

DAYS



# KEEPING PEOPLE SAFE AND HEALTHY THROUGH SCIENCE.

## CONTENTS

<b>01</b> Our purpose and role	<b>26</b> Contribution to the national science system
<b>02</b> Chair and Chief Executive's report	<b>27</b> Our people
<b>04</b> Our work	<b>31</b> Core funding projects
<b>06</b> Our outcomes and impacts	<b>33</b> Performance measures
<b>08</b> Outcome 1: Health	<b>35</b> Financial statements
<b>12</b> Outcome 2: Forensic science	<b>39</b> Independent auditor's report
<b>16</b> Outcome 3: Food safety	<b>62</b> Directory
<b>21</b> Outcome 4: Water and the environment	<b>63</b> ESR science centres
<b>24</b> Our strategy	

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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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ESR is a Government-owned Crown research institute that delivers world-class knowledge, research and laboratory services to help New Zealand get the most out of its investment in science and innovation.

We use the power of science to help our partners and clients solve complex problems and protect people and products in New Zealand, and around the world.

It's our independent scientific advice and services that are behind the decisions that safeguard people's health, protect our food-based economy, improve the safety of our freshwater and groundwater resources and provide the justice sector with expert forensic science.



It's been a challenging and successful year of achievement for ESR. Our scientific expertise has helped deal with a number of nationally significant issues, ranging from helping New Zealand's beef export industry to maintain access to key markets to playing a key role in the all-of-government response to the infant formula 1080 contamination threat.

Our team of 379 dedicated staff is committed to keeping people safe and healthy through science. While each member of our team plays a unique role, they are unified in their commitment to providing independent scientific advice that supports our four outcomes: health, forensic science, food safety, and water and the environment.

For our health outcome we reported on notifiable diseases, researched antimicrobial resistance and researched a wide range of diseases for the Ministry of Health, including rheumatic fever, meningitis and influenza. This year we also began a serosurvey of 1,800 Aucklanders as part of a five-year international project studying the effects of influenza on a population. The serosurvey involved taking blood samples before and after the winter 'flu season to see whether patients contracted influenza and developed immunity by the end of the season. The study is considered a world first in trying to assess the full disease burden of influenza in one population at one time. The findings of this research will provide researchers and policy-makers with new information that may reduce the annual impacts of influenza in New Zealand and around the world.

Our forensic scientists provided 24/7 support to New Zealand Police, collecting and analysing evidence to help solve serious crime. We also released the next version of STRmix™, our revolutionary DNA analysis software that is now being used by nearly 30 customers around the world to analyse complex mixed DNA samples.

STRmix™ has been a game-changer in solving crimes here in New Zealand and abroad, and the successful commercialisation of this powerful tool has been key to our return to profitability this year. We are also a world leader in developing 3D scanning technology for use in the justice sector, from police investigations right through to court proceedings.

Our work in food safety supports the Government and the food industry to protect people from foodborne diseases. This year we continued to support the Ministry of Health's response to outbreaks of foodborne illnesses, which included an outbreak of *Yersinia pseudotuberculosis*. Our food safety work also plays an important role in protecting New Zealand's reputation for high-quality food exports. Last year saw the successful commercial release of a biocontrol product developed by our scientists to reduce *Escherichia coli* (*E. coli*) O157 contamination in exported red meat. More than 700,000 doses of our biocontrol product were purchased, ensuring that New Zealand's billion-dollar beef export industry can continue to export to key markets such as the United States.

Clean water is something we almost take for granted in New Zealand, but land-based activities and environmental factors are putting increased pressure on our waterways. We work with government, local councils, iwi, industry and communities to support water quality initiatives. This year we collaborated with Environment

Southland, the National Institute of Water and Atmospheric Research and others to identify the levels of *E. coli* in Southland waterways. The work identified which rivers and streams are unsafe for recreational activities and more importantly helped to identify the sources of pollution to inform future interventions to improve water quality. This work has great potential to be expanded to other local councils and communities.

The outcomes we achieve are a key measure of our success, but generating an appropriate financial return is also essential. This year we are pleased to report a net profit of \$2.6 million after tax, representing a return on equity of 6.5%. Much of the turnaround from last year's loss can be attributed to increased revenue from the commercialisation of our intellectual property.

Our accomplishments come against the backdrop of last year's organisational challenges, which led to a thorough strategic refresh. This year we implemented the first year of our strategic roadmap, which focuses on improving our customer focus, growing ESR through expanded commercial activities, developing our strategy in human genomics, increasing staff engagement and addressing legacy investment in our IT (information technology) systems and property.



The successful execution of our refreshed strategy depends on our working with customers and government agencies in new ways. A good example of this is the screening laboratory we operate in partnership with the New Zealand Customs Service at the Auckland Air Cargo Inspection Facility. The laboratory was opened in August 2014 and provides scientific and investigative expertise at the border. This combination has proven to be an effective tool in preventing the entry to New Zealand of illegal drugs and items that present biosecurity risks.

Our performance against our Statement of Core Purpose was assessed this year through an independent four-year rolling review. The review's findings supported our strategy refresh and have been addressed through our strategic initiatives.

The contributions we have made to our outcomes, improved financial results and successful execution of our strategy would not have been possible without the commitment and support of all ESR staff, the senior leadership team and the Board.

We would like to acknowledge the guidance of Dr Susan Macken, who stepped down as Chair this year after leading ESR through the strategic refresh, and would also like to acknowledge Patricia Schnauer, who completed her term on the Board this year.

**Denise Church** QSO  
Chair

**Dr Keith McLea**  
Chief Executive

## OUR WORK

We work in a wide and diverse range of areas including crime scene investigation, workplace drug testing, radiation safety and emergency response, biosecurity and public health surveillance, drinking-water surveillance and food safety investigation.

We have a large team of forensic, social, radiation and infectious disease scientists and epidemiologists and are the preferred supplier of scientific services and radiological science services to the Ministry of Health, the sole provider of forensic science to New Zealand Police and the lead science advisor to the Ministry for Primary Industries (MPI).

Our expertise, experience and networks are trusted to solve complex problems, collate and analyse huge amounts of data and manage a range of critical national science assets and facilities for New Zealand, including the Notifiable Diseases Database, the New Zealand Reference Culture Collection and the National DNA Profile Databank.

All of the activities we undertake are within the scope of operation outlined in our Statement of Core Purpose. At right and below is an overview of our science capabilities that contribute to our four outcomes: health, forensic science, food safety, and water and the environment.

### **Hs** Health science

We offer world-class reference laboratory services and expertise for the detection and detailed characterisation of bacteria and viruses that can cause infectious diseases.

Using our reference laboratory information, the Notifiable Diseases Database and the information collected from laboratories, our internationally renowned experts collect, collate and analyse data and intelligence on a wide range of diseases present in New Zealand, including influenza, gastroenteritis, hepatitis and meningitis.

This extensive surveillance allows us to identify and characterise individual strains and cases of disease, track any changes in them, and detect outbreaks and assess the effectiveness of control measures, including vaccines.

We also collaborate on research projects with government agencies, tertiary institutes, national and international health services, and international organisations.

### **Rs** Radiation science

Our experts work across a wide range of sectors to provide advice on and services and research capabilities in public, occupational and medical exposure to radiation, performance assessments of radiation protection equipment, and measurements of naturally occurring, low-level radiation and radioactivity.

Through our National Centre for Radiation Science we help employers to protect their employees through specialised and tailored training courses and equipment calibration. Our Personal Dosimetry Service measures and records the ionising radiation doses to which employees are exposed in the workplace to ensure that recommended dose limits are not exceeded.

We have connections and strong working relationships with global authorities and agencies and work with both private and public sector customers to help them solve their problems and protect the production and export of their products.

### **Sg** Social science

We have expertise and experience in assisting decision-makers to address challenging or intractable problems that involve high levels of complexity and uncertainty.

Our multidisciplinary team has expertise in public and environmental health, bicultural research, environmental policy, community resilience, and systems thinking and modelling. With our breadth of knowledge we are able to provide our customers with a 'bigger picture' understanding of a wide range of issues.

**Wt**  
Workplace  
drug  
testing

We offer internationally accredited workplace drug testing. We can work with customers from many sectors to test for drugs that impair performance including alcohol, illicit drugs and certain legal drugs. Our work in this area helps employers to determine whether individual employees' ability to carry out their duties safely is being compromised, which could present a danger to the employees, their work colleagues and the public.

We also support the justice sector by providing drug testing services to the courts and prison system.

**Fs**  
Forensic  
science

Our expert crime scene scientists, drug chemists, physical evidence specialists, toxicologists and biologists are equipped with effective technology and knowledge and work behind the scenes to support New Zealand's justice and security sectors.

They analyse human tissue, crime scene trace evidence, bodily samples and other evidential material, and our comprehensive knowledge of the presence and interpretation of DNA is used across the country and around the world.

We provide services to New Zealand Police and other government agencies, including the New Zealand Customs Service and the New Zealand Defence Force. We also undertake forensic work for other parties including lawyers, commercial companies and private individuals.

**Fo**  
Food  
science

Our expertise, relationships and track record stretch across every food production sector in New Zealand. We work across bacterial, viral, chemical, physical and radiological hazards in food, which enables us to provide assurance to customers for their food products and reputations in New Zealand and around the world.

We have extensive national and international collaborative networks and access to a suite of International gold standard tests to help find out how, where and when food contamination has happened, as well as identify the types of contaminant and their sources.

**Ws**  
Water  
science

We work in partnership with key stakeholders, including government, industry, the community and Māori, to improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes.

We aid and support health authorities, local and central government, industry and communities by supplying scientific advice and expertise on the management of drinking-water, groundwater, recreational waters and wastewater.

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

## OUR OUTCOMES AND IMPACTS

### HEALTH

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

#### OUR IMPACTS

- ▶ The burden of illnesses and communicable diseases is reduced
- ▶ Ability to respond to communicable disease outbreaks is improved
- ▶ Human biosecurity risks are reduced
- ▶ Safer medicines through pharmaceutical testing
- ▶ Risks to human health from radiation are mitigated
- ▶ Safety is improved through workplace drug testing
- ▶ Decisions on complex public and environmental health issues are better informed

### FORENSIC SCIENCE

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

#### OUR IMPACTS

- ▶ Criminal investigations are supported by independent, reliable evidence
- ▶ Better forensically informed court decisions
- ▶ Findings by coroners are supported by reliable toxicology
- ▶ Drug dependency of offenders is reduced

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## **FOOD SAFETY**

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

### **OUR IMPACTS**

- ▶ New Zealand's reputation for high-quality food exports is maintained and enhanced
- ▶ Foodborne risks to human health are reduced
- ▶ Episodes and outbreaks of foodborne illnesses are diagnosed and mitigated

## **WATER AND THE ENVIRONMENT**

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

### **OUR IMPACTS**

- ▶ New Zealanders have assurance that drinking-water is safe
- ▶ Improvements in river, stream and groundwater quality are informed by scientific analysis
- ▶ Safer use of biowastes
- ▶ Environmental threats to human health from chemicals, microbes and physical contaminants are mitigated

1.3 million

VACCINE DOSES DISTRIBUTED  
FOR NATIONAL IMMUNISATION

6,415

SUPERBUGS TESTED IN  
THE ANTIBIOTIC  
REFERENCE LABORATORY

15,045

CASES OF NOTIFIABLE  
DISEASES REPORTED

71.8%

OF DISEASE OUTBREAKS TRACKED  
TO THE CAUSAL AGENT (PATHOGEN,  
TOXIN OR CHEMICAL)

40

MEDICINES TESTED FOR  
COUNTERFEIT OR  
ADULTERATED  
PRODUCTS

**OUTCOME 1**

**HEALTH**

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



## OUTCOME 1: HEALTH



We are at the forefront of protecting New Zealanders against new and emerging diseases. We provide the Ministry of Health with an overview of the levels of infectious disease in New Zealand and help respond to disease outbreaks, pandemics and general health concerns, including social issues such as family violence.

We provide health science services to government health and biosecurity agencies, district health boards and local government and play a role in the 'Healthier Lives' National Science Challenge.

### REDUCING THE BURDEN OF ILLNESS AND DISEASE

We provide surveillance of infectious diseases through our agreement with the Ministry of Health. Our work this year focused on influenza, rheumatic fever, hepatitis, meningitis, reporting notifiable diseases and researching antimicrobial resistance. As part of our contract with the Ministry of Health we produced the *Notifiable Diseases in New Zealand: Annual Report 2014*, which provided an overview of the current state of notifiable diseases in New Zealand.

Each year our research helps authorities to plan an effective response to the influenza virus. We lead the Southern Hemisphere Influenza Vaccine Effectiveness Research and Surveillance (SHIVERS) project. This multidisciplinary research project includes the Auckland District Health Board, Counties Manukau District Health Board, University of Otago, University of Auckland, US Centers for Disease Control and Prevention and World Health Organization Collaborating Centre at St. Jude Children's Research Hospital in Memphis, Tennessee.

We are working with the New Zealand Blood Service on a Ministry of Health-funded investigation of the prevalence of hepatitis E virus (HEV) in New Zealand blood donors. There is increasing scientific and regulatory interest internationally in the potential risks of transfusion-associated HEV, particularly for highly susceptible recipients, including transplant patients and pregnant women.

This year, our research into meningitis included integrated bioinformatics analysis and functional analysis to improve our understanding of the household transmission of meningococci. This work may have significant implications for protecting people from this potentially life-threatening illness.

The 'Virus Hunters' are a team of ESR researchers who work to identify undiagnosed diseases that have been placed in the too-hard basket. Our researchers

draw on next-generation DNA-sequencing technology to unravel unidentified samples from patients who remain undiagnosed. Virus hunter Dr Richard Hall confirmed New Zealand's first reported case of human parechovirus 3 (HPEV3) and published the findings in the *Journal of Clinical Microbiology* in January 2015. The virus is known to trigger severe diseases that could be fatal, including blood infections in newborn babies, acute inflammation of the brain, and even paralysis. The discovery was made as part of a Health



### CHANGING HOW WE PREPARE FOR 'FLU SEASON

The aim of the five-year research project SHIVERS is to identify ways to reduce the burden of influenza – in New Zealand up to 480,000 people will contract influenza in a single season and up to 1,500 will need to be hospitalised.

New Zealand's role in this international project is particularly important as our 'flu season often predicts what will happen in the Northern Hemisphere. The project is focused on two population-based surveillance systems (one hospital based and one community based) that cover 838,000 residents in the Auckland District Health Board and Counties Manukau District Health Board regions.

The work of the SHIVERS team this year included a serosurvey that involved about 1,800 participants. The study is considered a world first in trying to assess the full disease burden of influenza in one population at one time. Findings from this study will help New Zealand and other countries to better prepare for seasonal influenza control and pandemics.

Research Council of New Zealand-funded study delving into unsolved outbreaks of human gastroenteritis. Health authorities were notified to build awareness and assist in future policy development. This year we also continued our investigation of viral metagenomics and the identification of novel viral pathogens relating to animal and human health.

We work closely with the Ministry of Health on the national response to the threat of antimicrobial resistance among human pathogens. During the year we researched the antimicrobial resistance of *Staphylococcus aureus*, rheumatic fever and *Campylobacter*. Internationally, we are in discussions with the Secretariat of the Pacific Community on ways to assist with the surveillance of antimicrobial resistance in the Pacific Islands. We are also working with PHARMAC on a Ministry of Health-funded study to assess national trends in antimicrobial consumption.

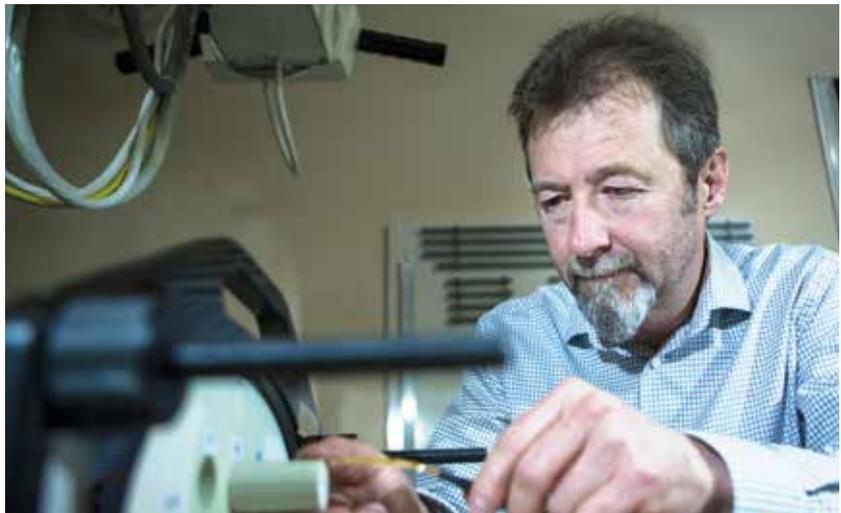
#### **REDUCING HUMAN BIOSECURITY RISKS**

We support the Ministry of Health and other government agencies in protecting New Zealanders from human biosecurity threats that range from Ebola to avian flu. We work with other scientists in New Zealand and around the world to build our capabilities in preventing, detecting and rapidly responding to human biosecurity threats.

This year we were involved in a joint project with MPI to upgrade the bio-containment laboratory at Wallaceville in Upper Hutt. As the only approved laboratory for containing and diagnosing serious, high-risk veterinary diseases, the laboratory ensures that New Zealand can confirm safely and rapidly the absence or presence of an exotic disease with sophisticated diagnostic tests to help us control the spread of the disease and protect agriculture and human health.

#### **REDUCING THE RISK OF RADIATION**

We protect New Zealand's people, environment and industries by supporting the safe and beneficial use of radiation and radioactive materials. We provide training in medical radiation protection, radiation incident and emergency response for first responders, the safe transport of radioactive material, and laser safety.



We test crop radiation levels to ensure that food produced for human and animal consumption is within safe limits for both national and international markets. We also provide irradiation services and this year we were involved in a research project focused on the irradiation of taro exported from the Pacific Islands. An extension of this research is our work on exploring the benefits of using ionising radiation in place of chemical methods.

We helped the International Atomic Energy Agency to deliver a training course aimed at helping Pacific Island nations to manage more effectively the import, export and transport of radioactive materials needed for medical and industrial applications.

#### **ASSISTING DECISION-MAKERS WITH COMPLEX PUBLIC AND ENVIRONMENTAL HEALTH ISSUES**

This year Superu (the Social Policy Evaluation and Research Unit, formerly the Families Commission) selected ESR to assess the mix and effectiveness of multiple interventions at a system level to prevent family violence. This work supports the Government's focus on getting better outcome data and evidence to support its investment decisions in dealing with complex social issues. It also builds on our research that led to two reports on family violence, which fed into *The People's Blueprint*, a report that outlines a vision for a new system to reduce New Zealand's high family violence rate.

#### **SAFER MEDICINES THROUGH PHARMACEUTICAL TESTING**

Our pharmaceutical team contributed to the ongoing safety of medicines and other therapeutic products on the New Zealand market through the provision of testing services benchmarked against international quality and safety standards.

Working primarily with the Ministry of Health, the pharmaceutical team performs routine testing of medicines as well as complaint investigations, such as those based on manufacturing failures and quality concerns, and therapeutic products suspected of being counterfeit or adulterated medicines.

#### **IMPROVING SAFETY THROUGH WORKPLACE DRUG TESTING**

We work with customers from many sectors to test for drugs that impair performance, including alcohol, illicit drugs and certain legal drugs. Our testing can indicate whether an employee's ability to carry out their duties safely is compromised, which may present a danger to the employee, their work colleagues and the public.

This year we made a significant investment in both people and equipment in our workplace drug testing services to improve the scope and quality of the services offered. The investment will provide New Zealand businesses with access to world-class drug testing services to ensure the safety of employees and the public.

19,597  
DNA TESTS CONDUCTED

71%  
OF DNA SAMPLES FROM  
CRIMES LINKED TO A PERSON

29%  
OF DNA SAMPLES FROM CRIMES  
LINKED TO OTHER CRIMES

2,434  
TOXICOLOGY CASES

89  
PARTICIPANTS IN THE  
ALCOHOL AND OTHER  
DRUG TREATMENT  
COURT REGULARLY  
TESTED

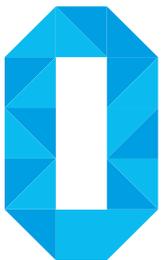
OUTCOME 2

# FORENSIC SCIENCE

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



## OUTCOME 2: FORENSIC SCIENCE



Our forensic science services are used throughout the New Zealand justice system. We are the sole forensic science provider to New Zealand Police. We also provide services for other government agencies including the Department of Corrections and the New Zealand Customs Service, along with other parties including lawyers, commercial companies and private individuals.

Our expert crime scene scientists, drug chemists, physical evidence specialists, toxicologists and biologists are equipped with effective technology and knowledge to support New Zealand's justice and security sectors. Our scientists analyse and interpret forensic evidence from the crime scene to the court room. Our forensic laboratories are accredited by the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors.

### **SUPPORTING CRIMINAL INVESTIGATIONS WITH RELIABLE EVIDENCE**

We have taken a strategic approach to building a forensic programme based on robust, independent scientific principles. We provide science services and are often called on to give forensic testimony, including in coronial cases.

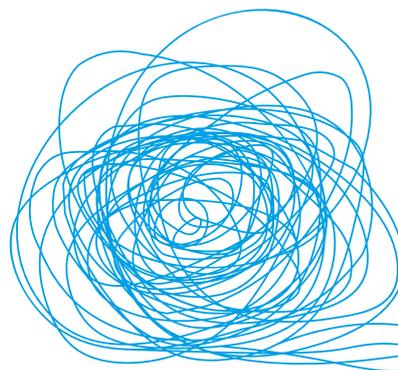
We are a world leader in using 3D scanning technology to capture crime scene images that allow police investigators, judges and jurors to return to crime scenes virtually.

Our long-term commitment to the forensic programme was highlighted this year as we celebrated the 20th anniversary of the creation of the National DNA Profile Databank. New Zealand was the second country in the world to create a DNA profile databank. We now have an international reputation for DNA matching, with 71% of all crime samples successfully linked to individuals, and 29% of samples linked to other crimes.

We continue to develop our capabilities in emerging research disciplines and this year we researched methods for using genome sequencing as an additional tool to support criminal investigations. In the future this research will enable us to identify distinguishing characteristics of suspects from DNA samples, leading to the earlier apprehension of alleged offenders and the earlier exclusion of those who are innocent.

Other research has focused on developing new methods to use degraded ribonucleic acid (RNA) for the identification of tissue type. A patent relating to the analysis of messenger RNA (mRNA) has been filed and we have signed a confidentiality agreement with a large US sequencing firm with the goal of forming a joint arrangement to develop the technology.

Collaboration is an importance aspect of our research and is evident in the partnerships developed with New Zealand universities and



## **STRMIX™ RESOLVE MORE DNA MIXTURES.**

### **STRmix™ – AN INNOVATIVE STEP AHEAD FOR DNA ANALYSIS**

We worked with Forensic Science South Australia to develop STRmix™, which is used by DNA reporting analysts for the interpretation of complex mixed DNA samples. The first commercial version of STRmix™ was made available in January 2014 and attracted significant international attention. This year a new version of the software was released and exceeded sales targets.

STRmix™ has already been used to solve a number of crimes in New Zealand, Australia and the US.

STRmix™ was a finalist in this year's KiwiNet Research Commercialisation Awards, which recognise and celebrate commercialisation success within New Zealand's universities and Crown research institutes.



other research institutes, and international research projects undertaken with US universities and funded through the US National Institute of Justice.

Partnerships and knowledge sharing are keys to success and reflected in our ongoing efforts. For example we worked with the New Zealand Customs Service to open a screening laboratory at the Customs Air Cargo Inspection Facility at Auckland Airport this year.

We also share our forensic expertise with other jurisdictions. This year we provided logistic support for the Forensic Capacity Training Workshop for Pacific Island Countries that was hosted by the United Nations Office on Drugs and Crime. Attendees from 12 Pacific Island police agencies also visited our Auckland facilities.

Internally, we are replacing our existing forensic laboratory information system with STARLIMS Forensic which will allow more efficient work flows and reduce our reliance on paper records, leading to improved turnaround times for our customers.

#### **SUPPORTING CORONIAL INVESTIGATIONS**

We provide scientific support to Coronial Services of New Zealand. Coroners have wide powers to examine evidence gathered on deaths where doctors cannot certify the causes of death. Based on the coroners' findings recommendations may be made on ways to prevent future deaths. Our services include a comprehensive forensic toxicology service, providing other forensic scientific support and forensic testimony as required.

#### **REDUCING DRUG DEPENDENCY**

This year we continued to support the Alcohol and Other Drug Treatment Court (AODTC) pilot project by providing drug testing services. This project provides treatment and rehabilitation services to about 100 offenders who would otherwise be serving custodial sentences.

7,700  
TESTS PERFORMED FOR  
BILLION-DOLLAR BEEF  
EXPORT INDUSTRY

868  
RADIATION-FREE CERTIFICATES  
ISSUED FOR FOOD EXPORTS

3,675  
FOOD AND BEVERAGE SAMPLES  
EXAMINED FOR CHEMICAL AND  
MICROBIAL HAZARDS

204  
SUSPECTED EPISODES OF FOOD  
POISONING INVESTIGATED

54  
FOOD FORENSIC  
INVESTIGATIONS  
CONDUCTED

OUTCOME 3

# FOOD SAFETY

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



## OUTCOME 3: FOOD SAFETY



We work with the food industry and regulators to help meet and exceed food safety standards set by importers of New Zealand products. We also help assure New Zealanders about the safety and integrity of the food they eat.

We are a key participant in the development of the New Zealand Food Safety Science and Research Centre. We are also a member of FoodHQ, the international centre for collaborative food research.

### MAINTAINING NEW ZEALAND'S REPUTATION FOR HIGH-QUALITY FOOD EXPORTS

We provide services to food companies and industry associations and are the specialist science provider to commercial analytical laboratories.

Building on our STECleaNZ research, we are also looking at ways to use biocontrols to reduce mastitis-causing pathogens in cows. Mastitis is a potentially fatal mammary gland infection that is one of the most common diseases to afflict dairy cows worldwide. The disease is also one of the most costly to the dairy industry.

Our 'Prove It' project has provided MPI with support for investigations into food quality, specifically identifying and confirming the species found in meat products. IANZ accreditation (ISO 17025) has been awarded for this determination testing. We are now looking at ways to commercialise the tests.

To support New Zealand's olive oil industry we have developed preliminary markers to differentiate New Zealand olive oils from imported products.



### FOOD SAFETY – HELPING INDUSTRY MEET EXPORTERS' REQUIREMENTS

Last year saw the successful commercial release of STECleaNZ, a biocontrol product that reduces *E. coli* O157 contamination in red meat. Because of the health risks involved, meat that carries *E. coli* strains (collectively known as STEC) cannot be exported to key markets, including the US, which is our largest market for beef and veal.

Our biocontrol product provides confidence to New Zealand beef farmers and the markets to which they export. More than 700,000 doses of STECleaNZ were purchased during the 2014 season.

Through the Meat Industry Research and Innovation Fund, ESR researchers are already working to extend STECleaNZ to include all STEC-strain types that are prohibited for export.

## REDUCING FOODBORNE RISKS TO HUMAN HEALTH

We recently renewed our contract as a preferred provider of core food safety science services to MPI. Our services include projects relating to chemical, microbiological, physical and radiological hazards in food. Underpinning these projects is a risk analysis programme, providing risk profiles, burden of disease estimates and quantitative risk modelling capability to MPI. A highlight of 2014/15 was our risk analysis contribution to the government consultation on changes to raw milk legislation in New Zealand. We also provide scientific services to the Ministry of Health in relation to food poisoning investigations.

Our bioinformatic capabilities are being enhanced within the food programme, as well as organisation-wide, through external training in the use of bioinformatic tools. This area of study has aided the development of a world-leading, rapid (six-hour), sensitive and cost-effective system for subtyping major foodborne and waterborne pathogens relevant to all food sectors. The resultant test is now commercially available through a third-party European biotechnology company, with royalties payable to ESR. In New Zealand the test has been used to identify rapidly two outbreaks and is currently being used by the poultry industry to investigate a newly emerging issue of health and economic importance. A staff member is now studying for a PhD using bioinformatics to continue the development of new tools for investigations of human bacterial gastroenteritis.

This year we worked with the Ministry of Health to establish the New Zealand Microbiology Network to discuss national microbiological issues, which are often associated with the consumption of contaminated water and food products. The network is managed by ESR and chaired by the Ministry of Health.



## RESPONDING TO FOOD SAFETY ISSUES

Last year saw the biggest outbreak of *Yersinia pseudotuberculosis* in New Zealand to date. More than 70 people were hospitalised with symptoms related to the illness. Our Enteric Reference Laboratory team and Health Intelligence team were crucial in the identification of and response to the outbreak, working with both the Ministry of Health and MPI to confirm cases, identify potential sources and identify ways to manage the problem.

We operate an outbreak surveillance system on behalf of the Ministry of Health and coordinate the investigation of disease outbreaks of national importance, particularly those involving more than one health district. This involves identifying

pathogens, tracing the sources of contaminated products and advising on product recalls. We also provide expert support and testimony; for example this year we continued to support prosecutors for an outbreak of *Listeria monocytogenes* in 2012.

An emerging issue in food safety is the potential for deliberate food contamination. We have been part of the government and industry response to a threat concerning the contamination of infant and other milk-powder-based formula with 1080. We have assisted MPI and New Zealand Police in sampling and testing products referred to us from the police under an agreed response protocol.

659

REGISTERED DRINKING-WATER  
ZONES SUPPORTED TO MEET  
REGULATORY REQUIREMENTS

2,920

TESTS TO IDENTIFY WATER  
CONTAMINATION SOURCES

4,064

WELLS SUPPLIED DATA FOR  
ANALYSIS OF GROUNDWATER  
DE-NITRIFICATION

185

WELLS TESTED FOR  
PESTICIDE LEVELS

10

COLLABORATORS IN THE  
CENTRE FOR INTEGRATED  
BIOWASTE RESEARCH

**OUTCOME 4**

# **WATER AND THE ENVIRONMENT**

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



## OUTCOME 4: WATER AND THE ENVIRONMENT



We support health authorities, local and central government, industry and communities by supplying scientific advice and expertise on the management of drinking-water, groundwater, recreational waters and wastewater.

Our work includes the surveillance and reporting of drinking-water quality, scientific advice on health and environment public policy, research on water quality 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.

### SUPPORTING SAFE DRINKING-WATER

We prepared the *Annual Review of Drinking-water Quality New Zealand* for the Ministry of Health. This report provided an analysis of the state of drinking-water in New Zealand and progress towards the Ministry of Health's goals for increasing compliance with standards.

We have a number of strong relationships with Pacific countries and aid agencies. This year we signed a three-year contract with UNICEF to deliver a Water, Sanitation and Hygiene (WASH) health project for schools in Kiribati. The aim of the project is to improve access to WASH facilities in the outer islands of Kiribati.

### IMPROVING THE SAFETY OF RIVERS, STREAMS AND GROUNDWATER

Our groundwater research team looks at land-use issues and how they affect groundwater quality. Much of our groundwater research is targeted directly at answering questions or providing scientific solutions to address groundwater pollution, such as nitrate contamination from intensified farming and microbial contamination from land-based effluent disposal practices.

We play a leading role in the 'Our Land and Water' National Science Challenge and are involved in the 'New Zealand's Biological Heritage' National Science Challenge. At the national level we lead the Government-funded Groundwater Assimilative Capacity

project, which is evaluating the capacity of groundwater systems to absorb nitrogen and microbial inputs leached from the land.

We are recognised for our groundwater modelling methodologies, and are providing advice to several regional councils as well

as regions in the Pacific. We are currently developing a microbial early warning system to rapidly assess groundwater health and provide information on potential contaminants.



### CLEANER RIVERS AND STREAMS – SUPPORTING LOCAL COUNCILS

This year we collaborated with Environment Southland scientists, the National Institute of Water and Atmospheric Research and others to determine the levels of *E. coli* in Southland waterways. *E. coli* is an indicator for other pathogens, including Campylobacteriosis, Cryptosporidiosis and Giardiasis. The work has helped Environment Southland to notify the public of areas that are not suitable for recreational activities and develop a plan of action to improve the overall health of its waterways. We are currently working with a number of other local councils to develop similar research projects to support their planning and policy work.

We are also working with Environment Southland to evaluate sources of faecal contamination in surface water within its region. This project builds on work we have done within the Ministry of Business, Innovation and Employment-funded Clean Water Production Land contract and supports Environment Southland to establish a science base for limit setting for freshwater management in response to the National Policy Statement for Freshwater Management and the New Zealand Coastal Policy Statement.

We invested core funding in the development of a database of organisms present in pristine and contaminated groundwater systems. We will maintain the database and assist in identifying and managing unwanted organisms in New Zealand groundwater systems.

#### **RESEARCHING ENVIRONMENTAL HAZARDS AND WASTE**

We lead CIBR, which provides targeted research and advice on environmental hazards and waste to improve how New Zealanders use and manage natural resources. CIBR provides the science that underpins the development of national guidelines for sustainable waste. It also provides advice on and peer reviews of human health impacts for resource consent applications and district planning with respect to land applications of waste. An example of this is the organic waste guidelines currently under development.

Our work includes developing monitoring and reporting programmes, applying bacterial and viral tracers to mark and follow effluent plumes, and conducting microbial risk assessments on discharges. We work with regional and district councils to provide the biophysical, social, cultural and economic science to facilitate sustainable biowaste management.

A few examples of local council projects undertaken this year are:

- A project to assess waste processing technologies such as vermicomposting to improve biowastes' quality, reduce their risks and enhance their reuse as soil fertiliser or amendment. CIBR is applying this science to assist the Kāpiti Coast District Council to reduce the amount of biowaste that goes to its landfill
- A project to identify the sources of faecal contamination in Christchurch city waterways. The findings will be used to guide public health messages for waterway users. The project is jointly funded by Environment Canterbury, Christchurch City Council and the Ministry of Health

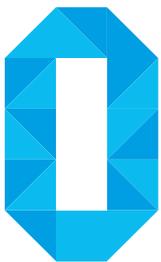


- A contract through Waimakariri District Council to conduct additional work to assist the council in resolving problems with the effectiveness of its wastewater treatment system.

#### **SUPPORTING CONSERVATION**

We invested core funding to develop a description of a possible human *E. coli* strain causing the cloacitis condition in the endangered kākāpō. This condition has been observed in several kākāpō and can promote bacterial growth and cause infertility and potentially death. By identifying the cause of cloacitis we hope to support conservationists in both treatment and preventive management.

## OUR STRATEGY



Our strategy was thoroughly refreshed in 2014 to address the challenges and opportunities in our operating environment. The refreshed strategy will ensure that our organisation is fit for the future – providing better support for our customers, improving the delivery of outcomes, contributing to the national science and innovation system and becoming more financially sustainable.

We will retain our current science capabilities while adopting a more commercially focused business model to improve financial sustainability.

### OUR PLAN AND PROGRESS

Our strategy is a focused change agenda spanning three strategic themes.

- *Strengthen the core: Improving customer orientation, investing in the right mix and calibre of people, infrastructure, systems and processes, optimising productivity and improving performance.*

This year we worked on improving stakeholder engagement and building more meaningful strategic-level relationships with our customers. We focused on improving leadership capabilities and staff engagement across ESR. We made good progress in upgrading our existing forensic laboratory system (STARLIMS), which features a number of improvements such as greater traceability of evidence.

- *Drive growth: Driving growth through commercialisation, forming new partnerships and attracting new international customers for our science services while continuing to provide world-class scientific services to our existing customers. Reducing forecast capital expenditure and releasing capital through real estate growth.*

This year we grew ESR by expanding our commercial activities. Importantly, we are also working to build a deeper understanding of our customers' needs and how we can assist them in achieving their goals.

- *Achieve step change: Using our existing strength in human health to build a national health intelligence platform to support ESR taking an active role in building the infrastructure for human genomics for the benefit of the national health care system.*

STRENGTHEN THE CORE	ACHIEVEMENTS IN 2014/15
<b>High-performing, customer-centric organisation</b>	Initial phase of customer engagement framework and measuring in place Targeted leadership training Financial/Non-financial goals operationalised Senior leadership team restructure appointments finalised
<b>More commercial programmes</b>	Revenue stretch target
<b>Greater focus</b>	Workplace drug testing and pharmaceutical reviews completed
<b>Leverage corporate centre</b>	STARLIMS Forensic New business planning approach New ESR brand IT infrastructure business case progressed
DRIVE GROWTH	
<b>Real estate strategy</b>	Canterbury options explored
<b>Commercial activities</b>	STRmix™ growth Remote Pointcloud Viewer commercialisation progressed
<b>Focus on Health</b>	Delivered additional services to Ministry of Health Initiated a closer relationship with Health Quality and Safety Commission Strengthened relationship with Secretariat of the Pacific Community
<b>Partnerships</b>	Establishing relationships at senior levels with strategic partners
ACHIEVE STEP CHANGE	
<b>Human genomics</b>	Core funding of genomics projects Maintain contact with national and international stakeholders

This year we undertook two omics research projects: investigating transcriptomics and genomics in forensic science. Both projects

may have far-reaching implications for the areas of health and forensic science.

#### FOUR-YEAR ROLLING REVIEW

In 2014 a four-year rolling review assessed our performance against our Statement of Core Purpose. The review findings supported the strategy refresh and have been addressed through our strategic initiatives as discussed above.

#### SCIENCE STRATEGY

This year we also developed the ESR Science Strategy 2015 to 2025. The science strategy is aligned with our strategy refresh and will promote investment in science that delivers outcomes that make a difference to New Zealand.

A key component of the strategy is to better identify the needs of our customers and sectors so that we can develop our science capabilities to provide the maximum impacts and benefits for New Zealand.

#### VISION MĀTAURANGA

We are well placed to deliver to Māori and Māori-related entities. Our work in food safety, for example, has implications for Māori businesses, marae-based activities and individuals. Water science is another area where we have much to offer Māori and where collaboration is key to achieving the best results. Many of our scientists and teams have developed a good reputation for collaboration with Māori, particularly in health- and water-related research projects with strong social science elements. We also ensure that our forensics work follows appropriate tikanga Māori.

This year we conducted a comprehensive stocktake of our current activities that support Vision Mātauranga and identified additional opportunities to conduct research with Māori. Based on the findings of that stocktake, we are developing a Māori Innovation Strategy and associated action plan.



*From left: Professor Bill Denny, ESR Board member; Hon Nicky Wagner, Minister of Customs; Rt Hon John Key, Prime Minister; Carolyn Tremain, Chief Executive and Comptroller of Customs; and Dr Keith McLea, Chief Executive ESR.*

#### CUSTOMS AIR INSPECTION FACILITY – WORKING CLOSELY WITH OUR CUSTOMERS

The joint ESR and New Zealand Customs Service screening laboratory, which operates out of the Customs Air Cargo Inspection Facility at Auckland Airport, came online this year and is a good example of how we are working with our customers in new ways.

ESR staff operate the laboratory and help Customs to detect illicit compounds at the border. The lab examines more than 100 items a month, including powder, crystals, liquids, creams, gels, tablets, capsules, paper tabs and plant material. Having both scientific and investigative expertise at the border has meant a faster and more coordinated response to combat illegal substances coming into the country and has resulted in several significant seizures, including New Zealand's second largest methamphetamine seizure in December 2014.

The facility is the first of its kind in New Zealand and was opened by the Prime Minister in August 2014.

## CONTRIBUTION TO THE NATIONAL SCIENCE SYSTEM



We seek opportunities to build collaborative relationships with Crown research institutes, universities and other research institutions within New Zealand and internationally. We also have strong, long-term partnerships with industry, government and Māori, and work with them to set research priorities that are well linked to their needs.

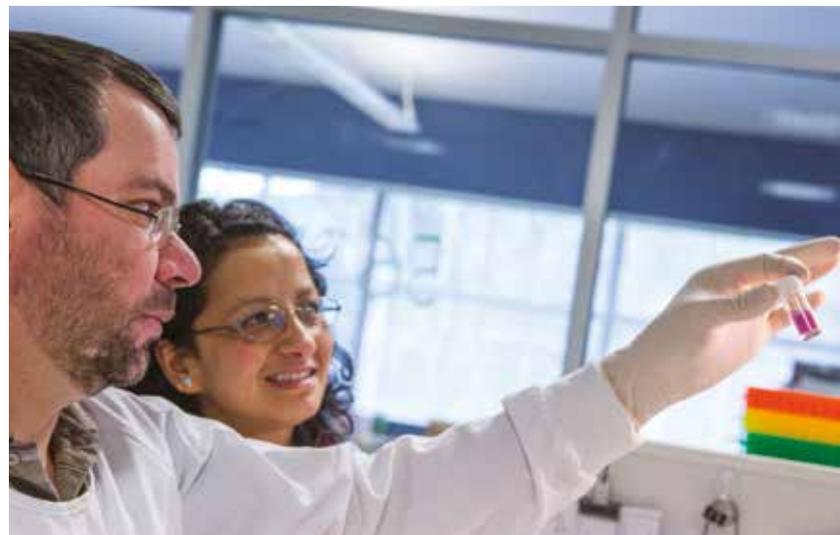
Our science capabilities enable us to be an expert advisor on critical national reference science in health, radiation science and forensics. Our scientists provide specific expertise in a number of areas, including in diseases and microbiology, surveillance systems and epidemiology and forensic science.

We also manage a range of national science assets and facilities that support New Zealand's science system. These include the:

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

### **NATIONAL SCIENCE CHALLENGES**

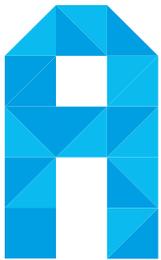
Our research contributes to several of New Zealand's National Science Challenges. We have a leadership role in the 'Our Land and Water' and 'New Zealand's Biological Heritage' National Science Challenges and we contribute to the 'Healthier Lives' National Science Challenge.



# OUR PEOPLE



## OUR PEOPLE



continued focus on people and culture is a critical success factor for us. To meet the science needs of New Zealand, deliver to our customers and increase revenue, we need to attract, retain and develop a high-performing and engaged workforce.

Our future success depends on deepening and broadening our science capabilities.

We remain committed to building and investing in the capabilities of our people so they can continue to deliver high-quality services that are critical to New Zealand. Providing staff with a safe workplace and supporting their wellbeing are also key priorities.

### 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 (66%) and are well represented at all levels and in all roles in our organisation. We have a stable workforce with turnover at 8% for the year ending 30 June 2015.

### 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. This commitment is also reflected in our organisational values, with 'Valuing People' one of the four cornerstone values.

The table on page 30 summarises our activities against the seven key elements of being a good employer.

### PARTNERSHIP FOR QUALITY

We operate a successful Partnership for Quality forum with the PSA and meet several times during the year to discuss issues affecting staff. The forum increases the collective participation of employees through the union and provides a channel through which employees can communicate recommendations or suggestions for 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 1.95 per 100 full-time equivalents (FTEs) 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 continual improvement in health and safety and are working hard to ensure that we will be fully aligned with the new Health and Safety at Work Act when it is introduced.



### INDRA SETIAWAN

While Programme Developer Indra Setiawan works in our IT team, the Forensic Business Group think of him as an honorary member of their team too. Indra has been involved with the forensic science laboratory information management system (STARLIMS) throughout the life of the project. His understanding of the needs of the Forensic Business Group and their customers, coupled with his knowledge of the system and his ability to work with third-party vendors, has made him invaluable to the team.

As his colleagues note, Indra is 'willing to challenge the status quo in order to improve service delivery to our customers'. His quest for continual improvement means that changes have been made to the STARLIMS system to better meet the needs of our forensic scientists and their customers.

379

STAFF

80%

STAFF ENGAGED  
IN SCIENCE

27

STAFF RECOGNISED  
THROUGH EXTERNAL  
AWARDS



From left: Dr Muriel Dufour, Dr Don Bandaranyake, Tammy Hambling, Dr Virginia Hope, Dr Graham Mackereth and Dr Jill Sherwood.

**GREAT TEAMWORK BY OUR SCIENTISTS RESPONDING TO THE YERSINIA PSEUDOTUBERCULOSIS OUTBREAK**

Last spring the Enteric Reference Laboratory team reported an increase in the number of *Yersinia pseudotuberculosis* cases compared with the previous year. *Yersinia pseudotuberculosis* is usually rare in New Zealand but can be caused by eating contaminated food. Using advanced reference methods, the lab team determined that the cases were most likely associated with a common source. The team provided an analysis of the outbreak to the Ministry of Health within just a few days of their initial report.

Our Health Intelligence team then worked with the Ministry of Health and MPI to identify the contaminated food source. While the investigation proved complex, the team was able to provide ongoing advice to the Government in responding to the outbreak.

Working together, scientists from our Enteric Reference Laboratory team and Health Intelligence team were able to identify and respond to the outbreak.

**Employment status**

302 full time  
77 part time

**Gender profile**

66% female  
34% male

**Age profile:**

36% aged 20 – 40 years  
56% aged 41 – 60 years  
8% aged 60+

**Disability profile\***

<1%

**Ethnicity\***

236 NZ European  
42 Asian  
6 Pacific Peoples  
9 Māori  
82 Other European  
4 MELAA\*\*

\* As declared by staff

\*\* MELAA: Middle Eastern, Latin American and African

## OUR PEOPLE

<b>GOOD EMPLOYER KEY ELEMENTS</b>	<b>ESR DELIVERY 2014/15</b>
Leadership, accountability and culture	<p>Targeted leadership workshops and coaching have been introduced for senior managers, with a focus on strengthening the capability of our leaders to support a high-performing, customer-centred culture effectively.</p> <p>Our leadership team communicates the strategic direction and organisational goals to staff at all levels and these cascade into clear group, team and individual goals. Our performance planning and review process is designed to build a high-performance culture through clear accountability and defined work outputs.</p>
Recruitment, selection and induction	<p>Robust recruitment and selection processes are in place that support EEO principles and our recruitment and selection policy is regularly reviewed. Recruitment is focused on competencies, skills and experience and supported by a broad range of assessment and selection tools to ensure the best candidate is selected in a fair and equitable manner.</p> <p>Our new employees are supported with a thorough induction programme that includes familiarisation with key policies and processes, including health and safety expectations and responsibilities.</p>
Employee development, promotion and exit	<p>Our performance appraisal and development system supports and encourages employees' development by providing a clear and achievable progression through building technical skills and behavioural competencies. This is achieved through structured learning, on-the-job opportunities, internal secondments and attendance at international and national science conferences.</p> <p>Employees who leave ESR are offered the opportunity to participate in exit interviews. The feedback is consolidated and used to determine how we can build on areas of strength and improve our working environment.</p>
Flexibility and work design	<p>We actively support flexible working arrangements with our flexible hours, extended flexitime and other flexible working arrangement policies, which are promoted in the <i>Employee Handbook</i>. We support parents returning to work by offering part-time and gradual return to full-time work arrangements. As at 30 June 2015, 20% of our employees worked part-time.</p>
Remuneration, recognition and conditions	<p>Our terms and conditions of employment are consistent with the good employer philosophy, with a range of benefits valued by our employees.</p> <p>Our system for remuneration review recognises the contributions of individuals and supports the development of a high-performance culture. We reward people fairly and equitably on the basis of contribution, regardless of gender, age or ethnicity.</p> <p>We have three annual Excellence Awards that recognise and celebrate individuals and teams for their achievements.</p>
Harassment and bullying prevention	<p>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.</p> <p>New employees are introduced to this policy and given training as part of their induction. The policy is reviewed regularly.</p>
Safe and healthy environment	<p>All of our employees are given comprehensive training, guidelines and supervision to ensure everyone's safety, health and wellbeing at work. We have a strong health and safety culture and employees have the opportunity to provide regular input through site health and safety committees.</p> <p>We participate in the ACC Workplace Safety Management Practices programme and hold tertiary-level accreditation, the highest level achievable.</p> <p>We provide a Wellness Programme to employees that supports their health and wellbeing, including 'flu vaccinations, counselling, annual wellness checks and workstation assessments.</p>

## CORE FUNDING PROJECTS



Core funding enables ESR to invest in science that will make a difference for our customers and have impacts for New Zealand. The projects are assessed by the Strategic Science team for science merit, ability to deliver impact and contribution to ESR's sustainability.

We have identified genomics and bioinformatics as key enablers for ESR and have invested in these areas.

The Pioneer Fund is a seed fund that allows our scientists to test ideas that may have commercial benefits for ESR.

### RESEARCH THAT SUPPORTS OUTCOMES

On the following page are key projects funded this year that contribute to one or more of our four outcomes. A number of the projects have received additional financial support and have been made possible through collaborative partnerships with both New Zealand and international science providers.

### STRATEGIC PROJECTS

This year we invested \$1.5 million in projects that support our overall strategic direction. Most of these projects support all four outcomes and increase our capabilities in key areas. Projects funded this year included:

- Leading workshops and completing a stocktake to identify current work with Māori and to identify areas for future work that can be done in partnership. This work is being used to inform our Māori Innovation Strategy
- Building bioinformatic capabilities (the application of computer technology to the management of biological information) in relation to bacterial pathogens through analyses of several species to better support outbreak investigation, along with antimicrobial resistance and population analysis.

### PIONEER FUND

The purpose of the Pioneer Fund is to identify projects relating to our outcomes that could have commercial relevance. Projects funded this year included:

- Forensic science: Researching an accurate firearm trajectory plug-in app for a leading laser 3D crime scene scanning software company
- Food safety: Setting up a high-performance liquid chromatography-based method for quantifying key polyphenols and anthocyanins in fruit products and health care products. The method can be used to ensure that products have the types and amounts of these naturally occurring compounds as claimed
- Water and the environment: Developing tests to discriminate between environmental and enteric *E. coli* in water samples. This work will allow researchers to better pinpoint sources of *E. coli*.

## CORE FUNDING PROJECTS

OUTCOMES	KEY PROJECTS
Health	<p>Analysis of sulphate assimilation pathway and pili in the pathogenesis of meningococci. Improved the evidence for household transmission of meningococci (which can cause serious infections, including meningitis) using whole genome sequencing.</p> <p>Continued investigation of viral metagenomics and the identification of novel viral pathogens relating to animal and human health. Identification of the viral cause of a previously undiagnosed illness in babies.</p> <p>Investigation of the potential of epigenetic mechanism as biomarkers for obesity and type 2 diabetes, with a view to improved patient stratification and treatment.</p> <p>Research on reducing the burden of disease through whole-system change will be used by the Ministry of Health as a basis for an early detection and prevention model of care.</p>
Forensic science	<p>STRmix™, expert software for forensic DNA interpretation, is a growing commercial success. Further research has supported the continued development of the application.</p> <p>Scientific knowledge and capability in omics research, improved bioinformatics knowledge and new collaborations have been achieved through two projects investigating transcriptomics and genomics in forensic science.</p> <p>The science supporting the analysis of bloodstain patterns has been advanced through research into the dynamics of bloodstain formation on fabrics.</p> <p>Projects focused on DNA profiling population genetic issues, contextual bias in bloodstain pattern analysis and cell identification through mRNA analysis. Funding obtained through the US National Institute of Justice has also supported these research outcomes. A patent application relating to the analysis of mRNA has also been achieved.</p>
Food safety	<p>Development of a world-leading, rapid, sensitive and cost-effective test for subtyping major food and waterborne pathogens. The test is now commercially available through a third-party European biotechnology company, with royalties payable to ESR.</p> <p>The potential use of phages for biocontrol of mastitis-causing pathogens was explored, building on the successful commercial release of STECleaNZ.</p> <p>Work has been done to support our Prove It project, which has also provided MPI with support to investigate food quality issues.</p> <p>Tests for differentiating New Zealand-sourced olive oils from those from overseas of inferior quality have been developed.</p>
Water and the environment	<p>An end-user-driven project has investigated the potential environmental and public health issues associated with diversion and on-site reuse of domestic greywater. This has led to a report on greywater reuse in New Zealand for the Ministry of Health.</p> <p>A microbial early warning system is being developed for rapidly assessing groundwater health and indications of potential contaminant causes. The research is also developing a low-cost molecular method for targeted microbial identification in mixed samples such as groundwater, wastewater and food.</p>

## PERFORMANCE MEASURES

### OUTCOME PERFORMANCE INDICATORS

OUTCOMES	MEASURES	ACTUAL	TARGET
Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health	Ministry of Health and PHARMAC satisfaction	Average rating satisfactory	Very good 60% of the time
	Ministry of Health satisfaction with ESR's support for incidents	Acceptable	90% 'Good' or better
	Critical turnaround times are met	98%	100%
	Wastage of Vaccine Schedule vaccines	1%	<1%
	Meet Ministry of Health project brief milestones and deliverables	99%	95%
Increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes	Percentage of offences submitted for comparison with the National DNA Profile Databank are resolved within 30 days	88%	90%
	Police satisfaction	90%	90%
	Fulfilment of contractual obligations under the Police service level agreement	94%	100%
	DNA samples linked to a person or other crime	71% of DNA samples linked to a person 29% of DNA samples linked to other crimes	70% of DNA samples linked to a person 33% of DNA samples linked to other crimes
	Volume crime submissions	4% growth	Doubled from 2013/14
Enhance the protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods  and  Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes	Meet obligations in core contracts with New Zealand government agencies, such as MPI, the Ministry of Health and the Ministry of Foreign Affairs and Trade	Most obligations met	Obligations met
	Meet obligations in our contracts with international agencies, such as the Comprehensive Nuclear-Test-Ban Treaty Organization	Most obligations met	Obligations met
	Become the key provider for scientific advice for New Zealand and the Pacific nations, using a multidisciplinary approach	5 projects	4 projects
	Enhance and formalise partnerships with other science and testing providers	Draft agreement under negotiation	Signed agreement in place by June 2016

## PERFORMANCE MEASURES

### GENERIC PERFORMANCE INDICATORS

FOCUS	MEASURES	ACTUAL	TARGET
End-user collaboration	Revenue per FTE from commercial sources	\$27,898	\$25,170
Research collaboration	Publications with collaborators	72	65
Technology and knowledge transfer	Commercial reports per scientist FTE	0.64	0.45
Science quality	Impact of scientific publications (measured using Web of Science citations for the preceding calendar year)	3.1	3.3
Financial indicators	Revenue per FTE	\$185,126	\$163,766
	Commercial revenue	\$9.8m	\$10.0m

### FINANCIAL PERFORMANCE INDICATORS

	Year ended 30/06/15	Target	Year ended 30/06/14
Revenue, \$M	65.0	65.1	61.8
Operating margin, %	13.9	13.1	8.1
Return (NPAT*) on equity, %	6.5	4.8	(1.4)
Return (EBIT) on assets, %	6.0	4.7	(1.3)
Profit volatility, %	20.2	–	20.3
Acid test, ratio	1.5	1.0	1.3
Equity ratio, %	67.3	73.3	67.8
Gearing	0.8	–	0.7
Interest cover	–	–	–
Annualised operating margin per FTE, \$'000s	25.6	21.5	13.2

\* Net profit/(loss) after taxation



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## FINANCIAL STATEMENTS

### 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 2015.



**Marion Cowden**  
Deputy Chair



**Tahu Potiki**  
Director

## REPORT OF THE DIRECTORS

The directors present the *Annual Report* and audited financial statements of ESR for the year ended 30 June 2015.

The Auditor-General is the statutory auditor pursuant to section 21 of the Crown Research Institutes Act 1992. The Auditor-General has appointed Chris Barber with the assistance of PricewaterhouseCoopers to audit the financial statements and to express an opinion on them. Their report is on page 39 – 40.

## 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 were declared or paid in respect of the 2015 financial year.

## DIRECTORS' INDEMNITY

ESR has arranged for directors' and officers' insurance for any act or omission in their capacity as directors 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 a director 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:

Dr Susan Macken	\$46,000
Marion Cowden	\$28,750
Tahu Potiki	\$23,000
Professor Bill Denny	\$23,000
Dr Helen Darling	\$23,000
Patricia Schnauer	\$23,000
John O'Hara	\$23,000
	\$189,750

## DISCLOSURE OF INTERESTS BY DIRECTORS

As at 30 June 2015 the following directors had made the following general disclosures:

### Dr Susan Macken (Chair) – term completed 30 June 2015

Director, Tamaki Redevelopment Company  
Independent Non-executive Director, Bank of New Zealand  
Director, Fertility Associates  
Managing Director, STG Limited  
Director, Blossom Bear Limited  
Non-executive Director, Treasury  
Director, Auckland Waterfront Development Agency Limited

### 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  
Director and shareholder, Muireall Olaghair Properties Limited  
Trustee, Nazareth Care Charitable Trust  
Member, Audit and Risk Committee, Ministry for the Environment  
Chair, Age Concern (Wellington)  
Chair, Daya Trust  
Director, Co-operative Bank Limited

### Tahu Leslie Potiki

Director, Ngāi Tahu Tourism Limited  
Elected representative, Te Rūnanga o Ngāi Tahu  
Trustee, Ngāi Tahu Charitable Trust  
Director, Arataki Associates Limited

## FINANCIAL STATEMENTS

### **Patricia Schnauer – term completed 30 June 2015**

Director, Milllife Trustee Limited  
Director, Milllaw Services Limited

### **Professor Bill 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 Cancer Therapeutics Cooperative Research Center, Melbourne  
Member, Ministry of Health/Health Research Council Steering Committee for Cancer Research Partnership  
Member, Management Group, Maurice Wilkins Centre for Molecular Biodiscovery, University of Auckland  
Member, senior management team, Cancer Society Auckland  
Shareholder, Pathway Therapeutics Limited, San Francisco  
Member, National Science Challenges Panel  
Board member, New Zealand Genomics Limited

### **Dr Helen Darling**

Advisory Board Member, ExportNZ  
Director and shareholder, Darling and Associates  
Director and shareholder, Cherry Futures Limited  
Director and shareholder, Asia Pacific Centre for Food Integrity  
Director, Artemis Limited

### **John O'Hara**

Director, Tekron International Limited  
Director, Spidertracks Limited  
Chair and lead investor, Ask Nicely 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 arm's length with appropriate directors' interests 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.

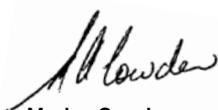
### **REMUNERATION**

The total remuneration in respect of employees paid above \$100,000 was as follows:

Remuneration range	No. of staff
\$100,000 – \$109,999	15
\$110,000 – \$119,999	15
\$120,000 – \$129,999	8
\$130,000 – \$139,999	5
\$140,000 – \$149,999	4
\$150,000 – \$159,999	3
\$160,000 – \$169,999	4
\$170,000 – \$179,999	1
\$190,000 – \$199,999	2
\$200,000 – \$209,999	1
\$250,000 – \$259,999	1
\$300,000 – \$349,999	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.



**Marion Cowden**  
Deputy Chair



**Tahu Potiki**  
Director



## **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 2015.

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. The Auditor-General has appointed me, Chris Barber, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the Group, consisting of the Institute of Environmental Science and Research Limited and its subsidiary (collectively referred to as 'the Group'), on her behalf.

### **OPINION**

We have audited the financial statements of the Group on pages 41 to 61, that comprise the statement of financial position as at 30 June 2015, 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 2015; 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 20 August 2015. 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 that fairly reflect the matters to which they relate. We consider internal control 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 all 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.



**INDEPENDENT AUDITOR'S REPORT**

Institute of Environmental Science and Research Limited.

**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 section 15 of 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 which are compatible with those independence requirements. Other than the audit and these assignments, we have no relationship with, or interests in, the Group.

A handwritten signature in black ink that reads 'Chris Barber'.

Chris Barber  
On behalf of the Auditor-General  
Wellington, New Zealand

A handwritten signature in black ink that reads 'PricewaterhouseCoopers'.

PricewaterhouseCoopers

## STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME

for the year ended 30 June 2015

Note	Group actual year ended 30 June 2015 audited \$'000s	Group budget year ended 30 June 2015 unaudited \$'000s	Group actual year ended 30 June 2014 audited \$'000s
<b>Operating revenue</b>			
Revenue from rendering of services	57,286	57,333	54,042
Core funding	7,723	7,723	7,723
	<b>65,009</b>	<b>65,056</b>	<b>61,765</b>
<b>Operating expenses</b>			
Scientific materials	(6,213)	(6,330)	(5,798)
Subcontracting expenses	(6,698)	(6,264)	(5,954)
Employee benefit expense	(31,980)	(31,628)	(32,488)
Depreciation and amortisation expense	4/5 (5,465)	(5,946)	(5,741)
Other expenses	2 (11,112)	(12,300)	(12,524)
	<b>(61,468)</b>	<b>(62,468)</b>	<b>(62,505)</b>
	<b>3,541</b>	<b>2,588</b>	<b>(740)</b>
<b>Operating profit/(loss)</b>			
Finance income – interest income	179	78	86
Finance expense	(9)	(13)	(13)
	<b>170</b>	<b>65</b>	<b>73</b>
<b>Net finance income</b>			
	<b>3,711</b>	<b>2,653</b>	<b>(667)</b>
<b>Profit before income tax expense</b>			
Income tax expense	3 (1,128)	(743)	114
	<b>2,583</b>	<b>1,910</b>	<b>(553)</b>
<b>Profit for the period attributable to the Institute's shareholder</b>			
Other comprehensive income	–	–	–
	<b>2,583</b>	<b>1,910</b>	<b>(553)</b>
<b>Total profit or loss and other comprehensive income for the period attributable to the Institute's shareholder</b>			

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

## FINANCIAL STATEMENTS

### STATEMENT OF CHANGES IN EQUITY

for the year ended 30 June 2015

	Group actual audited Share capital \$'000s	Group actual audited Retained earnings \$'000s	Group actual audited Total \$'000s
<b>Balance at 1 July 2013</b>	<b>8,494</b>	<b>30,624</b>	<b>39,118</b>
Loss for the period	–	(553)	(553)
Other comprehensive income	–	–	–
<b>Total comprehensive income</b>	<b>–</b>	<b>(553)</b>	<b>(553)</b>
Transactions with owners:			
Dividend	–	–	–
<b>Balance at 30 June 2014</b>	<b>8,494</b>	<b>30,071</b>	<b>38,565</b>
<b>Balance at 1 July 2014</b>	<b>8,494</b>	<b>30,071</b>	<b>38,565</b>
Profit for the period	–	2,583	2,583
Other comprehensive income	–	–	–
<b>Total comprehensive income</b>	<b>–</b>	<b>2,583</b>	<b>2,583</b>
Transactions with owners:			
Dividend	–	–	–
<b>Balance at 30 June 2015</b>	<b>8,494</b>	<b>32,654</b>	<b>41,148</b>

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

## STATEMENT OF FINANCIAL POSITION

as at 30 June 2015

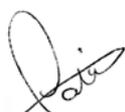
	Note	Group actual 30 June 2015 audited \$'000s	Group budget 30 June 2015 unaudited \$'000s	Group actual 30 June 2014 audited \$'000s
<b>Non-current assets</b>				
Property, plant and equipment	4	30,248	32,405	31,900
Investment		30	–	30
Intangible assets	5	11,407	10,928	8,979
		<b>41,685</b>	<b>43,333</b>	<b>40,909</b>
<b>Current assets</b>				
Cash and cash equivalents		7,702	1,752	1,897
Trade and other receivables	7	10,780	10,123	13,304
Derivative financial instruments		–	–	142
Income tax receivable	11	–	–	432
Inventories – scientific materials and consumables		628	1,458	1,027
		<b>19,110</b>	<b>13,333</b>	<b>16,802</b>
<b>Current liabilities</b>				
Trade and other payables	8	11,806	7,675	11,884
Employee benefits	9	2,663	2,750	2,571
Finance lease liabilities	10	153	–	223
Derivative financial instruments		161	–	–
Income tax payable	11	359	618	–
		<b>15,142</b>	<b>11,043</b>	<b>14,678</b>
<b>Net current assets</b>		<b>3,968</b>	<b>2,290</b>	<b>2,124</b>
<b>Non-current liabilities</b>				
Employee benefits	9	763	743	910
Finance lease liabilities	10	168	–	62
Deferred taxation	6	3,574	3,786	3,496
		<b>4,505</b>	<b>4,529</b>	<b>4,468</b>
<b>Net assets</b>		<b>41,148</b>	<b>41,094</b>	<b>38,565</b>
<b>Equity</b>				
Share capital	13	8,494	8,494	8,494
Retained earnings		32,654	32,600	30,071
<b>Total equity</b>		<b>41,148</b>	<b>41,094</b>	<b>38,565</b>

The Board of Directors of the Institute of Environmental Science and Research Limited authorised these financial statements for issue on 20 August 2015.

On behalf of the Board:



**Marion Cowden**  
Deputy Chair



**Tahu Potiki**  
Director

Dated 20 August 2015

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

## FINANCIAL STATEMENTS

### STATEMENT OF CASH FLOWS

for the year ended 30 June 2015

	Note	Group actual year ended 30 June 2015 audited \$'000s	Group budget year ended 30 June 2015 unaudited \$'000s	Group actual year ended 30 June 2014 audited \$'000s
<b>Cash flows from/(used in) operating activities</b>				
<i>Cash was provided from:</i>				
Customers/Core funding		64,339	65,038	61,515
Interest received		179	78	86
		64,518	65,116	61,601
<i>Cash was applied to:</i>				
Suppliers and employees		(52,239)	(55,563)	(56,792)
Interest paid		(9)	(13)	(14)
Income tax paid	11	(260)	(420)	(239)
		(52,508)	(55,996)	(57,045)
<b>Net cash inflow from operating activities</b>	<b>14</b>	<b>12,010</b>	<b>9,120</b>	<b>4,556</b>
<b>Cash flows from/(used in) investing activities</b>				
<i>Cash was provided from:</i>				
Proceeds from sale of property, plant and equipment		–	–	84
		–	–	84
<i>Cash was applied to:</i>				
Purchase of property, plant and equipment		(2,108)	(3,767)	(2,345)
Purchase of intangible assets	5	(3,859)	(3,536)	(2,188)
Acquisitions		–	–	(30)
		(5,967)	(7,303)	(4,563)
<b>Net cash outflow from investing activities</b>		<b>(5,967)</b>	<b>(7,303)</b>	<b>(4,479)</b>
<b>Cash flows from/(used in) financing activities</b>				
<i>Cash was provided from/(applied to):</i>				
Dividends paid		–	–	–
Repayment of finance lease liabilities		(238)	(172)	(316)
<b>Net cash (outflow)/inflow from financing activities</b>		<b>(238)</b>	<b>(172)</b>	<b>(316)</b>
<b>Net (decrease)/increase in cash held</b>		<b>5,805</b>	<b>1,645</b>	<b>(239)</b>
Cash and cash equivalents at the beginning of the period		1,897	107	2,136
<b>Cash and cash equivalents at the end of the period</b>		<b>7,702</b>	<b>1,752</b>	<b>1,897</b>
<b>Comprising:</b>				
– cash at bank		22	–	210
– short-term deposits		7,680	1,752	1,687
<b>Total cash and cash equivalents</b>		<b>7,702</b>	<b>1,752</b>	<b>1,897</b>

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 2015.

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

ESR is a Crown research institute that provides specialist scientific services and research, particularly to the health and justice sectors.

These financial statements have been approved for issue by the Board on 20 August 2015.

#### Basis of preparation

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

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 1993.

The financial statements have been prepared on the basis of historical cost, except for financial instruments 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).

#### Changes in accounting policies

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

#### Statement of compliance

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

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

#### 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 that have been issued as at 30 June 2015 but are not yet effective. It is not anticipated that standards not yet effective will significantly affect the financial statements of the Group with the exception of NZ IFRS 15 [see below].

#### ***NZ IFRS 15, Revenue from contracts with customers (effective for annual periods beginning on or after 1 January 2017)***

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 five-step model for revenue recognition to depict the transfers of promised goods or services to customers in amounts that reflect the considerations 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 2017.

#### Accounting estimates and judgements

The preparation of financial statements in conformity with NZ IFRS requires judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, 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.

Management's judgements, which have the most significant effect on amounts recognised in the financial statements, are found in '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 stage of completion method requires the Group 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 reasonably 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 2015 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 the consideration given to acquire the assets and the value of other directly attributable costs that have been incurred in bringing the assets to the locations 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 or equipment, less any estimated residual value, over its estimated useful life, as follows:

<b>Type of asset</b>	<b>Estimated useful life</b>
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 lives of the assets (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. The 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. Acquired intangible assets are amortised according to the straight-line method over their estimated useful lives, not exceeding 10 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 the development of 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 an asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of the 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**

The income tax expense for the period is the tax payable on the current period's taxable income based on the national income tax rate for each jurisdiction. This is then adjusted by changes in deferred tax assets and liabilities attributable to temporary differences between the tax bases of assets and liabilities and their carrying amounts in the financial statements, and unused tax losses.

Deferred tax assets and liabilities are recognised for temporary differences at the tax rates expected to apply when the assets are recovered or liabilities are settled. The relevant tax rates are applied to the cumulative amount of deductible and taxable temporary differences to measure the deferred tax asset or liability. An exception is made for certain temporary differences arising from the initial recognition of an asset or a liability. No deferred tax asset or liability is recognised in relation to temporary differences if they arose in a transaction, other than a business combination, and at the time of the transaction did not affect either accounting profit or taxable profit or loss.

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 to utilise those temporary differences and losses.

Deferred income tax assets are recognised to the extent that it is probable that future taxable profit will be available against which the temporary differences can be utilised.

### **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 periods 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. The initial recognition of a finance lease results in an asset and a 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 assets' useful lives and lease terms.

Leases in which a significant portion of the risks and rewards of ownership is 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 a 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 the consideration received. Revenue from the supply of services is recognised in the accounting periods in which the services are rendered, by reference to the stage of completion of the specific transactions assessed on the basis of the actual services 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 (Government grants) is recognised in the statement of profit or loss and other comprehensive income when the requirements under the grant agreements 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.

### ***Vaccine revenue***

ESR purchases vaccines on behalf of the Pharmaceutical Management Agency (PHARMAC). PHARMAC maintains the risks and rewards related to the inventory and as such no inventory is recognised within ESR's statement of financial position. ESR receives and recognises commission revenue only in relation to the services performed.

Amounts due for vaccine purchases are disclosed in 'Trade and other payables' whilst amounts due to vaccine sales are disclosed in 'Trade and other receivables'.

## **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 currency 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, the policies and practices of management, the relationships 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 those with 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-dates – the dates on which the Group commits to purchase or sell the assets. 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 the 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 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.

## FINANCIAL STATEMENTS

### 2. OTHER EXPENSES INCLUDE THE FOLLOWING SPECIFIC ITEMS:

	Note	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Fees paid to PricewaterhouseCoopers for:			
– the audit of the statutory financial statements		112	109
– the audit for A133 compliance, SHIVERS project		26	26
Total audit-related fees paid to the auditors		138	135
– non-audit-related services – taxation compliance		23	22
<b>Total fees paid to auditors</b>		<b>161</b>	<b>157</b>
Defined contribution plan expense		844	820
Directors' fees	17	190	187
Bad debts written off		26	3
Communications (including, phone, network, postage and courier)		673	716
IT system maintenance and licence costs		1,324	1,401
Consultancy fees		1,292	2,101
Impairment of receivables (loans and advances)		(17)	–
Foreign exchange loss(gain)		(17)	(5)
Fair value loss (gain) on forward exchange contract		161	(142)
Marketing and advertising		143	173
Office and administration		1,393	1,383
Occupancy		2,034	2,382
Rental and operating lease costs		845	754
Training and conferences		277	303
Travel (airfares and accommodation)		1,615	1,772
Restructuring expense		191	488

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

	Note	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
The taxation charge has been calculated as follows:			
<b>Profit/(Loss) before income tax expense</b>		<b>3,711</b>	<b>(667)</b>
Prima facie taxation at 28%		1,039	(187)
<i>Plus taxation effect of:</i>			
Net prior year's under/(over) estimation		–	–
Non-deductible/(assessable) items		89	73
<b>Tax/(Credit) expense for the year</b>		<b>1,128</b>	<b>(114)</b>
<i>The tax expense for the year is represented by:</i>			
Current taxation		1,123	(172)
Deferred taxation	6	5	58
		<b>1,128</b>	<b>(114)</b>

#### 4. PROPERTY, PLANT AND EQUIPMENT

Group	Freehold land \$'000s	Buildings and leasehold improvements \$'000s	IT equipment and software \$'000s	Plant, equipment and vehicles \$'000s	Assets under construction \$'000s	Total \$'000s
<b>At 1 July 2013</b>						
Cost	476	29,128	7,456	30,097	382	67,539
Accumulated depreciation	–	(5,911)	(5,863)	(21,854)	–	(33,628)
Net book value at the beginning of the year	476	23,217	1,593	8,243	382	33,911
<b>Year ended 30 June 2014</b>						
Net book value at the beginning of the year	476	23,217	1,593	8,243	382	33,911
Additions	–	–	530	1,573	302	2,405
Transfers from assets under construction	–	401	–	49	(450)	–
Disposals	–	(7)	(13)	(71)	–	(91)
Depreciation for the year	–	(907)	(1,010)	(2,408)	–	(4,325)
<b>Net book value at the end of the year</b>	<b>476</b>	<b>22,704</b>	<b>1,100</b>	<b>7,386</b>	<b>234</b>	<b>31,900</b>
<b>At 30 June 2014</b>						
Cost	476	29,522	7,973	31,346	234	69,551
Accumulated depreciation	–	(6,818)	(6,873)	(23,960)	–	(37,651)
<b>Net book value at the end of the year</b>	<b>476</b>	<b>22,704</b>	<b>1,100</b>	<b>7,386</b>	<b>234</b>	<b>31,900</b>
<b>Year ended 30 June 2015</b>						
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)
<b>Net book value at the end of the year</b>	<b>476</b>	<b>21,935</b>	<b>1,170</b>	<b>6,623</b>	<b>44</b>	<b>30,248</b>
<b>At 30 June 2015</b>						
Cost	476	29,667	8,811	32,788	44	71,786
Accumulated depreciation	–	(7,732)	(7,641)	(26,165)	–	(41,538)
<b>Net book value at the end of the year</b>	<b>476</b>	<b>21,935</b>	<b>1,170</b>	<b>6,623</b>	<b>44</b>	<b>30,248</b>

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

Group	30 June 2015 \$'000s	30 June 2014 \$'000s
Cost – capitalised finance lease assets	1,149	874
Accumulated depreciation	(828)	(598)
<b>Net book value at the end of the year</b>	<b>321</b>	<b>276</b>

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.

## FINANCIAL STATEMENTS

### 5. INTANGIBLE ASSETS

Group	Computer software – externally purchased \$'000s	Computer software – internally generated \$'000s	Customer contracts \$'000s	Assets under construction \$'000s	Total \$'000s
<b>At 1 July 2013</b>					
Cost	7,610	6,620	1,338	1,260	16,828
Accumulated amortisation	(5,613)	(2,655)	(353)	–	(8,621)
<b>Net book value at the end of the year</b>	<b>1,997</b>	<b>3,965</b>	<b>985</b>	<b>1,260</b>	<b>8,207</b>
<b>Year ended 30 June 2014</b>					
Net book value at the beginning of the year	1,997	3,965	985	1,260	8,207
Additions	307	–	–	1,881	2,188
Transfers from assets under construction	–	2,261	–	(2,261)	–
Amortisation for the year	(634)	(559)	(223)	–	(1,416)
<b>Net book value at the end of the year</b>	<b>1,670</b>	<b>5,667</b>	<b>762</b>	<b>880</b>	<b>8,979</b>
<b>At 30 June 2014</b>					
Cost	7,917	8,881	1,338	880	19,016
Accumulated amortisation and impairment losses	(6,247)	(3,214)	(576)	–	(10,037)
<b>Net book value at the end of the year</b>	<b>1,670</b>	<b>5,667</b>	<b>762</b>	<b>880</b>	<b>8,979</b>
<b>Year ended 30 June 2015</b>					
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)
<b>Net book value at the end of the year</b>	<b>1,743</b>	<b>5,016</b>	<b>539</b>	<b>4,109</b>	<b>11,407</b>
<b>At 30 June 2015</b>					
Cost	8,547	8,881	1,338	4,109	22,875
Accumulated amortisation and impairment losses	(6,804)	(3,865)	(799)	–	(11,468)
<b>Net book value at the end of the year</b>	<b>1,743</b>	<b>5,016</b>	<b>539</b>	<b>4,109</b>	<b>11,407</b>

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

'Assets under construction' relates to the development of a new laboratory operational system; the completion and implementation of the system are expected by September 2015. Also included is the redevelopment of existing platforms and software.

## 6. DEFERRED TAXATION

Deferred tax assets and liabilities are attributed to the following:

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Balance at the beginning of the year	(3,496)	(3,438)
Transfer from current tax	(73)	–
Statement of profit or loss and other comprehensive income charge	(5)	(58)
<b>Balance at the end of the year</b>	<b>(3,574)</b>	<b>(3,496)</b>

	Accelerated tax depreciation \$'000s	Employee benefits and provisions \$'000s	Total \$'000s
<b>Year ended 30 June 2014</b>			
Balance at the beginning of the year	(4,482)	1,044	(3,438)
(Under)/Over provision in prior year	–	–	–
Charged/(Credited) to statement of profit or loss and other comprehensive income	(158)	100	(58)
<b>Balance at the end of the year</b>	<b>(4,640)</b>	<b>1,144</b>	<b>(3,496)</b>
<b>Year ended 30 June 2015</b>			
Balance at the beginning of the year	(4,640)	1,144	(3,496)
(Under)/Over provision in prior year	–	–	–
Transfer from current tax	(57)	(16)	(73)
Current year (charged)/credited to statement of profit or loss and other comprehensive income	–	(5)	(5)
<b>Balance at the end of the year</b>	<b>(4,697)</b>	<b>1,123</b>	<b>(3,574)</b>

There are no unrecognised deferred tax assets or liabilities.

Deferred tax liabilities expected to be settled within 12 months total \$872,000 (2014: \$860,000).

## 7. TRADE AND OTHER RECEIVABLES

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Trade debtors	10,053	12,175
Provision for doubtful debts	(60)	(77)
	9,993	12,098
Prepayments	787	1,206
	<b>10,780</b>	<b>13,304</b>

As at 30 June 2015, trade receivables of \$247,000 (2014: \$1,223,000) 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:

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000
Past due 1 – 30 days	66	435
Past due 31 – 60 days	47	431
Past due >61 days	134	357
	<b>247</b>	<b>1,223</b>

## FINANCIAL STATEMENTS

### 8. TRADE AND OTHER PAYABLES

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Accrued expenses	1,181	1,091
Payroll and GST accruals	874	1,602
Revenue in advance	1,439	732
Trade payables	8,312	8,459
	<b>11,806</b>	<b>11,884</b>

Accrued expenses include a provision for the disposal of a Cobalt 60 source. The provisions at 30 June 2015 are expected to be fully utilised during the first quarter of the 2016 financial year.

### 9. EMPLOYEE BENEFITS

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Annual leave accrual	2,397	2,261
Service leave accrual	248	299
Other	18	11
<b>Current liabilities</b>	<b>2,663</b>	<b>2,571</b>
Service leave accrual	674	765
Retirement leave accrual	86	139
Other	3	6
<b>Non-current liabilities</b>	<b>763</b>	<b>910</b>

### 10. FINANCE LEASE LIABILITIES

Future minimum lease payments are as follows:

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Not later than one year	153	223
Later than one year and not later than five years	168	67
Later than five years	–	–
<b>Total minimum lease payments</b>	<b>321</b>	<b>290</b>
Future finance charges on finance leases	–	(5)
<b>Present value of finance lease liabilities</b>	<b>321</b>	<b>285</b>

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

The present values of the finance lease liabilities are as follows:

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Not later than one year	153	223
Later than one year and not later than five years	168	62
Later than five years	–	–
	<b>321</b>	<b>285</b>

### 11. INCOME TAX PAYABLE

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Balance at the beginning of the year	(432)	(20)
Current year charge	1,123	(172)
Prior period adjustment	(72)	–
Provisional taxation payments	(260)	(240)
<b>Balance at the end of the year</b>	<b>359</b>	<b>(432)</b>

### 12. BORROWINGS

ESR holds a multi-option credit facility with Westpac Banking Corporation for \$6,000,000 (2014: \$6,000,000), which is provided subject to ESR meeting an equity ratio covenant specified by the bank. The facility expires in March 2016. The facility has been used during the year to cover working capital movements. All amounts had been repaid by balance date. There were no breaches of the equity ratio covenant during the year.

### 13. EQUITY

#### Share capital

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
<b>8,494,000 ordinary \$1 shares (issued and fully paid)</b>	<b>8,494</b>	<b>8,494</b>

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 2015 year (2014: Nil).

## FINANCIAL STATEMENTS

### 14. RECONCILIATION OF PROFIT/(LOSS) AFTER TAXATION TO CASH FLOWS FROM OPERATING ACTIVITIES

	Note	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
<b>Profit for the year after taxation</b>		<b>2,583</b>	<b>(553)</b>
<b>Non-cash items:</b>			
Depreciation and amortisation expense	4/5	5,465	5,741
Provisions		303	480
Bad debts written off	2	26	3
Impairment of receivables (loans and advances)	2	(17)	–
Deferred tax charged to the income statement	6	5	58
Foreign exchange losses	2	(17)	(5)
Fair value loss/(gain) on derivatives	2	161	(142)
		<b>5,926</b>	<b>6,135</b>
<b>Impact of changes in investing activities:</b>			
Profit/Loss on sale of assets		10	(84)
		<b>10</b>	<b>(84)</b>
<b>Financing</b>			
Finance charge on leases		9	9
		<b>9</b>	<b>9</b>
<b>Changes in working capital:</b>			
Decrease/(increase) in trade and other receivables		2,515	(1,647)
Decrease/(increase) in income tax receivable		432	(412)
(Increase)/decrease in income tax payable		359	–
Decrease/(increase) in inventories		399	(302)
(Decrease)/increase in employment benefits		92	(370)
(Decrease)/increase in financial liabilities		(70)	(261)
(Decrease)/increase in trade and other payables		(245)	2,041
		<b>3,482</b>	<b>(951)</b>
<b>Net cash inflow/(outflow) from operating activities</b>		<b>12,010</b>	<b>4,556</b>

### 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 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. The investment has a carrying value of \$30,000 (2014: \$30,000).

## 16. COMMITMENTS

### Capital commitments

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Property, plant and equipment	357	80
Intangible assets – software	284	1,266
<b>Total capital commitments</b>	<b>641</b>	<b>1,346</b>

Included in the above table as at 30 June 2015 is an amount of \$284,000 (30 June 2014: \$1,266,000) which relates to the development of laboratory information management software.

### Operating lease commitments

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

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Not later than one year	543	818
Later than one year and not later than five years	81	517
Later than five years	–	–
<b>Total operating commitments</b>	<b>624</b>	<b>1,335</b>

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 subsidiary entities disclosed in note 15. There were no transactions with these related parties in the year ended 30 June 2015 (30 June 2014: 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 that ESR would have adopted if there were no relationships with key management personnel.
- Fees paid to directors during the year were \$189,750 (30 June 2014: \$187,144), with no balances outstanding at balance date (30 June 2014: 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 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Salaries and other short-term employee benefits	1,499	1,471
Termination benefits	73	74
Other long-term employee benefits	12	31
Directors' fees	190	187
<b>Total key management personnel compensation</b>	<b>1,774</b>	<b>1,763</b>

## FINANCIAL STATEMENTS

### 18. FINANCIAL INSTRUMENTS BY CATEGORY

	Loans and receivables \$'000s	Fair value through profit or loss \$'000s	Total \$'000s
<b>30 June 2014</b>			
<b>Assets as per balance sheet</b>			
Trade and other receivables excluding prepayments	12,098	–	12,098
Derivative	–	142	142
Cash and cash equivalents	1,897	–	1,897
<b>Total</b>	<b>13,995</b>	<b>142</b>	<b>14,137</b>
	Financial liabilities at amortised cost \$'000s	Fair value through profit or loss \$'000s	Total \$'000s
<b>Liabilities as per balance sheet</b>			
Finance lease liabilities	285	–	285
Derivative	–	–	–
Trade and other payables	11,152	–	11,152
<b>Total</b>	<b>11,437</b>	<b>–</b>	<b>11,437</b>
	Loans and receivables \$'000s	Fair value through profit or loss \$'000s	Total \$'000s
<b>30 June 2015</b>			
<b>Assets as per balance sheet</b>			
Trade and other receivables excluding prepayments	9,993	–	9,993
Derivative	–	–	–
Cash and cash equivalents	7,702	–	7,702
<b>Total</b>	<b>17,695</b>	<b>–</b>	<b>17,695</b>
	Financial liabilities at amortised cost \$'000s	Fair value through profit or loss \$'000s	Total \$'000s
<b>Liabilities as per balance sheet</b>			
Finance lease liabilities	321	–	321
Derivative	–	161	161
Trade and other payables	10,367	–	10,367
<b>Total</b>	<b>10,688</b>	<b>161</b>	<b>10,849</b>

### 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, the Australian dollar 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 \$1,267,518 at 30 June 2015 (30 June 2014: US \$1,176,307).

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

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Australian dollar	49	257
Euro	119	4
US dollar	264	881
Others	297	28
	<b>729</b>	<b>1,170</b>

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

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
Australian dollar	265	34
Pound sterling	14	–
US dollar	83	194
Others	8	7
	<b>370</b>	<b>235</b>

### ii) Interest rate risk

As at the 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 did not have any borrowings as at 30 June 2015 (30 June 2014: 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:

- A proportional foreign exchange rate movement of -10% (depreciation of New Zealand dollar) and +10% (appreciation of New Zealand dollar) against the foreign currencies.
- 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 impacts on ESR's reported profit before income tax expense and equity at balance date would be:

- Foreign currency \$36,000 (30 June 2014: \$93,000)
- Interest rate \$69,000 (30 June 2014: \$17,000).

## FINANCIAL STATEMENTS

### 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 that 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 that requires assessments of the creditworthiness of potential customers, where the value of the contracts 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 was held by ESR in respect of cash and cash equivalents and trade receivables as at 30 June 2015 (30 June 2014: 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 2015 the trade receivables balance included \$7,022,000 (30 June 2014: \$9,965,000) 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.

A contractual undiscounted maturity analysis of financial liabilities is presented below:

Group	30 June 2015					30 June 2014				
	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	10,367	10,367	–	–	–	11,152	11,152	–	–	–
Finance lease liabilities	335	167	123	45	–	285	223	49	13	–
	<b>10,702</b>	<b>10,534</b>	<b>123</b>	<b>45</b>	<b>–</b>	<b>11,437</b>	<b>11,375</b>	<b>49</b>	<b>13</b>	<b>–</b>

### d) Fair values

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

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

#### e) Capital risk management

ESR's objectives when managing capital are to maintain financial stability, achieve sustainable growth and 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. The Government provides ESR with guidelines with the expectation that an appropriate average return will be achieved over time, rather than requiring ESR to 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 the Government. The ratios are reported in the *Statement of Corporate Intent*.

The return on equity and gearing ratios as at 30 June 2015 and 30 June 2014 were as follows, along with the relevant annual targets set by ESR.

	Group 30 June 2015 \$'000s	Group 30 June 2014 \$'000s
<b>Return on equity ratio</b>		
Profit/(Loss) for the year	2,583	(553)
<b>Average equity</b>	<b>39,857</b>	<b>38,842</b>
<b>Actual ratio</b>	<b>6.5%</b>	<b>(1.4%)</b>
<b>Target ratio</b>	<b>4.8%</b>	<b>2.7%</b>
<b>Gearing ratio</b>		
<b>Net debt</b>		
Finance lease liabilities – current	153	223
Finance lease liabilities – non-current	168	62
	<b>321</b>	<b>285</b>
<b>Equity</b>	<b>41,148</b>	<b>38,565</b>
<b>Actual ratio</b>	<b>0.8%</b>	<b>0.7%</b>
<b>Target ratio</b>	<b>0.0%</b>	<b>0.0%</b>

#### 20. CONTINGENT LIABILITIES

The directors are satisfied that there were no claims outstanding that would have a material impact on ESR's financial position, as at 30 June 2015 (30 June 2014: Nil).

#### 21. SUBSEQUENT EVENTS

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

### **DIRECTORS**

Dr Susan Macken – Chair (to 30 June 2015)  
Denise Church QSO – Chair (from 1 July 2015)  
Marion Cowden – Deputy Chair  
Professor Bill Denny  
Tahu Potiki  
Dr Helen Darling  
John O'Hara  
Patricia Schnauer (to 30 June 2015)

### **CHIEF EXECUTIVE**

Dr Keith McLea

### **SENIOR LEADERSHIP TEAM**

Dr Keith Bedford, Acting General Manager, Health  
Dr Jill Vintiner, Acting General Manager, Forensic  
Dr Libby Harrison, General Manager, Environmental Science  
Dr Phil Carter, Chief Scientist  
Hamish Findlay, Commercial Manager  
Celia Wellington, General Manager, People and Communications  
Steve Pyne, Chief Information Officer  
Bryan Lau Young, General Manager, Business Services  
Jenny Beale, General Counsel/Company Secretary

### **REGISTERED OFFICE**

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Porirua 5240  
New Zealand  
Tel: +64 4 914 0700  
Fax: +64 4 914 0769  
[www.esr.cri.nz](http://www.esr.cri.nz)

### **AUDITOR**

Chris Barber of PricewaterhouseCoopers  
on behalf of the Auditor-General

### **BANKER**

ANZ Bank New Zealand Limited

### **SOLICITOR**

Buddle Findlay

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## ESR SCIENCE CENTRES

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Fax: +64 4 914 0770

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Fendalton  
Christchurch 8540  
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Fax: +64 3 351 0010

### **NATIONAL CENTRE FOR BIOSECURITY AND INFECTIOUS DISEASE (NCBID) – WALLACEVILLE**

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Upper Hutt 5140  
New Zealand  
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Fax: +64 4 529 0601

### **MT ALBERT SCIENCE CENTRE**

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Private Bag 92021  
Victoria Street West  
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New Zealand  
Tel: +64 9 815 3670  
Fax: +64 9 849 6046



The background features a complex geometric composition. A large, dark grey triangle points downwards from the top left. A horizontal black band crosses the middle of the image. On the right side, a white square is partially visible, with its top-right corner cut off by a diagonal line. The overall aesthetic is minimalist and modern.

**THE  
SCIENCE  
BEHIND  
THE TRUTH.**

**Wt**

Workplace  
drug  
testing

**Fo**

Food  
science

**Ws**

Water  
science

**Hs**

Health  
science

**Sg**

Social  
science

**Fs**

Forensic  
science

**Rs**

Radiation  
science

