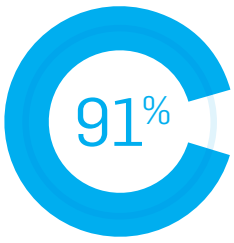
ESR plays a key role in three of New Zealand's National Science Challenges:

- Healthier Lives
- Our Land and Water
- New Zealand's Biological Heritage.

Our science also contributes to 'The Deep South' National Science Challenge.

HERE FOR NEW ZEALAND

OUR PARTNERS & CUSTOMERS



Overall stakeholder satisfaction

"Quality science, leading edge technology"

"Specialised knowledge and expertise"

"Excellent focus on industry along with a real passion for the work they do"

ESR stakeholder survey conducted by Colmar Brunton for the Ministry of Business, Innovation and Employment (MBIE)

CHAIR & CHIEF EXECUTIVE'S REPORT

It's been a very successful year for ESR in many ways. Our scientists played a critical role in addressing important challenges facing New Zealand, using smart science to keep communities safe, healthy and prosperous. ESR's financial results improved markedly, with a record profit achieved. We also made good progress in executing our strategy, growing international markets for our science services and developing new products.

Keeping communities safe, healthy and prosperous

ESR tackled many complex challenges this year including potential outbreaks of communicable diseases, tracking cases of antibiotic resistant superbugs, using the power of DNA to solve more crime, helping our exporters meet the food safety standards of international markets, and working with regional councils to clean up waterways across New Zealand.

To safeguard public health, ESR's capability to respond to disease outbreaks and pandemics was a critical part of New Zealand's emergency response to the Zika virus. ESR led an international collaboration researching the spread of influenza and identifying the best strains to include in vaccinations. We examined trends in antibiotic resistant superbugs and researched the use and misuse of antibiotics in New Zealand.

To help solve crime, ESR delivered increased volumes of DNA testing and casework to Police. We worked with Customs, preventing the importation of illicit drugs in international mail and air cargo. We implemented enhanced forensic systems to maintain a clear chain of evidence and provide access to comprehensive electronic case file records.

To improve the safety of food consumed in New Zealand we traced the source of foodborne disease outbreaks, including an outbreak of hepatitis A associated with frozen berries. Our scientists also worked with exporters to meet the food safety standards of international markets. ESR's innovative biological control products were used to eliminate *E. coli* from beef, which is a requirement for access to the lucrative United States market.

ESR provided the science behind a wide range of initiatives to improve water and the environment. Our scientists worked with 13 local and regional councils around New Zealand to improve the quality of waterways. ESR continued to lead a New Zealand-wide collaboration of 10 research partners exploring ways to reduce the amount of biowaste disposed of in landfill.

Strengthening relationships with our partners

A major focus this year was strengthening our relationships with key government partners, Crown research institutes, universities and all of our customers. We established a Stakeholder Reference Panel to explore the strategic challenges of our key stakeholders and how ESR can best meet their needs. Stakeholder satisfaction with ESR increased to 91%, which reflects the value of ESR's specialist knowledge, expertise and customer service.

Investing in smart research

ESR invested MBIE Strategic Funding in innovative research to improve delivery of outcomes for New Zealand and contribute to National Science Challenges. For example, to improve water quality ESR scientists researched methods for more accurately modelling contaminant transport in alluvial gravel aquifers, which are economically important and occur throughout New Zealand.

Developing our people

This year our people were actively involved in the development of ESR's vision and refreshed values. ESR's refreshed values ensure our people have the right mindset, delivering excellent science to our stakeholders while adopting innovative thinking and a commercial focus. A leadership programme was rolled out during the year, strengthening management and leadership capability across ESR.

Achieving strong financial results

This year's net profit after tax of $3.8m was an excellent result and significantly above last year ($2.6m). The increased profit was achieved due to strong financial performance across all Business Groups. Revenue growth, combined with tight control of expenditure, drove the improved result. The result reflected one-off savings in overheads and an increase in Police submissions.

Return on equity was also strong at 8.9%. Achieving greater than 8% return on equity on a sustainable basis will be challenging in the years ahead, but is essential for us to meet future financial challenges.

A strong commercial focus will be critical to deliver the financial results necessary for modernising our science facilities.

$3.8 million NET PROFIT

8.9% return ON EQUITY

Executing our strategy

Good progress was made on implementing ESR's strategy this year. The Board continued to review the strategy to ensure ESR is positioned to meet New Zealand's challenges, grow international markets for science services and develop new products and services.

ESR worked with the Ministry of Health (MoH), New Zealand Police, the Ministry for Primary Industries (MPI) and Ministry of Foreign Affairs and Trade (MFAT) to increase the impact ESR's science has on partners' strategic goals. Improving the financial sustainability of these contracts remained challenging due to the ongoing financial constraints faced by our government partners.

Our innovative forensic software STRmix™ continues to grow internationally and is now admissible in evidence in several states of the USA. The software is used to crack difficult to solve crimes, identifying multiple individuals' DNA from mixed samples found at crime scenes. The software is now used in more than 60 forensic laboratories around the world.

We also reviewed our pipeline of new science innovations to deliver future public and commercial value. This year we continued to develop a new RNA method for identifying body fluids, which will be used to solve crime in New Zealand and overseas.

To capitalise on the latest international developments, ESR is using whole genome sequencing to access much richer genetic information. Our growing genomics and bioinformatics capabilities, when combined with collaborators in the health and science sectors, will form part of New Zealand's emerging clinical human genomics capabilities, delivering better public health outcomes.

We are proud of the dedication and contribution made by all staff in delivering a strong year for ESR.

We would like to recognise the contribution made to ESR by Tahu Potiki who stepped down from the Board this year and welcome to the Board Richard Gill.

Denise Church QSO
Chair

Dr Keith McLea
Chief Executive

OUTCOME **ONE**

Public health

Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health.

We provide research, laboratory services and expert advice on a wide range of diseases present in New Zealand including measles, influenza, legionella, gastroenteritis, hepatitis and meningitis.

In an increasingly globalised world, the risk to public health from introduced diseases is greatly increased. We use our national clinical expertise and response capability to mobilise quickly to identify and respond to disease outbreaks.

Our work improves public health by reducing the harm and cost of infectious diseases. Using our reference laboratory information, the Notifiable Diseases Database and information collected from laboratories, our scientists collect and analyse data on a wide range of diseases present in New Zealand.

ESR manages the National Centre for Radiation Science (NCRS) which plays an important role in ensuring radiation equipment in New Zealand is operated safely. We provide advice, services, training and research on public, occupational and medical exposure to radiation. This includes performance assessment of radiation protection equipment and equipment calibration.

Our multidisciplinary social systems team informs policy development and initiatives in public and environmental health, bicultural research, environmental policy, and community resilience. Our expertise has contributed to better understanding how complex social issues can be tackled using a systems approach.

ESR also provides internationally accredited drug and alcohol testing to employers, prisons and the courts.

Below are a few highlights of the past year.

Reducing the spread of Zika

ESR played a key part in the emergency response to the Zika virus, recommending response measures to limit the spread of the virus. Zika, which can cause microcephaly and other serious brain anomalies in unborn children, is a notifiable disease in New Zealand. The mosquito species that spread the disease are not normally found in New Zealand however are found in many other countries including the Pacific Islands. ESR collected information on travellers returning to New Zealand, identifying patterns where infected travellers had visited. This information proved invaluable to the World Health Organisation when developing targeted measures to reduce the spread of Zika in the Pacific.

Preventing communicable disease

ESR undertook routine surveillance of human pathogens across New Zealand and targeted surveillance of notifiable diseases. We conducted a number of major reviews of pathogenic organisms and outbreaks. Our surveillance and reporting covered sexually transmitted infections, severe acute respiratory infections, influenza, and enteric pathogens associated with severe morbidity and mortality in the elderly and very young.

14,306 cases
OF NOTIFIABLE DISEASES REPORTED

5,263 superbugs
TESTED IN OUR REFERENCE LABORATORY

28,408 samples
PROCESSED BY OUR HEALTH GROUP

As part of an urgent response to potential local transmission of dengue, we developed a new testing method which can determine the genotype of a dengue virus within three days of receiving a sample, as opposed to traditional testing regimes that can take two weeks.

Antibiotic-resistant superbugs

The increasing incidence of microorganisms resistant to traditional antibiotics is a global issue. Of particular concern is the growing incidence of multiple resistant organisms in hospital settings. To inform decision-making on this issue, this year we completed the comprehensive summary *Antibiotic Consumption in New Zealand, 2006–2014* to provide baseline information on patterns of antibiotic consumption in New Zealand. As the first

comprehensive survey in New Zealand to look at antibiotic consumption, key findings included a significant increase in antibiotic consumption between 2006 and 2014, ethnic and geographic differences in antibiotic consumption, and relatively high rates of consumption in New Zealand compared to similar developed countries. The report reinforced the need for more comprehensive information and advice to clinicians prescribing antibiotics.

Collaborative international research on influenza

Influenza remains a major global problem which causes unacceptable levels of morbidity and mortality and an adverse economic impact on communities and society. Every year, the World Health Organisation gathers information about flu virus strains currently circulating. This helps to identify the main virus strains which the next season's flu vaccines should provide protection against.

The ESR-led 'Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance' (SHIVERS) project aims to understand how the flu virus spreads, mutates and interacts with other harmful viruses in New Zealand. It contributes to both the World Health Organisation's Global Influenza Programme and New Zealand's vaccination policy. The project is a multi-agency collaboration with the University of Auckland, Auckland District Health Board, Counties Manukau District Health Board, the University of Otago, and two United States agencies: St Jude's Research Hospital and the US Centers for Disease Control (CDC).

The study, which is in its fifth and final year, includes two population-based surveillance systems (one hospital based and one community based) covering over 905,000 residents in the Auckland District Health Board and Counties Manukau District Health Board regions. Using the National Health Index number researchers can tell which patients have previously received the flu vaccine and therefore assess the effectiveness of the vaccine at preventing flu. SHIVERS researchers found that in one year, vaccination provided 52 per cent protection against lab-confirmed influenza hospitalisation and 56 per cent protection against influenza presenting to general practice.

Using the latest advancements in genetics to improve public health

The development of whole genome sequencing of bacteria and viruses has unlocked potential for accessing more precise information on the causes and characteristics of communicable diseases. This year ESR conducted genomic analysis and identification of several bacterial and viral pathogens. The use of whole genome sequencing provides additional information on diseases and disease strains, which helped improve responses for dengue (see above) and legionella. Whole genome sequencing was also used for the first time to assist with determining the source of the outbreaks of *Yersinia enterocolitica* in Canterbury and Wellington.

Using science to tackle complex social issues

Our social systems scientists worked with Accident Compensation Corporation (ACC) looking at ways to transform ACC's Injury Prevention portfolio to deliver highly effective services around family violence.

We also worked with the University of Canterbury, Victoria University of Wellington and Indigemo Consulting on the 'Making Services Reachable' project. A practical toolkit was developed to help social services engage with clients considered 'hard to reach'. This work has involved working closely with three social services who have reputations for successfully working with hard-to-reach clients to understand the relationship between engagement, uptake of service and outcomes for these clients.

This year our social systems team conducted research on 'Activating communities to reduce the burden and inequalities associated with type-2 diabetes'. The project is aligned with the Healthier Lives National Science Challenge.

Knowing your limit

The 'Know your limit' campaign, designed by Hospitality New Zealand and the Brewers' Association, provided people with information about the new limits for drink-driving. ESR provided the science underpinning this nationwide campaign.


"I like the challenge of explaining complicated things."

OUTCOME **TWO**

Forensic science

Increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes.

Our expert crime scene scientists, drug chemists, physical evidence specialists, toxicologists and biologists provide services to the New Zealand Police and other government agencies including Customs and Defence, as part of our contribution to the criminal justice system.

As well as the analysis of human tissue, crime scene trace evidence, bodily samples and other evidential material, our comprehensive knowledge of the recovery and interpretation of DNA evidence is used across the country and around the world.

Our forensic laboratories are accredited by the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors. Our accreditation was reassessed this year and has been extended until 2020.

Our new forensic laboratory information system went live in November. The information system underpins the work of our forensic scientists and technicians, and provides comprehensive electronic case file records.

As highlights from the past year show, our work aids criminal investigations and crime prevention.

Stopping drugs at the border

The joint Customs/ESR Screening Laboratory can now identify drugs more quickly and cost effectively in incoming international mail and air cargo. The lab's real-time testing capabilities provide an advantage for investigations against illicit drug importers. About 700 shipments of illegal drugs, including Class A such as methamphetamine, and Class B such as ecstasy, plus about 1100 other forms of drugs, have been identified. The information is used by Customs and authorities to target criminal activity and streamline border protection operations. Research conducted by ESR's scientists identified 40 new drug compounds, resulting in the identification of 200 previously unknown samples intercepted at the border.

Taking our DNA software to the world

This year we licensed our state-of-the-art forensic software STRmix™ to several DNA laboratories in North America. STRmix™ can identify multiple individuals' DNA from complex mixed samples found at crime scenes. STRmix™ has now been ruled admissible in evidence in several states within the United States. Work on the next major release of STRmix™ (v2.4) has been completed.

We continue to seek ways to improve what information can be gleaned from evidence left behind at a crime scene. This year we filed an international patent for the methodology for detecting RNA stable regions and biomarkers to be used in a forensic body fluid identification kit. Our product will enable forensic laboratories to identify which part of the body a crime sample originated from, providing additional information that complements identification evidence from DNA.

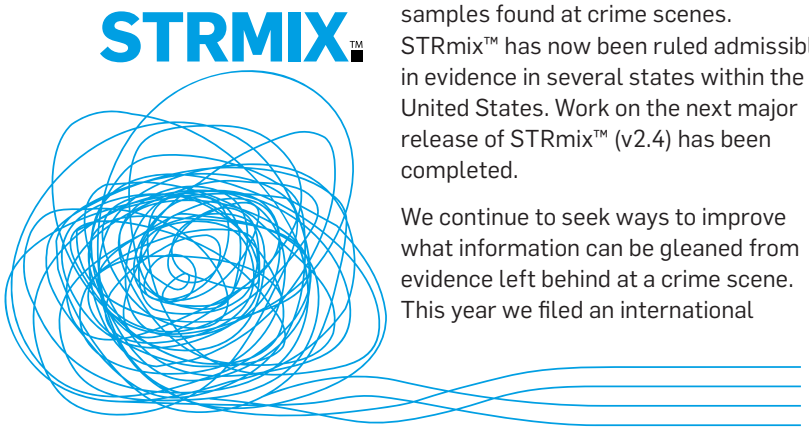
25,277 DNA TESTS
CONDUCTED BY OUR FORENSIC GROUP

75% of DNA samples
FROM CRIME SCENES WERE LINKED TO A SPECIFIC PERSON

31% of DNA samples
FROM CRIME SCENES WERE LINKED TO OTHER CRIMES

Realistic visualisation of crime scenes

Our forensic experts continued to increase and evolve the use of laser scanning at crime scene investigations. The tool produces fast, dimensionally-accurate and photorealistic imagery that captures information in a way that assists with the interpretation of evidence, such as blood spatter patterns and ballistic trajectories, as well as improving the clarity of presentations in Court.



1080 Contamination threat

The offender responsible for the infant formula 1080 contamination threat in 2014 was sentenced in March 2016. ESR tested and confirmed the presence of 1080 in the threat letter. ESR also found and analysed trace DNA left by the offender on a retraction letter, which supported the apprehension of the offender.

Internationally recognised blood spatter analysis

Scientist Dr Michael Taylor has become the 14th person, and the first New Zealander, to be named as a Distinguished Member of the International Association of Bloodstain Pattern Analysts. Bloodstain pattern analysis is the science of studying bloodstains following violent crimes and accidents to help investigators interpret the evidence and evaluate scenarios for the incident in question.

Screen captures from Forensics NZ

Improving public awareness of ESR's role

We were involved in the production of a new documentary series *Forensics NZ*.

Produced by South Pacific Pictures in collaboration with ESR and the New Zealand Police, this documentary series highlighted the science used to solve New Zealand crimes.

"It's very satisfying doing what you can for the family. Ultimately it comes down to why I do the job."

OUTCOME **THREE**

Food safety

Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods.

Testing kiwifruit for contaminants as part of the Total Diet Survey

New Zealand's reputation for safe and healthy food underpins our economy. Maintaining this reputation requires the capability to capitalise on technological advances, to meet complex export market requirements, and to recognise the increasing awareness and expectations of consumers.

Our experts play an important role in New Zealand's food system. Our work across bacterial, viral, chemical, physical and radiological hazards in food provides assurance to food producers and consumers in New Zealand and around the world.

Below are a few highlights from the past year.

Responding to foodborne disease outbreaks

ESR assisted with the response to an outbreak of hepatitis A associated with frozen berries by providing laboratory testing of berry samples as well as advice on epidemiology. Our work with MoH and MPI resulted in a nationwide product recall, protecting New Zealand consumers and limiting the outbreak of the disease. As part of this work ESR established a new process to obtain sequence data on the viruses isolated from human cases, which enabled the interpretation of epidemiology linking cases.

Improving export market access for our primary industries

We are working with MPI to validate a commercially available molecular tool (NeoSEEK) for the elimination of Shiga toxin-producing *E. coli* (STEC) in New Zealand beef. This project will help maximise export opportunities for the beef industry and ensure we meet our international trading obligations.

We also finalised an agreement with the Meat Industry Association to find ways to extend our biocontrol agent, STECleaNZ, to detect all STEC-strain types that are prohibited for export.

We worked on biological control projects using ESR's bacteriophage technology, particularly for bovine mastitis. Findings from this research could improve animal health and dairy production.

Working together to improve food safety

The New Zealand Food Safety Science and Research Centre was launched in May 2016 at Massey University in Palmerston North. The purpose of the Centre is to protect and enhance the reputation of food produced in New Zealand. Hosted by Massey University, the Centre is a collaboration between seven organisations (ESR, Plant and Food Research, AgResearch, University of Otago, Auckland University, Massey University, Cawthron Institute).

4,700 tests

FOR THE BILLION DOLLAR EXPORT BEEF INDUSTRY

979 radiation-free tests

TO MEET FOOD EXPORT REQUIREMENTS

2,340 food & beverage

SAMPLES WERE EXAMINED FOR CHEMICAL & MICROBIAL HAZARDS

What's in our food?

This year, we commenced the five-yearly New Zealand Total Diet Study, which is funded by MPI. The year-long study tests different types of foods (4000 samples in all) for agricultural chemical contaminants, contaminant metals and selected nutrients. The study is an important part of New Zealand's food safety system, ensuring the safety of food for New Zealand consumers.

International conference hosted by ESR

ESR hosted CHRO 2015, the world's leading international conference on Campylobacter, Helicobacter and related organisms. Campylobacter is the most common bacterial cause of foodborne illness in New Zealand. The conference was a success with 260 delegates attending.

Strengthening our links with China

ESR is one of nine New Zealand organisations involved in the New Zealand-China Food Protection Network established to enhance communication between research scientists, government organisations and industries here and in China. The network has led to collaborative research in food safety and security with 51 Chinese partners.

ESR Science Leader Dr Brent Gilpin was selected as one of 10 New Zealand researchers to participate in the 2015 NZ-China Scientist Exchange Programme. The exchange includes a three-week visit to China with an emphasis on developing research proposals for joint NZ-China research funding.

ESR is also trialling pre-certification of food exports to China, with the aim of reducing the time New Zealand exports spend on the wharf from weeks to days. During the year ESR signed Memoranda of Understanding with China Inspection and Quarantine (Shenzhen) and the China Certification and Inspection Group (CCIC).

"I like to think that our science is contributing to society, keeping people safe and healthy."

OUTCOME **FOUR**

Water & the environment

Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes.

We provide scientific advice and expertise on the management of drinking-water, groundwater, recreational and wastewater, and biowaste to health authorities, local and central government, industry and communities.

Our work includes the reporting of drinking-water quality, scientific advice on health and environment public policy, research on issues related to drinking-water and recreational waters and information systems management.

We lead the Centre for Integrated Biowaste Research (CIBR) which combines the expertise of 10 New Zealand research institutes, universities and research partners.

We contribute to the Our Land and Water National Science Challenge.

Cleaning up our rivers

Our groundwater team worked with 13 local and regional councils to improve the quality of waterways around New Zealand.

This included working with the Waikato Regional Council to produce predictive reducing-zone maps in The Hauraki and Coromandel catchments as a part of the council's Hauraki Healthy Rivers project. This helped Waikato Regional Council to better understand nitrate reduction in the Waikato region.

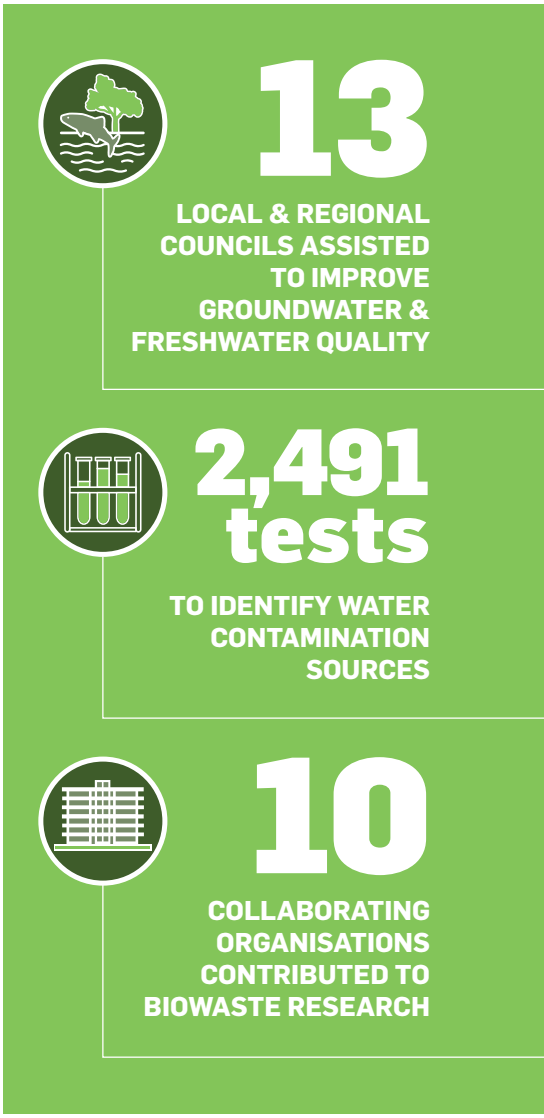
We completed the second year of a co-funded project with Environment Southland to identify the sources of pollution and improve the water quality of the rivers and streams in Southland.

Sustainable and safe use of biowaste

We completed the first part of a multi-year project for the Gisborne District Council on the redesign of their wastewater treatment system. As part of our work, we are trialling what happens when sludge biowaste is deposited on drying wetlands planted with different plant species. This approach may provide an alternative to ocean disposal.

Working with the Building Research Association of NZ (BRANZ), we are researching the safe use of grey water and rainwater.

ESR worked with Māori researcher and ecotoxicologist Jamie Ataria and released the ground-breaking report Tapu to Noa – Māori cultural views on biowastes management: a focus on biosolids. This report will help councils and other regulators in their work with local hapū and iwi.



Partnering with the Pacific

ESR's expertise was behind the launch of two guidelines aimed at encouraging Tonga's tourism and health sectors. We developed guidelines for Tonga's many tourist accommodation businesses including best practice and advice on safe rainwater harvesting, controlling mosquito-borne diseases and food safety and hygiene. The guidelines represent the culmination of three years of partnership between the Kingdom's Ministry of Health, Tourism Division and ESR in a project funded by the New Zealand MFAT Aid Programme.

As part of a research contract with MFAT we investigated the potential for coral beach sands to be used as a septic tank disposal field material in Kiribati. The research found that coral beach sand in Kiribati can effectively filter out harmful pathogens.

Can Manuka trees clean toxic soil?

This year, we researched the antimicrobial properties of Manuka and the capacity for its roots to kill a range of pathogens in soil. Preliminary findings of our research indicate that Manuka can be an effective plant for improving the safety of biowaste, and can be used to reduce the amount of biowaste going to landfill.

"Science is about finding hidden truths in the world around us."

STRATEGY

Good progress was made on implementing our strategy this year - driving growth, strengthening the core of ESR, working towards a step-change in public health and developing our science strategy. We continued to review our strategy to keep communities safe, healthy and prosperous.

Drive growth

Drive growth through commercialisation, form new partnerships and attract new international customers for our science services. Continue to provide world class scientific services to our existing customers.

This year we achieved international growth of our science products and services, focusing on markets in North America, Europe, China and the Pacific. Our world leading forensic software STRmix™ is now used in 62 forensic laboratories around the world. We strengthened our relationships with China, signing agreements which may lead to pre-export certification of New Zealand food exports to China. In the Pacific we developed public health guidelines in Tonga and conducted research that will improve public health in Kiribati.

In New Zealand we worked closely with MoH, New Zealand Police and MPI to increase the impact ESR's science has on partners' strategic goals. Improving the financial sustainability of these contracts remained challenging due to the ongoing financial constraints faced by our government partners.

Other initiatives underway include renewing the New Zealand Police service level agreement, engaging more with Māori and developing our property strategy.

Strengthen the core

Invest in the right mix and calibre of people, infrastructure, systems and processes. Optimise productivity and improve customer orientation and performance.

This year all staff were actively engaged in refreshing ESR's values. Our refreshed values encourage our people to have the right mindset for delivering excellent science to our stakeholders and adopting innovative thinking and a commercial focus to implement our strategy. A leadership programme was rolled out, strengthening management and leadership capability across ESR.

We transformed our forensic processes and implemented new forensic case management software, maintaining a clear chain of evidence and providing comprehensive electronic case file records. We laid the groundwork for moving our IT infrastructure to the All of Government Infrastructure as a Service solution. To improve customer orientation we established a Stakeholder Reference Panel to examine the strategic challenges of our key stakeholders and explore how ESR can best meet their needs.

Achieve step-change

Leverage our expertise in health science by exploring a national health intelligence platform that will support us taking an active role in building the infrastructure for omics technology applications for the benefit of the national healthcare system.

We facilitated stakeholder workshops in preparation for a joint New Zealand Clinical Human Genomics Summit. The Summit will bring together all potential stakeholders across New Zealand and provide a platform for an open and transparent discussion on the potential for clinical use of human genomics. We also continued to build core capability in genomics and bioinformatics and develop close collaborative relationships with other organisations.

Using Whole Genome Sequencing to access much richer information

Science strategy

Adapt our science to ensure ESR operates at the intersection between consumers' needs, market opportunities and what can be done with science.

This year we continued to develop our science strategy. The science strategy will address how we will grow our science and its impacts, what science we will undertake and what capabilities we will develop. The science strategy will inform how we invest MBIE Strategic Funding to best effect.

Achievements in 2015/16

Drive Growth	▪ Grow revenue ▪ Grow STRmix™ and international business ▪ Deliver additional services to MoH ▪ Implement opportunities through environmental science partnerships
Strengthen the core	▪ Build a customer-centric culture ▪ Engage with key customers to understand how to work together better ▪ Transform police programme business processes ▪ Raise staff engagement ▪ Implement excellence in leadership and management ▪ Invigorate ESR's strategy 2017–2021 ▪ Identify a long-term IT infrastructure solution ▪ Explore informatics platform
Achieve step change	▪ Advance the human genomics discussion in New Zealand

OUR PEOPLE

A continued focus on people and culture is critical to our success. To meet the science needs of New Zealand, deliver to our customers and increase revenue, we work to attract, retain and develop a capable high performing workforce.

We continued to invest in the development of our leaders to ensure they have the skills and mindset to build the capability of their teams, lead our culture, and facilitate growth, change and innovation. The introduction of our leadership programme provided a consistent foundation for strengthening management and leadership capability across the organisation.

Workforce profile

One of our strengths is the diverse range of staff we have working for us. This includes New Zealand European, Māori, Pasifika and Asian. The majority of our staff (82%) are employed in science or science support roles. Women make up the majority of our workforce (67%) and are well represented at all levels and in all roles in our organisation. We have a stable workforce with turnover at 10% for the year ending 30 June 2016.

Being a good employer

This year we continued to demonstrate our commitment to being a good employer and advocating organisation-wide equal employment opportunity (EEO) practices relating to the recruitment and selection, development, management and retention of all staff. The table on page 26 summarises our activities against the seven key elements of being a good employer.

A few highlights in our activities this year include:

- strong employee participation in our award scheme to recognise excellence across disciplines and roles within the organisation
- revamping our wellness programme to ensure it continues to be aligned with our employees' health and wellbeing needs
- revising our performance management and remuneration framework to ensure staff feel valued, recognised and appropriately rewarded for their contribution
- introducing a new online performance management system aligned with our refreshed values, resulting in a simplified process and improved transparency and objectivity. The new process has been well received by staff and will continue to be refined.

Workforce statistics	Actual as at 30 June 2015	Actual as at 30 June 2016
Total staff	379	386
% staff engaged in science	80%	82%
Number of full time staff	302	312
Number of part time staff	77	74
% female staff	66%	67%
% male staff	34%	33%
% aged 20-40 years	36%	36%
% aged 41-60 years	56%	56%
% aged 60+	8%	8%
Disability profile	<1%	<1%

Ethnicity breakdown		
NZ European	236	233
Asian	42	48
Pacific peoples	6	5
Māori	9	8
Other European	82	88
MELAA*	4	4

Middle Eastern, Latin American and African

82%
of staff involved in science

Good employer key elements	ESR delivery 2015/16
Leadership, accountability and culture	▪ Targeted leadership workshops and coaching for managers, with a focus on strengthening the capability of our leaders to effectively champion a high-performing, customer-centred culture. ▪ Our leadership team communicates the strategic direction and organisational goals to staff at all levels. ▪ Our performance management and development process is designed to build a high-performance culture through clear accountability and defined work outputs. ▪ A new vision and refreshed values were launched to staff creating stronger alignment with ESR's strategic direction. Our awards scheme encourages leadership and accountability and is aligned with our values.
Recruitment, selection and induction	▪ Recruitment and selection processes are in place that foster EEO principles. Recruitment is focused on competencies, skills and experience and backed by appropriate assessment and selection tools to ensure the best candidate is selected in a fair and equitable manner. ▪ Our new employees receive a thorough induction programme that includes familiarisation with key policies and processes.
Employee development, promotion and exit	▪ Our performance management and development system encourages employees' development by providing clear and achievable progression through building technical skills and behavioural competencies. We offer on-the-job opportunities, internal secondments, and attendance at international and national science conferences. ▪ This year we introduced a new online performance management system and guidelines that align with our refreshed values and improve transparency and objectivity. ▪ Employees who leave ESR are offered the opportunity to participate in either an online or face to face exit interview. The feedback is consolidated and used to determine how we can build on areas of strength and improve our working environment.
Flexibility and work design	▪ We promote flexible working arrangements with our flexible hours, extended flexitime, and other flexible working arrangement polices, which are outlined in the Employee Handbook. We support parents returning to work by offering part-time and gradual return to full-time work arrangements. As at 30 June 2016, 19% of our employees work part-time.
Remuneration, recognition and conditions	▪ Our terms and conditions of employment are consistent with the good employer philosophy, with a range of benefits valued by our employees. ▪ We reward people fairly and equitably on the basis of contribution, regardless of gender, age or ethnicity. This year we revised our performance management and remuneration framework to ensure staff feel valued, recognised and appropriately rewarded for their contribution and to help nurture a high-performance culture. ▪ We have two annual Staff Awards that recognise and celebrate individuals or teams for their achievements.
Harassment and bullying prevention	▪ Our Acceptable Behaviour Policy sets out the standards of behaviour expected of all our people, how to deal with unacceptable behaviour including harassment and bullying, and where to access further information and support if required, including the Employee Assistance Programme. ▪ New employees are introduced to this policy and given training as part of their induction. The policy is reviewed regularly.
Safe and healthy environment	▪ Our health and safety policies and procedures were comprehensively reviewed this year, including an external review of our major health and safety policies. ESR is implementing the recommendations of the review, with oversight provided by the ESR Board. ▪ Employees are given comprehensive training, guidelines and supervision to ensure everyone's safety, health and wellbeing at work. ▪ We participate in the ACC Workplace Safety Management Practices programme and hold tertiary-level accreditation, the highest level achievable. ▪ This year we revamped our Wellness Programme to better meet the health and wellbeing needs of our employees. The programme includes flu vaccinations, counselling and workstation assessments.

Partnership for quality

Our Partnership for Quality forum is offered jointly with the Public Service Association to discuss issues affecting staff. The forum increases collective participation of employees through the union and provides a channel through which employees can communicate recommendations or suggestions on policies, practices and programmes to ESR management.

Health and safety

We frequently conduct work that exposes staff to a large variety of physical, chemical, psychological, and biological hazards. This, in part, is why we have developed such a strong health and safety culture, which is evidenced by our total recordable injury frequency rate of 3.6 per 100 full-time equivalents and our tertiary-level accreditation in the ACC Workplace Safety Management Practices programme.

All our employees are given comprehensive training, guidelines, mentoring and supervision to ensure everyone's safety, health and wellbeing at work. We are committed to continuous improvement in health and safety, and have reviewed and are updating all of our health and safety policies and procedures to align ourselves with the new Health and Safety at Work Act 2015.

"I wanted a career where I could use science to help people."

Board of Directors

Denise Church QSO is Chair of the ESR Board. She is a Director of Leadership Matters Ltd and a company director, consultant and executive coach. She has extensive governance experience and currently holds a number of Board roles including Chair of Karori Sanctuary Trust, Trustee of the Scout Youth Foundation and Member of the National Executive Committee, Scouts New Zealand.

Marion Cowden is Deputy Chair of the ESR Board. Marion is a fellow of the Institute of Chartered Accountants of New Zealand and holds a BSc and BCom from Auckland University and a MBA (with Distinction) from Massey University. She has held senior roles in finance and corporate services in New Zealand and Australian public services and with the Commonwealth Secretariat based in London. Her current governance roles include Deputy Chair of the Energy Efficiency and Conservation Authority, board member of St John of God Hauora Trust and Chair of the Audit and Risk Committee, Ministry for the Environment.

Professor Bill Denny is a graduate of Auckland University. He trained at Auckland and Oxford Universities as a medicinal chemist. He is currently Director of the Auckland Cancer Society Research Centre in the University of Auckland's School of Medical Sciences, where he has been closely involved in the development of eight drugs from the Centre into clinical trials. He is co-author of 600 scientific papers and 100 patent applications in the area of drug design and development, a Rutherford Medallist of the Royal Society of New Zealand and an Officer of the New Zealand Order of Merit.

Dr Helen Darling graduated with a PhD in Public Health from the Dunedin School of Medicine, University of Otago and has founded two companies that work in the area of food integrity. Helen continues to work in the area of commercialisation of food integrity services and is particularly interested in the application of technology to enhance global food supply chains. In addition to industry and business knowledge, she has over 20 years' governance experience.

John O'Hara has over 25 years' experience in commercialising innovation for high tech companies and government agencies. John founded and led three companies - one was sold privately, one publicly listed in New Zealand and one listed on the NASDAQ. He is an angel investor in 16 New Zealand startup companies. John has extensive governance experience and is Chair of Ask Nicely Ltd and a Director of Spidertracks Ltd.

Richard Gill is a creative engineer with a passion for leveraging leading-edge technologies to drive key improvements in human safety and organisational performance. Richard has a number of notable technology start-ups under his belt and is currently a Founder and CEO of mobile technology company CLOUD M. He is also an advisor on ICT, strategy and innovation to a number of organisations.

Tahu Potiki was born and raised in Karitane. His father is of Māori descent from the tribes of Kāi Tahu and Kāti Mamoe and his mother is of European descent. Tahu has been published on a number of subjects and is a regular speaker at conferences and public gatherings. He is considered an expert on South Island Māori history, language and culture as well as being involved in modern Māori politics and tribal development at a local and national level. Tahu has been involved in social and community work, Māori education and for five years he was the Chief Executive Officer of Te Rūnanga o Ngāi Tahu.

Senior Leadership Team

From left to right

Steve Pyne is Chief Information Officer at ESR. He has worked at the nexus of science and ICT support for a number of government and corporate organisations, including in his previous role as CIO for the Science and Innovation Group at MBIE.

Bryan Lau Young is General Manager Business Services and Chief Financial Officer at ESR. Bryan has 20 years' experience across a broad range of industries having held senior financial and commercial roles in consulting, telecommunication, financial services and aviation with a focus on lifting organisational financial performance. Prior to joining ESR Bryan was Head of Finance at Airways NZ where he was responsible for commercial relationships with airlines and airports, structuring international growth and acquisition initiatives and leading the newly formed finance, property and procurement team.

Celia Wellington is the General Manager People & Communications at ESR. She has a background as an industrial psychologist, with over twenty years' experience in the organisational development field. Celia has delivered consultancy services, at both an operational and strategic level, to a wide range of public and private sector organisations in New Zealand.

Dr Keith McLea is Chief Executive at ESR. He has worked across a number of Government ministries providing strategic and policy advice. Keith has a PhD in human genetics and has trained as a toxicologist. Keith has spent much of his professional career working in the personal injury insurance and injury prevention sectors and has been a Director at Cranleigh Strategic Limited.

Dr Graeme Benny is General Manager Health at ESR. Having worked in executive roles in both the private and public sectors, Graeme brings strong management skills and a proven track record to the organisation. Before coming to ESR, Graeme was the Chief Executive of Health Workforce New Zealand. Graeme earned his PhD in clinical biochemistry from the University of Auckland.

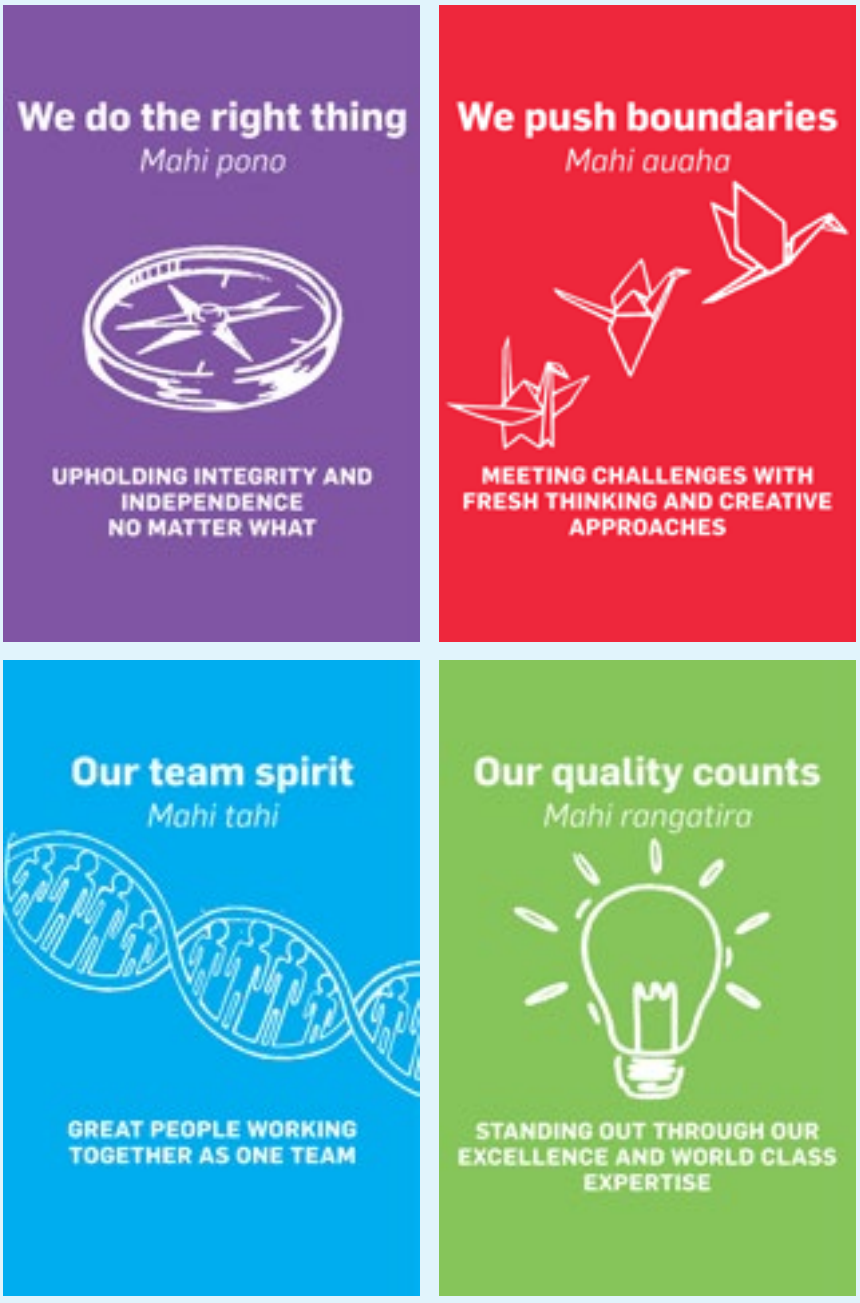
Dr Keith Bedford is General Manager Forensic at ESR. Keith began his career as a forensic scientist with the then Chemistry Division of the DSIR. He went on to hold a number of forensic roles in ESR and its predecessor organisations, including a year's secondment to London's Metropolitan Police Forensic Science Laboratory. In 2001 Keith was awarded a New Zealand Science and Technology Medal for sustained contribution to forensic science.

Dr Libby Harrison is General Manager Environmental Sciences at ESR. Libby held a number of consulting and management roles, including serving as a General Manager at both Landcare Research and the Environmental Protection Authority prior to joining ESR. Originally from the UK, she earned her PhD in insect pest control from University College, London University.

Hamish Findlay is General Manager Commercial and Business Development at ESR. Hamish served as a Senior Commercialisation Manager at MBIE, Commercialisation Manager for Otago Innovation Ltd and previously held research marketing roles for the University of Otago and Roy Morgan Research.

Our refreshed values

This year, we refreshed our values to align with and drive our high-value contribution for New Zealand to keep communities safe, healthy and prosperous.



Doing the right thing under pressure

This year Dr Keith Bedford was awarded the 'Doing the right thing' values award.

As General Manager Forensic, Keith oversees all ESR's forensic business group activities, including the delivery of forensic services for the New Zealand Police.

He has had oversight of the forensic evidence in numerous court cases in his 40 year career, some of which were featured this year in Prime TV's show *Forensics NZ.*

"Forensic science requires independence, quality, and integrity – principles that I have tried to bring to all my roles," he says.

The adversarial nature of the justice system can put a lot of pressure on an expert witness. Keith has championed professional ethics, adherence to codes of practice and guided ESR scientists do the right thing no matter the pressure.

Keith adds that one of the most rewarding parts of his job is working with staff who are committed to making a positive difference.

"An important aspect of forensic science is that it can help to ensure fairness and justice in our society. It's a huge responsibility and something that all our team members take very seriously."

Science Leadership

ESR's senior science leaders come from a broad range of science backgrounds and have internationally recognised subject matter knowledge and expertise. They are representative of the high calibre of our scientists.

Dr Phil Carter is ESR's Chief Scientist and Chair of the Strategic Science Team. Phil is a molecular microbiologist who has worked at ESR for over 15 years. He is responsible for the Research Office, the allocation of strategic funding across ESR science and ESR's scholarships and awards. His research interests include the population genetics of bacterial pathogens including *Neisseria, Campylobacter, E. coli* O157 and Salmonella.

Dr Virginia Hope MNZM is ESR's Medical Director and leads our growing team of medical specialists. She is a public health medicine specialist and medical administrator. Virginia has 30 years' experience in medical practice and has worked as an occupational medicine specialist, a Medical Officer of Health specialising in environmental health and as a Senior Lecturer in Environmental Health and Health Protection at the University of Auckland. Virginia has publications in water quality, *giardiasis*, outbreak and pandemic investigations, health risk assessment and environmental risk factors for infectious disease.

Dr John Buckleton is a Principal Scientist at ESR. He has an international reputation based on his extensive publication record and contributions to forensic science, particularly in evidence interpretation. He has made a notable contribution in forensic DNA statistics and interpretation. Dr Buckleton has published more than 150 peer-reviewed scientific papers and co-authored five books, in addition to his experience as a forensic case-working scientist. His contribution to leading-edge thinking in forensic science was recognised by the award of a Doctor of Science degree from the University of Auckland in 2010. His innovations have contributed significantly to four series of patents relating to enhanced DNA techniques.

Murray Close is a Principal Scientist and leads the Groundwater Contamination research team. He has over 37 years' experience and a wide knowledge of groundwater conditions and processes throughout New Zealand. His current interests include pesticide contamination of groundwater; measurement & modelling of attenuation of contaminants in groundwater; unsaturated (vadose) zone processes; regional and national groundwater quality assessment; remediation of contaminated groundwater, groundwater ecosystems, and land use impacts on groundwater quality.

Dr SallyAnn Harbison is a Senior Science Leader, a member of ESR's Strategic Science Team and the DNA Technical Leader in Forensic Biology in Auckland. SallyAnn's background is in forensic crime scene and evidence examination, and she specialises in forensic DNA and RNA analysis leading, for example, the implementation of Y STR profiling and RNA analysis. Her current research is focused on integrating new generation DNA sequencing technologies into forensic science for identification and intelligence based applications.

Dr Jo-Anne Bright is a Senior Science Leader within the Forensic Biology group at ESR where she has worked since 1999. In 2015, Jo was awarded her PhD after studying advanced DNA profile interpretation. Jo has co-authored numerous papers and presented at a number of workshops in this area, including in Thailand, Australia, US and the UK. Jo is one of the co developers of STRmix™, expert software for the interpretation of forensic DNA profiles and the new Australasian standard.

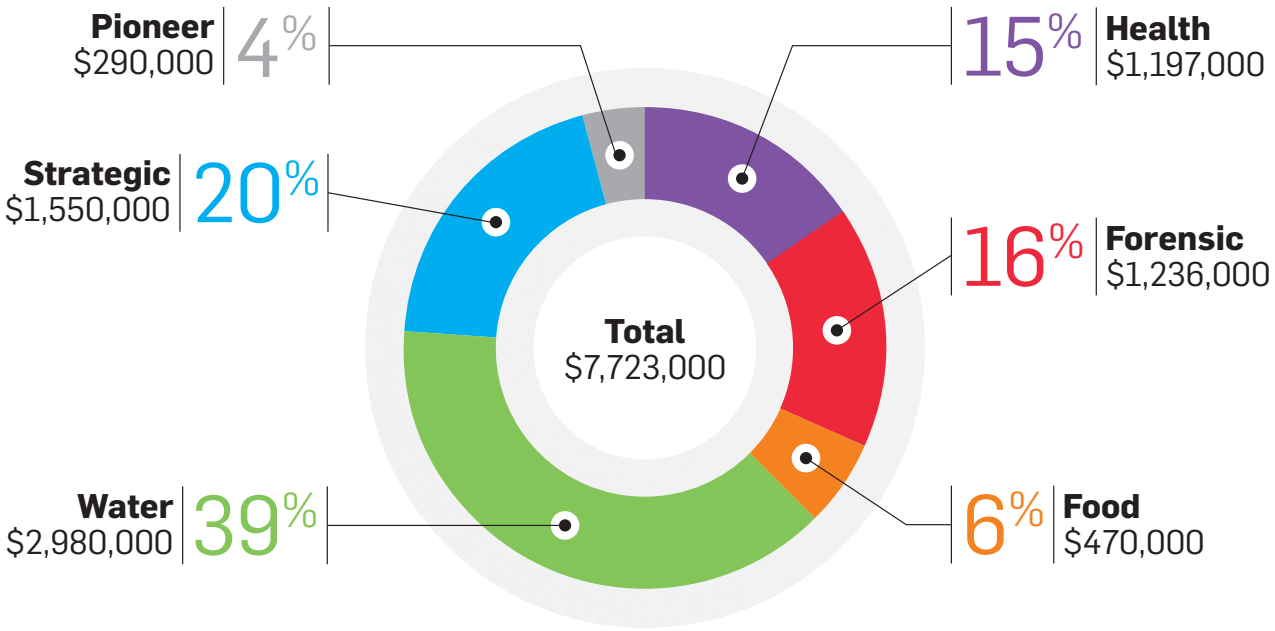
Dr Sue Huang is a Senior Science Leader at ESR. Sue is a virologist and the director of the World Health Organisation (WHO) accredited National Influenza Centre and WHO National Poliovirus Reference Laboratory at ESR. She has a PhD in virology from the University of Pennsylvania in Philadelphia, USA. Her area of expertise is infectious and pathogenic human viruses, particularly influenza, other respiratory viruses, polio and other enteroviruses, including studying aetiological agents, diagnostic methods, routes and modes of transmission, viral pathogenesis and host immune responses, disease burden and related risk factors, vaccine effectiveness, viral ecology and evolution.

Dr Brent Gilpin is a Senior Scientist and a member of ESR's Strategic Science Team. Brent is a molecular biologist whose primary research interests include the application of genetic analysis techniques to understanding foodborne and waterborne outbreaks and disease. This includes microbial contamination of water, the importance of different indicators and pathogens in water, tools for tracking sources of contamination of water, assessment of health risks, and the use of whole genome sequencing and metagenomics analysis.

MBIE STRATEGIC FUNDING

MBIE Strategic Funding enables ESR to invest in scientific research and capability. We invest in research relating to our four outcomes, strategic investments to build our science capabilities and ESR's Pioneer Fund for innovative new research.

Allocation of MBIE Strategic Funding



All projects are assessed against the following criteria:

- scientific merit (excellence)
- clear demonstration of how the proposal will contribute to ESR's outcomes (impact)
- enhanced collaborations and capability development
- co-funding or commercial opportunities

Researching our four outcomes

ESR invests the majority of MBIE Strategic Funding in research projects that improve impacts in public health, forensic science, food safety and water and the environment.

Below are examples of key projects funded this year. Many of the projects identified below have received additional financial support and were made possible through collaborative partnerships with both New Zealand and international science providers.

OUTCOME	PROJECT	IMPACT
Health	**Markers of Human Health**	This project identifies and develops biomarkers of disease to aid better targeted interventions for obesity, type-two diabetes and related traits.
	Virus Hunters	ESR has developed a robust metagenomic method that can be deployed at short-notice to sequence or diagnose any virus, which will help reduce the spread and burden of disease.
Forensic science	**Transcriptomics in forensic science - taking RNA into new fields**	Our research improves the delivery of independent, reliable evidence through more quickly and definitively identifying body fluids. Using new omics technology will result in more efficient analysis of forensic evidence, improved body fluid identification methods, reduced turn-around-times and provide more robust results for the justice sector.
	Modelling solutions for blood spatter on fabric surfaces	This research improves ESR's reporting on blood spatter in many assault cases in NZ courtrooms each year.
	Genomics in forensic science	Genomics has the ability to significantly increase the information content of forensic evidence, which will help solve crimes more quickly. For example, providing investigators with hair and eye colour, and characteristics of appearance, gender and genetic ancestry will allow better targeting of investigative resources and narrowing possible suspects.
Food	**Biocontrol of bovine mastitis**	This project is developing biocontrols which control bovine mastitis, reducing antibiotic use in the NZ milk production system.
	Developing new products and markets for ESR Biocontrol	ESR is developing biological control agents which inactivate Campylobacter, mitigating a significant food safety risk for NZ's poultry industry.
Water	**Developing enhanced groundwater modelling methodologies and capability**	Alluvial gravel aquifers are economically very important and occur throughout New Zealand. This project develops methods for more accurately modelling contaminant transport in these aquifer systems. This project contributes to improving the safety of freshwater and groundwater resources for human use.
	Centre for Integrated Biowaste Research (CIBR)	Our research into greywater and wastewater is improving the quality of treated effluent by reducing microbial and chemical contaminants that could potentially end up in drinking water catchments or contaminate the natural environment.
	Smart synthetic DNA tracers	This research characterises contaminant pathways from land into and through groundwater and surface water systems, and the connections between these systems, which will help inform responses that improve the quality of rivers, streams and groundwater.

Strategic projects

This year we initiated three strategic projects to develop our strategy in human genomics:

- a Bacterial Genomics Project to provide more detailed surveillance of diseases, which will help reduce the number of outbreaks and burden of disease
- building bioinformatics and statistics expertise through training and mentoring
- a Genomics and Informatics Portfolio to continually improve service delivery for our customers.

Currently our focus is primarily on building capability in disease genomics, but we also see a role for ESR in building the infrastructure for human genomics for the benefit of the national health care system.

Using pocket-sized sequencing equipment to identify diseases

This year, ESR's Virus Hunters team tested mobile technology that could play a major role in fighting global disease outbreaks.

The team tested a handheld USB-operated MinION device developed by the UK-based Oxford Nanopore Technologies and showed the technology can be used to rapidly and accurately sequence influenza viruses. DNA analysis that currently takes days or even weeks, and is only possible in the lab may soon be possible in the field. Understanding the DNA of influenza virus is critical when trying to determine the best way to treat and stop the spread of an outbreak.

The ability to rapidly, and accurately, sequence influenza viruses is instrumental in the prevention and mitigation of influenza but applies equally to other viruses.

The study shows the potential for the device to be used in other outbreak scenarios such as bird flu and MERS-CoV, and could be a game-changer for responding to disease outbreaks.

The research was published on the *Frontiers in Microbiology* journal website where it attracted considerable interest (more than 7,000 views and 1,000 downloads).

ESR's handheld MinION DNA sequencer

Pioneer Fund

The purpose of ESR's Pioneer Fund is to identify innovative projects that have good potential to improve the delivery of outcomes. Projects funded this year include the following:

Surveillance of measles using web mining	This project explored the feasibility of using web data to perform syndromic surveillance of communicable diseases using measles as an example.
Characterisation of designer drugs and database development	We are developing a database to characterise 'designer' drugs that frequently pose a major public safety issue. These drugs are often composed of novel compounds which have no documented history of medical effects. The database provides an evidence base for the Psychoactive Substances Act 2013 and the Government's National Drug Policy 2015 to 2020.
Drug testing of wastewater	We investigated the feasibility of conducting testing at wastewater plants to identify the volume of illicit drugs used in a region. This project will provide more accurate intelligence on actual drug usage in a location. A tender was subsequently awarded to ESR by the National Drug Investigation Bureau.
Evaluation of raw milk prior to UHT processing	We researched the potential to develop a rapid, easily portable test that can be used to predict the suitability of raw milk for UHT processing. The research will feed into our food safety research programme and may provide a financially viable solution for UHT processing to the dairy sector.

VISION MĀTAURANGA

This year ESR began a sustained effort to advance the four themes identified in Vision Mātauranga:

INDIGENOUS INNOVATION	TAIAO	HAUORA/ORANGA	MĀTAURANGA
Contributing to economic growth through distinctive research and development	Achieving environmental sustainability through iwi and hapū relationships with land and sea	Improving health and social wellbeing	Exploring indigenous knowledge and research, science and technology

Using a drone and a 3D scanner to record Ngati Rangithi's cultural assets

Preserving Māori cultural assets

ESR partnered with Matata based iwi Ngati Rangitihi and 3D visualiation experts Blue Cube Consulting to co-develop a virtual marae visualisation platform named Te Rererunga (the 'fly over'). Te Rererunga allows iwi to record, document, preserve and share the unique cultural heritage of their marae and wāhi tapu.

The application builds on ESR's 3D capture and visualisation expertise to deliver an immersive and interactive culture heritage preservation and education tool.

Key functions of Te Rererunga include the archival record of a marae and its contents should damage or loss occur, better informed insurance cover and preserving the memories and stories behind significant buildings and artefacts.

The application enables the transition of knowledge exchange from an oral tradition to an interactive process that can engage with a wider and more dispersed audience, enhancing the connection between iwi members and their marae.

Improving drinking water safety for Northland communities

ESR's water team examined changes in Northland Māori communities' drinking water safety and security due to climate change. The work was undertaken in collaboration with Massey University as part of The Deep South National Science Challenge.

Engaging with iwi

ESR won the 'best overall paper' award at a biowaste conference in Gisborne for a presentation on *Tapu to Noa – Māori cultural views on biowastes management: a focus on biosolids.*

ESR's presentation and accompanying report are the summation of many years of work with communities around New Zealand. They provide a guide for non-Māori towards knowing how to ask the right questions in conversations and engagement with local hapū and iwi regarding biowaste and biosolids issues. The report will be particularly useful for councils and other regulators.

Manager Māori Economy appointed

This year ESR appointed a Manager Māori Economy to:

- expand and grow our engagement with Māori
- grow our understanding of, and success in, meeting Māori aspirations outlined within Vision Mātauranga
- increase understanding of Te Ao Māori across the whole of ESR to sustain engagement with Māori well into the future.

The Manager Māori Economy will implement ESR's refreshed Māori Strategy. Over the coming year the focus will be to develop relationships with iwi. The objective is building strong relationships across ESR and making a genuine difference to the iwi we are working with.

PERFORMANCE INDICATORS

Outcome performance indicators

	ACTUAL	TARGET
Public health		
Time-critical turnaround times are met	100%	100%
MoH satisfaction with ESR's support for responses	Good	Good
MoH satisfaction with ESR services	Good to very good	Good
Laboratory result report delivery times	delivery time of 70% of reports reduced by 3 days	reduced by 20%
MoH's project brief milestones and deliverables met	98%	95%
Forensic science		
DNA samples linked to a person	75%	70%
DNA samples linked to other crimes	31%	33%
DNA samples processed within 30 days	Not met due to increased samples received	90%
Fulfilment of contractual obligations under the service level agreement	SLA obligations fulfilled	100%
Police satisfaction with ESR's timeliness and quality of service	>80%	90%
Food safety		
Delivery of MPI's contract project work before end of the financial year	82%	80%
MPI's satisfaction with ESR's support for responses	91% average stakeholder satisfaction	
Turnaround time for support to MoH for outbreaks of foodborne illnesses	All analyses of samples commenced within 24 hours of receipt	
% of export radiation certificates issued within required timeframes for export	100%	100%
Meet project milestones and deliverables	All projects met time and quality expectations	95%
Increase in revenue	1.3% increase in food and water revenue	Increased
Water & the environment		
Respond to requests for advice from the MoH and public health units within the timeframes agreed for analysis and advice services	All time requirements were met for analysis and advice	Time requirements met
Meet agreed milestones in the MoH environmental health contract	87%	95%
Increased project work related to environmental health in the Pacific	Two new contracts signed	Two new contracts signed
Provide water quality advice and advanced analytical services to regional and unitary councils each year to assist them in improving recreational water quality	>80% of councils	>80% of councils
Meet project milestones and deliverables	87% milestones met 100% deliverables met	95%
Increase in revenue	1.3% increase in food and water revenue	Increased

Generic CRI performance indicators

		ACTUAL	TARGET
End user collaboration	Revenue from commercial and other sources per FTE	$160,100	$146,400
Research collaboration	Publications with collaborators	64	65
Technology and knowledge transfer	Commercial reports per scientist FTE	0.62	0.45
Science quality	Impact of science publications (measured using Web of Science citations for the preceding financial year)	3.4	3.1
Financial indicators	Revenue per FTE	$197,520	$182,100
	Commercial and other services revenue	$56.8m	$54.9m

Financial performance indicators

	ACTUAL 2016	TARGET 2016	ACTUAL 2015
Revenue	$70.1m	$68.2m	$65.0m
Operating margin	15.5%	13.6%	13.9%
Return (NPAT)* on equity	8.9%	5.5%	6.5%
Return (EBIT)** on assets	8.6%	4.8%	6.0%
Profit volatility	22.5%	N/A	20.2%
Acid test ratio	1.7	1.0	1.5
Equity ratio	71.3%	66.8%	67.3%
Gearing	1.1	0.5	0.8
Interest cover	N/A	N/A	N/A
Annualised operating margin per FTE	$30,543	$24,773	$25,600

**Net Profit After Tax*
***Earnings Before Interest and Tax*

FINANCIAL STATEMENTS

Institute of Environmental Science and Research Limited

For the Year Ended 30 June 2016

Contents

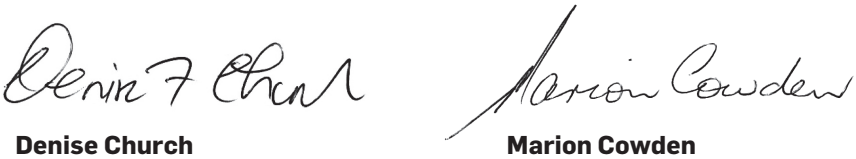
Statement of Responsibility

We certify that the Company has operated in accordance with the principles of the Crown Research Institutes Act 1992 and Companies Act 1993. The Company has also complied with all statutory environmental regulations.

We acknowledge responsibility for the preparation of these financial statements and for the judgements used therein.

Internal control procedures are considered to be sufficient to provide a reasonable assurance as to the integrity and reliability of the financial reports.

In our opinion these financial statements fairly reflect the financial position and operations of the Institute of Environmental Science and Research Limited (ESR) for the year ended 30 June 2016.



Denise Church
Chair

Marion Cowden
Deputy Chair

Report of the Directors

The directors present the Annual Report and audited financial statements of the Institute of Environmental Science and Research (ESR) for the year ended 30 June 2016.

The Auditor-General is the statutory auditor pursuant to section 21 of the Crown Research Institutes Act 1992. The Auditor General has appointed Chris Ussher with the assistance of PricewaterhouseCoopers to audit the financial statements and to express an opinion on them. Their report is on page 42 and 43.

Principal activity

ESR is a Crown Research Institute that provides specialist scientific services and research, particularly to the health and justice sectors. Its purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems, and the environmental sector to improve the safety and contribute to the economic, environmental and social wellbeing of people and communities in New Zealand.

Dividends

No dividends have been declared or paid in respect of the 2016 financial year.

Directors' indemnity

ESR has arranged for directors and officers insurance for any act or omission in their capacity as a director of the Company.

Directors' use of information

No Member of the Board of ESR, or any subsidiary, issued a notice requesting to use information received in their capacity as directors that would not otherwise have been available to them.

Donations

No donations were made during the year.

Remuneration of Directors

The directors who held office in the period of this report and their total remuneration and other benefits were:

Denise Church (Chair)	$46,000
Marion Cowden (Deputy Chair)	$28,750
Tahu Potiki	$23,000
Richard Gill	$11,500
Dr Helen Darling	$23,000
Professor William Denny	$23,000
John O'Hara	$23,000
	$178,250

Disclosure of interests by Directors

As at 30 June 2016 the following directors had made the following general disclosures:

Denise Church (Chair)

Chair, Karori Sanctuary Trust
Trustee, Scout Youth Federation
Director and Shareholder, Leadership Matters Limited
Member, National Executive Committee Scouts New Zealand

Marion Cowden (Deputy Chair)

Deputy Chair, Energy Efficiency and Conservation Authority
Board Member, St John of God Hauora Trust
National Council Member, Student Job Search Aotearoa
Trustee, Nazareth Care Charitable Trust
Member, Audit and Risk Committee, Ministry for the Environment
Part-time Executive Officer, Age Concern (Wellington)
Director, Co-operative Bank Limited
Member, Real Estate Agents Authority
Director and shareholder, Muriell Olaghair Properties Limited

Tahu Leslie Potiki

Director, Ngai Tahu Tourism Ltd
Elected Representative, Te Runanga o Ngai Tahu
Trustee, Ngai Tahu Charitable Trust
Director, Arataki Associates Ltd

Professor William Denny

Director, Auckland Cancer Society Research Centre, University of Auckland
Head, Scientific Advisory Committee, Australian Cancer Research Foundation Drug Discovery Centre, Sydney
Member, Scientific Advisory Group, Australian Cooperative Research Centre for Cancer Therapeutics, Melbourne
Member, Ministry of Health/Health Research Council Steering Committee for Cancer Research Partnership
Member, Management Group, Maurice Wilkins Centre for Molecular Bioscience, University of Auckland
Member, Senior Management team, Cancer Society Auckland
Member, National Science Challenge Panel
Board Member, NZ Genomics Ltd

Dr Helen Darling

Advisory Board Member, Export NZ
Director and Shareholder, Darling and Associates
Director and Shareholder, Cherry Futures Limited
Director and Shareholder, Asia Pacific Centre for Food Integrity
Expert Committee, United States Pharmacopeial Convention, Food Ingredients
Expert Committee, United States Pharmacopeial Convention, Food Adulteration

John O'Hara

Director, Spidertracks Limited
Chair and Lead Investor, Ask Nicely
Director, Tekron International Limited
Director, Tekron IP Limited
Director, Tekron Limited
Director, John O'Hara Limited
Director and Shareholder, Sport Aircraft Limited

Richard Gill

Director, Shareholder and CEO, Cloud M Limited
Director and Shareholder, Richard Gill Limited
Director, Richard Gill Trustees Limited

Directors' interests

No director held any interest in the shares of the Institute. The Institute has funding contracts with the Marsden Fund and the Ministry of Business, Innovation, and Employment, which are negotiated at arms' length with appropriate directors' interest being declared. Except for these contracts no material contracts involving directors' interests were entered into during, or subsequent to, the period covered by this report.

Remuneration

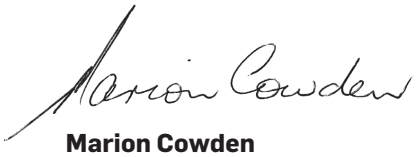
Total remuneration in respect of employees paid above $100,000 was as follows:

Remuneration Range	No. of Staff
$100,000 - $109,999	29
$110,000 - $119,999	15
$120,000 - $129,999	10
$130,000 - $139,999	2
$140,000 - $149,999	2
$150,000 - $159,999	3
$160,000 - $169,999	5
$190,000 - $199,999	3
$200,000 - $209,999	1
$220,000 - $229,999	1
$230,000 - $239,999	2
$400,000 - $409,999	1

Events subsequent to balance date

The directors are not aware of any matter or circumstance since the end of the financial year that has significantly affected, or may significantly affect, the operation of the Institute.

Denise Church
Chair



Marion Cowden
Deputy Chair

Independent Auditor's report

To the readers of the Institute of Environmental Science and Research Limited Group's financial statements for the year ended 30 June 2016.

The Auditor-General is the auditor of the Institute of Environmental Science and Research Limited and its New Zealand domiciled subsidiaries and other controlled entities (collectively referred to as 'the Group'). The Auditor-General has appointed me, Chris Ussher, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the Group on her behalf.

Opinion

We have audited the financial statements of the Group on pages 44 to 64, that comprise the statement of financial position as at 30 June 2016, the statement of profit or loss and other comprehensive income, statement of changes in equity and statement of cash flows for the year ended on that date and the notes to the financial statements that include accounting policies and other explanatory information.

In our opinion, the financial statements of the Group:

- present fairly, in all material respects:
  - its financial position as at 30 June 2016; and
  - its financial performance and cash flows for the year then ended; and
- comply with generally accepted accounting practice in New Zealand and have been prepared in accordance with New Zealand equivalents to International Financial Reporting Standards and International Financial Reporting Standards.

Our audit was completed on 25 August 2016. This is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities, and we explain our independence.

Basis of opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the International Standards on Auditing (New Zealand). Those standards require that we comply with ethical requirements and plan and carry out our audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Material misstatements are differences or omissions of amounts and disclosures that, in our judgement, are likely to influence readers' overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

An audit involves carrying out procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgement, including our assessment of risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments we consider internal control relevant to the Group's preparation of the financial statements in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.

An audit also involves evaluating:

- the appropriateness of accounting policies used and whether they have been consistently applied;
- the reasonableness of the significant accounting estimates and judgements made by the Board of Directors;
- the adequacy of the disclosures in the financial statements; and
- the overall presentation of the financial statements.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements. Also we did not evaluate the security and controls over the electronic publication of the financial statements.

We believe we have obtained sufficient and appropriate audit evidence to provide a basis for our audit opinion.

Responsibilities of the Board of Directors

The Board of Directors is responsible for the preparation and fair presentation of financial statements for the Group that comply with generally accepted accounting practice in New Zealand.

The Board of Directors' responsibilities arise from the Crown Research Institutes Act 1992.

The Board of Directors is also responsible for such internal control as it determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error. The Board of Directors is also responsible for the publication of financial statements, whether in printed or electronic form.

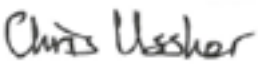
Responsibilities of the Auditor

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you based on our audit. Our responsibility arises from the Public Audit Act 2001.

Independence

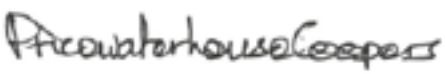
When carrying out the audit, we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the External Reporting Board.

In addition to the audit, we have carried out other assurance services and assignments in the areas of taxation compliance and advice, benchmarking and business case review services, which are compatible with those independence requirements. Other than the audit and these assignments, we have no relationship with or interests in the Group.



Chris Ussher

On behalf of the Auditor-General
Wellington, New Zealand



PricewaterhouseCoopers

Statement of Profit or Loss and Other Comprehensive Income

for the year ended 30 June 2016

Group	Note	Actual 2016 $'000s	Budget 2016 $'000s	Actual 2015 $'000s
Operating revenue				
Revenue from rendering of services		62,359	60,505	57,286
Core funding		7,723	7,723	7,723
		70,082	**68,228**	**65,009**
Operating expenses				
Scientific materials		5,755	6,270	6,213
Subcontracting expenses, commissions and royalties		7,142	7,458	6,698
Personnel expense		33,820	33,247	31,658
Depreciation and amortisation expense	**4/5**	5,519	6,305	5,465
Other expenses	**2**	12,528	11,971	11,434
		64,764	**65,251**	**61,468**
Operating profit/(loss)		**5,318**	**2,977**	**3,541**
Finance income - interest income		163	227	179
Finance expense		(24)	(13)	(9)
Net finance income		**139**	**214**	**170**
Profit before income tax expense		**5,457**	**3,191**	**3,711**
Income tax expense	**3**	1,615	893	1,128
Profit for the period attributable to the Institute's shareholder		**3,842**	**2,298**	**2,583**
Other comprehensive income		-	-	-
Total profit or loss and other comprehensive income for the period attributable to the Institute's shareholder		**3,842**	**2,298**	**2,583**

The accompanying notes form an integral part of these financial statements.

Statement of Changes in Equity

for the year ended 30 June 2016

Group	Share capital $'000s	Retained Earnings $'000s	Total Equity $'000s
Balance at 1 July 2014	**8,494**	**30,071**	**38,565**
Profit for the period	-	2,583	2,583
Other comprehensive income	-	-	-
Total comprehensive income	-	**2,583**	**2,583**
Transactions with owners:			
Dividend	-	-	-
Balance at 30 June 2015	**8,494**	**32,654**	**41,148**
Balance at 30 June 2015	**8,494**	**32,654**	**41,148**
Profit for the period	-	3,842	3,842
Other comprehensive income	-	-	-
Total comprehensive income	-	**3,842**	**3,842**
Transactions with owners:			
Dividend	-	-	-
Balance at 30 June 2016	**8,494**	**36,496**	**44,990**

The accompanying notes form an integral part of these financial statements.

Statement of Financial Position

as at 30 June 2016

Group	Note	Actual 2016 $'000s	Budget 2016 $'000s	Actual 2015 $'000s
Non-current assets				
Property, plant and equipment	4	30,784	31,952	30,248
Investment		30	30	30
Intangible assets	5	11,044	12,606	11,407
		41,858	**44,588**	**41,685**
Current assets				
Cash and cash equivalents		12,364	7,326	7,702
Trade and other receivables	6	7,888	11,475	10,780
Derivative financial instruments		134	-	-
Inventories - Scientific materials and consumables		875	1,458	628
		21,261	**20,259**	**19,110**
Current liabilities				
Trade and other payables	7	8,999	13,908	11,806
Employee benefits	8	2,925	2,750	2,663
Finance lease liabilities	9	258	154	153
Derivative financial instruments		-	-	161
Income tax payable	10	730	741	359
		12,912	**17,553**	**15,142**
Net current assets		**8,349**	**2,706**	**3,968**
Non-current liabilities				
Employee benefits	8	1,194	971	763
Finance lease liabilities	9	250	62	168
Deferred taxation	11	3,773	3,496	3,574
		5,217	**4,529**	**4,505**
Net assets		**44,990**	**42,765**	**41,148**
Equity				
Share capital	13	8,494	8,494	8,494
Retained earnings		36,496	34,271	32,654
Total equity		**44,990**	**42,765**	**41,148**

The Board of Directors of the Institute of Environmental Science and Research Limited authorised these financial statements for issue on 25 August 2016.

On behalf of the Board:

Denise Church
Chair

Marion Cowden
Deputy Chair

Dated 25 August 2016

The accompanying notes form an integral part of these financial statements.

Statement of Cash Flows

for the year ended 30 June 2016

Group	Note	Actual 2016 $'000s	Budget 2016 $'000s	Actual 2015 $'000s
Cash flows from/(used in) operating activities				
Cash was provided from:				
Customers/Core Funding		69,276	67,503	64,339
Interest received		163	227	179
		69,439	67,730	64,518
Cash was applied to:				
Suppliers and employees		(58,278)	(57,459)	(52,239)
Interest paid		(10)	(13)	(9)
Income tax paid	**10**	(1,045)	(420)	(260)
		(59,333)	(57,892)	(52,508)
Net cash inflow from operating activities	**14**	**10,106**	**9,838**	**12,010**
Cash flows from/(used in) investing activities				
Cash was provided from:				
Proceeds from sale of property, plant and equipment		2	-	-
		2	-	-
Cash was applied to:				
Purchase of property, plant and equipment		(3,810)	(7,269)	(2,108)
Purchase of intangible assets	**5**	(1,345)	(250)	(3,859)
		(5,155)	(7,519)	(5,967)
Net cash outflow from investing activities		**(5,153)**	**(7,519)**	**(5,967)**
Cash flows from/(used in) financing activities				
Cash was provided from/(applied to):				
Dividends paid		-	-	-
Repayment of finance lease liabilities		(291)	(172)	(238)
Net cash outflow from financing activities		**(291)**	**(172)**	**(238)**
Net increase in cash held		**4,662**	**2,147**	**5,805**
Cash and cash equivalents at the beginning of the period		7,702	5,179	1,897
Cash and cash equivalents at the end of the period		**12,364**	**7,326**	**7,702**

The accompanying notes form an integral part of these financial statements.

Notes to the Financial Statements

1. Statement of significant accounting policies

Reporting entity

These financial statements of the Institute of Environmental Science and Research Limited and its subsidiaries ("ESR" and the "Group") are for the year ended 30 June 2016.

ESR is a Crown Entity incorporated and based in New Zealand. Its registered office is 34 Kenepuru Drive, Porirua.

ESR is a Crown Research Institute that provides specialist scientific services and research to the public health, food safety, security and justice systems, and the environmental sector.

Statement of compliance

The financial statements have been prepared in accordance with the requirements of the Crown Entities Act 2004, the Crown Research Institutes Act 1992, the Companies Act 1993 and the Financial Reporting Act 2013.

These financial statements have been prepared in accordance with Generally Accepted Accounting Practice in New Zealand (NZ GAAP). They comply with International Financial Reporting Standards (IFRS) and other applicable financial reporting standards as appropriate for profit-oriented entities.

The Group has adopted External Reporting Board Standard A1 Accounting Standards Framework (For-profit Entities Update) (XRB A1). XRB A1 establishes a for-profit tier structure and outlines which suite of accounting standards entities in different tiers must follow. The group is a Tier 1 entity. There was no impact on the current or prior year financial statements.

Basis of preparation

The financial statements are Parent and Group financial statements. The subsidiary of ESR is a dormant non-trading entity and consequently there is no difference between the financial statements of the Group and those of the Parent.

The financial statements are prepared on the basis of historical cost, except for financial instruments, certain leased assets and long service leave as identified in the specific accounting policies and accompanying notes.

The financial statements are presented in New Zealand dollars and all values are rounded to the nearest thousand dollars ($000).

The budget and target figures presented in these financial statements are unaudited.

Changes in accounting policies

Accounting policies have been applied on a basis consistent with the prior year.

Comparative information

Some comparative items in the statement of profit or loss and other comprehensive income have been reclassified to ensure consistency with the current year. This reclassification has no effect on the statements of financial position or equity.

Critical accounting estimates and judgements

The preparation of financial statements requires judgements, estimates and assumptions that affect the application of policies and reported amounts of assets and liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates. The estimates and assumptions are reviewed on an on-going basis.

The judgements that have the most significant effect on amounts recognised in the financial statements are applied in the determination of revenue and employee benefits.

Revenue

The Group uses the stage of completion method in accounting for its fixed price contracts to deliver scientific services. The use of the stage of completion method requires management to estimate the services performed to date as a proportion of the total services to be performed. The stage of completion is calculated and reviewed monthly, and significant variances are investigated to ensure that the stage of completion estimate is reasonable in line with the overall project plan, estimated completion date and prior measurements of progress.

Principles of consolidation

Subsidiaries

The consolidated financial statements incorporate the assets and liabilities of all subsidiaries of ESR as at 30 June 2016 and the results of the operations of all subsidiaries for the year then ended.

Subsidiaries are those entities controlled, directly or indirectly, by the Parent. Subsidiaries are consolidated from the date on which control is transferred to ESR. They are de-consolidated from the date that control ceases.

The acquisition method of accounting is used to account for the acquisition of businesses by the Group. The cost of an acquisition is measured as the fair value of the assets given, equity instruments issued and liabilities incurred or assumed at the date of exchange. Identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date, irrespective of the extent of any non-controlling interest. The excess of the cost over the fair value of the Group's share of the identifiable net assets acquired is recorded as goodwill. If the cost of acquisition is less than the Group's share of the fair value of the identifiable net assets of the subsidiary acquired the difference is recognised directly in the statement of profit or loss and other comprehensive income.

Property, plant and equipment

Items of property, plant and equipment are initially recorded at cost and subsequently at cost less accumulated depreciation and impairment. The cost of property, plant and equipment includes the value of consideration given to acquire the assets and the value of other directly attributable costs that have been incurred in bringing the assets to the location and condition necessary for their intended use.

The carrying amounts of property, plant and equipment are reviewed at least annually to determine if there is any indication of impairment. Where an asset's recoverable amount is less than its carrying amount, it will be reported at its recoverable amount and an impairment loss will be recognised.

Losses resulting from impairment are reported in the statement of profit or loss and other comprehensive income.

Realised gains and losses arising from the disposal of property, plant and equipment are recognised in the statement of profit or loss and other comprehensive income in the periods in which the transactions occur.

Depreciation is charged on a straight-line basis at rates calculated to allocate the cost of an item of property, plant and equipment, less any estimated residual value, over its estimated useful life, as follows:

Type of Asset	Estimated useful life
Land	Not depreciated
Freehold buildings	20 - 50 years
Leasehold improvements	10 years
Plant, equipment and vehicles	3 - 10 years
IT equipment and internal software	3 - 10 years

Intangible assets

Computer software

Items of computer software that do not comprise an integral part of the related hardware are treated as intangible assets with finite lives. Intangible assets with finite lives are recorded at cost, and subsequently recorded at cost less any accumulated amortisation and impairment losses. Amortisation is charged to the statement of profit or loss and other comprehensive income on a straight-line basis over the useful life of the asset (between 3 and 10 years).

Customer contracts

The Intangible asset customer contracts represents the fair value of future revenue streams from customer contracts acquired under business combinations. Initial recognition of the intangible asset is stated at fair value. Subsequent to initial recognition, acquired intangible assets are stated at initially recognised amounts less accumulated amortisation and any impairment. Amortisation of acquired intangible assets is made according to the straight-line method over their estimated useful life, not exceeding ten years.

Research and development costs – internally generated intangible assets

Expenditure on research is expensed when it is incurred.

Development expenditure incurred on an individual project is capitalised if the process is technically and commercially feasible, future economic benefits are probable and ESR intends to and has sufficient resources to complete development and to use or sell the asset.

Any expenditure capitalised is amortised over the period of expected future sales from the related project from the point the asset is ready for use.

Impairment of non-financial assets

Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units).

Taxation

Current tax

Current tax is calculated with reference to the current period's taxable profit or loss calculated using tax rates and tax laws that have been enacted or substantially enacted by reporting date. Current tax for the current and prior periods is recognised as a liability (or asset) to the extent that it is unpaid (or refundable).

Deferred tax

Deferred tax is calculated using the comprehensive balance sheet liability method in respect of temporary differences arising from differences between the carrying amount of assets and liabilities in the financial statements and the tax base for those items.

Deferred tax assets and liabilities are not recognised if the temporary differences giving rise to them from the initial recognition of assets and liabilities (other than as a result of a business combination) affects neither taxable income nor accounting profit.

Deferred tax assets are recognised for deductible temporary differences and unused tax losses only if it is probable that future taxable amounts will be available against which deductible temporary differences or unused tax losses and tax offsets can be utilised.

Deferred tax assets and liabilities are measured at the tax rates expected to apply when the assets are recovered or liabilities settle using tax rates and tax laws that have been enacted or substantially enacted by reporting date.

Cash and cash equivalents

Cash means cash on hand, demand deposits and other highly liquid investments in which ESR has invested as part of its day-to-day cash management. The following definitions are used in the statement of cash flows:

- Investing activities are those activities relating to the acquisition, holding and disposal of fixed assets and investments.
- Financing activities are those activities that result in changes in the size and composition of the capital structure of ESR and this includes both equity and debt not falling within the definition of cash. Dividends paid in relation to the capital structure are included in financing activities.
- Operating activities are the principal revenue producing activities and other activities that are not investing or financing activities.

Trade and other receivables

Trade receivables are stated at their estimated realisable value after providing against debts where collection is doubtful. An estimate of the value of doubtful debts is made based on a review of debts at year end. Bad debts are written off in the period in which they are identified.

Inventories

Stocks of consumables and work in progress are stated at the lower of cost and net realisable value. Cost is determined on a first in, first out basis.

Trade and other payables

These amounts represent the best estimate of the expenditure required to settle an obligation arising from goods or services provided to ESR prior to period end. These amounts are unsecured and are usually paid within 30 days of recognition. Liabilities and provisions to be settled beyond 12 months are recorded at their present value.

Employee benefits

Wages, salaries and annual leave

Liabilities for wages and salaries including annual leave that are expected to be settled within 12 months of the reporting date are recognised in respect of employees' services up to the reporting date and are measured at the amounts expected to be paid when the liabilities are settled.

Obligations for contributions to defined contribution retirement plans are recognised in the statement of profit or loss and other comprehensive income as they fall due.

Long service leave, retirement leave and service leave

The liability for long service leave, retirement leave and service leave is recognised as an employee benefit liability and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to the expected future salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the reporting date for Government bonds with terms to maturity and currency that match, as closely as possible, the estimated future cash outflows.

Leases

Finance leases transfer to ESR, as lessee, substantially all the risks and rewards incidental to ownership of a leased asset. Initial recognition of a finance lease results in an asset and liability being recognised at amounts equal to the lower of the fair value of the leased asset or the present value of the minimum lease payments. Each lease payment is allocated between the liability and finance charges so as to achieve a constant rate of finance charge over the term of the lease. Property, plant and equipment acquired under a finance lease are depreciated over the shorter of the useful life and lease term of the asset.

Leases in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are charged to the statement of profit or loss and other comprehensive income on a straight-line basis over the period of the lease.

Borrowings

Borrowings are initially recognised at fair value, net of costs incurred. Borrowings are subsequently measured at amortised cost. Any differences between the proceeds (net of transaction costs) and the redemption amount is recognised in the statement of profit or loss and other comprehensive income over the period of the borrowing using the effective interest rate method.

Borrowings are classified as current liabilities unless ESR has an unconditional right to defer the settlement of the liability for at least 12 months after the balance date.

Share capital

Ordinary shares are classified as equity. Incremental costs directly attributable to the issue of new shares or options are shown as appropriate in equity as a deduction, net of tax, from the proceeds.

Revenue

Sales of goods and services

Revenue is earned by ESR in exchange for the provision of outputs (services) to third parties.

Revenue from the supply of services is measured at the fair value of consideration received. Revenue from the supply of services is recognised in the accounting period in which the services are rendered, by reference to the stage of completion of the specific transaction assessed on the basis of the actual service provided as a proportion of the total services to be provided. Any revenue for which services have not been supplied as at the reporting date but for which payment has been received is deferred within the statement of financial position as revenue in advance.

Core funding

ESR receives core funding from the government in order to perform scientific research activities. Core funding is recognised in the statement of profit or loss and other comprehensive income when the requirements under the funding agreement have been met.

Interest income

Interest income is recognised in the statement of profit or loss and other comprehensive income on a time proportion basis, using the effective interest rate method.

Foreign currency

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates. The Group financial statements are presented in New Zealand dollars, which is ESR's functional and presentation currency.

Foreign currencies transactions are recorded at the foreign exchange rates in effect at the dates of the transactions. Monetary assets and monetary liabilities denominated in foreign currencies are translated at the rates of exchange ruling at the end of each reporting period. Non-monetary assets and non-monetary liabilities denominated in foreign currencies that are measured at fair value are translated to the functional currency at the exchange rate at the date that the fair value was determined.

Goods and services tax

Items in the statement of profit or loss and other comprehensive income and statement of cash flows are disclosed net of Goods and Services Tax (GST). All items in the statement of financial position are stated net of GST with the exception of receivables and payables, which include GST invoiced.

Dividends

A provision is made for the amount of any dividend declared on or before the end of the financial year but not distributed at balance date.

Financial instruments

The designation of financial assets and financial liabilities by ESR into instrument categories is determined by the business purposes of the financial instruments, policies and practices of management, the relationship with other instruments and the reporting costs and benefits associated with each designation. The designations applied by ESR are reflected in the financial statements.

Financial assets

The Group classifies its financial assets as loans and receivables and at fair value through profit and loss. Management determines the classification of its financial assets at initial recognition.

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the reporting date. These are classified as non-current assets. ESR's loans and receivables comprise trade and other receivables and cash and cash equivalents in the statement of financial position.

Regular purchases and sales of financial assets are recognised on the trade-date – the date on which the Group commits to purchase or sell the asset. Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the Group has transferred substantially all risks and rewards of ownership. Loans and receivables are carried at amortised cost using the effective interest method.

The Group assesses at each reporting date whether there is objective evidence that a financial asset or a group of financial assets is impaired.

Financial liabilities

Financial liabilities held by ESR include trade and other payables, employee benefits and derivatives.

Such financial liabilities are recognised initially at fair value less transaction costs and subsequently measured at amortised cost using the effective interest rate method. Financial liabilities entered into with durations less than 12 months are recognised at their nominal value.

Derivatives

Derivative financial instruments are recognised both initially and subsequently at fair value. They are reported as either assets or liabilities depending on whether the derivative is in a net gain or net loss position. ESR does not use hedge accounting and as such derivatives are classified as held-for-trading financial instruments with fair value gains or losses recognised in the statement of profit or loss and other comprehensive income. Such derivatives are entered into for risk management purposes.

Adoption status of relevant new financial reporting standards and interpretations

The Group has elected not to early adopt any of the new standards and amendments to existing standards which have been issued as at 30 June 2016 but not yet effective. It is not anticipated that standards not yet effective will significantly impact the financial statements of the Group with the exception of IFRS 15.

NZ IFRS 15, *Revenue from contracts with customers*, (effective for annual periods beginning on or after 1 January 2018)

NZ IFRS 15 addresses recognition of revenue from contracts with customers. It replaces the current revenue recognition guidance in NZ IAS 18 Revenue and NZ IAS 11 Construction contracts and is applicable to all entities with revenue. It sets out a 5 step model for revenue recognition to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The Group has yet to assess NZ IFRS 15's full impact. The Group will apply this standard from 1 July 2018.

2. Other expenses include the following specific items:

Group	Note	2016 $'000s	2015 $'000s
Fees paid to PricewaterhouseCoopers for:			
- the audit of the statutory financial statements		112	112
- the audit for A133 compliance, SHIVERS Project		26	26
Total audit related fees paid to the auditors		138	138
- taxation compliance and advice		31	23
- business case review and benchmarking advice		34	-
Total fees paid to auditors		**203**	**161**
Directors' fees	**17**	178	190
Directors' expenses		59	31
Bad debts written off		-	26
Communication costs (including network charges)		667	673
IT Systems maintenance and licence costs		1,300	1,324
Legal & consultancy fees		1,417	1,353
Impairment of receivables (loans and advances)		15	(17)
Foreign exchange loss/(gain)		193	(17)
Fair value loss/(gain) on forward exchange contract		(134)	161
Marketing and advertising		178	143
Office and administration		1,675	1,393
Occupancy & insurance		2,886	2,586
Rental and operating lease costs		771	832
Travel		1,927	1,615
Outsourced Costs		1,093	810
Other operating costs		101	170
Other expenses		**12,528**	**11,434**

Given the nature of ESR's principal business activities, research comprises part of ESR's everyday business operations. As such, expenses relating to research are not separately identified. The cost of research to ESR is distributed between the relevant expense items, for example employee benefits and scientific materials used.

3. Taxation

Group	Note	2016 $'000s	2015 $'000s
The taxation charge has been calculated as follows:			
Profit/(Loss) before income tax expense		**5,457**	**3,711**
Prima facie taxation at 28%		1,528	1,039
Plus taxation effect of:			
Non-deductible/(assessable) items		87	89
Tax expense for the year		**1,615**	**1,128**
The tax expense for the year is represented by:			
Current taxation	**10**	1,466	1,123
Deferred taxation	**11**	149	5
		1,615	**1,128**

4. Property, plant and equipment

Group	Freehold land $'000s	Buildings and leasehold improvements $'000s	IT equipment $'000s	Plant, equipment and vehicles $'000s	Assets under construction $'000s	Total $'000s
At 1 July 2014						
Cost	476	29,522	7,973	31,346	234	69,551
Accumulated depreciation	-	(6,818)	(6,873)	(23,960)	-	(37,651)
Net book value at the beginning of the year	**476**	**22,704**	**1,100**	**7,386**	**234**	**31,900**
Year ended 30 June 2015						
Net book value at the beginning of the year	476	22,704	1,100	7,386	234	31,900
Additions	-	110	697	1,499	75	2,381
Transfers from assets under construction	-	35	230	-	(265)	-
Disposals	-	-	-	-	-	-
Depreciation for the year	-	(914)	(857)	(2,262)	-	(4,033)
Net book value at the end of the year	**476**	**21,935**	**1,170**	**6,623**	**44**	**30,248**
At 30 June 2015						
Cost	476	29,667	8,811	32,788	44	71,786
Accumulated depreciation	-	(7,732)	(7,641)	(26,165)	-	(41,538)
Net book value at the end of the year	**476**	**21,935**	**1,170**	**6,623**	**44**	**30,248**
Year ended 30 June 2016						
Net book value at the beginning of the year	476	21,935	1,170	6,623	44	30,248
Additions	-	86	1,172	1,274	1,941	4,473
Transfers from assets under construction	-	618	-	266	(884)	-
Disposals	-	(59)	-	(67)	-	(126)
Depreciation for the year	-	(922)	(870)	(2,019)	-	(3,811)
Net book value at the end of the year	**476**	**21,658**	**1,472**	**6,077**	**1,101**	**30,784**
At 30 June 2016						
Cost	476	30,278	7,935	33,343	1,101	73,133
Accumulated depreciation	-	(8,620)	(6,463)	(27,266)	-	(42,349)
Net book value at the end of the year	**476**	**21,658**	**1,472**	**6,077**	**1,101**	**30,784**

IT equipment recognised under finance leases (where ESR is a lessee) included in the above table, has the following values.

Group	2016 $'000s	2015 $'000s
Cost - capitalised finance lease assets	1,661	1,149
Accumulated depreciation	(1,153)	(828)
Net book value at the end of the year	**508**	**321**

ESR does not have any property, plant and equipment used as security for liabilities.

Restriction on Title

In relation to the transfer of land owned by the Company shareholding ministers shall have regard to the principles of the Treaty of Waitangi in accordance with section 10 of the Crown Research Institutes Act 1992. Properties owned by the Company in Christchurch, Wellington and Auckland have caveats on the land as required by section 31 of the Crown Research Institutes Act 1992, which maintains the general provisions of the Public Works Act 1981. The Company complies with section 31 of the Crown Research Institutes Act 1992.

5. Intangible assets

Group	Computer software - externally purchased $'000s	Computer software - internally generated $'000s	Customer contracts $'000s	Assets under construction $'000s	Total $'000s
At 30 June 2014					
Cost	7,917	8,881	1,338	880	19,016
Accumulated amortisation	(6,247)	(3,214)	(576)	-	(10,037)
Net book value at the end of the year	**1,670**	**5,667**	**762**	**880**	**8,979**
Year ended 30 June 2015					
Net book value at the beginning of the year	1,670	5,667	762	880	8,979
Additions	395	-	-	3,464	3,859
Transfers from assets under construction	235	-	-	(235)	-
Amortisation for the year	(557)	(651)	(223)	-	(1,431)
Net book value at the end of the year	**1,743**	**5,016**	**539**	**4,109**	**11,407**
At 30 June 2015					
Cost	8,547	8,881	1,338	4,109	22,875
Accumulated amortisation and impairment losses	(6,804)	(3,865)	(799)	-	(11,468)
Net book value at the end of the year	**1,743**	**5,016**	**539**	**4,109**	**11,407**
Year ended 30 June 2016					
Net book value at the beginning of the year	1,743	5,016	539	4,109	11,407
Additions	284	-	-	1,061	1,345
Transfers from assets under construction	101	4,698	-	(4,799)	-
Amortisation for the year	(573)	(912)	(223)	-	(1,708)
Net Book Value at the End of the Year	**1,555**	**8,802**	**316**	**371**	**11,044**
At 30 June 2016					
Cost	8,284	13,465	1,338	371	23,458
Accumulated amortisation and impairment losses	(6,729)	(4,663)	(1,022)	-	(12,414)
Net book value at the end of the year	**1,555**	**8,802**	**316**	**371**	**11,044**

ESR does not have any intangible assets whose title is restricted or used as security for liabilities.

6. Trade and other receivables

Group	2016 $'000s	2015 $'000s
Trade debtors	6,968	10,053
Provision for doubtful debts	(75)	(60)
	6,893	9,993
Prepayments	995	787
	7,888	**10,780**

As at 30 June 2016, trade receivables of $316,000 (2015: $247,000) were past due but not impaired. These relate to a number of customers for whom there is no recent history of default. The ageing analysis of these trade receivables is as follows:

Past due 1 - 30 days	125	66
Past due 31 - 60 days	72	47
Past due > 61 days	119	134
	316	**247**

7. Trade and other payables

Group	2016 $'000s	2015 $'000s
Accrued expenses	2,485	1,943
GST payable	180	112
Revenue in advance	1,563	1,439
Trade payables	4,771	8,312
	8,999	**11,806**

Accrued expenses include a provision for $196,000 (2015: $158,000) for the disposal of a Cobalt 60 source.

8. Employee benefits

Group	2016 $'000s	2015 $'000s
Annual leave accrual	2,681	2,397
Service leave accrual	234	248
Other	10	18
Current liabilities	**2,925**	**2,663**
Service leave accrual	1,107	674
Retirement leave accrual	84	86
Other	3	3
Non-current liabilities	**1,194**	**763**

9. Finance lease liabilities

Future minimum lease payments are as follows:

Group	2016 $'000s	2015 $'000s
Not later than one year	300	153
Later than one year and not later than five years	249	168
Later than five years	-	-
Total minimum lease payments	**549**	**321**
Future finance charges on finance leases	(41)	-
Present value of finance lease liabilities	**508**	**321**

The finance leases relates to IT equipment. Upon termination of the initial lease period, ESR can either choose to extend the term further, or return the leased assets to the lessor. There is no option to purchase the leased assets upon termination of the lease.

The present value of finance lease liabilities are as follows:

Group	2016 $'000s	2015 $'000s
Not later than one year	258	153
Later than one year and not later than five years	250	168
Later than five years	-	-
	508	**321**

10. Income tax payable

Group	2016 $'000s	2015 $'000s
Balance payable/(receivable) at the beginning of the year	359	(432)
Current year charge	1,466	1,123
Prior period adjustment	(50)	(72)
Provisional taxation payments	(1,045)	(260)
Balance at the end of the year	**730**	**359**

11. Deferred taxation

Deferred tax liabilities/(assets) are attributed to the following:

Group	2016 $'000s	2015 $'000s
Balance at the beginning of the Year	3,574	3,496
Transfer from current tax	50	73
Charge to statement of profit or loss and other comprehensive income	149	5
Balance at the end of the year	**3,773**	**3,574**

	Accelerated tax depreciation $'000s	Employee benefits $'000s	Provisions and other items $'000s	Total $'000s
Year ended 30 June 2015				
Balance at the beginning of the year	4,640	(1,053)	(91)	3,496
Transfer from current tax	57	15	1	73
Current year (charged)/credited to statement of profit or loss and other comprehensive income	-	5	-	5
Balance at the end of the year	**4,697**	**(1,033)**	**(90)**	**3,574**
Year ended 30 June 2016				
Balance at the beginning of the year	4,697	(1,033)	(90)	3,574
Under provision in prior years	-	50	-	50
Current year charge/(credit) to statement of profit or loss and other comprehensive income	431	(206)	(76)	149
Balance at the end of the year	**5,128**	**(1,189)**	**(166)**	**3,773**

There are no unrecognised deferred tax assets or liabilities.
Deferred tax liabilities expected to be settled within 12 months total $974,000 (2015: $872,000).

12. Borrowings

ESR holds a multi-option credit facility with Westpac Banking Corporation for $3,000,000 (2015: $6,000,000), which is provided subject to ESR meeting an equity ratio covenant specified by the bank. The facility expires in March 2018. The facility has not been used during the year.

13. Equity

Share capital

Group	2016 $'000s	2015 $'000s
8,494,000 Ordinary $1 Shares (issued and fully paid)	**8,494**	**8,494**

All ordinary shares rank equally with one vote attached to each fully paid ordinary share.
No dividends were proposed or declared for the 30 June 2016 year (2015: nil).

14. Reconciliation of profit/(loss) after taxation to cash flows from operating activities

Group	Note	2016 $'000s	2015 $'000s
Profit for the year after taxation		**3,842**	**2,583**
Non-cash items:			
Depreciation and amortisation expense	**4, 5**	5,519	5,465
Increase in provisions		37	303
Bad debts written off	**2**	-	26
Increase/(decrease) in provision for doubtful debts	**2**	15	(17)
Deferred tax charged to the income statement	**11**	149	5
Fair value loss/(gain) on derivative financial instruments	**2**	(134)	161
		5,586	**5,943**
Changes in working capital:			
Decrease/(increase) in trade and other receivables		2,904	2,498
Decrease/(increase) in income tax receivable		-	432
Decrease/(increase) in inventories		(247)	399
(Decrease)/increase in trade and other payables		(2,807)	(245)
(Increase)/decrease in income tax payable		371	359
(Decrease)/Increase in employment benefits		693	92
(Decrease)/Increase in financial liabilities		(161)	(70)
		753	**3,465**
Items classified as investing and financing activities:			
Loss on disposal of property, plant & equipment		62	10
(Increase) in trade payables related to purchase of property, plant & equipment		(151)	-
Finance charge on leases		14	9
		(75)	**19**
Net cash inflow from operating activities		**10,106**	**12,010**

15. Investments

Subsidiary companies

ESR has one wholly owned, non-trading, subsidiary company:

Name	Balance Date	Country of Incorporation
ESR Limited	30 June	New Zealand

The subsidiary has remained non-trading during the period.
At balance date the investment in the subsidiary had a nil carrying value.

Investments

ESR holds 18 shares in Kiwi Innovation Network Limited and the investment has a carrying value of $30,000 (2015: $30,000)

16. Commitments

Capital commitments

Group	2016 $'000s	2015 $'000s
Property, plant and equipment	431	357
Intangible Assets - Software	58	284
Total capital commitments	**489**	**641**

Operating lease commitments

The future aggregate minimum lease payments under non-cancellable operating leases are as follows:

Group	2016 $'000s	2015 $'000s
Not later than one year	58	543
Later than one year and not later than five years	1	81
Later than five years	-	-
Total operating commitments	**59**	**624**

ESR leases land, buildings, equipment and vehicles. There is a renewal option in respect of the land and building lease. There are no renewal options or options to purchase in respect of vehicles held under operating leases.

ESR has a number of standard operational agreements for the purchase of materials and consumables that have both fixed and variable components, some of which extend beyond one year.

17. Related party transactions and key management personnel

Related party transactions

ESR is a wholly owned entity of the Crown. ESR enters into transactions with other Crown entities and Government departments.

Related parties include the entities disclosed in note 15. There have been no transactions with these related parties in the year ended 30 June 2016 (30 June 2015: nil).

The following transactions were carried out with related parties:

- There are close family members of key management personnel employed by ESR. The terms and conditions of those arrangements are no more favourable than those ESR would have adopted if there were no relationship with key management personnel.
- Fees paid to Directors during the year were $178,250 (30 June 2015: $189,750). Directors' fees of $7,667 were payable at balance date (30 June 2015: Nil).

No provision has been required, nor any expense recognised, for impairment of receivables from related parties.

Key management personnel compensation

Key management personnel comprise the Chief Executive Officer, members of the Senior Leadership Team and the Directors. Key management personnel compensation is disclosed below.

Group	2016 $'000s	2015 $'000s
Salaries and other short-term employee benefits	1,877	1,471
Termination benefits	-	74
Other long-term employee benefits	16	31
Directors' fees	178	190
Total key management personnel compensation	**2,071**	**1,766**

18. Financial instruments by category

Group	Loans and receivables $'000s	Fair value through profit or loss $'000s	Total $'000s
30 June 2015			
Assets as per balance sheet			
Trade and other receivables excluding prepayments	9,993	-	9,993
Cash and cash equivalents	7,702	-	7,702
Total	**17,695**	**-**	**17,695**

	Financial liabilities at amortised cost $'000s	Fair value through profit or loss $'000s	Total $'000s
Liabilities as per balance sheet			
Finance lease liabilities	321	-	321
Derivative	-	161	161
Employee benefits	3,426	-	3,426
Trade and other payables	10,367	-	10,367
Total	**14,114**	**161**	**14,275**

		Loans and receivables $'000s	Fair value through profit or loss $'000s	Total $'000s
30 June 2016				
Assets as per balance sheet				
Trade and other receivables	6	6,893	-	6,893
Derivative		-	134	134
Cash and cash equivalents		12,364	-	12,364
Total		**19,257**	**134**	**19,391**

		Financial liabilities at amortised cost $'000s	Fair value through profit or loss $'000s	Total $'000s
Liabilities as per balance sheet				
Finance lease liabilities	9	508	-	508
Employee benefits		4,119		4,119
Trade and other payables	7	7,256	-	7,256
Total		**11,883**	**-**	**11,883**

19. Financial risk management

ESR's activities are exposed to a variety of financial risks: market risk, credit risk, liquidity risk, cash flow risk and fair value interest-rate risk. ESR's overall risk management programme focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on ESR's financial performance. The policies approved and financial instruments being utilised at balance date are outlined below.

a) Market risk

In accordance with its Treasury Management Policy, ESR uses derivative financial instruments to economically hedge its exposure to foreign exchange risks from its operational, financing and investment activities. These derivatives are classified at fair value through profit or loss, and gains and losses are recognised in the statement of profit or loss and other comprehensive income.

i) Foreign exchange risk

Foreign exchange risk occurs as a result of transactions denominated in a currency other than ESR's functional currency of New Zealand dollars. Currencies commonly transacted in, and giving rise to foreign exchange risk include the United States dollar, Australian dollar, Euro and the Pound sterling. ESR is subject to foreign currency risk through its trade receivables and trade payables balances.

Where a material foreign currency balance is entered into (exposures equivalent to greater than New Zealand dollar $100,000), ESR is required by the Treasury Management Policy to hedge its exposure to the currency through the use of forward exchange contracts.

ESR held one forward exchange contract of US $1,110,779 at 30 June 2016 (30 June 2015: US $1,267,518).

The carrying amounts of the Group's trade and other receivables denominated in foreign currencies are:

Group	2016 $'000s	2015 $'000s
US dollar	984	264
Euro	111	119
Australian dollar	71	49
Pound Sterling	51	-
Others	-	297
	1,217	**729**

The carrying amounts of the Group's trade and other payables denominated in foreign currencies are:

Group	2016 $'000s	2015 $'000s
Australian dollar	128	265
US dollar	32	83
Euro	14	-
Others	3	22
	177	**370**

ii) Interest rate risk

As at reporting date, ESR is subject to interest rate risk through the holding of cash and cash equivalents. ESR uses a mixture of call and short-term deposit investment accounts to hold excess funds. Available interest rates are monitored to ensure the best return on cash.

When ESR is required to draw down its credit facilities, interest rate risk is managed through entering into a predetermined mixture of floating and fixed rate borrowings, depending on the level of borrowings entered into. ESR does not have any borrowings as at 30 June 2016 (30 June 2015: Nil).

iii) Market risk sensitivity analysis

ESR is exposed to market risk through the holding of the following financial instruments: cash, trade receivables and trade payables. ESR management has analysed the below sensitivities in market risk factors over a 12 month period:

- proportional foreign exchange rate movement of -10% (depreciation of New Zealand dollar) and +10% (appreciation of New Zealand dollar) against the foreign currencies; and
- a parallel shift of +1%/-1% in market interest rates in New Zealand.

If these movements were to occur (all other variables held constant), the impact on ESR's reported profit before income tax expense and equity at balance date is:

- foreign currency $104,000 (30 June 2015: $36,000)

- interest rate $108,000 (30 June 2015: $69,000)

b) Credit risk

Credit risk refers to the risk that a counterparty will default on its contractual obligations, resulting in financial loss to ESR. The financial instruments, which expose ESR to credit risk, are principally cash and cash equivalents, and trade receivables.

Bank balances and short-term investments (comprising cash and cash equivalents) are held with New Zealand registered banks in accordance with ESR's Treasury Management policy. The majority of high value trade receivables comprise government entities and therefore the potential risk of default is low. ESR has a Contracts Policy which requires assessment of credit worthiness of potential clients, where the value of the contract is material as defined in the policy.

A provision for doubtful debts is maintained in respect of trade receivables and this is reassessed on a regular basis. No collateral is held by ESR in respect of cash and cash equivalents, and trade receivables as at 30 June 2016 (30 June 2015: nil)

The carrying amount of financial assets recognised in the statement of financial position best represents ESR's maximum exposure to credit risk at the reporting date.

As at 30 June 2016 the trade receivables balance included $4,610,000 (30 June 2015: $7,022,000) owed by entities within, or owned by, the New Zealand Government. It is not believed that there is any material risk of loss with these receivables.

c) Liquidity risk

Prudent liquidity risk management implies the availability of funding through adequate levels of committed credit facilities. Liquidity risk is monitored through the forecasting of cash flows, and ensuring that the committed credit lines in place remain adequate for requirements.

Contractual undiscounted maturity analysis of financial liabilities is presented below:

Group	2016					2015				
	Carrying value $'000s	Less than 1 year $'000s	1-2 years $'000s	2-5 years $'000s	Greater than 5 years $'000s	Carrying value $'000s	Less than 1 year $'000s	1-2 years $'000s	2-5 years $'000s	Greater than 5 years $'000s
Trade payables	7,436	7,436	-	-	-	10,367	10,367	-	-	-
Finance lease liabilities	549	300	224	25	-	335	167	123	45	-
	7,985	**7,736**	**224**	**25**	**-**	**10,702**	**10,534**	**123**	**45**	**-**

d) Fair values

The carrying value of financial assets and liabilities recorded in the financial statements approximate their fair values.

Fair value is generally based on the contracted amount payable/receivable of financial assets and financial liabilities, being the amount for which the financial instrument is to be exchanged. Fair value includes the impact of any assessed impairment of the financial instruments – please refer to the statement of significant accounting policies for details of each financial instrument and their recognition criteria.

e) Capital risk management

ESR's objectives when managing capital are to maintain financial stability, achieve sustainable growth and to realise its strategic goals and targets, all within the risk appetite of its shareholder and management.

In line with Government requirements, ESR monitors its capital structure through the return on equity and gearing ratios. Government provides ESR with guidelines with the expectation that an appropriate average return is achieved over time, rather than requiring that ESR meet the specified targets annually.

Each year ESR internally sets return on equity and gearing ratio targets, bearing in mind the overall results expected by Government. The ratios are reported in the Statement of Corporate Intent.

The return on equity and gearing ratios as at 30 June 2016, and 30 June 2015 were as follows, along with the relevant annual targets set by ESR.

Group Return on equity ratio	2016 $'000s	2015 $'000s
Profit/(loss) for the year	3,842	2,583
Average equity	**43,069**	**39,857**
Actual ratio	**8.9%**	**6.5%**
Target ratio	**5.5%**	**4.8%**
Gearing ratio		
Net debt		
Finance lease liabilities - current	258	153
Finance lease liabilities - non current	250	168
	508	**321**
Equity	**44,990**	**41,148**
Actual ratio	**1.1%**	**0.8%**
Target ratio	**0.5%**	**0.0%**

20. Contingent liabilities

The directors are satisfied that there are no claims outstanding that would have a material impact on ESR's financial position, as at 30 June 2016 (30 June 2015: Nil).

21. Subsequent events

There were no events subsequent to reporting date that require disclosure in the financial statements.

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Presented to the House of Representatives pursuant to section 44 of the Public Finance Act 1989.

The Institute of Environmental Science and Research Limited (ESR) is a Crown research institute. It was incorporated in July 1992 and is wholly owned by the New Zealand Government. The two shareholding ministers appoint a Board of Directors to govern the organisation. ESR has science centres in Auckland, Wellington (Porirua and Wallaceville) and Christchurch.

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