

2020



THE FRESHWATER
RESEARCH CENTRE



ANNUAL REPORT





“Water is the most critical resource issue of our lifetime
and our children’s lifetime. The health of our waters is the
principal measure of how we live on the land.”

Luna B. Leopold

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About the FRC

The Freshwater Research Centre (FRC) is a non-profit organisation that undertakes research across a range of disciplines in the field of freshwater science. The centre promotes cross-cutting, collaborative and relevant research and is committed to developing innovative solutions for balancing human needs and ecological requirements for water. Members are specialist river and wetland ecologists, with collective research experience exceeding 150 years.

Freshwater is widely acknowledged to be fundamental to economic and social well-being, and its availability or scarcity is rapidly becoming one of the planet's most pressing environmental concerns. Sustainable use of water resources is essential if human societies are to continue to derive long-term benefits in the face of local development needs and global climate change. Integral to the FRC's philosophy is the conviction that water is not just a resource, but an essential element for the sustenance of life itself, and that maintaining healthy aquatic ecosystems is central to the continued existence of human society.

Despite its fundamental value, this resource is threatened by human activities that continue to degrade its quality and quantity. Water resources are particularly threatened in countries like South Africa where the climate is generally semi-arid and water resources are naturally scarce. To effectively manage water resources, it is imperative that we understand how freshwater ecosystems function and the ecological consequences of water use.

Our goals are to achieve a thorough understanding

of how freshwater ecosystems are structured and how they function, to improve our ability to use water resources sustainably, and to predict the effects of climate change and other human-related impacts on the integrity of freshwater ecosystems. Ultimately our research generates knowledge on ecological infrastructure of freshwater ecosystems and its value to society, which informs policy and management.

Our vision is to undertake collaborative research that is relevant, data-driven, scientifically defensible and which promotes the effective management, conservation and rehabilitation of freshwater ecosystems in southern Africa. We are committed to promoting excellence in research, training and education, and through these channels to better understand and cope with global change.

We aim to share this knowledge with society and raise awareness of the value of freshwater ecosystems through traditional and digital media channels, as well as peer-reviewed literature. We strive to develop local capacity in the aquatic sciences through supervising and mentoring students and by providing internship opportunities. Our environmental education and outreach programme - Living Labs - exposes school groups to the wonders and values of healthy ecosystems.

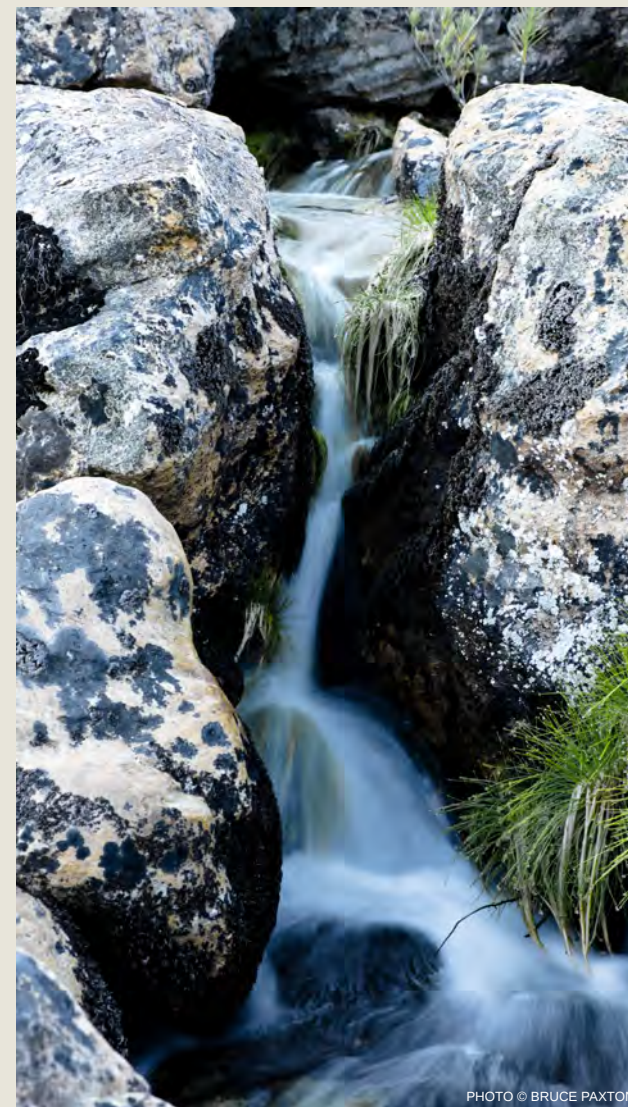


PHOTO © BRUCE PAXTON



2020 in Review

2020 has been an exciting and industrious year for the Freshwater Research Centre. Several multi-year projects have been completed. Our focal areas of monitoring and management, resource protection and conservation, climate change, and water and livelihoods, continue to direct our work. Our expansion into the field of bioinformatics has been exciting, with several projects now onboard.

In fiscal year 2020, we:

- ✓ Completed the development of tools for assessing the Present Ecological State (PES) of wetlands (WET-Health Version 2) contributing significantly to the generation of new knowledge relating to the ecological condition of wetlands in South Africa.
- ✓ Completed a study that tested a second larvicide for controlling pest blackfly on the middle and lower Orange River.
- ✓ Progressed further on the development of decision support tools aimed at assessing the risks of pesticides in freshwater ecosystems. The Soil Water Assessment Tool (SWAT) model is a useful tool for managing and mitigating non-point source pesticide pollution at a catchment scale.
- ✓ Completed a two-phase project focused on biodiversity and water resources in the Upper Riviersonderend, Amandels and Du Toits Rivers in the Theewaterskloof Catchment. A third phase has now begun.
- ✓ Started our Saving Sandfish project in the Biedouw River, Cederberg. Urgent conservation action is required to prevent the sandfish from going extinct. This project falls within the FRC's Cape Critical Rivers conservation programme.
- ✓ Released version 2 of the Freshwater Biodiversity Information System (FBIS) for tracking change in South Africa's freshwater biodiversity. Each release of the FBIS enhances functionality, biodiversity modules, dashboards and reporting.
- ✓ Began a collaborative project to develop an atlas and phenology of dragonflies and damselflies in South Africa, based on the University of Cape Town's Animal Demography Unit's, citizen science project, OdonataMap.
- ✓ Started organising an African Freshwater Bioinformatics Workshop for leaders of projects developing African freshwater biodiversity information systems, to be hosted by FRC in Cape Town in 2020.
- ✓ Completed a project focusing on the development of environmental water temperature guidelines for perennial rivers in South Africa, contributing significantly to the generation of new knowledge relating to water temperature.
- ✓ Continue to work with stakeholders in the water-stressed and biologically significant Koue Bokkeveld.
- ✓ Undertook two consultancies related to biomonitoring and environmental flows in the Zimba District of Zambia's Southern Province and Kagera River in north-western Tanzania.
- ✓ Provided practical training on SASS5 aquatic biomonitoring for participants from the Department of Human Settlements, Water and Sanitation, the South African National Biodiversity Institute and De Zalze Winelands Golf.
- ✓ Grown the Living Labs outdoor education programme to 34 schools. To date we have run a total of 60+ outings, reaching 2000+ learners, and



- provided training to 40 educators.
- ✓ Embarked on a fundraising event "Riding for rivers and wetlands", where over the course of 2019 and 2020, two mountain bike riders cycling as Team FRC completed a series of challenging stage races during the build up toward the 2020 ABSA Cape Epic.

As FRC continues to grow, we embrace opportunities to collaborate with organisations and fellow researchers, conservators, managers and implementers. I am enormously grateful for the passion and dedication of our board members, researchers, students and interns; and indebted to our funders and donors who continue to support us.

Helen Dallas
Executive Director
Freshwater Research Centre

A handwritten signature in dark ink, appearing to read 'H Dallas'.

Monitoring and Management

Development of tools for assessing the Present Ecological State (PES) of wetlands (WET-Health Version 2)

The main aim of this project was to develop a refined suite of "tools" for assessing the Present Ecological State (PES) of wetland ecosystems in South Africa, building on the existing WET-Health tool (Macfarlane et al. 2009) previously developed through the WRC and SANBI as part of the Wetland Management Series and the Wetland-IHI tool developed through the then Department of Water Affairs & Forestry (DWAF) for determining the PES of floodplain and channelled valley-bottom wetlands (Rowntree et al. 2007). PES is a measure of the deviation from a presumed natural reference condition, typically expressed as an "Ecological Category" (ranging from A to F, with A representing a largely natural or minimally impacted state and F representing a critically modified state). The refined suite of tools has been named WET-Health Version 2.0. During this year of the project (2019-2020), refinements were made to the spreadsheet tools already developed and tested during the previous year for both desktop-based ("Levels 1A and 1B") and field-based ("Level 2") rapid wetland PES assessments. The development of tools specifically designed for desktop-based assessment, which was identified as a major need amongst

stakeholders during the early consultative part of the project, was a particularly important improvement on the previously existing tools. The main report for the project (a Technical Guide) was also finalised during the year, and then published in May 2020 (see citation below). There was general agreement from the WRC Reference Group members that it would be important, as a follow-on from the current project, to produce a less technical User Manual for the tools that have been developed. Our main partners on this project are Eco-Pulse Environmental Consulting Services and the University of KwaZulu-Natal.

Final report citation: Macfarlane DM, Ollis DJ and Kotze DC (2020). WET-Health (Version 2.0). A refined suite of tools for assessing the Present Ecological State of wetland ecosystems. Technical Guide. WRC Report No. TT 820/20. Water Research Commission, Pretoria.

Project value: R 1, 500 000

Reintroduction of second larvicide to control pest blackfly on the Orange River

Red Meat Research and Development SA funded a recently completed study that tested a second larvicide for controlling pest blackfly on the middle and lower Orange River. While the larvicide is not new, it became ineffective in the mid-2000s for controlling pest

blackfly here because of a build-up of resistance to the product in the local blackfly population. This means that only one larvicide, a bacterial larvicide, has been available for controlling blackfly for the past 10-15 years.

The Orange River Blackfly Control Programme, established in the early 1990s, was originally based on alternating use of two larvicides - a bacterial larvicide (Vectobac®) and an organophosphate (Abate®). While Abate does not result in these application drawbacks due to its more concentrated, lower viscosity formulation, its over-use was cautioned against because of the higher likelihood of resistance developing among blackfly populations.

With more than ten years since the last use of Abate in the Orange River, it was hypothesized that larval resistance had diminished to the point where Abate could be used again. This recently completed study re-tested the efficacy of the larvicide Abate on pest blackfly. This was first tested for product viability at a site about half an hour's drive from Grahamstown on Great Fish River. Here, the same species of blackfly which caused the outbreak on the Orange River have not been exposed to Abate. Next, the gutter trials were repeated on the Orange River near Upington in the Northern Cape. In all trials, larval mortalities were significant after application of the larvicide.

Project Value: R 175 620

Mitigating the Risks of Pesticide Pollution in the Aquatic Environment

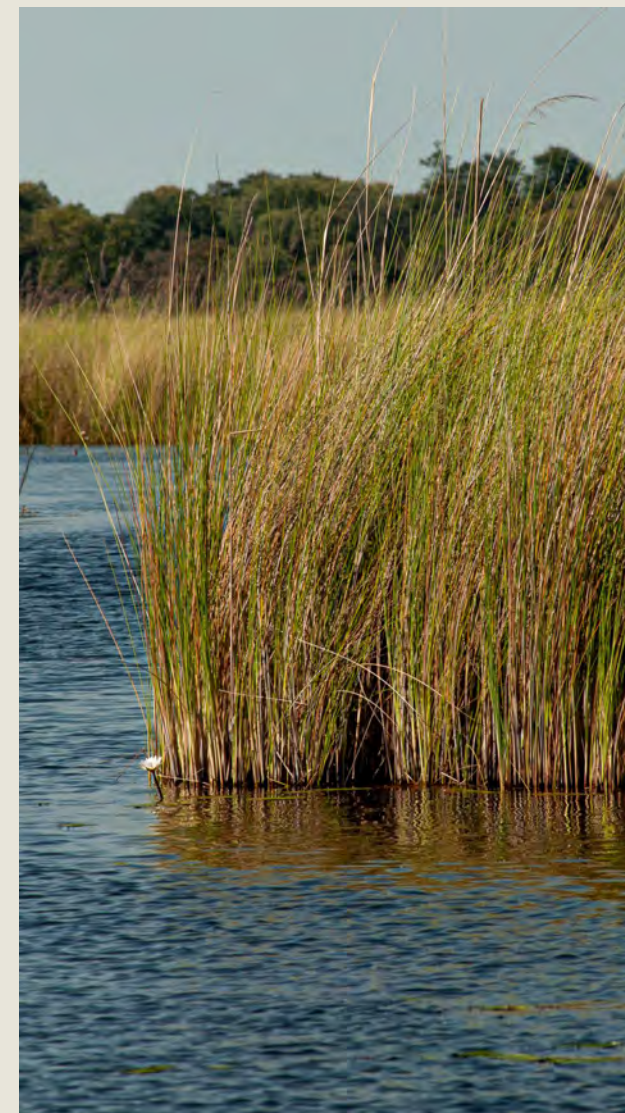
During the 2019/20 project year, further progress was made on the development of decision support tools aimed at assessing the risks of pesticides in freshwater ecosystems. The Soil Water Assessment Tool (SWAT) has been implemented in the Kars River catchment, near Napier in the Western Cape. The SWAT model estimates temporal and spatial loadings of pollutants derived from different land use activities and is therefore potentially a valuable tool for managing and mitigating non-point source pesticide pollution at a catchment scale. The model has been calibrated to produce realistic estimates of flow in the catchment and has identified hot-spot sub-catchments where pesticide concentrations could potentially pose a risk to aquatic biota. This type of information is invaluable for managing risk to the critically endangered Heuningnes Redfin (*Pseudobarbus* sp.) which occurs in the upper reaches of the Kars River which is the focus of research by Keir Lynch, an M.Sc. student involved in the project. These modelling outputs will be compared to the results of pesticide samples collected in the catchment to determine whether the model can accurately predict pesticide concentrations and whether it can be reliably used to predict and manage non-point source pesticide pollution in larger catchments in South Africa. Five separate sampling campaigns have been

undertaken and analysis of samples collected during these campaigns will be undertaken during the 2020/2021 financial year.

Outputs to date:

- ✓ Updated Pesticide Use Maps indicating estimated application rates of almost 200 pesticide active ingredients per quaternary catchment in South Africa.
- ✓ Pesticide Risk Maps indicating the predicted risk of applied pesticides to algae, invertebrates and fish per quaternary catchment.
- ✓ Pesticide Risk Indicator designed to estimate the relative risks of different pesticides applied to crops in South Africa

Project value: R 4, 000 000



Supporting sustainable water use and conservation in water-scarce biodiversity-rich regions of southern Africa



Resource Protection and Conservation

Conserving the Rivers of the Theewaterskloof Dam

In 2019, we completed a two-phase project focused on biodiversity, water resource and stakeholder assessments, community science and awareness raising in the Upper Riviersonderend, Amandels and Du Toits Rivers in the Theewaterskloof Catchment (Western Cape, South Africa). Central to the project were the important messages that the protection and management of the rivers, wetlands and biota in this region must take into consideration the highly contested nature of the resource in the Theewaterskloof Dam (which supplies 53% of Cape Town's water).

The central themes of the project were the conservation of indigenous freshwater fish, protection of river and wetland health in the catchments, and the engagement of local and regional stakeholders. We undertook a river citizen science programme with the local schools in the valley, and worked closely with the Vyeboom and Villiersdorp communities to co-create a magnificent giant redfin sculpture to celebrate the Sonderend River.

We have now moved into a third phase of this partnership with The Nature Conservancy where we have developed a monitoring plan and protocols for tracking change in freshwater ecosystems and biodiversity in response to alien plant clearing planned for several rivers flowing into the Theewaterskloof catchment.

The study area is a hotspot for freshwater fish endemism and conservation in the Cape Fold Ecoregion (CFE). The three catchments provide sanctuary for the Endangered giant redfin, *Pseudobarbus skeltoni*, the Riviersonderend Catchment-endemic Cape kurper, *Sandelia capensis* sp. "Riviersonderend", and three genetically-distinct lineages of Cape galaxias *Galaxias zebratus* (one of which is entirely endemic to the Riviersonderend Catchment).

Project value: R 1, 140 570.00



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Resource Protection and Conservation



Saving Sandfish

The Clanwilliam sandfish, endemic to South Africa's Olifants-Doring River system which flows through the Cederberg Mountains, is the country's most threatened, migratory freshwater fish. Once widespread throughout the system, its distribution has contracted and fragmented, to the point where it may have disappeared from the Olifants catchment entirely, leading to its Endangered IUCN conservation status.

The Doring River and its tributaries is last large, undammed, free-flowing river system in South Africa's Cape Fold Ecoregion (CFE) Biodiversity Hotspot, - and the last outpost for remaining sandfish populations.

The most recent survey data from the Doring point toward a sharp decline in sandfish numbers, and an absence of young fish indicates widespread recruitment failure. There are now only two known tributaries where sandfish still spawn: the Oorlogskloof and Biedouw Rivers, but these populations are under pressure from threats like invasive species impacts, water abstraction and sedimentation. Urgent conservation action is required to prevent the sandfish from going extinct. To this end, the Saving Sandfish project has initiated a programme to increase sandfish survival by rescuing and relocating young fish from vulnerable habitats (with invasive fish and excessive water abstraction) in the lower Biedouw River to a short stretch of alien free river upstream, and to refugia created by working with land-owners removing alien fish from farm dams.

In October 2019, 610 juvenile sandfish were rescued and relocated to the upper Biedouw River, and rigorous scientific monitoring is underway to gauge the success of this conservation intervention. In 2020 we are aiming to rescue and relocate 5000 young sandfish to three farm dams where alien fish have been removed with the help of local land owners to create new sandfish sanctuaries. The project also has a strong communication component, and the Saving Sandfish journey is being chronicled through a web series called Saving sandfish being produced in partnership with local freshwater storytellers Fishwater Films. This project

falls within the FRC's Cape Critical Rivers (CCR) conservation programme, and we are working with partners CapeNature, Department of Environment and Nature Conservation Northern Cape Endangered Wildlife Trust, Bushmanskloof reserve, Enjo Nature Farm, Mertenhof Farm and Gone Outdoor. Funding from National Geographic, Mohammed Bin Zayed Species Conservation Fund and the Federation of South African Flyfishers.

Project Value: R 650 000.00



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Bioinformatics



Freshwater Biodiversity Information System

FBIS is a web-based information system for tracking change in South Africa's freshwater biodiversity. Version 2 was released in July 2019 following an intense period of technical development, collation of biodiversity data and testing. This year the FBIS team focused on growing interest and user engagement. Since May 2019 we have presented on FBIS at nine conferences/symposia/forums, exposing both national and international freshwater biodiversity communities to the FBIS. To date, 157 users have signed up, including biodiversity/conservation planners (15), consultants (51), researchers (50), water resource managers (32) and citizens (7); from 79 different organisations. The FRC-SANBI collaboration provided a number of avenues for organisational and individual, as well as formal and informal capacity development through registered students, interns and staff members. Thus far, 48 individuals from 16 different organisations have been trained in using FBIS in workshops, as well as on-the-job training. FBIS has a user friendly spatial interface that allows users to navigate easily to a site, to view or add algal, aquatic invertebrate, fish, as well as abiotic data. Each biotic module has a detailed dashboard that serves occurrence data over time, with details of origin, endemism and conservation status. FBIS links with GBIF for its taxonomic backbone and imports all relevant GBIF occurrence records, which a user can select to add to FBIS validated data. FBIS links to IUCN to obtain the most up to date conservation status information for individual species.

FBIS V2 includes 39 spatial filter layers (within 10 categories) and 6 base layers. Partnerships and input from end-users have been key to the development of FBIS. Version 3 is due for release in July 2020.

Project value: R 4, 000 000

African Freshwater Bioinformatics Workshop

A number of countries in Africa are developing information systems for serving freshwater biodiversity data. Many of these projects are funded by the JRS Biodiversity Foundation. To support collaboration, FRC is hosting a 3-day workshop in Cape Town, South Africa in 2020, for leaders of projects developing African freshwater biodiversity information systems. The aim is for participants to share knowledge, expertise and lessons learned from existing information systems and the projects associated with them, and to explore avenues for future inter-project collaborations. Participants will demonstrate existing platforms and freshwater biodiversity projects. The workshop will focus on data challenges, technical design and stakeholder engagement, and includes opportunities for participants to discuss, share and network. The event will culminate in the establishment of an African bioinformatics forum to promote continued knowledge-sharing and collaboration. It will include participants from JRS Biodiversity Foundation-funded projects, private sector partners, and experts from South Africa, Europe.

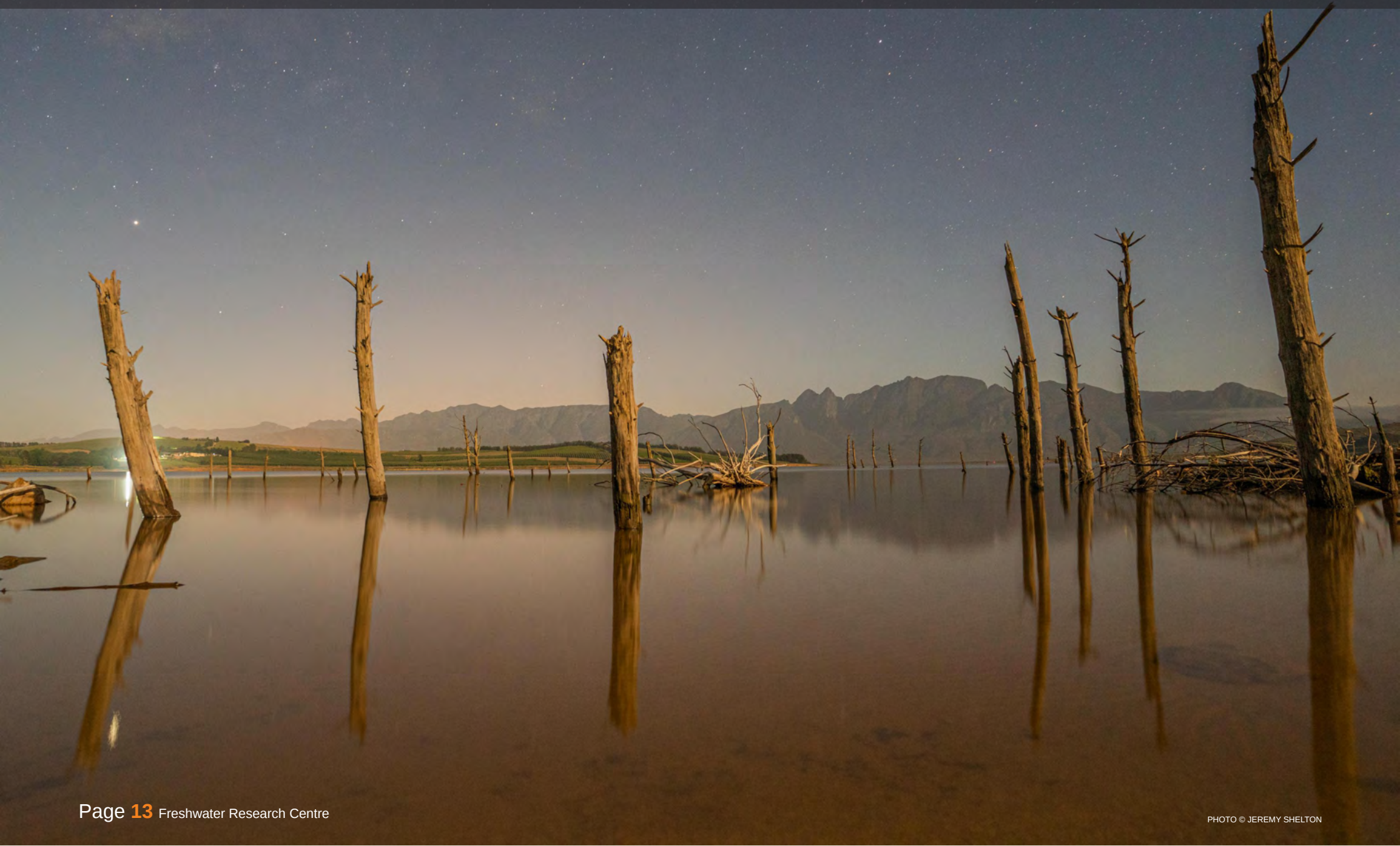
Budget: R 800,000

Developing an Atlas and Phenology of Dragonflies and Damselflies in South Africa

This project started in November 2019 and is led by Prof Leslie Underhill of the University of Cape Town's Animal Demography Unit (ADU). The ADU's citizen science project, OdonataMap, underpins this project, which will produce a comprehensive atlas for Odonata in South Africa. Odonata encompass dragonflies and damselflies, both potential indicators of healthy freshwater ecosystems. The FRC-University of Cape Town collaboration is expected to complete the atlas and related products in 2021, establishing Odonata as a practical indicator of freshwater ecosystem health, providing and promoting useful tools for decision-makers and advocacy, and improving freshwater health assessments. Specific objectives and activities include growing the number of Odonata records, using the distribution data to define Vital Odonata Areas of South Africa, contributing to the seasonal phenology of these species for inclusion in global climate change discussions, and mobilizing data and products through the FBIS. This project will close the remaining gaps in knowledge and data access in South Africa, and support freshwater resource mapping, climate change research, and more.

Budget: R 1,650,000

Assessing and predicting the effects of climate change on aquatic ecosystems to inform future water resources management and policy



Climate Change

Environmental Water Temperature Guidelines for Perennial Rivers

This project aimed to bridge the gap between science/research and management/implementation, by taking the body of research on water temperature and packaging it in ways that best serves the end-users. The objective of this research was to translate knowledge generated over more than a decade of thermal research on South African rivers into a protocol for those practitioners and decision-makers responsible for the protection of our rivers. The project was successfully completed in September 2019 and the researchers produced two volumes on the topic of environmental water temperature guidelines for rivers. The first volume provides the technical background to the project, including an overview of water temperature, thermal impacts and the effect of thermal changes on river organisms. Included in this document is an outline of the engagement with water resource practitioners during the project, as part of a process to ensure alignment between the tool and practitioners needs; and provides a summary of the protocol for establishing environmental temperature guidelines for perennial rivers in South Africa, demonstrated with three case studies. For those wishing to gain more detailed information, it also includes, as a resource, a list of previous publications related to this research. The second volume is a technical manual for setting water temperature targets. It provides guidance on when water temperatures in rivers should be considered and how to assess changes in water temperature, among other aspects. Several new resources, maps, databases, innovative tools, protocols and processes have been developed to

assist water practitioners in their ongoing efforts to support evidence-based decision-making in South Africa.

Completed Reports:

Dallas HF and Rivers-Moore NA. 2019. Environmental water temperature guidelines for perennial rivers in South Africa. Volume 1: Technical Report. Water Research Commission Report No. TT 799/1/19, Water Research Commission, Pretoria.

Dallas HF and Rivers-Moore NA. 2019. Environmental water temperature guidelines for perennial rivers in South Africa. Volume 2: A technical manual for setting water temperature targets. Water Research Commission Report no. TT 799/2/19, Water Research Commission, Pretoria.

Project Value: R 1, 500 000



Supporting the sustainable and equitable water use in a water-scarce agricultural regions of Southern Africa



Water and Livelihoods



Biodiversity & Water in the

Koue Bokkeveld

The rivers of the Koue Bokkeveld, located in the Cape Fold Ecoregion biodiversity hotspot, Western Cape, are notable for their high water yield and their high levels of aquatic biological diversity and endemism. Five of the 11 quaternary catchments are delineated as National Freshwater Ecosystem Priority Areas (FEPAs) and a number of threatened IUCN listed aquatic species are found here. Irrigation of primarily deciduous fruits for export and vegetables constitutes 98 % of the water use in the area and conflicts over water use arise among users and between water users and the environment.

The FRC firmly believes that conservation can be a powerful lever of change for sustainable development. Since the start of this project (June 2017), the focal objective has been to embed sustainable water management principles in the Koue Bokkeveld farming community through a process of stakeholder engagement and institutional support in the light of over-abstraction levels, drought and future climate change scenarios. We have taken on the challenge of changing farmers' perceptions of the environment in order to get them to see it as another 'water user', to release water for environmental flows downstream and to change behaviours and practices around water use when it comes to allocating water among themselves.

The 2019/20 project year has not been without its challenges, but the FRC believes this has been a watershed year for the project, where the effort of the last two years has started to pay off. This has largely been due to the fact that our initiatives have attracted the attention of passionate people in WWF, Department of Agriculture, Landcare and the Department of Human Settlements, Water & Sanitation (DHSWS). This has resulted in the proclamation of the Tweerivieren Nature Reserve, the development of Farm Management Plans and emergency alien vegetation clearing operations in the Twee catchment.

From a water resources management point of view, we are very pleased that the WWF has managed to access funding through the retailers (Tesco, Sainsbury, Woolworths) to open a catchment coordinator post in the Twee River. An independent water manager has been high on our priority for a while since we quickly realized that farmers do not have the capacity or time to undertake complex water management interventions.

Frank discussions with the DHSWS have opened up new potential for leveraging change in the catchment – most importantly for a catchment-wide IWRM approach to managing water. Throughout, the FRC has been open with its data and we have in many instances been consulted on new dam applications and environmental flow issues – by farmers, the DHSWS, the DEA and CapeNature. We take this as a sign that our

work is relevant, and our contribution valued.

The FRC, with Zutari Engineering will be developing a spreadsheet-based Operational Water Management Tool which the catchment coordinator will use for day to day management, for drought planning, as well as to demonstrate the risks of climate change and water security

Project Value: R 1, 068 000



Environmental Assessment



Environmental Assessment

Silverlands Ranching Biomonitoring & Environmental Flows

As part of their commitment to Environmental Social Governance (ESG) standards, Silverlands Ranching Limited, appointed the FRC to undertake annual biomonitoring of the aquatic ecosystems on their cattle ranch and outgrower agricultural business located in the Zimba District of Zambia's Southern Province. The FRC also collected baseline data for a future assessment of the potential impacts of the Kalomo-Luezi canal and for an Environmental Flows (E-Flows) study on the Kalomo River.

This study was undertaken during January 2020 to address the following:

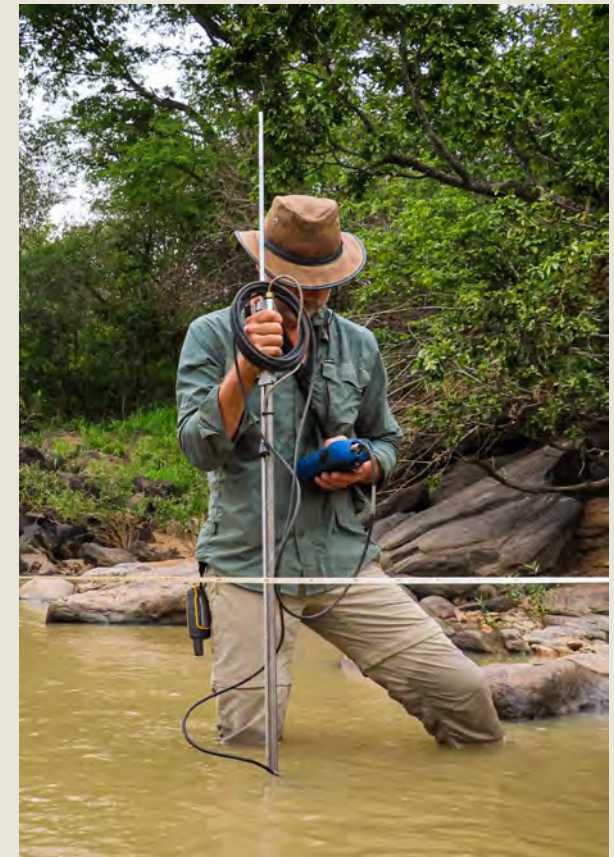
- Aquatic ecosystem health and water quality monitoring programme on Silverlands as part of a continuation of the required annual aquatic biomonitoring programmes on the Silverlands properties;
- Baseline data collection for a specialist assessment of potential impacts of the proposed Kalomo-Luezi canal and water transfer system;
- Baseline data collection for a proposed E-flows study on the impact of flow-related impacts of abstraction from the Kalomo River.

Kakono Hydroelectric Dam Tanzania

The Tanzania Electric Supply Company Limited (TANESCO) intend to develop an 87 MW run-of-river Hydropower Project (HPP) in the Kagera River 90km west of Bukoba in north-western Tanzania. The proposed Project has the potential to adversely impact on the Kagera River and associated aquatic ecosystems. This study in which the FRC provided specialist input into the freshwater fish component was undertaken in collaboration with SLR Consulting and Nepid Consultants. The outputs formed part the supplemental data and reports for the Environmental and Social Impact Assessment (ESIA) of the proposed Project.

The objectives of this the study were to: 1) Describe the current ecological state of aquatic ecosystems within the Kakono HPP Project Area; 2) Describe the current threats affecting the ecological state of aquatic ecosystems; 3) Assess the Aquatic Critical Habitats potentially affected by the project construction and operation.

Primary aquatic ecology data were collected during a field survey between 21 to 28 February 2020 (macroinvertebrates), and 21 February to 01 March 2020 (fish).





South African Scoring System (SASS) training and accreditation

Skills and Training

Biomonitoring Training The FRC provided SASS5 Aquatic Biomonitoring training in January 2020. Participants from the Department of Water and Sanitation, the South African National Biodiversity Institute and De Zalze Winelands Golf Estate participated in the training over 3 days. SASS (South African Scoring System) is the cornerstone of river monitoring and is widely used by river practitioners in South Africa to assess the health of our rivers. The course involves a combination of theoretical and practical training on SASS and the identification of aquatic macroinvertebrates. Four SASS accreditation days were run during the year and fourteen participants obtained their SASS accreditation. Looking forward, FRC will again offer SASS training and accreditation in 2021.



Fostering meaningful relationships between our youth and their environment and
nurturing more conservation-conscious future generations



Education and Outreach

The Living Labs

Founded in 2016, Living Labs is the Freshwater Research Centre's river education and outreach programme. It centres around connecting schools and other community groups to nearby rivers for an immersive nature experience, at the same time collecting meaningful ecological data. Rivers are ideal outdoor classrooms for learning about biodiversity, ecology and conservation, and the activities covered during the Living Labs experience are designed to complement what is learned in Life Sciences at schools. Under the guidance of passionate freshwater biologists, the groups conduct their own 'miniSASS' assessment - a biomonitoring tool to estimate the health of the river.

This hands-on, wet feet, “real science” experience allows learners to relax in nature and connect with their local river environment - often for the very first time. Besides the palpable excitement that an encounter with a larval dragonfly generates, the river health assessment also produces meaningful data about the state of the river ecosystem. The results are uploaded to a national database and thereby made available to scientists and freshwater decision makers.

Living Labs also offers miniSASS training, equipment and ongoing support for school teachers and community leaders, thereby striving to grow a strategic network of schools and community groups,

each connected to a river which they learn from and help conserve.

Over the period 2019-2020, Living Labs reached schools and learners from a range of backgrounds in 12 different Western Cape river catchments, inspiring a fresh wave of freshwater consciousness, and contributing meaningfully to river conservation along the way. Our network of schools has grown to 34, and to date we have run 60+ outings, reaching 2000+ learners. In total, 40 educators have received training in both river health assessment protocols, and in running river conservation biology experiences for school groups, and river health sampling kits have been provided to three school groups that showed a need for them.

Our second Living Labs Ecology Camp was held in December 2019 where 15 grade 10's and 11's and 12's spent the weekend immersed in a mountain stream learning about water values and freshwater ecosystem conservation by taking part in activities like miniSASS and river snorkeling fish surveys. Furthermore, we have now partnered up with Youth For Conservation (Y4C, Maria Hauk) and the Impact Trust (Geordie Ratcliffe) to expand the reach and impact of the programme moving forward.

Grants from The National Geographic Society, Cape Town Environmental Education Trust and the Table Mountain Fund. Donation from Keen Outdoor.



Riding for Rivers and Wetlands

Over the course of 2019 and 2020, two mountain bike riders cycling as Team FRC completed a series of challenging stage races during the build up toward the 2020 ABSA Cape Epic. These races took the team through a variety of local landscapes along cycling routes that crossed many of the regions' most critical water source areas.

Through a series of blog posts showcased on our website news page, the riders' adventures were shared with a growing community of 'Team FRC' supporters, highlighting interesting freshwater landmarks and messages as they went.

Unfortunately due to Covid 19, the Epic was cancelled, but the campaign still managed to raise R15 500, which will be used to support our class-leading Living Labs river education and awareness programme. The programme centres around connecting schools and other community groups to nearby rivers for an immersive nature experience that collects meaningful ecological data along the way. Rivers are incredible outdoor classrooms for learning about biodiversity, ecology and conservation, and the activities covered during the Living Labs experience are designed to complement what is learned in Life Sciences lessons at school.

We are grateful to all of the donors who supported this initiative so generously, and we will be sharing

updates on the impact of the raised funds when we are able to resume our planned outreach activities.

Team FRC riders: Barbara Dallas-Daw, Nives Schabert



Donors, Funders and Partners

DONORS AND FUNDERS

Water Research Commission of SA
JRS Biodiversity Foundation
National Geographic
Joint Nature Conservation Committee
Red Meat Research & Development South Africa
Hans Hoheisen Charitable Trust managed by Nedbank Private Wealth
Table Mountain Fund
Cape Town Environmental Education Trust
The Nature Conservancy
South African National Biodiversity Institute
Mohammed Bin Zayed Species Conservation Fund
World Wide Fund for Nature

KEY PARTNERS

University of Cape Town
University of Stellenbosch
Nelson Mandela Metropolitan University
South African Institute for Aquatic Biodiversity
CapeNature
Department of Environment and Development Planning
South African National Biodiversity Institute
Department of Agriculture LandCare
University of the Western Cape
Department of Human Settlements Water and Sanitation
Institute of Natural Resources
University of Pretoria
Agricultural Research Council

Board and Researchers

BOARD OF DIRECTORS

Dr. Helen Dallas
(Executive Director)

Dr. Jenny Day
(Non-Executive Director)

Dr. Mao Amis
(Non-Executive Director)

RESEARCHERS

Dr. Nick Rivers-Moore
(Water Ecosystems)

Dr. Jeremy Shelton
(Water Ecosystems)

Dr. Bruce Paxton
(Water Ecosystems and Flows)

Dr. Justine Ewart -Smith
(Water Ecosystems)

Dr. James Dabrowski
(Water Quality)

Kate Snaddon
(Wetlands Science)

Dean Ollis
(Environmental Assessment)

ADMINISTRATION & ACCOUNTING

Janette Lumley
(Office Administration)

Marycke Rosche Acc.
(Accountants)

Verryn & Co.
(Independent Auditors)

STUDENTS

Nonkanyiso Zungu
(PhD Student)

Keir Lynch
(MSc Student)

Pfananani Ramulipho
(PhD Student)

Mohammed Kajee
(Msc Student)

Jody-Lee Reizenberg
(PhD Student)

INTERNS

Melandri Rafferty
(Intern)

Phillip Frenzel
(Intern)

Aneri Swanepoel
(Intern)

Financials

Statement of Financial Position as at 29 February 2020

Figures in Rand	2020	2019
Assets		
Non-Current Assets		
Property, plant and equipment	34,965	53,660
Current Assets		
Trade and other receivables	1,106,076	863
Cash and cash equivalents	2,907,679	2,408,199
	4,013,755	2,409,062
Total Assets	4,048,720	2,462,722
Equity and Liabilities		
Equity		
Retained income	400,406	199,643
Liabilities		
Current Liabilities		
Trade and other payables	3,648,314	2,263,079
Total Equity and Liabilities	4,048,720	2,462,722

Statement of comprehensive income

Figures in Rand	2020	2019
Revenue	6,151,084	5,049,784
Other income	612,039	514,978
Operating expenses	(6,673,077)	(5,624,728)
Operating (loss) profit	(90,046)	(59,966)
Investment revenue	110,717	67,061
Finance Costs		
(Loss) profit for the year	200,763	7,083
Other comprehensive income	-	-
Total comprehensive (loss) income for the year	200,763	7,083

Detailed Income Statement

Figures in Rand	2020	2019
Grant Revenue		
Grant Funding Expenses	(5,533,020)	(3,858,21)
Grant Funding Income	(6,151,084)	(5,049,784)
Grant Prepaid Income	(618,064)	(1,191,573)
	-	-
Training and Education		
Living -Labs – Expenses	(19,885)	(97,679)
Living -Labs – Income	18,604	47,797
Living -Labs – Prepaid income	(1,252)	49,882
SASS Training – Expenses	(77,091)	(98,608)
SASS Training – Income	61,790	195,550
SASS Training – Prepaid income	15,301	96,942
	-	-
Freshwater Research Centre NPC Income		
Donations	12,650	6,276
Equipment and vehicle rental income	31,529	88,117
Grant administration fees	450,682	381,151
Insurance Proceeds	27,391	-
Office Rental Income	21,600	39,434
Salaries Reimbursed	68,187	-
	612,039	514,978
Expenses	(521,933)	(574,944)
Operating profit (loss)	90,046	(59,966)
Investment income	110,717	67,061
Finance costs	-	-
	110,717	67,049
Profit for the year	200,763	7,083

The FRC would like to extend our gratitude to the donors and funders who contributed to our successes in 2020

