Shallow Marine and Coastal Research Infrastructure

2017 - 2022

Self-Evaluation Report

SMCRI Shallow Marine & Coastal RESEARCH INFRASTRUCTURE

science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

NRF National Research Foundation | SAEON South African Environmental Observation Network

NRF National Research Foundation | SAIAB South African Institute for Aquatic Biodiversity

Executive summary

The Department of Science and Innovation officially launched the South African Research Infrastructure Roadmap in 2016. The SARIR initiative is a high-level strategic and systemic intervention to provide research infrastructure across the entire public research system, building on existing capabilities and strengths, and drawing on future needs. The overall objective of SARIR is to provide a strategic, rational, medium to long-term framework for planning, implementing, monitoring and evaluating the provision of research infrastructures necessary for a competitive and sustainable national system of innovation (NSI).

The Shallow Marine and Coastal Research Infrastructure (SMCRI) was established in 2017 to develop an array of instruments and physical research platforms around the coast of South Africa (and its sub-Antarctic Islands) to collect long-term reliable data for scientific research to help decision makers formulate appropriate environmental policies to lessen the risk and vulnerability of the coastal zone to climate and global change. The SMCRI taps into South Africa's geographical advantage by providing access to cutting edge research platforms and data at appropriate spatial and temporal scales in all the coastal biogeographic regions from all three oceans to stimulate innovative research and IP generation that is of regional importance and global relevance.

Since 2017 the SMCRI made excellent progress with regards to the immediate implementation of this national research platform. This driven start-up enabled SMCRI to meet most of the requisite 2017/18 – 2019/20 deliverables as outlined in the DSI Contract Number DST/CON0146/2017. The team has managed this through the initiation of key Supply Chain Management (SCM) activities in terms of the purchase and commissioning of the key capital items, e.g. a light sports aircraft for the Airborne Remote Sensing Platform, a hyperbaric chamber, a coastal research vessel for the Coastal Craft Platform, a variety of instruments for the coastal biogeochemistry laboratories, etc. SMCRI was very successfully launched in 2018, and despite some capacity concerns (due to budget uncertainty) and challenges with the procurement of the MetOcean Coastal Observation Moorings, SMCRI was on track to complete the roll-out in Year 4 when the COVID-19 pandemic hit.

The 2020/21 and 2021/22 years were characterized by the COVID-19 pandemic and the resultant lockdown. The pandemic influenced SMCRI through a) no field work or laboratory work conducted in > 60 days, b) no roll-out of new RIs requiring national / international travel, c) moratorium on filling vacant posts, d) delays in students completing their fieldwork, lab work and degrees, e) > 60-day gap in two 12-year time series datasets, f) restricted access to the Marion Island Sentinel Site, and f) sustaining a budget cut of 10%. These impacts were further exacerbated by the restriction on advertising of tenders during the first half of 2022, in response to the Advisory Notes from National Treasury, dated 25 February and 3 March 2022, regarding the Preferential Procurement Regulations, 2017. These external influences delayed the roll-out of SMCRI by more than two years.

Despite all these set-backs, SMCRI produced impressive outputs over the past five years:

- Employed 15 full-time staff, of which 80% are from designated groups
- Trained and provided research platform support to 173 post-graduate students, of which 75% were from designated groups
- Successfully completed 507 LTER and research fieldtrips, 653 BRUV deployments and 351 ROV dives

- Published 92 peer reviewed manuscripts with an average Impact Factor > 4
- Analysed 13,552 seawater biogeochemistry samples
- Provided access to 233 unique platforms users
- Science engagement reached 2041 learners, 168 educators and 968 members of the public
- Websites, databases and online fact sheets attracted 6997 new unique users
- Uploaded 4,259,207 observations into the Observations Database that adhere to the FAIR principles and is freely available to the global scientific community
- Produced products that are beneficial to society, e.g. airborne surveys of flood ravaged areas, providing Hyperbaric Oxygen Therapy through a Public Private Partnership, monitoring pollution in estuaries, etc.
- Close collaboration with other SARIR projects, e.g. EFTEON, SAPRI and BIOGRIP

The major challenges faced by SMCRI include under-expenditure caused by the COVID pandemic that has resulted in a large carry-forward of unspent funds, slow establishment of participative Community of Practice working groups, and SCM challenges. SMCRI will focus the next five years on mitigating these challenges and achieving its six key objectives of transformation, impact of research infrastructure, impact of science engagement, excellence, internationalisation and sustainability. SMCRI has a key role to play in improving the livelihoods of coastal communities, not only in South Africa, but also in the region and the next five years will see SMCRI lead several projects to establish and improve coastal observations in under-resourced countries around the world.

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1. SMCRI Overview

1.1. Introduction

The Shallow Marine and Coastal Research Infrastructure (SMCRI) is one of 13 large Research Infrastructures developed by the Department of Science and Innovation (DSI) as part of the South African Research Infrastructure Roadmap (SARIR). The SMCRI was established in 2017 to develop an array of instruments and physical research platforms around the coast of South Africa and its sub-Antarctic Islands to collect long-term reliable data for scientific research to help decision makers formulate appropriate environmental policies to lessen the risk and vulnerability of the coastal zone to climate and global change. The SMCRI is tapping into South Africa's geographical advantage by providing access to cutting edge research platforms and data at appropriate spatial and temporal scales in all the coastal biogeographic regions from all three oceans to stimulate innovative research and IP generation that is of global relevance. SMCRI is building on the suite of observatories, sentinel site and research platforms already established and maintained by the National Research Foundation's (NRF) South African Environmental Observation Network (SAEON) and the South African Institute for Aquatic Biodiversity (SAIAB).

The SMCRI is geographically dispersed, but managed from a Central Coordinating Unit (CCU) based at the Ocean Sciences Campus of the Nelson Mandela University. The central location of the CCU relative to the Sentinel Sites allows for effective financial and operational management. The CCU being integrated with the SAEON Elwandle Coastal Node, means that CCU personnel enjoy full operational support both in terms of human resources and infrastructure from SAEON, SAIAB and the NRF.

The Ocean Sciences Campus is exceptionally well suited as an operational base for SMCRI. Launched in October 2017 by the Nelson Mandela University, the Ocean Sciences Campus is envisaged to become a nucleus for innovation, research, teaching and engagement in key marine and maritime spheres. Through partnerships spanning disciplines transcending the socio-ecological spectrum, much needed human capital development and new knowledge will be generated to help steer the process of balancing pursuance of unlocking blue economic potential and sustainability. As a full partner in this initiative, SAEON and SMCRI will be embracing these challenges in the spirit of transdisciplinarity and innovation. In so doing, considerable investment had been made by SMCRI in partnership with the university, which includes the establishment of a Marine Biogeochemistry Laboratory, Sedimentology Unit, Microscopy Laboratory, an Oceanography Electronics Workshop, a Marine Plastics Research Laboratory and significant infrastructural development in support of the Research Dive platform.

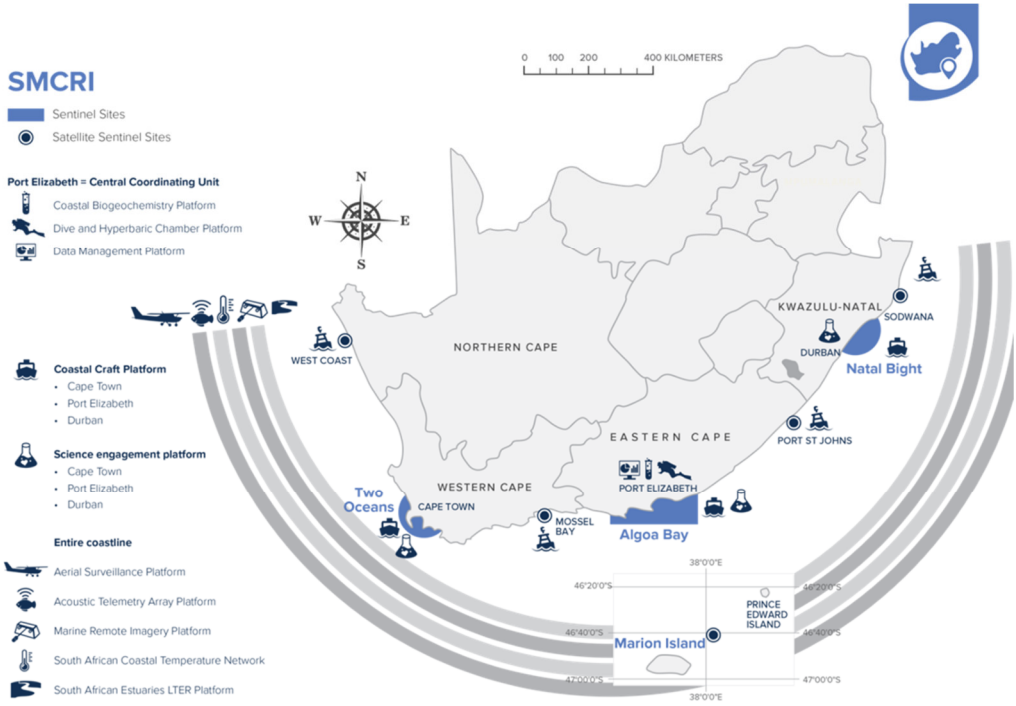
Mitigating climate change also provides an economic opportunity for South Africa, the "blue economy". In the development of the "blue economy", the exploitation of living (fisheries, aquaculture, tourism) and non-living marine resources (oil and gas, minerals, energy) should be on a scale that is socially and economically justifiable and ecologically sustainable. The SMCRI is deploying observatories and research platforms at key sites around the coast to improve our understanding of the key drivers of change and the potential ecosystem and socio-economic response. SMCRI will directly provide data to grow the "blue economy" especially in the key sectors of fishing, aquaculture, oil and gas, shipping, mining and coastal development. South Africa's Constitution, the National Strategy for Sustainable Development

(NSSD) and the National Development Plan: Vision 2030 requires the protection, conservation and sustainable use of the marine environment.

The SMCRI research platforms (see Fig. 1 below) managed by two NRF facilities are:

- SAEON Elwandle Coastal Node:
    - Algoa Bay Sentinel Site for Long-Term Ecological Research
    - Two-Oceans Sentinel Site for Long-Term Ecological Research
    - Natal Bight Sentinel Site for Long-Term Ecological Research
    - Marion Island Sentinel Site for Long-Term Ecological Research
    - Satellite Sentinel Sites for Long-Term Ecological Research
        - Namaqua MPA (West Coast)
        - Mossel Bay (South Coast)
        - Tsitsikamma MPA (South Coast)
        - Dwesa/Mkambati MPA (Wild Coast)
        - iSimangaliso MPA (North Coast)
    - Coastal Biogeochemistry Laboratory
    - Hyperbaric Chamber
    - Data Management
    - Science Engagement
    - Airborne Remote Sensing
    - South African National Temperature Network
    - South African Estuaries Monitoring Network
- South African Institute for Aquatic Biodiversity:
    - Coastal Craft Fleet
    - Acoustic Tracking Array Platform (ATAP)
    - Marine Remote Imagery Platform (MaRIP)

These platforms are described in more detail in Appendix F and in the SMCRI booklet.



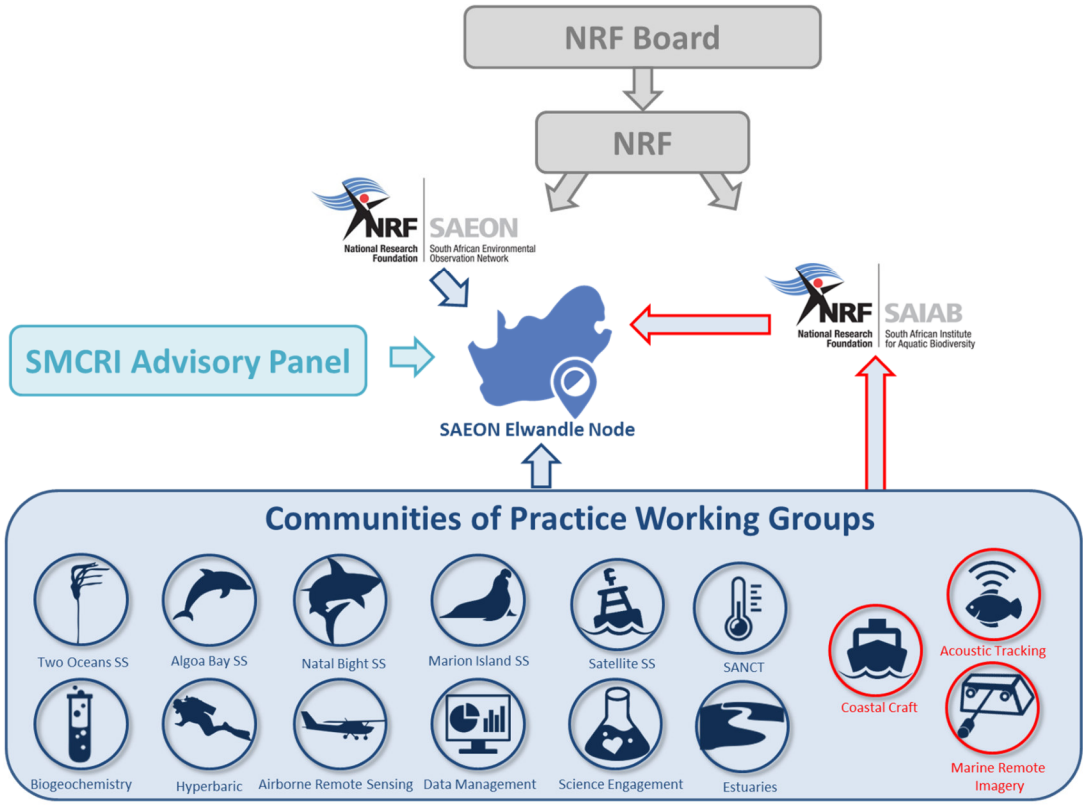
Spatial distribution of SMCRI platforms

1.2. Governance Structure

The SMCRI Advisory Panel meets once a year (normally November) and provides strategic guidance to the SAEON Elwandle Coastal Node on the overall strategic direction, management and performance of the SMCRI in accordance with the DSI funding contract (DST/CON0146/2017 and subsequent amendments). The schematic below (Fig. 2) highlights the advisory structures of SMCRI. Communities of Practise Working Groups have been established for some of the 15 research infrastructure platforms making up SMCRI. The role of the Working Groups is to provide technical advice and guidance from stakeholders and to drive the technical development of the research platforms.

The Advisory Panel responsibilities are to:

- Provide sound strategic guidance to the SAEON Elwandle Node;
- Offer advice on the long-term sustainability of SMCRI;
- Offer advice on the Annual Performance Plans (implementation milestones and budget allocations) and Annual Progress Reports;
- Play a catalytic ambassadorial role for SMCRI and lobby for support when necessary.



SMCRI Advisory Structures

The Advisory Panel comprises eleven Members. The SMCRI Manager and a nominee of SAEON, SAIAB and the DSI are ex-officio Members. As at July 2022, membership of the Advisory Panel is:

- Chair: Prof Anusha Rajkaran
- Six institutional members nominated by SMCRI:
    - Dr Gerhard Cilliers (DFFE - Oceans and Coasts) (Second: Mr Ashley Naidoo)
    - Mr Rudzani Malala (SAWS)

    - Dr Judy Mann (SAAMBR)
    - Dr Andrew Mather (Coastal Policy, eThekwini Municipality)
    - Vacant (DFFE - Fisheries) (Dr Andrew Cockroft retired and must be replaced)
    - Mr Sibusiso Majola (DWS RQS)
    - Ms Kithi Ngesi (Nelson Mandela Bay Municipality)
- Three members nominated through the SANCOR Regional Representatives from research entities in the following coastal provinces:
    - Northern Cape and Western Cape (Dr Anusha Rajkaran, UWC),
    - Eastern Cape (Prof Janine Adams, NMU) and
    - KwaZulu-Natal (Mr Santosh Bachoo, EKZNW).
- Ex-officio Members are:
    - DSI Content Oversight: Dr Gilbert Siko
    - Managing Director of SAEON: Dr Mary-Jane Bopape
    - Managing Director of SAIAB: Dr Angus Paterson
    - SMCRI Manager: Prof Thomas Bornman

The following working groups have been very active and meeting regularly to plan the operations of the research platforms:

- Airborne Remote Sensing
    - Dr Jasper Slingsby (UCT - Chairperson)
    - Sean Bailey (NRF-SAEON)
    - Kyle Smith (SANParks)
    - Don McGillivray (Industry - Consulting)
    - Dr Melanie Lück-Vogel (CSIR)
- Hyperbaric Chamber
    - Dr Eddelene Bouwer (Level 2 Diving Medical Practitioner - Chairperson)
    - Mr Sean Bailey (NRF-SAEON)
    - Commander Anthony Gin (SA Navy Diving Unit)
    - Dr Toufiek Samaai (DFFE)
    - Mr Louis van Aardt (Recreational Diving Community)
    - Captain Ashley Adams (SAPS Dive Unit)
- KZN-Bight Sentinel Site
    - Dr Jenny Huggett (DFFE O&C - Chairperson)
    - Dr Angus Macdonald (UKZN)
    - Dr Brent Newman (CSIR)
    - Prof David Glassom (UKZN)
    - Dr David Pearton (SAAMBR/ORI)
    - Dr Denham Parker (DFFE Fisheries)
    - Dr Fiona MacKay (ORI/SAAMBR)
    - Dr Johan Groeneveld (ORI/SAAMBR)
    - Dr Justin Pringle (UKZN)
    - Dr Nthuthuko Masikane (UNIZULU)
    - Dr Steven Weerts (CSIR)
    - Dr Tanya Haupt-Schuter (DFFE O&C)
    - Dr Tarron Lamont (DFFE O&C)
    - Mr Thor Eriksen (SAIAB)
    - Dr Toufiek Samaai (DFFE O&C)
    - Prof Ursula Scharler (UKZN)
    - Dr Marjolaine Krug (DFFE O&C)

- Dr Shaun Deyzel (NRF-SAEON)

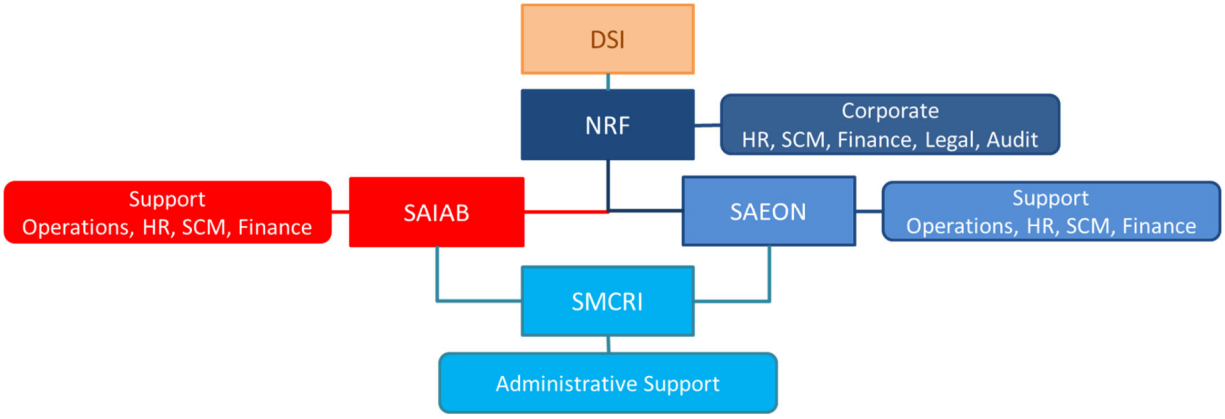
The following two platforms was active prior to COVID, but new working groups have been constituted and will meet only again in August 2022

- Algoa Bay Sentinel Site
  - Dr Shaun Deyzel (NRF-SAEON, interim Chairperson)
  - Prof Eileen Campbell / Dr Paul-Pierre Steyn (NMU)
  - Dr Dylan Bailey / Dr Greg Hofmeyr (Bayworld)
  - Dr Mfundo Bizane (SMCRI)
  - Mr Phumlile Cotiyane-Pondo (SMCRI)
  - Prof Lorien Pichegru (NMU, ICMR)
  - Dr Cloverley Lawrence (SANParks)
  - Prof Nikki James (SAIAB)
  - Prof Rosie Dorrington (RU, SARChI)
- Coastal Biogeochemistry
  - Dr Susan Taljaard (CSIR, Stellenbosch)
  - Nolisidisu Jafa (DWS RQS, Pretoria)
  - Dr Sarah Fawcett (UCT / BIOGRIP)
  - Daisy Kotsedi / Gerhard Cilliers (DFFE)
  - Dr Thandi Mmachaka (DWS compliance monitoring)
  - Prof Janine Adams (NMU, SARChI)

The rest of the research platforms do not yet have an active working group because the platforms are either 1) not established yet (e.g. Two-Oceans, Marion Island Sentinel Sites and satellite sites) or 2) are incorporated into other working groups at the moment, e.g. Estuaries, Coastal Temperature Network, Data Management, etc.

1.3. Management structure

SMCRI is managed by two business units of the National Research Foundation, a statutory entity established in terms of the National Research Foundation Act (Act no. 23 of 1998). The SAEON Elwandle Coastal Node is completely integrated into the SMCRI and the manager of the Node also manages the RI. SMCRI has in-house administrative support (administrator and administrative assistance), but relies on SAEON and SAIAB for all the necessary support functions, e.g. business operations, HR, finance and SCM. In turn, the two business units rely on NRF Corporate shared services such as HR, Legal, Finance, Audit and SCM to provide the necessary support in terms of policies, procedures and advice (see organogram below).



The SMCRI management structure within the NRF

1.4. Auditing

SMCRI, through the NRF, undergoes regular internal and external audits to monitor and evaluate its performance. The purpose of the performance auditing is to evaluate the economy, efficiency and effectiveness of SMCRI's operations so as to assure management that its strategic objectives are being carried out and whether or not they can be improved on. The key findings of the last NRF Internal Audit (2019/20) is listed in Appendix E.

1.5. Reporting

SMCRI produces a monthly progress report that are used to populate the quarterly NRF and DSI reporting templates. The quarterly reports are in turn used to develop Annual Reports where the progress is measured against the Annual Performance Plan.

No	Report	Frequency
1	SMCRI/Elwandle Node Monthly progress reports	Monthly
2	NRF Quarterly progress reports	Quarterly
3	DSI Quarterly progress reports	Quarterly
4	NRF Annual highlights report	Annual
5	DSI Annual Progress reports	Annual
6	Project APRs to funders (NRF and external)	Annual
7	Student bursary APRs (NRF and other funders)	Annual

1.6. Launch

The SMCRI was officially launched by the DG of DSI, Dr Phil Mjwara, in Port Elizabeth (Gqeberha) on 19 October 2018.

Dr Phil Mjwara (DSI) Dr Molapo Qhobela (NRF CEO), Dr Danny Adams (CD, DSI), Prof Andrew Leitch (DVC Research, NMU), Prof Derek Swartz (VC, NMU) and Dr Angus Paterson (SAIAB MD)

SMCRI staff, students and interns that made the launch possible

2. History of Annual Performance Plans, Strategic Objectives and KPI's

The strategic objective of the SMCRI, as per the original proposal (Bornman 2016), was to provide research infrastructure for:

- Strategic, socio-economic and scientific impact
- Scientific excellence
- Human capacity development

To achieve these broad objectives, SMCRI's project plan and KPI's during the first three years (See SMCRI APP 2016/17 – 2018/19) were to:

- Establish the technical and liaison panels
- Procure the Research Infrastructure
- Appoint staff, interns and students
- Ensure platforms are integrated, commissioned and operational
- Increase and improve stakeholder involvement

After reporting on these KPI's for the first two years (See Annual Progress Reports for 2017/18 and 2018/19), the DSI requested that progress be reported on Human Capacity Development, impact and transformation. As a result the new SMCRI APP (2019/20 – 2021/22) was more aligned to the NRF Strategy 2020, with the following key objectives:

- Promote globally competitive research and innovation through
    - Human Capacity Development
    - Knowledge Generation
- Establish and Maintain Research Infrastructure and Platforms
- Enhance strategic international engagements
- Entrench Science Engagement

At the end of 2020/21, a new SMCRI Annual Performance Plan was drafted with six strategic objectives aligned to one or more of the national priorities as set out in WP-STI 2019 (DSI), NRF Vision 2030, NRF Strategy 2025, the NRF APP 2021-23, SAEON Strategy 2030 and the SAEON APP 2021-23. The objectives were based on the core tenets of Transformation; Excellence; Service Culture and Sustainability, i.e.

- Transformed, internationally competitive and sustainable research and technical workforce
- Impact of research infrastructure
- Impact of science engagement
- Excellence
- Enhance strategic international engagements
- Sustainability

These six strategic objectives for SMCRI contributed to increasing the "uptake and impact" of the SMCRI value chain shown in the schematic above. During the past five years, the Key Performance Indicators (KPI) remained centred around the objective of sound governance, commissioning and operationalisation of the research platforms and stakeholder involvement. The performance of SMCRI against the key strategic objectives (Section 3) and the KPIs (Section 4) are discussed below.

3. Summary of Performance

3.1. Transformed, internationally competitive and sustainable research and technical workforce

To accelerate transformation of the knowledge workforce and achieve greater diversity, SMCRI made a concerted effort to appoint more scientific, technical and ICT staff from designated groups. SMCRI currently employs 15 full-time staff (12 or 80% from designated groups), 1 post-doctoral fellowship (4 over the past 5 years, 75% from designated groups) and two interns (8 over the past 5 years, 88/% from designated groups). More detail on Human Resources and HCD over the past five years are provided in Section 5.

Over the past 5-years SMCRI managed to attract and retain highly-skilled staff – staff capable of running world-class platforms and collaborating with world-class researchers. SMCRI, through NRF-SAEON and NRF-SAIAB, managed to:

- Increase our reputation as a trusted source of knowledge on coastal marine science and environmental change in South Africa, and a shaper, influencer and stimulator of the national environmental research ecosystem.
- Develop career enrichment opportunities. Some of these were organised and facilitated by the Corporate Human Resource Development Unit, while others were sourced at programme level and paid for by SMCRI, e.g. swimming lessons, skipper training, research diver training, first aid courses, etc. The education assistance

programme was used by staff members pursuing formal studies for improving their formal qualifications by providing financial support to these staff members for the duration of their studies. All senior SMCRI staff were encouraged to complete a Management Development Course provided by the NRF through the University of Stellenbosch Business School.

The human capital development outputs from SMCRI over the past five years are shown in the table below (detail provided in Appendix A- Section 12). Of the 173 students (Hons to post-docs) that used SMCRI platforms, 75% were from designated groups with more than 60% of the students being female. The figures for 2021/22 indicated that more than 92% of SMCRI students were from designated groups, showing that our trajectory of student diversity is on the right track to transform the marine science community. These figures are in stark contrast to the SMCRI user community, that is still largely untransformed, despite good advances made to improve the gender profile. One of the reasons for this, despite a concerted effort made by SMCRI to increase the diversity of our external stakeholders, is because a large number of the platform users accessed our freely available data holdings. Seeing that SMCRI adheres to the FAIR principle, we place no restrictions on who can access our data.

Level	South African (or SA Citizenship)								Non-South African		TOTAL	
	African		Coloured		White		Indian		Specify			
	M	F	M	F	M	F	M	F	M	F	M	F
Hons	5	10	0	0	2	4	0	3	0	0	7	17
Masters	14	19	1	6	9	14	3	4	0	5	27	48
PhD	7	10	2	2	9	17	0	4	7	3	25	36
Postdocs	2	1	0	0	5	1	0	1	2	1	9	4
Users	14	7	5	2	71	76	0	9	30	19	120	113
TOTAL	42	47	8	10	96	112	3	21	39	28	188	218

SMCRI will continue to closely collaborate with the SAIAB-ACEP Phuhlisa and Joint Marine Labs programmes to ensure that we build on the good work done over the past five years and make a significant contribution to transforming the marine science community.

Students and interns on a PELTER cruise

Students and SMCRI/NMU lecturers of the Marine Ecology Course

3.2. Impact of research infrastructure

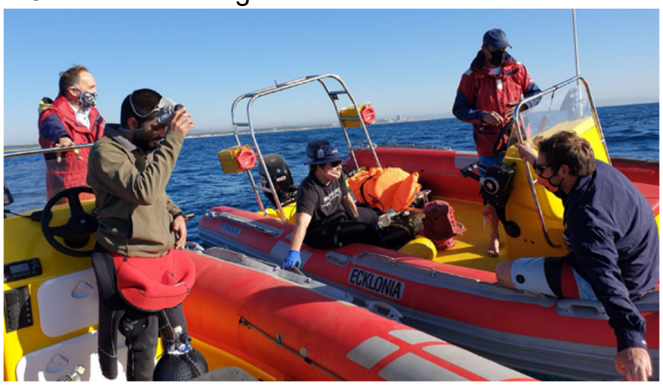
SMCRI delivered data and platform support services from its 15 research platforms during 2017/18 - 2021/22. Highlights from the 15 platforms were:

3.2.1. Algoa Bay Sentinel Site for Long-Term Ecological Research

SMCRI continued with the servicing, maintenance and LTER programmes of the Algoa Bay Sentinel Site. Over the past 5 years the following highlights were recorded:

- COVID-19 lockdown had a major impact on the research and LTER activities of SMCRI in the Sentinel Site. The technical staff removed as many UTR strings from Algoa Bay as possible prior to the lockdown as we were uncertain how long the lockdown would last.
- ADCPs: Hourly wave and current measurements at Schoenmakerskop, Cape Recife and Bird Island since 2008. The ADCP instruments were left in during the lockdowns because of restrictions on diving teams during 2020. No data were lost.
- UTR Thermistors: Hourly temperature data at various depths in both St Francis Bay (x5 strings since 2012) and Algoa Bay (11 strings since 2008). Biggest gap in the 14-year dataset is the 4 months missed when the strings were removed in April –July 2020.
- PELTER: Monthly PELTER sampling were maintained during the past five years. Three trips were missed during April, May and June 2020 due to COVID-19 lockdowns. In addition, four trips were missed (Apr, May, June & July 2021) because of SCM delays in paying the seaworthy certificate fees to SAMSA (who was not registered on the Central Supplier Database)
- SBLTER: Monthly Sandy Beach field trips were completed in 2018 and 2019, but no field trips were conducted due to COVID restrictions in number of staff per vehicle from March 2020 till March 2022. Monthly sampling has commenced again.
- RSLTER: 2020 and 2021 Algoa Bay Rocky Intertidal Winter and Summer Sampling completed in conjunction with SANParks Scientific Services.
- Stromatolite C/T loggers were maintained at four stromatolite pools since 2014, i.e. Cape Recife, Schoenmakerskop, Seaview and Oyster Bay.
- All the Algoa Bay Sentinel Site data was requested for two Community of Practice projects, i.e. Algoa Bay and Ocean Accounting.

SMCRI students deploying the CTD



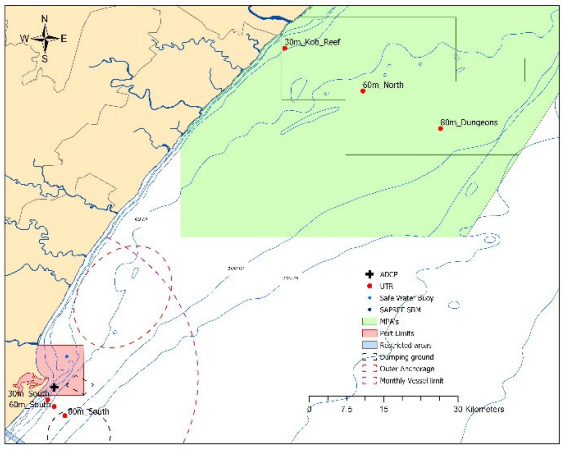
SMCRI staff make use of two smaller vessels to maintain social distancing for dive operations

3.2.2. Two-Oceans Sentinel Site for Long-Term Ecological Research

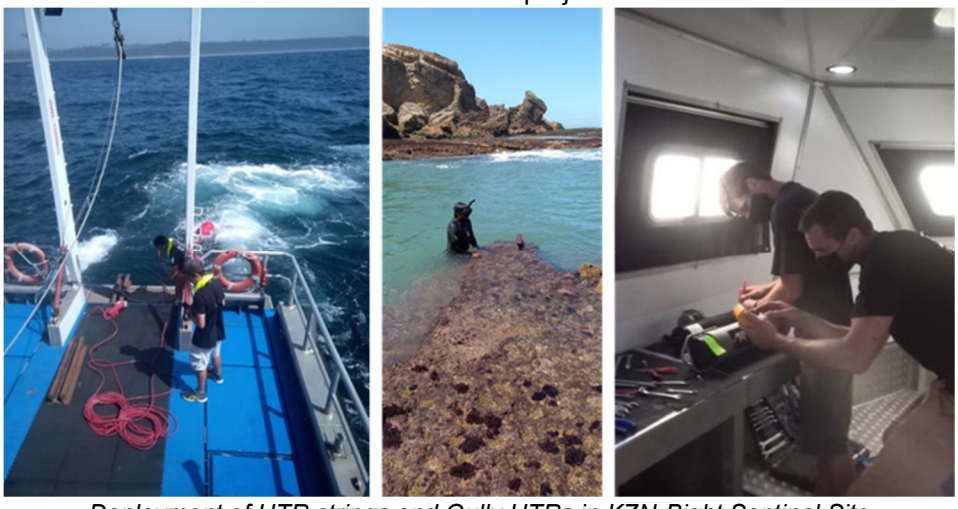
Research Infrastructure for the Kelp LTER sites ready for deployment since 2019. Meetings were held with stakeholders to plan first deployments in False Bay and Betty's Bay prior to and during lockdown. Two information sharing sessions were held with stakeholders, i.e. Kogelberg Task Team and Western Cape Estuaries Task Team. SMCRI also supported a SANOCEAN project in False Bay through platform provision in 2021. SMCRI postponed the role-out of the Two-Oceans Sentinel Site due to the COVID-19

pandemic – for the first year due to uncertainty regarding the impact of various lockdown levels on field work and in the second year due to uncertainty regarding further budget cuts. Plans are in place to hold several stakeholder workshops in 2022 and have the first instruments installed before the end of 2022. Discussions were also held with EFTEONs Greater Cape Town Landscape as well as the BIOGRIP to ensure the three RI's work together at this important socio-ecological site.

3.2.3. Natal Bight Sentinel Site for Long-Term Ecological Research



First KZN-Bight Sentinel Site Working Group meeting was held a week before the COVID-19 lockdown. Most of the subsequent meetings were held virtually during 2020 and 2021 to discuss placement of Underwater Temperature Recorder Arrays. Dr Jenny Huggett (DFFE) was elected as KZNBSS WG Chair for the term 2021-22. A short report was developed for the KZN-Bight Sentinel Site Working Group on possible locations for the thermistor strings. Locations were provided by key stakeholders from ORI, EKZNW and WildOceans. The mooring plans for the KZN-Bight Sentinel Site were approved by the CoP Working Group and permit applications to EKZNW for the three uThukela MPA moorings was approved. Research permit applications were also approved by DFFE. The first three UTR thermistor strings were deployed off the Bluff in February 2022. The three thermistor strings earmarked for the uThukela Banks could not be deployed because of bad weather. SMCRI provided an additional mooring to Dr Fannie Shabangu from DFFE to deploy a long-term acoustic instrument off the Bluff. Three shallow Gully UTRs were deployed in the vicinity of the city of Durban (see pictures below). A site has also been approved by the KZN Bight Sentinel Site Working Group for the long-term deployment of an ADCP (in partnership with SAIAB). The KZNBSS WG supported a proposal for the partial adoption of the existing "ORI Plankton Line" as the locations for long-term sampling of the pelagic ecosystem (PELTER). Components of the KZN-Bight Sentinel Site is included in the uThukela Blue Action Fund EbA project.



Deployment of UTR strings and Gully UTRs in KZN-Bight Sentinel Site

3.2.4. Marion Island Sentinel Site for Long-Term Ecological Research

Long-term wind stations were deployed on Marion Island in collaboration with the CSIR and University of Pretoria that forms part of a bigger SANAP project. COVID restrictions are still impacting the projects and plans for the Sentinel Site due to quarantine restrictions imposed on the resupply vessels. Marion SS was included in SAPRI's Long-Term Observations Land and Long-Term Observations Ocean plans. SMCRI participated in the SAPRI LTO Land User Fora meeting to discuss SMCRI's involvement in LTER activities on Marion Island as well as Gough Island. The SAPRI Manager also serves on the SMCRI Advisory Panel. Plans are advanced to conduct the first field surveys in April 2023.

3.2.5. Satellite Sentinel Sites for Long-Term Ecological Research

ADCP deployed at Rabbit Rock, Sodwana

Of all the proposed Satellite sites, only Sodwana and Tsitsikamma is instrumented at the moment. Sodwana UTR data from shallow and deep deployments and ADCP data from Red Sands have been retrieved, downloaded and shared with ACEP Project scientists. Plans for Sodwana Bay SSS were presented at the KZN Stakeholder meeting. SMCRI serves on the St Lucia Scientific Technical Advisory Group (SLSTAG). Two CT loggers were sent to EKZNW for deployment in the St Lucia Estuary as part of the Sodwana Satellite Sentinel Site. An estuarine vessel was procured for the KZN-Bight SS and Sodwana Satellite SS estuarine research and LTER activities. This vessel will also be available for the EFTEON Maputoland Landscape.

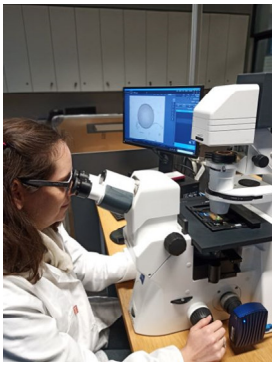
The biannual BELTER surveys at the Tsitsikamma MPA, which would have included the deployment of two UTRs (Rheeders and Waterfall reefs), one GTP and one ADCP mooring (new deployment at Middle Bank) had to be postponed in 2020 -2022 due to COVID and again in 2022 due to a technical issue with the ADCP and in lieu of the Hyperbaric Chamber not being available as stand-by for diving operations over that period due to a short supply of High-Pressure Air Compressor parts supplying the Air Banks.

3.2.6. Coastal Biogeochemistry Laboratory

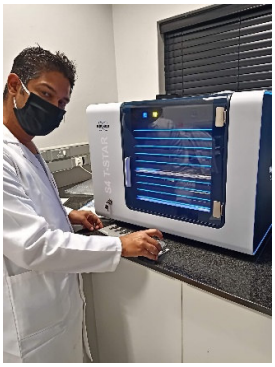
- The platform currently consists of a Seal AA3 nutrient auto analyser (to measure marine and estuarine water for SiO_4, NO_3^-, NO_2^-, NH_4^+ and PO_4^{3-}), a Milli-Q water purification system (to supply Type 1 Ultra-pure water), a Turner Designs fluorometer (to measure chlorophyll-a), a Hitachi UV-Vis spectrophotometer (to measure dissolved oxygen, pH and chlorophyll-a) and a Walz PHYTO-PAM fluorometer (to measure chlorophyll content and photosynthetic efficiency of microalgae). With these data continually being captured a long-term picture can be built on the status of our coastal ecosystems to aid managers and policy makers when making decisions regarding our resources.
- SMCRI extended the laboratory's capacity with a Total Reflection X-ray fluorescence (TXRF) benchtop instrument capable of measuring a number trace and heavy metals from Magnesium to Americium in the ppb range.

- A C/N/S analyser (Flash Elemental Analyser) was procured in 2021 to measure all species of Carbon, Nitrogen and Sulphur. This instrument has not been set-up as yet, because it requires a dedicated laboratory with gas installations. The new laboratory will be ready in August 2022.
- CEFAS (UK) sponsored all the equipment to establish a Commonwealth Litter Programme (microplastics) Laboratory at the SMCRI Central Coordinating Unit. A new purpose built laboratory will be completed by July 2022 to house the microplastics instrumentation.
- The laboratory analysed 13721 Chl-*a* and nutrient (nitrate, nitrite, ammonium, phosphate and silicate) samples.
- The laboratory also received the following support instruments:
    - Salinometer (to calibrate the salinity measurements of the CTDs). This instrument was tested during the rest trip to Marion Island.
    - A Dissolved Oxygen and autotitrator (lab based and ship based instruments). Training on Dissolved Oxygen, hardness and total organic carbon (TOC) titrations were provided by Metrohm.

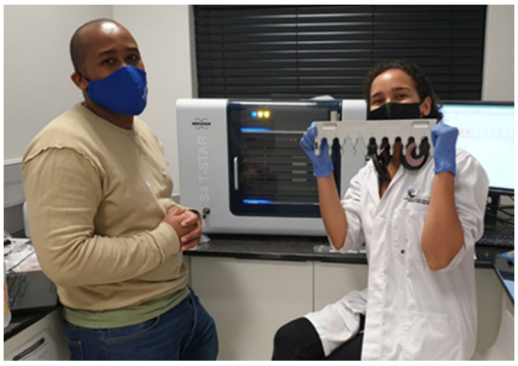
- The Dissolved Oxygen and Autotitrator were installed and are ready for use. Interest in these equipment was low initially, but is envisaged to increase in 2022/23. Two registered platform users utilised the TXRF for the analysis of 243 samples in 2022 already.



Microscope Lab



Pollutant research



Newly installed Bruker TXRF analyser (heavy metals)

3.2.7. Hyperbaric Chamber

The hyperbaric chamber is fully operational and the following key highlights were recorded over the past five years:

- SMCRI hosted delegates (including the DDG and Chief Inspector) from the Department of Employment and Labour (DoEL) for information sharing on hyperbaric chamber operations.
- Unique Hydra was appointed as the service provider to conduct the 6-monthly maintenance of the hyperbaric chamber for 5-years.
- Exemption was received from the Department of Employment and Labour allowing use of Class IV Chamber Operators and Supervisors.
- An article on the chamber was published in the Nelson Mandela University newsletter: https://lnkd.in/dBjUpqs

- The Chamber compressor was regularly used to fill cylinders for SMCRI, SAEON, SAIAB and the Department for Emergency Medical Care (NMU).
- SMCRI assisted ICMR (NMU) in developing a business plan to revive their Research Diving Unit.
- The Chamber was on stand-by for a Subtech diving operation in Ngqura.
- The construction of an 8 m deep dive tank (opposite) on the Ocean Sciences Campus (part of the extension of C and E block) is progressing well and will be completed in August 2022/23.

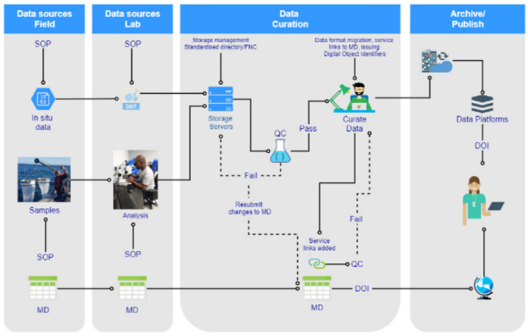
- SMCRI, assisted by NRF Legal, set up an agreement with a diving medical practitioner (Level 2) to use the Hyperbaric facilities for the treatment of patients. The benefit to the SMCRI will be that the dive doctor will be on standby for our activities and cover the costs of the services and maintenance of the platform. The chamber will then also provide a service to the broader society and not only for the diving community. Bay Hyperbaric Medicine (BHM) started Hyperbaric Oxygen Therapy Chamber operations in January 2022 and logged 154 hours and 46 minutes (78 dives) chamber dives in Jan-March 2022.
- Mr Francois Burman (USA) and Prof Jack Meintjies (University of Stellenbosch) visited to accredit the facility in December 2021 with the DoEL, DAN as well as SAUHMA. The Hyperbaric Chamber received its accreditation.
- A Community of Practise Working Group was established and four meetings have been held to date.

3.2.8. Data Management

The SMCRI data management team, consisting of 5 staff, held weekly meetings with SAEON uLwazi staff on the Observations Database, Open Data Platform, Metadata and DOI service integration. Data management usage statistics over the past 5 years:

- SAEIS website: 4983 users, 4928 new users, 6846 sessions, 19181 page views
- SMCRI website: 1426 users, 1393 new users, 2008 sessions, 4849 page views
- Species Fact Sheets: 487 users, 482 new users, 678 sessions, 1756 page views
- Observations Database WebAPI: 32 users, 25 new users, 216 sessions, 495 page views
- Observations Database Query: 147 users, 137 new users, 437 sessions, 1138 page views

The Observations Database (ObsDB) is fully operational with a functioning public interface (https://observations.saeon.ac.za/). Integration with the Open Data Platform (SAEON Catalogue: https://catalogue.saeon.ac.za/) has been achieved, thereby allowing ObsDB data to be discovered through Catalogue metadata queries. SMCRI has to date completed 841 imports of 4,259,207 observations that are freely available to the science community.

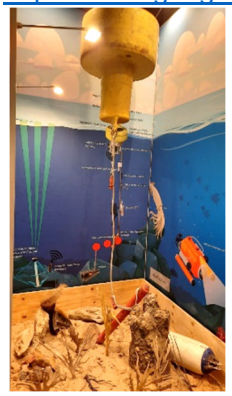


Data management pipeline developed

Image of the Keurbooms Estuary (1973) donated by Prof Jenny Day and now included in SAEIS.

3.2.9. Science Engagement

- Planned educational outreach activities had to be cancelled during 2020 and 2021, due to restrictions imposed by the COVID-19 pandemic. These were replaced with virtual events, e.g. a virtual science camp, educators training session, hosting the iNaturalist competition; online celebration of national interventions, e.g. National Marine Week, National Science Week, etc.
- SAASTA appointed two DSI funded Science Engagement interns with SMCRI to assist with the roll-out of the DSI Cofimvaba Science Centre and other science engagement and outreach activities.
- SMCRI was involved in several science engagement activities, including online camps, workshops, science exhibition in Stutterheim (DFFE), celebrations (World Oceans Day, World Biodiversity Day, Earth Day), Operation Clean Spot coastal clean-ups, developing an exhibit for the Cofimvaba Science Centre and production of several educational videos, training material, newsletter articles and interviews on SABC TV.
- The science engagement team reached:
  The National Science Week webinar, titled: “People and the Ocean” reached 73 participants (see https://drive.google.com/file/d/1BAAMzcCEg0qNUChRL7chD6rDIMGQh7wF/view



3.2.10. Airborne Remote Sensing

- The aircraft was delivered in 2019 and is hangered at the David Stuurman International Airport. The aircraft was not permitted to fly during Lockdown Level 5-4. Once permission to fly was obtained from the CAA, several high resolution orthophoto surveys have since been successfully completed, i.e.
  - Oyster Bay to Klippepunt (western extremity of the ABSS)

  - Jeffreys Bay to Paradise Beach to survey flood damage for the Kouga Municipality;
  - Survey of Blaauberg and Melkbosstrand beaches in Cape Town for Prof Charlie Griffiths;
  - Survey of the Grootbos Nature Reserve, Western Cape for Fynbos Node and reserve management.
  - Numerous estuaries, i.e. Kromme, Swartkops, Gamtoos, Kariega and Sundays.
- The coastal survey from Huisklip to Cannon Rocks (taking oblique photos of estuary mouths and counting beach users), has been conducted monthly since flying was allowed in 2020. Some months have been missed because mandatory periodic inspection (MPI) by the contracted AMO, repairs and bad weather.
- SAEON E-news article: Airborne remote-sensing platform supports long-term environmental research. SAEON E-news, Issue 5 2020. https://enews.saeon.ac.za/issue-05-2020/airborne-remote-sensing-platform-supports-long-term-environmental-research/
- Two pilots have been appointed as independent contractors in 2021, with a further two identified to undergo their type certification before being appointed. Contracts are for three years.
- The LiDAR system was procured in 2021 and was installed and tested in March 2022. The first test flights of the LiDAR have been successful several surveys are planned, including mapping the flood damage in KZN.
- The Airborne Remote Sensing Standard Operating Procedures was finalised and presented to the ARSP Working Group for feedback. To further facilitate logistics, an online booking form was created for stakeholders applying for survey flights.

SMCRI Pilot and Senior Technician, Mr Sean Bailey.

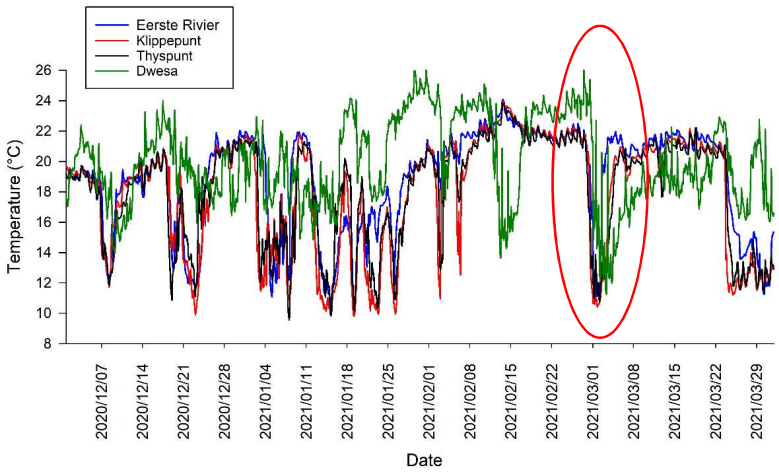
Orthomosaic of the Sundays Estuary mouth

3.2.11. South African Coastal Temperature Network

- SMCRI deployed and serviced the following Gully UTRs during the past five years:
  - West Coast: Groen Estuary, Strandfontein
  - South Coast: Cape Agulhas, Mossel Bay, Victoria Bay, Buffelsbaai, Robberg
  - Tsitsikamma Coast: St Francis to Storms River: Thyspunt, Oyster Bay, Klippepunt, Rebelsrus, Eerste Rivier, and Port St Francis
  - Wild Coast: Kei Mouth, Wavecrest, Dwesa, Hluleka, Mkambati, Fish River
  - Algoa Bay SS: Humewood, Kenton-On-Sea, Woody Cape and Cape Pedrone, St Croix, Noordhoek, Sardinia Bay, Jahleel Island, Seaview.
  - KZN-Bight SS: Umhlanga, Bluff and SAPREF
- The SAIAB ATAP temperature dataset was shared with SAEON for integration into SACTN and the Observations Database. A new research permit was submitted to

ECPTA for the Gully UTRs in MPA's along the Wild Coast. Ezemvelo KZN Wildlife handed over the Coastal Temperature Network loggers and data to SAEON/SMCRI. SMCRI will from now on manage these stations.

- Meetings were also held with the National Institute of Fisheries Research (IIP) in Mozambique to start planning the roll-out of the Gully UTR network higher up along the Indian Ocean coast.
- Data from these inshore UTRs are in high demand from the research community. The image below shows the temperature data from several GUTRs and provided valuable insights into the fish kills that were observed during March 2021.



Gully UTR data showing Marine Heatwave followed by upwelling

3.2.12. South African Estuaries Monitoring Network

SMCRI supported research and LTER in the following estuaries over the past 5 years:

- LTER (quarterly): Kariega, Kromme, Sundays, Gamtoos, Knysna and Swartkops estuaries
- RSET (annually): Knysna, Swartkops, Nahoon and Nxoxo
- Research support: Sundays & Swartkops (organopesticides - NMU); Great Brak Estuary (CSIR, National Estuary Health Project); Chatty River (NMU and UCT); Gamtoos & Kromme (organopesticides & heavy metals – DFFE-NRM, SAEON and NMU); Swartkops and Sundays estuaries (fish – SAIAB and NMU), Knysna Estuary (Nelson Mandela University collaboration), Nahoon Estuary, (SAEON/SAIAB collaboration medium-term changes over time).
- CT loggers only: St Lucia Estuary (EKZNW)

New estuaries that will be added to the network include those in the Two-Oceans and KZN-Bight Sentinel Sites, as well as Keurbooms and two Intermittently Open Estuaries, i.e. Groot (Nature's Valley) and Tsitsikamma in 2022.

RSET Sea-level research

Estuarine LTER research

3.2.13. Coastal Craft Platform

- The coastal craft platform (vessels > 9 m and < 15 tonnes) is managed by SAIAB and currently consists of three vessels, i.e.
    - R/V *uKwabelana* – Durban (dedicated multibeam vessel)
    - R/V *Phakisa* – Durban
    - R/V *Observer* – Gqeberha (built during in 2019/2020)
- The Coastal Craft Platform reach now extends from the Southern and East Coast from Mossel Bay to Sodwana Bay and enables work from the coast to the 250m depth contour (continental shelf and shelf-edge).
- The rest of the coastline is serviced by smaller research vessels (<9 m), although SMCRI is in discussion with DFFE to take over one of their larger vessels to service the Two-Oceans Sentinel Site (Cape Town).
- All three vessels are fully subscribed and conduct in excess of 120 sea-days per vessel per year (since commissioning).

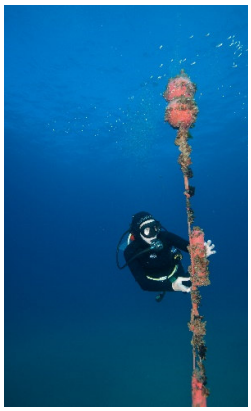
R/V Observer

SMCRI crew sampling

3.2.14. Acoustic Tracking Array Platform

- The ATAP array is well established and maintained along the south and east coast of South Africa. The network of 100 base stations around the coast of South Africa was reduced to 92 during the course of the year because of stations going missing or being purposefully removed to prevent loss as a result of sedimentation or other risks.
- The ATAP network collects valuable bottom temperature and these have been shared with SMCRI to lodge in the Observations Database.
- During the past five years ATAP had the following key highlights:
    - Operational stations: 92 -100

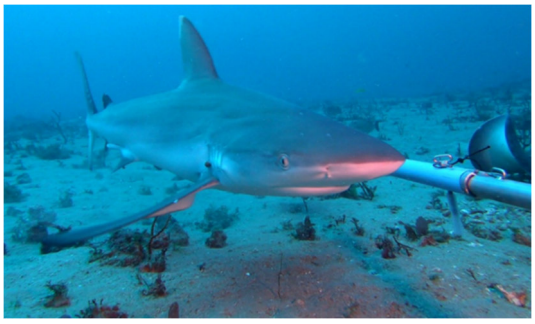
  - Number of active tags varied over the reporting period from >1000 to 788
  - Number of species being tracked: 41 (10 fishes, 6 rays, 22 sharks, 3 turtles)
- SMCRI will assist ATAP to expand their network up the West Coast during the first half of 2022.
- ATAP initiated a collaboration with Wild Oceans that will witness the tagging of over 250 sharks and rays over the next two years.

ATAP receivers being serviced in KZN

3.2.15. Marine Remote Imagery Platform

- MaRIP expanded its deep-sea research capabilities with the acquisition of two new baited camera landers.
- A MaRIP research paper was published in Nature (IF = 69) that used BRUVs and stereo-BRUVs to measure the abundance and conservation status of reef sharks globally.
- MaRIP has been very active during the past five years, recording the following key highlights:
  - Multiple ROV (351 trips) and stereo-BRUV (653 trips) specific research trips
  - Uploaded 3110 observations
  - Platform use included 45 post-graduate students and 43 researchers from 19 research entities.
- SMCRI appointed a Benthic Ecologist to coordinate the BELTER programme. This scientist will work closely with the MaRIP staff based at SAIAB.
- A key project of MaRIP includes the search for new Marine Natural Products in collaboration with the SARChI in Marine Natural Products at RU.



SBRUV image of a shark

ROV operations in Algoa Bay onboard R/V Observer

3.3. Impact of science engagement

SMCRI contributes to SAEON's Environmental Science Education Programme (ESEP) through funding, technical and research expertise and support of DSI's Science Centres. The ESEP focuses on exposing school learners to the actual science of environmental observation, data collection, analysis, reporting and disseminating findings of hand on projects. School learners are engaged in hands-on, enquiry-based teaching and learning to demonstrate the value of long-term and large-scale environmental observation and monitoring. A weather and climate flagship programme has been established by providing weather stations to 7 schools in the Eastern Cape. While the SAEON ESEP is well established, we recognise the need to grow the programme, particularly considering that quality post-graduates from the environmental sciences are needed to achieve our transformation objectives. Furthermore, achieving the enhanced societal impact envisioned by the DSI White Paper and NRF Vision 2030 requires that we increase our reach through engaging society at multiple levels. SMCRI resources ensured that our secondary school programme and awareness events continued, even during lockdown, and assisted to increase our communication of SMCRI research results to the general public. SMCRI was active in Science education, awareness and communication during the past five years reaching 2041 learners, 168 educators as well as 968 members of the public. Some highlights include:

3.3.1. Science education

- Grade 9 Science Camps: Reached 52 learners, 4 educators from 7 schools.
- Grade 10 Science Camps: Reached 69 learners, 4 educators from 9 schools.
- Grade 11 Science Camps Reached 34 learners from 7 schools.
- Maritime School Spring Camp: 27 learners, 4 educators and 12 education department officials
- Number of interactions with Learners: 235
- All Atlantic Blue School and Eskom Science Expo projects: Reached 34 learners from 6 schools
- SMCRI Campus tours: Reached 300 learners and 25 educators from 5 schools, as well as 19 students from HBUs.
- Job / Work shadowing: 13 learners from 2 schools
- GIS Workshop: 103 learners and 86 educators from 3 schools
- SMCRI assisted with the development of the Grade 11 Marine science curriculum training manual
- SMCRI staff developed an exhibit for and participated in the launch of the Cofimvaba Science Centre.

Learners studying the rocky shore during Science Camps

3.3.2. Science awareness

- Number of interactions with the Public: 12 events reaching 438 people
- Participated in environmental day celebrations: 16 events reaching 981 learners from 28 schools, 36 educators, 55 HEI students, 13 scientists, 1 tourist and 305 general public
- SMCRI staff and student scientific talks: 4
- Career expos and festivals: 4 events reaching 193 learners and 9 educators from 44 schools as well as 152 members of the public (including the cities and towns of Gqeberha, Kariega, Stutterheim and Kimberley).
- Science awareness training: Reached 77 EPWP staff
- SMCRI and SAEON Elwandle Node presented three talks at a National Science Week webinar, titled “People and the Ocean: Effects of anthropogenic activities on marine biodiversity”. 73 people attended the webinar. Link to full webinar: https://drive.google.com/file/d/1BAAMzcCEg0qNUChRL7chD6rDIMGQh7wF/view
- SMCRI adopted a “Operation Clean Spot” site as part of an initiative of Sustainable Seas Trust and cleaned the site twice (see images below). The first clean involved 6 learners from Lungisa High School.




3.3.3. Science communication

- SMCRI and SAEON Elwandle Node published 19 E-newsletter articles (See Appendix B, Section 14.2 for more detail). The SAEON E-newsletter is globally distributed.
- SMCRI and SAEON produced a science awareness video on microplastics for the Cofimvaba Science Centre. See: https://stratus.saeon.ac.za/index.php/s/HNNmxcpBg5BYY5W

- SMCRI and SAEON mentions and interviews during World Oceans Day on SABC TV:
    - https://www.youtube.com/watch?v=UEIy23gv-uE
    - https://www.youtube.com/watch?v=kXGEykVht1k
- An article titled Float your kid's boat and help clean up oceans, published in The Herald during National Marine Week, highlighted the marine plastic pollution crisis. The article cites Professor Tommy Bornman, manager of SMCRI on the "harsh realities of plastic in our oceans".
- SMCRI showcased its work during an exhibition at the launch of National Science Week in Kimberley. The launch and SMCRIs exhibition was aired on SABC 2 News.
- Eskom Science Expo award for Ntsika learner, was published in Grocotts Mail on October 11. It highlights the achievements of local learner Lindelihle Manyati, who won a bronze medal and a SAEON Special Award at the 2019 Eskom Expo for Young Scientists International Science Fair.
- Meet the South Africans on the Weddell Sea Expedition: http://www.sanap.ac.za/2019/01/30/meet-the-south-africans-on-the-weddell-sea-expedition-antarctica/

3.4. Excellence

SMCRI aims to "be a national and world scientific leading research platform; operating research infrastructures producing high quality data and research, while being an enabling facility to support science" (NRF Vision 2030). To this end, SMCRI will continue to provide cutting-edge technology and state-of-the-art instrumentation, and produce high quality data and research. We are aware of the challenge of balancing research and platform management, and will continue to seek the optimal balance. We will also continue with our efforts to realise the value of the substantial datasets SMCRI, SAEON and SAIAB has acquired over the past two decades, and that our platforms continuously generate. Building on our wide scope of work and integrated character, we will also continue to play a leading role in global environmental research networks and infrastructures.

SMCRI produced 91 peer-reviewed manuscripts over the past 5 years (See Appendix B, Section 14.1) published in 54 different journals with an average Impact Factor of > 4.06. The IF of journals SMCRI manuscripts were published in were above the South African and Global average, highlighting the important and excellent research being published by SMCRI staff, students and users of SMCRI data/platforms.

SMCRI staff are also increasing their standing globally, having been asked to review or edit manuscripts for the following WoS journals: Estuarine, Coastal and Shelf Science, Antarctic Research, South African Journal of Botany, Revista de Biología Marina y Oceanografía, African Journal of Aquatic Science, Limnology and Oceanography, Ecological Indicators, Environmental Monitoring and Assessment, Science of the Total Environment, Frontiers in Marine Science, African Journal of Marine Science, Marine Ecology Progress Series, Journal of Fish Biology, GEO-Marine Letters, South African Journal of Science, Botanica Marina, Regional Studies in Marine Science, Deep Sea Research Part II, Marine Environmental Research, Journal of Geochemical Exploration, Elementa. SMCRI staff also assisted the NRF with reviews for funding applications and NRF ratings and examined dissertations and theses for: UCT, NMU, UWC, US, UKZN, RU and the University of Waikato, NZ.

The SMCRI successfully completed 507 LTER and research fieldtrips, 653 BRUV deployments, 351 ROV dives and analysed 13552 LTER samples in the laboratory. The SMCRI platforms attracted 233 established researchers and 173 students made use or were trained on our platforms. SMCRI websites, databases and online fact sheets attracted 6997 new unique users, the majority of which accessed the 4,259,207 observations uploaded into our Observations Database that is freely available to the global scientific community. More detail is provided in the Appendices.

3.5. Enhance strategic international engagements

SMCRI has developed strong international collaborations over the past five years. The SMCRI manager offered regular support to the DSI's international meetings upon invitation and have presented SMCRI and DSI in Mexico, Brazil and the United Kingdom. Knowledge generation has been successful at SMCRI and backed-up by numerous grants contracts, MoA's and MoU's with partnering international organisations, e.g.

1) AANChOR / All ATlantic Network of Coastal Observation Systems and Technology
2) Belmont Forum funded MARISCO (Marine Research and Innovation for a Sustainable Management of Coasts and Oceans) Project with the Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg, Germany.
3) Collaborator on the Community of Practice in Oceans Accounting in the Western Indian Ocean (Work Package 2: Oceanographic datasets)
4) Collaborator with UCT and Nekton (Oxford University) on microplastics in Antarctica.
5) Partner in the SA/Poland collaboration (University of Szczecin) on diatoms
6) CEFAS, UK to fund the establishment of a Commonwealth Litter Programme (microplastics) Laboratory at SMCRI;
7) MARE, University of Lisbon collaboration on pollution research in estuaries.
8) University of Plymouth, Coastal Marine Applied Research, UK. MetOffice / Newton grant - Weather and Climate Science for Service Partnership (WCSSP) South Africa
9) University of Plymouth and the GCRF SARSA Project: Sustainable Abalone Ranching in South Africa
10) Collaboration with National Oceanography Centre (Southampton) and the University of Southampton on research infrastructure, tsunami research and stromatolites.
11) SMCRI member of the Executive Committee of the International Long-Term Ecological Research (ILTER) Network
12) SMCRI member of the Scientific Committee of the International Long-Term Ecological Research (ILTER) Network
13) SMCRI member of the Governance Board of the Global Environmental Research Infrastructure network.
14) ATAP staff serve on OTN's International Scientific Advisory Committee and OTN's International Data Management Committee.
15) MaRIP collaborate on a Coral Reef Monitoring Project with Mozambique
16) MaRIP participated in an assessment of the reef ecosystem of the Comoros (CEPF funded project managed by Wild Oceans).

17) MaRIP collaborated with NEKTON First Descent to survey benthic reefs in the Maldives/Seychelles
18) MaRIP staff serve on the GOOS BioEco panel working on the Fish EOV
19) SMCRI staff serve as co-chairs on the Ocean Best Practice Task Team to develop ocean best practices for Coastal Observation in under-recourced countries.
20) SMCRI staff are co-founding members of CoLAB (Coastal Lab in a Box).
21) SMCRI staff served on the following panels:
    a. GEO Plenary and GEO Blue Planet Local Organising Committee meeting
    b. SPACES II Review Panel
    c. Ocean Innovation Africa Conference
    d. 6th High-Level Industry-Science-Government Dialogue on Atlantic Interactions during the session on Improved Resource Management of Oceans, Coasts and Marine Systems: Coastal Observations.
22) SMCRI attended numerous international conferences and workshops in Italy, Portugal, England, China, Germany, Brazil and Mozambique.

Several new engagements are under development, e.g. joint proposal with Portugal, Mozambique (IIP on oceanographic observations) as well as collaboration with international programmes such as EMBRC and AtlantECO

SMCRI applied for several large collaborative grants over the past 5 years, i.e.

1) NASA funded BioSCAPE call on using multispectral remote sensing to identify phytoplankton around the coast of South Africa (Lamont Doherty Earth Observatory at Columbia University, SMCRI and DFFE) – Successful and will start in 2022 with field campaigns in October 2023.
2) IFREMER funded CHARM Holocene Climate Change Project looking at sediment cores from the mudbelt of the Zambezi River (Mozambique Shelf) and Orange River (Université d'Angers, SMCRI and NMU). Not successful, but reapplying in 2022/23.
3) EU Horizon RI collaboration between EU and Africa with the aim to develop a Coastal Greenhouse Gas and Blue Carbon Observing Network (collaborate with ICOS, CSIR, UCT, SAPRI, EFTEON, etc.). Successful and will start in November 2022.
4) Towards establishing a Kelp LTER network in South Africa (SMCRI, USLTER in UCLA Berkley and UWC) – Not successful.
5) COastal LAb in a Box (COLAB) workshop funding application submitted to IAPSO (University of Edinburgh, SAEON, SMCRI) – Not successful.
6) SMCRIs funding application to European Union Marine Robots (EUMR) Infrastructure Call (www.eumarinerobots.eu) to develop new innovative sensors to measure and quantify phytoplankton on Autonomous Underwater Vehicles (AUVs) to measure the changing ecosystem under the thinning ice of both the Arctic and the Antarctic was successful.

2nd ILTER-OSM, Leipzig, Germany

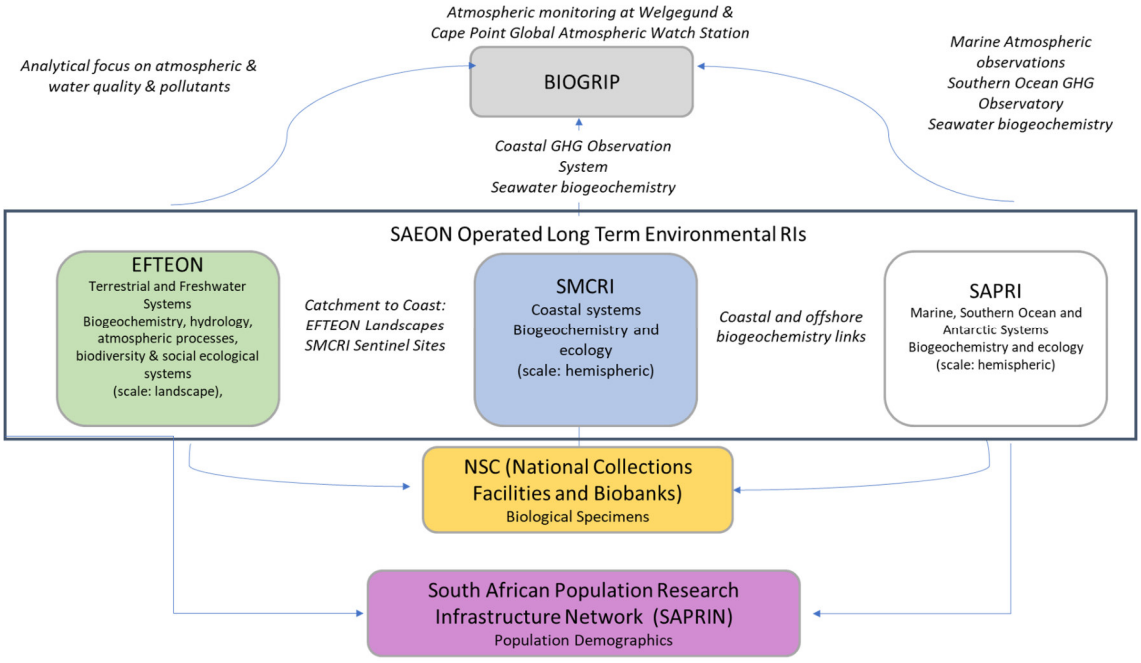
2nd Functional Biodiversity Symposium in Oldenburg, Germany

3.6. Sustainability

Ensuring that SMCRI platforms persist into the future requires sustained funding, maintenance of established infrastructure and satisfied staff and stakeholders. Regarding the latter, SMCRI must be perceived as valuable by our funders, our collaborators, and to society in general. Over the past five years SMCRI made a concerted effort to be recognised as a long-term strategic investment of national importance, which is deeply rooted in society and indispensable for the delivery of high-quality environmental research, human capacity development and environmental decision support. It is also important to govern SMCRI effectively and maintain our reputation as a reputable and reliable recipient of public funds.

3.6.1. Links to other SARIR projects

Collaborating with other research infrastructure (e.g. BIOGRIP, EFTEON, SAPRI NSC and SAPRIN) is also critical to maintain a national perspective on critical topics and to leverage expertise and resources from the other RI's. The strong links between the RI's are shown in the schematic below. SMCRI is well located in the coastal zone to link the oceans to the terrestrial environments.



Close linkages between SMCRI and the other SARIR RIs

3.6.2. Alignment to national, continental and international priorities

The SMCRI Annual Performance Plan are aligned to the national priorities as set out in WP-STI 2019 (DSI), NRF Vision 2030, NRF Strategy 2025, the NRF APP 2021-23, SAEON Strategy 2030 and the SAEON APP 2021-23. The response to global change is one of the key Grand Challenges identified by the Department of Science and Innovation. SMCRI is leading research on the continent in terms of understanding and projecting changes to the marine environment, the impact of these changes, and mitigation to limit their long-term effects. SMCRI has deployed observatories and research platforms at key sites around the South African coast to improve our understanding of the key drivers of change and the potential ecosystem and socio-economic response. SMCRI is also a key partner to develop new innovative observatories that are easy to maintain and that can be deployed in under-resourced countries in Africa, to grow the network of global long-term environmental observatories.

SMCRI plays a unique role in strengthening the National System of Innovation (NSI) by bringing higher education closer to the innovation requirements of society. It responds wholly to the Biodiversity focus area of the National Research and Development (R&D) Strategy and the Global Change Grand Challenge of 2008 – 2018 and capitalises on the competitive edge that South Africa has as the third most biodiversity rich country in the world, by improving knowledge on marine and coastal diversity. Environmental quality is a basic human right protected in South Africa's Constitution and the people of the country has a right to know and understand the status of our environment. SMCRI is an innovation that not only generates knowledge on understanding of environmental change, but also attracts a broader student base into mathematics and science through its science engagement and educational outreach activities programme (See previous sections).

The White Paper on Science Technology and Innovation (WP STI, 2019) places STI at the centre of South Africa's development agenda. It advocates for the adoption of the principles of open science as a means of growing the science, technology and innovation outputs and impact. All SMCRI's platforms and data holdings adhere to the FAIR guiding principles of Findability, Accessibility, Interoperability, and Reusability.

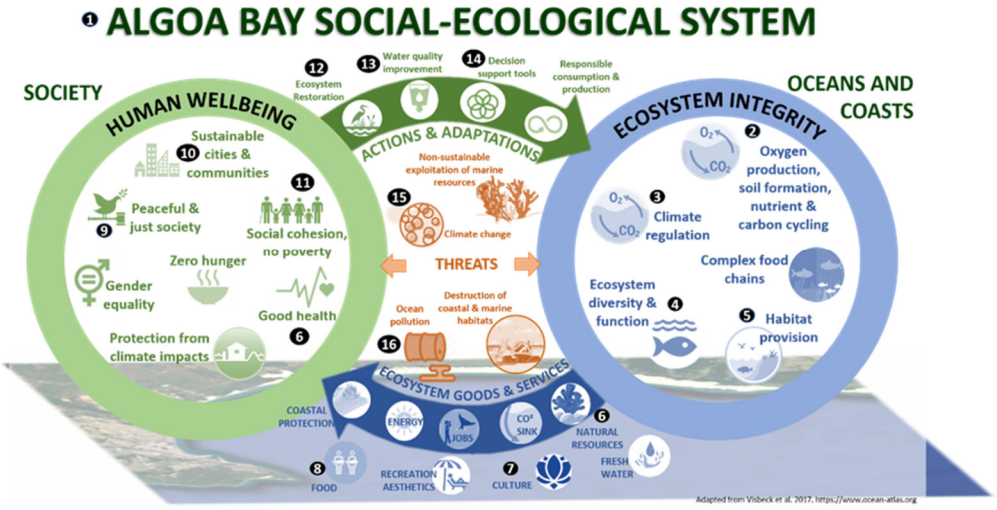
Lastly, although SMCRI is managed by SAEON and SAIAB, it also collaborates closely with other National Facilities (iThemba Labs and SKA), key government departments such as DFFE, DWS, SAWS, conservation agencies (SANParks, CapeNature, ECPTA, Isimangaliso WPA, KZN Wildlife), research entities (CSIR, ORI, OSearch), NGO's (SOS, SST) and HEI's (NMU, RU, UCT, US, UWC, UFH, WSU, UKZN, NWU) to achieve its research and operational plan.

3.6.3. Knowledge produced for societal benefit

NRF Vision 2030 introduces the concept of research impact, also called 'societal impact', as a critical addition to the strategic direction of the NRF. Such impact is defined as 'the demonstrable contribution that excellent research makes to society and the economy'. We recognise that in order to create meaning from our research platforms, they must ultimately deliver benefits at local, national and global scales.

3.6.3.1. *Developing a Socio-Ecological Framework for Marine Management*

The Algoa Bay Sentinel Site for Long-Term Ecological Research (established in 2007 by SAEON and expanded through SMCRI funding) is the best monitored coastal area in Africa and in the Southern Hemisphere. The diversity of habitats, oceanographic processes and socio-economic reliance on the marine environment in Algoa Bay has provided dynamic natural laboratories for carrying out trans-disciplinary, multi-institutional field-based research that can be applied to the rest of South Africa. A NRF funded Community of Practise project to develop a Marine Spatial Plan for Algoa Bay (Dorrington et al. 2018) was funded from 2017 – 2022, with SAEON and SMCRI providing the majority of the data required to develop a Socio-Ecological Framework for Marine Management (see image below). The focus is on the Algoa Bay Sentinel Site (because of the large data holdings supported by SAEON and SMCRI) and focusses research on aspects of society and the economy, in particular 1) Human well-being, 2) Actions and adaptations, 3) Threats, 4) Ecosystem goods and services, and 5) Ecosystem integrity.



Climatic and anthropogenic changes have introduced a new challenge in growing the blue economy sustainably (resulting in sustainable jobs for societal change), e.g. land based pollution sources to estuaries and coastal waters; reduced freshwater inflow; harmful algal blooms (HABs), sea-level rise, increased sea surface temperature, plastic pollution, to name but a few. In light of two important decades (Restoration and Oceans) and in response to African societal needs such as social-environmental justice and equity, protection of biocultural heritages and deepening poverty, SMCRI will be establishing additional Long-Term Socio-Ecological Research sites in Cape Town (Two-Oceans SS) and in Durban (KwaZulu-Natal Bight SS).

3.6.3.2. *Developing a novel Ocean Accounts Framework for South Africa*

Natural capital accounting focuses on measuring the value of ecosystem services, i.e. the benefits that humans derive from nature, and to include this value in the “wealth” of a nation. Benefits derived from nature include easily valued services such as food production (e.g. fisheries traded on open markets), more difficult services to value such as flood and storm surge protection, and the more difficult to value cultural services. SMCRI and SAEON datasets and scientists form an integral part of a NRF Communities of Practice (CoP) project investigating the development of an Ocean Accounts Framework for South Africa (phase 1)

and the Western Indian Ocean Region (phase 2). The CoP aims to assess the applicability of the Ocean Accounts Framework in the Western Indian Ocean as a central component of a wider strategy to ensure ocean governance contributes as optimally as possible to the broader sustainable development goals of South Africa and the IORA member states of the Western Indian Ocean by ensuring the inclusivity, safety, security and sustainability of coastal communities. During phase one (2020–2021) the project focussed on investigating the efficiency and relevance of the Ocean Accounts Framework in implementing ocean policy and applying ocean-governance instruments. The risks and vulnerabilities associated with climate change, food security and unsustainable development were also investigated using primarily SAEON and SMCRI long-term datasets and outputs from this project is expected in 2022/23.

3.6.3.3. Socio-economic benefits of research platforms

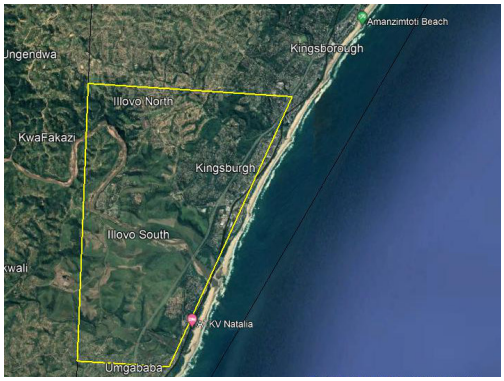
The two projects above are supported by eight SMCRI research platforms, i.e. Sentinel Sites for LTSER, data management, coastal craft, ATAP, MaRIP, Estuarine Monitoring Network, SA Coastal Temperature Network and the Biogeochemistry Platform. As the platforms are rolled out on a wider spatial scale, so will the use of the data in socio-economic studies increase. Other research platforms and infrastructure that has an important future socio-economic role to play include:

Airborne Remote Sensing platform

The SMCRI aircraft and its airborne remote sensing capability is providing significant socio-economic benefits to South Africa. The data collected by this platform includes high resolution aerial photogrammetry (aerial photos), infrared and thermal sensors (identification of objects at night) and LiDAR (high-resolution digital elevation models). Some of the products already produced have significant socio-economic benefits, i.e.:

- Highly accurate 3-D models of the coastline is invaluable to the Risk and Vulnerability Atlas, development of coastal set-back lines, coastal zone management and research on the socio-economic impact of sea-level rise and increase in the magnitude and frequency of storm surges. Meetings have been held with the developed of SARVA to include this information.
- The Airborne Remote Sensing Platform flew two surveys that contributed to management decisions and produced decision making products, i.e.
    - Survey of the Grootbos Nature Reserve in the Western Cape. The original survey request was from Fynbos Node for scientific purposes, but the survey will assist the managers of the Reserve to map and monitor change over time as the last high resolution survey was conducted in 1930.
    - Survey of the coastal towns of Jeffreys Bay, Aston Bay and Paradise Beach. The survey was conducted on request from the Kouga Municipality to map the damage caused by the heavy rainfall and floods in May 2021.
- Surveillance of risks to the socio-economy, e.g. red tides near aquaculture facilities or beaches, oil spills, industrial/sewage effluent spill, etc. The South African Maritime Safety Association (SAMSA) has already requested assistance from the Airborne Remote Sensing Platform to help identify the location, extent and spread of oil spills

- along the coast of South Africa. The DSI (Dr Henry Roman) also requested assistance from SMCRI to survey the flood damage in KZN. The aircraft could unfortunately not be used immediately after the floods because the LiDAR sensor was being installed over that period. Plans are in place to survey several of the flood ravaged areas as part of the National State of Disaster – Flood Response.



Illovo area identified by SANSA for detailed airborne surveillance by SMCRI

- High resolution aerial photographs that can be used to identify land-use change as a result of climate and anthropogenic impacts. Requests have been received from Pierre de Villiers (CAPENature) to survey estuaries in the Western Cape, from Prof AJ Smit (UWC) to survey Kelp wrack on the beaches around Cape Town and Ndlambe Municipality to survey coastal areas to inform coastal management.
- Calculation of resource availability (no. of whales, sharks, etc.) exploitation (no. of fishers) and illegal activities (poaching, illegal fishing, etc.) has been received from SANParks and will be planned for the future.

Hyperbaric Chamber Platform

The hyperbaric chamber was originally procured to improve safety of scientific and commercial divers operating in the Eastern Cape. There has recently been an increasing demand for the SMCRI hyperbaric chamber to be used for Hyperbaric Oxygen Therapy (HBOT). The SMCRI technicians do not have the time to conduct full time chamber dives and SMCRI developed a Public-Private partnership with a diving medical practitioner (Bay Hyperbaric Medicine) to run the HBOT side of the operation. Bay Hyperbaric Medicine (BHM) started Hyperbaric Oxygen Therapy Chamber operations in January 2022 and logged 154 hours and 46 minutes (78 dives) chamber dives in Jan-March 2022. This PPP benefits SMCRI and society through:

- Near continuous use of the platform instead of only during emergencies (which are thankfully few and far between), thereby ensuring the chamber is always on stand-by and operational.
- Income generating, ensuring the sustainability of the platform in the long term.
- Treatment of patients in the Eastern Cape, improving their health and saving costs that would have been incurred had they to be sent to Cape Town or Durban.
- New field of medical research, that includes the treatment of long COVID in patients. The chamber will also be used by the Nelson Mandela University Medical School to train and capacitate new doctors, nurses and EMC personnel.

Coastal biogeochemistry laboratories

The SMCRI currently has one of the most state-of-the-art seawater biogeochemistry laboratories in South Africa. The range of instruments and analyses the laboratory can conduct is unparalleled and already provides a valuable service, not only to the scientific community, but also to coastal municipalities and conservation agencies. Although the laboratory is fully subscribed with LTER and research samples, there is an opportunity to provide a wider service that will have important societal benefits, especially in the pollution monitoring (heavy metals, eutrophication, microplastics and organo-phosphates). Requests

have already been received from DFFE Oceans and Coasts to assist their coastal monitors with the analyses of their samples, SANPArks to analyse Knysna Estuary samples, Western Cape government to assist with the monitoring of the Klein Brak Estuary, Nelson Mandela Bay Municipality to analyse samples and provide interpretation of results for the Swartkops Estuary, etc. The laboratory conducted a Return on Investment analyses for the nutrient auto analyser and calculated that SMCRI paid of the investment within the first three years of operation.

Coastal Observation Moorings (under development)

Seven real-time Coastal Observation Moorings will be deployed around the coast of South Africa. These moorings will send data in real-time via cellular or satellite networks to SMCRI databases and web interfaces where the data can be viewed by the public and eventually downloaded (after verification) by scientists. These moorings will link in with moorings already deployed by DEFF to create a network of valuable coastal bio-physical data all around the coast of South Africa. Some of the potential uses that will have socio-economic benefits include:

- Early warning system through data provision from the surface weather stations and subsurface current and wave sensors. Data will be provided in real-time to the South African Weather Service (SAWS) Marine Forecasting group to improve their models.
- Early warning of large swell and strong currents to SAMSA, Transnet National Ports Authority (TNPA), National Sea Rescue Institute (NSRI) and Life Saving SA. This will enable these entities to issues early warnings to shipping, bathers and other ocean users to safeguard lives at sea and protect infrastructure.
- Use of data in models to predict currents and swell to assist with oil and effluent spill modelling, drifting object predictions, search and rescue operations, etc.
- Improved sea condition reporting will assist ocean users such as fishers, scuba divers, surfers, researchers, etc. to make better use of good sea days and avoid risking time, money and safety when conditions are not ideal for their sport/occupation.

3.6.3.4. Direct socio-economic benefits of SMCRI

The SMCRI is also making a direct socio-economic contribution through:

- Employment opportunities. There are currently 15 scientists and technicians employed by SMCRI with a further 10 to be employed over the next year;
- Capacity building and training. SMCRI staff are required to engage in ongoing development and training. SMCRI and SAEON staff are also involved in the direct supervision and training of >20 post-graduate students. Students are provided opportunities to travel and learn from international experts, e.g. Athi Mfikili went to Portugal, Italy and the UK for training and Phumlile Cotiyane-Pondo spent 3 months as an exchange student in Poland.
- Science engagement: SMCRI staff are engaged in educational outreach activities at 7 schools in the Eastern Cape. Science engagement also includes the development of marine curriculum, teaching educators how to interpret and teach the marine and GIS curriculums, attending fairs and expos, and assisting in the development of exhibits for science centres, thereby exposing the next generation to a potential career in science;
- Preferential procurement of locally produced technology, e.g. research vessels, moorings, consumables, etc. thereby boosting the local and national economy;
- Leverage income through international agreements and partnerships, e.g. >R1,5 million microplastics laboratory provided by CEFAS (UK) to SMCRI to conduct

microplastics research in South Africa and research grants from international funders for >R2 million.

3.6.3.5. District development model

SMCRI platforms has the potential to provide significant socio-economic benefits to district and local municipalities (see Section 15 -Appendix D of capabilities and offerings). To date, SMCRI has assisted Kouga Municipality to survey the infrastructure damage caused by floods, provided an orthophoto of the Kariega Estuary to Ndlambe Municipality to improve their management of the coast, and we've provided data to the Nelson Mandela Bay Municipality on the eutrophication and pollution status of the Swartkops Estuary. Several projects are in the pipeline and will be realised in 2022/23, i.e.

- Survey of KZN flood damage across multiple municipalities (August 2022)
- Survey of the biogeochemistry of the Klein Brak Estuary for the Mossel Bay Municipality in collaboration with DFFE, DWS, CSIR and other government departments.

3.6.4. Environmental sustainability

SMCRI recognise that we operate in an era of environmental degradation and unsustainable development, and that our own operations impact the environment as much as those of others. While the research we support is aimed at creating a more sustainable society, we should strive to be a role model organisation, in terms of reducing our negative impacts on the natural environment. SMCRI has implemented strict Waste Management protocols and have hired a service provider to dispose of all hazardous waste in a responsible manner. The SMCRI has significantly reduced it carbon footprint through reduced air travel (replacing most in-person meetings with virtual meetings) and printing (50% reduction in printing).

4. Performance on SMCRI deliverables

4.1. Key Performance indicators

Objective	SMCRI Key Deliverables 2017/18 – 2021/22			
	KPI	Quantity/Quality		
		Target	5-year Actual	Reasons for deviations
Governance	Advisory Panel meetings	5 (1 p/a)	3	Advisory Panel meetings were held in 2019/20, 2020/21 and 2021/22. Took two years to develop the panel with the right membership.
	Community of Practice Working Group meetings	15 panels meeting once a year	4 panels met once a year	Majority of CoPWG exist in some form or another but have not been formally constituted. Main reason due to mature platforms having their own community and others have not yet been rolled out.
	Platforms workshops (SAEON + SAIAB)	10 (2 p/a)	>20	SAIAB and SAEON met several times per annum to plan and discuss progress.
	SMCRI meetings with DSI	10 (2 p/a)	13	DSI SARIR forum met twice per year and more frequently during the past 3 years to discuss the impact of COVID
	SMCRI meetings with SAEON & SAIAB MDs	20 (4 p/a)	>30	Quarterly meetings were held to discuss progress as well as ad hoc meetings, e.g. to develop trilateral MoUs, NF Forums, etc.
	SMCRI meeting with key government departments	18 (2-4 p/a)	23	Numerous meetings have been held with DFFE (various branches), DME, DWS (various branches), DBE (science engagement),etc
	Policy contributions	10	15	At least three contributions to management decisions made per annum, mostly to conservation agencies.
	% of staff from designated groups	75%	80%	12 of the 15 SMCRI staff are from designated groups
Platforms integration,	Algoa Bay SS	Roll-out complete	All complete except MOCOM moorings	MOCOM moorings procurement still not finalised despite trying numerous procurement instruments. NRF Corporate SCM assisting.

commissioning and operational	Two-Oceans SS	Revised post COVID to CMP Phase 1	Instruments ready for deployment – none deployed	Instruments ready, awaiting CoP WG meeting and approval of plans
	Natal Bight SS	Revised post COVID to CMP Phase 1	CMP Phase 1 instruments deployed	Phase 1 deployed successfully: 6 UTRs and 3 shallow UTRs. 2nd phase starting in 2022/23
	Marion Island SS	Revised post COVID to Wind stations	Wind stations deployed	Wind stations in place, but other activities need to be planned for 2023 change-over with SAPRI and DFFE
	Satellite Sentinel Sites	Revised post COVID to Gully UTRs (GUTR)	3 Gully UTRs deployed	Achieved, but servicing of South and West Coast overdue.
	Biogeochemistry Lab	10 external users 2500 samples analysed	23 external users >13,000 samples analysed	Number of external users decreased during lockdowns KPI for samples analysed need to increase to 3000 per year.
	Airborne Remote Sensing	12 x Coastal observations (p/a) 2x Estuarine mapping 2x Event & research surveys p/a	Average 9 coastal surveys p/a 3 estuarine mapping, 3 x research & event surveys p/a	Delivering 12/12 coastal surveys not possible due to long periods of downtime for regular maintenance and repairs. KPI's need to be adjusted. Other targets easily reached and need to increased
	Hyperbaric Chamber	6 operators; 0 downtime 12 x dives p/a	2 operators; 5 undergoing practical training; 2 days downtime >100 dives	Downtime due to 6-monthly service and maintenance. KPI's need to reflect no more than 4 days downtime. PPP results in >20 dives per month.
	Data Management	ObsDB & SAEIS launched 50 verifiable users	ObsDB active SAEIS active ObsDB: uploaded 4,358,063 24 verifiable data users	ObsDB launched and active Websites receiving considerable traffic To increase the number of verifiable users of the ObsDB, the platform will require to be promoted with stakeholders. Hundreds of unverifiable users due to open data policy
	Science Engagement	1250 learners; 50 educators reached 1 exhibit at Science Centre	>2000 learners; 168 educators; 968 members of the public 1 exhibit at Cofimvaba SC	Science engagement targets reached and exceeded

	Coastal Temp Network	200	181	Restrictions on travel (vehicle occupancy SOPs) limited field trips to deploy and maintain UTRs. Only three new UTRs deployed.
	Estuarine Network	10 estuaries	9 estuaries	Roll-out of additional estuaries slow due to COVID limitations.
	Coastal Craft	All 3 vessels operational 20 verifiable users	All operational 47 users	More users than anticipated due to ongoing and new projects
	Marine Remote Imagery	2 LTER sites; >100 m depth video surveys 5 verifiable users	368 BRUV and 157 ROV deployments 56 users	More users than anticipated due to ongoing and projects that stood over from the pandemic years
	Acoustic Tracking Array	Expand to West Coast & KZN 10 verifiable users	No West Coast 92 stations 35 users	Expansion to west Coast delayed due to COVID limitations
Stakeholder involvement	No. of students using the RI (Hons, M, PhD)	50 p/a	>100 p/a	Consistently exceeded the annual target, primarily due to the use of the platforms by the ACEP Phuhlisa Programme. Students also took longer to complete their degrees.
	No. of students trained at the RI (Hons, M, PhD)	20	>40	Target exceeded each year.
	No. of students graduated from using the RI (Hons, M, PhD)	10 p/a	44	Only accurate records kept of own supervised students graduating. No records available for the first year because it was not a KPI in 207/18.
	No. of peer-reviewed publications	75	92	Manuscript targets exceeded
	No of fulltime (resident) Researchers using the RI	10 p/a	15-17 p/a	Employing additional staff has been slow due to moratorium in 2020.
	No. of associate (part time) Researchers using the RI	50	>100 p/a	Exceeded target, due to researchers catching up on projects delayed by COVID and the researchers associated with the Phuhlisa Programme
	No. of fulltime staff at the RI	18 + 7 (NRF) = 25	15 + 7 (NRF) = 22	Below target due to slow filling of vacant positions

4.2. Strategies to overcome areas of under performance

The SMCRI is behind target to roll-out the additional Sentinel Sites (Two-Oceans, KZN-Bight and Marion Island) and Satellite Sentinel Sites (including ATAP to the West Coast). The main reason for this under performance is because of restrictions imposed by the COVID-19 pandemic (travel restrictions, moratorium on posts, moratorium on procurement above R500,000.00, beach closures and budget cuts). The uncertainty around annual budget cuts made it particularly difficult to roll-out additional resource intensive sites. The SMCRI Advisory Panel and DSI approved the revised Annual Performance Plan in 2020 whereby the roll-out of these sites were postponed for a year or until the budgets are confirmed. The easing of lockdown levels in 2021 allowed the SMCRI to make significant progress to start rolling-out some of the overdue deployments. Strategy to finalise the roll-out of the outstanding sites include:

- Series of workshops in August 2022 to develop the Two-Oceans Sentinel Site
- Workshops with DFFE, SAPRI and stakeholder to plan Marion SS
- Deploy first *in situ* instruments in the Two-Oceans SS in Q3 (2022/23)
- Roll-out the West Coast ATAP network and Namaqua Satellite SS (Q3 2022/23)
- Finalise the procurement of the MetOcean Coastal Observation Moorings (2023/24)

SMCRI did not meet its targets of regular meetings of advisory and governance panels. The Advisory Panel took 2 years to set-up, but since then has been highly effective in meeting annually and providing guidance to SMCRI. The community of practice working groups were easy to establish for some platforms and more difficult for those platforms already well established, e.g. estuaries, coastal temperature, etc. Some of the platforms have also not been rolled-out / set-up and the working groups have not been formalised as workshops are still ongoing.

SMCRI is also behind target to fill numerous critical vacancies (see organogram in Section 5). This is largely due to the moratorium on posts during the COVID-19 pandemic, uncertainty around medium-term budgets and an under capacitated HR Department at SAEON. Strategy to overcome the backlog in vacancies include:

- Appoint four critical vacancies (adverts/job descriptions have been sent to HR and we are collaborating with NRF Corporate HCM to accelerate filling these posts)
- Appoint key staff to each of these Sentinel Sites (1 each for Two-Oceans, KZN-Bight and Marion Island)
- Restructure the reporting lines and fill the last vacancies (2023)

5. Human Resources

5.1. Employees

A total of 15 staff is currently employed at SMCRI.

Name	South African							
	Black		Coloured		White		Indian	
	M	F	M	F	M	F	M	F
Imtiyaaz Malick (Oceanographic technician)			✓					
Dr Lucienne Human (Biogeochemist)							✓	
Tim Parker-Nance (Senior developer)					✓			
Lizeka Ncudu (Administrative assistant)		✓						
Tarryn Swartbooi (Laboratory technician)				✓				
Werner Kuntz (Marine Technician)					✓			

Jethan d'Hotman (Marine Technician					✓			
Belicia Matsha (Data Systems Tech)		✓						
Cholofelo Molatedi (Data Infrastructure Tech)		✓						
Imkitha Makoyi (Biodiversity Information Tech)		✓						
Dr Mfundo Bizani (Zooplankton Ecologist)	✓							
Phumlile Cotiyane-Pondo (Phytoplankton Ecologist)	✓							
Dr Taryn Murray (ATAP Data scientist)						✓		
Taryn Joshua (SMCRI Coordinator)				✓				
Dr Shirley Parker-Nance						✓		
Travis Smit (Marine technician – resigned)					✓			
TOTAL	2	4	1	2	3	2	1	

A total of 8 staff is seconded from SAEON and SAIAB

Name	South African							
	Black		Coloured		White		Indian	
	M	F	M	F	M	F	M	F
Prof Thomas Bornman (Manager)					✓			
Dr Shaun Deyzel (Operations coordinator)					✓			
Sean Bailey (Senior Technician)					✓			
Arlene Cobb (Office administrator)				✓				
Nozipiwo Hambaze (Science engagement)		✓						
Ryan Palmer (ACEP Manager)					✓			
Dr Anthony Bernard (MaRIP coordinator)					✓			
Dr Wayne Goschen (Oceanographer - resigned)					✓			
Dr Albrecht Götz (Marine Ecologist - resigned)					✓			
TOTAL		1		1	5			

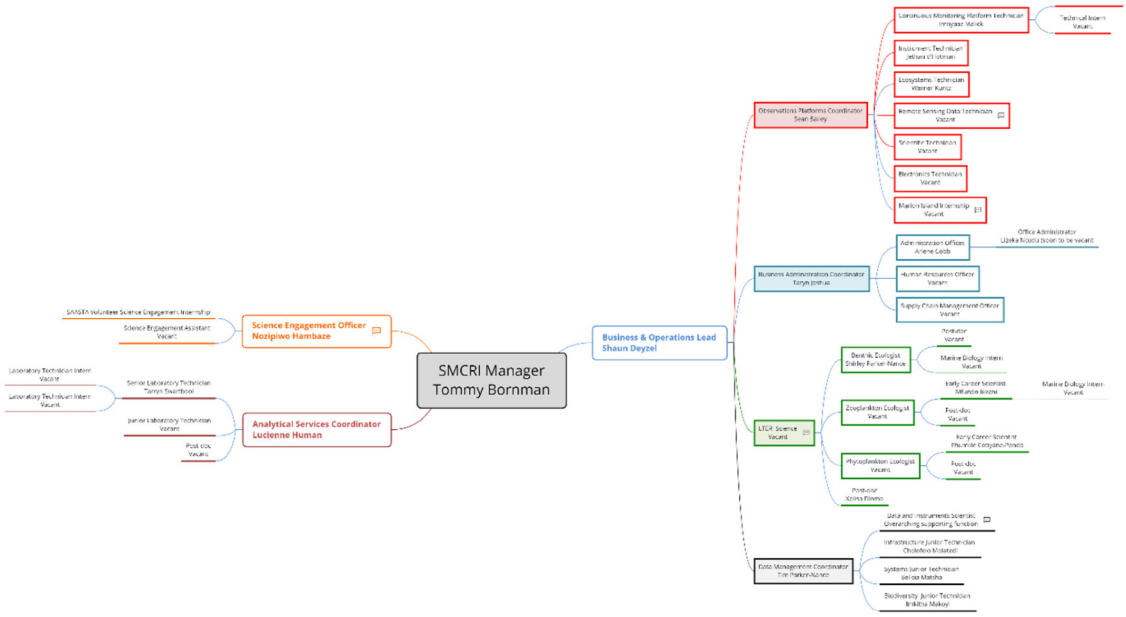
SMCRI mentored the following interns:

Name	South African							
	Black		Coloured		White		Indian	
	M	F	M	F	M	F	M	F
Jennifa Mohale (2018-2020)		✓						
Werner Kuntz (2018-2020)					✓			
Melissa Pollard (2018 – 2019)						✓		
Amanda Mgwali (2019-2021) (DSI/NRF funded)		✓						
Yonela Mahamba (SAASTA funded) (2020 – 2021)		✓						
Rebotile Matabane (SAASTA funded) (2020-2021)		✓						
Oko Sotshongaye (SAASTA funded) (2021-2022)		✓						
Phamela Fani (volunteer in-service trainee) (2021)		✓						
TOTAL		6			1	1		

SMCRI mentored the following post-doctoral fellows:

Name	South African							
	Black		Coloured		White		Indian	
	M	F	M	F	M	F	M	F
Robert Williamson (2017 – 2019)					✓			
Paula Pattrick (2019 – 2021)						✓		
Zimkitha Gebe (2020 – 2021)		✓						
Xolisa Dlomo (2020 – ongoing)	✓							
TOTAL	1	1			1	1		

The staff organogram is provided below showing both the existing and vacant positions.



5.2. Learning and development interventions:

- Hyperbaric Chamber Operator and Supervisor training: 7 x staff members
- First Aid training: 8 x staff members
- Ship Captain's Medical Training Course: 6 x staff members
- Supply Chain Management training: 13 x staff members
- SHE-representative training: 2 x staff members
- Category R skippers licence: 2 x students
- Category C skippers training: 1 staff member
- Swimming lessons: 1 staff member, 7 students and 1 intern
- Category EC driver training: 2 staff members
- Class IV diver training: 1 x staff member
- Private Pilot Licence training: 1 staff member

SMCRI have increased the capacity of scarce skills through the employment of independent contractors on an *ad hoc* (when needed) basis for the following fields:

- Scientific Divers (minimum Class IV)
- Scientific Dive Supervisors (minimum Class IV)
- Commercial pilots (preferably with Glasair Sportsman type rating)

5.3. Health and Safety

Over the past five years SMCRI had a strong focus on risk, health and safety management to prevent accidents that could be both costly and damaging to SMCRI's reputation. The Department of Employment and Labour (DoEL) audited SMCRI in 2019, 2020 and 2021. The reason for their last visit was to assess how SMCRI implemented their COVID-19 scenarios. Although they focussed mostly on the research dive unit, other operational sites and activities were also inspected. SMCRI addressed all the concerns within the 60-day limit to the satisfaction of the DoEL. A delegation of 12 staff (including the DDG, Directors and Chief Inspectors) from DoEL also visited SMCRI on 10 June 2021 to receive an overview of Hyperbaric Chamber operations. The consolidated Elwandle SHER folder can be accessed at: https://drive.google.com/drive/folders/17X2gZxqN75wi5TqlhN3vdrGne4CdPrUl

Six staff/student members tested positive for COVID-19, during the 2020/21 – 2021/22 years. All six staff members fully recovered and all staff and students are fully vaccinated. SMCRI has weekly COVID-19 Risk meetings and the minutes from these meetings, SOPs, permits, attendance registers, etc. can be found at:
https://drive.google.com/drive/folders/1kX5wXl8YCuri66uL8CJN2RM_wPPpRqrM

5.4. HR challenges:

One of the greatest challenges faced by SMCRI over the past five years is the large number of vacancies that have not been filled. These vacancies are not due a lack of available human resources, but rather because the RI was cautioned to not increase its staff compliment too quickly because of uncertainty regarding the medium-term budgets. The COVID pandemic also resulted in the NRF imposing a moratorium on all new posts that lasted for more than a year and the resultant backlog in advertising posts further delayed capacitating SMCRI.

6. Risk management

6.1. Risk assessment and mitigation measures

Major risks faced by SMCRI, as well as the main mitigation measures implemented, are provided below (and in Section 6.2. Risk Analyses):

- The largest risk faced by SMCRI is the under-expenditure caused by the COVID pandemic that has resulted in a large carry-forward of unspent funds. (See Section 7: Financial Performance, for more detail)
- COVID-19 posed the biggest risk to the health and safety of staff during 2020-2022. All staff and students were encouraged to work from home where possible and SOPs adhered to when in the laboratory, office and field. All staff and students are fully vaccinated allowing a return to more normal working practises in 2022/23.
- Not having well established and participative Community of Practice Working groups / user fora risks stakeholder dissatisfaction and threatens transparency of operations and decision making.
- Building of the new C and E block extension on the Ocean Sciences Campus of the NMU have caused disruptions, but the building will be completed in August 2022.
- Power outages caused by loadshedding and theft of grid infrastructure results in long periods without electricity. The campus generator takes 5 minutes to start-up, so there is a period without power and this impacts the laboratory instruments that are not on large enough UPS systems. This was the main reason for the low number of samples analysed in 2021.
- Essential suppliers, e.g. PEDSAC and SAMSA, cannot be paid because they are either not on the CSD, tax certificates are out of date or they are slow in completing SBD forms. This is seriously impacting business. Temporary mitigation measures include staff asking for advances to pay for fuel.
- Delays in procurement of MetOcean Coastal Observation Moorings due to the complexity of procuring innovative products locally. SMCRI is working closely with NRF Corporate SCM to develop a new procurement instrument to facilitate the process.
- Supplier fatigue and tenderpreneurs remain problematic in the Supply Chain Management process.

6.2. Risk analysis

Likelihood [1]
1 – Rare = hardly ever occur
2 – Unlikely = unlikely to occur
3 - Moderate = occurrence not entirely unexpected
4 – Likely = will probably occur
5 – Certain = almost always occurs

Impact [2]
1 - Low = very little impact
2 - Minor = impact can be handled through remedial actions
3 - Moderate = prejudice attainment of the current year's objectives;
4 - Major = would threaten the sustainability of the facility;
5 - Critical = would threaten the sustainability of the NRF.

Risk rating [3] Impact x Likelihood

Risk analysis and risk control/management strategies							
Risk	**Effect of risk**	**Likelihood[1]**	**Consequences[2]**	**Risk rating[3]**	**Control measures**	**Additional controls**	**Implementation driver**
10% Reduction in Core Grant funding	Financial shortfall. Inability to maintain research platforms and ecosystem sampling.	5 (Certain)	Impact: 3 (Major)	15	Strict and conservative budgeting practised. Sentinel sites and continuous monitoring platforms established and expanded in a phased approach.	Reduce temporal scale, reduce spatial spread of sites.	1) Ensure Core Grant funding from DSI is sufficient 2) Work towards a sustainable funding model on selected platforms.
Lack of human resources (low in-house staff numbers due to NRF moratorium)	Technical and scientific services disrupted and inefficient. Will impact on RI performance and reporting.	3 (Moderate)	Impact: 4 (Major)	12	Staff members are required to fulfil more than one role and assist in areas outside of their KPAs. Staff require training in more than one field, e.g. diving, skippering, etc.	Use of students, DSI/NRF interns and SAEON / SAIAB support staff	1) Ensure a healthy student body associated with the RI. 2) Apply regularly for DSI interns. 3) Train staff in a wide range of skills.
Further reduction in core grant funding (>20%)	Financial shortfall. Inability to maintain research platforms	3 (Moderate)	Impact: 4 (Major)	12	Strict and conservative budgeting practised. No further roll-out of sentinel sites and new instruments/platforms. No new staff appointed.	Reduce temporal scale, reduce spatial spread of sites, reduce staff numbers	1) Ensure Core Grant funding from DSI is sufficient 2) Work towards a sustainable funding model on selected platforms.
Failure of technical equipment / loss at sea	Postponement or cancelation of fieldtrips / loss of data and equipment	3 (Moderate)	Impact: 3 (Moderate)	9	Maintain existing equipment. Ensure redundancy. Insurance in place. Key staff fully competent and adhere to best practices.	Acquire additional instruments as back-up units; strong local community and stakeholder training and support	1) Ensure back-up instruments available & in good working order
Disruption caused by closure of campus/beaches due to COVID-19	Restricted access to facilities, research platforms and sites	3 (Moderate)	Impact: 4 (Major)	12	Move key infrastructure off-campus in the event the campus is closed. Sample sites prior to increased lockdown levels.	Cloud based storage of data. Additional security measures to safeguard RI on site.	1) Anticipate closure 2) Safeguard staff & students 3) Store off-site
Disruption due to load, water shedding & student protests	Restricted access to facilities and research platforms	4 (Likely)	Impact: 4 (Major)	16	Plan activities around schedules. Safeguard sensitive equipment.	Procure UPSs for lab and critical IT equipment. Solar power generation. Procure water tanks to ensure lab remains functional	1) Ensure key equipment remains operational 2) Ensure vehicles and vessels can be washed down after being at sea

7. Financial Performance

7.1. Budget

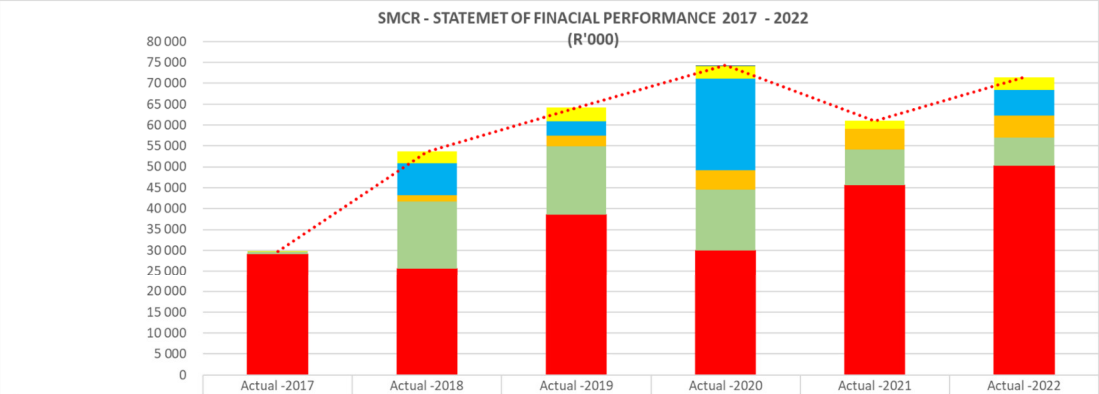
The SMCRI project received R190,776,000 over the past 6 years (2016/17 – 2021/22). Of this, SMCRI managed to spend R138,700,000. (See table below). The budget SMCRI received over this period was R11,722,000 less than the original budget, due to the 10% cuts agreed to during the COVID-19 pandemic and to allow for the roll-out of additional SARIR projects. The largest part of the budget was spent on the procurement of research infrastructure. The biggest challenge experienced with the budgets were on the National Principle of MTEF cycle budget allocations, namely that only the first year is guaranteed and the outer two years were indicative and only used for planning purposes. Uncertainty around the budgets resulted in a precautionary approach in expenditure, especially with regards to longer term commitments, such as salaries.

SMCR - STATEMENT OF FINANCIAL PERFORMANCE 2017 - 2022
(R' 000)

DESCRIPTION	ACTUAL 2017	ACTUAL 2018	ACTUAL 2019	ACTUAL 2020	ACTUAL 2021	ACTUAL 2022
INCOME	**29 698**	**53 654**	**64 213**	**74 302**	**61 037**	**71 484**
Funds Received	29 698	32 400	36 500	30 436	31 254	**30 488**
Funds carry forward/Budget	-	21 254	27 713	43 866	29 783	**40 996**
EXPENSES	**646**	**27 973**	**25 706**	**44 260**	**18 886**	**21 229**
Operating expenses	66	2 789	3 231	3 055	1 926	**3 005**
Bursaries and grant				150	-	-
Internal expenses		7 680	3 591	21 919	3 468	**6 217**
Salaries	17	1 490	2 450	4 652	5 022	**5 273**
Capex	563	16 014	16 434	14 484	8 470	**6 734**
FUNDS CARRIED FORWARD	**29 052**	**25 681**	**38 507**	**30 042**	**42 151**	**50 255**

7.2. Financial performance

SMCRI experienced major variances (large carry forwards) since the start of the project due to the late payment of the original budget in 2016/17. Despite the carry-forward from the first year, SMCRI did very well to spend the majority of its budget during 2017/18 to 2019/20. Expenditure slowed down significantly during 2020/21 and 2021/22, primarily as a result of limited operations due to the COVID-19 pandemic and lockdowns, the moratorium on posts and the moratorium on bids >R500,000 imposed by the NRF. This under-expenditure was further exacerbated in 2022 by Treasury advising all organs of state to hold all tenders in abeyance until clarity was received on the Preferential Procurement Regulations, thereby further delaying procurement by a further 6 months. The result is that SMCRI currently has a carry forward of R50,255,294 from 2021/22. Procurement plans have been put in place, and weekly meetings have been instituted with SAEON and SAIAB SCM as well as NRF Corporate SCM, to ensure that the entire carry-forward is spent during Q2 and Q3 to allow the DSI to pay over the 2022/23 budget and still allow sufficient time to spend 90% of this budget as well. The financial performance over the past five years are shown in the graph below. The graph clearly shows the impact of the COVID-19 pandemic on expenditure, especially on Capex.



	Actual -2017	Actual -2018	Actual -2019	Actual -2020	Actual -2021	Actual -2022
Bursaries & Grant	0	0	0	150	0	0
Operating expenses	66	2 789	3 231	3 055	1 926	3 005
Internal Expenses	-	7 680	3 591	21 919	-	6 217
Salaries	17	1 490	2 450	4 652	5 022	5 273
Capex	563	16 014	16 434	14 484	8 470	6 734
Funds Carried forward	29 052	25 681	38 507	30 042	45 619	50 255
Funds Available to spent	29 698	53 654	64 213	74 302	61 037	71 484

7.3. Sustainability

Leveraged income: The SMCRI relied heavily on seconded staff from SAEON and SAIAB to ensure the immediate implementation of the RI. The leveraged income from these seven salaries covered by SAEON and SAIAB amounted to R21,750,000 over the past five years.
Platform return on investment: SMCRI hosts 15 research platforms and their value is derived from managing them as platforms for ongoing research and human capacity development. As an example, two laboratories managed by the Coastal Biogeochemistry Platform showed a significant Return on Investment (RoI), i.e.

- Microscope Lab:
  - Life cycle cost to date = R 2,521,998.93
  - Return on investment = R 7,448,800.00 (based on bursaries of 8 students and 2 post-docs, one contract research grant and subsidies from 10 manuscripts produced)
- AA3 nutrient auto analyser:
  - Life cycle cost to date = R4,850,000.00 (asset, maintenance, consumables, salary of technician)
  - Return on investment = R7,814,400.00 (based on14536 samples analysed at R400 per sample for 4 nutrients + outputs from students, manuscripts, etc.)

These platforms are best operated at a cost recovery model in order to maintain the availability of the platforms to add value to research and innovation activities that would otherwise not have been possible in their absence. These platforms can support contract research as long as there is sufficient technical capacity to provide the support over and above the LTER and research needs.
Contract platform provision/rental: SMCRI entered into a Public Private partnership with Bay Hyperbaric Medicine to sustainably operate the Hyperbaric Chamber. The partnership resulted in an income of R300,000 per annum that is sufficient to service and maintain the chamber and at the same time provide an essential service to society.
Equipment and Philanthropic donations: The SMCRI was donated research equipment from CEFAS (UK) worth R1,500,000.00 to set up a CLiP microplastics laboratory. SMCRI staff also received training from CEFAS worth >R250,000.00. A SMCRI staff member also received a R580,000 research grant through a philanthropic donation. As SMCRI becomes better known more of these donations can be expected.

8. Conclusion

SMCRI made excellent progress with regards to the immediate implementation of the roll-out phase of the SMCRI. This driven start-up enabled SMCRI to meet most of the requisite deliverables as outlined in the DSI Contract Number DST/CON 0007/2017 and the revised contract DST/CON0146/2017. SMCRI was slightly behind in its roll-out by the time the COVID-19 pandemic hit due to some procurement challenges and the slow filling of vacancies. The pandemic had a significant impact on the operations and roll-out of SMCRI, resulting in the postponement in the roll-out of the other sentinel sites because of uncertainty around lockdown levels and available budgets. This delay was further exacerbated by a moratorium on advertising posts and bids over R500,000 followed by a restriction on all tenders for 6 months. The combination of these events set SMCRI back at least two years and operations, procurement and filling vacancies only started up again full-time in 2022/23. This means that after 5 years, SMCRI is still effectively in the roll-out phase, which should be concluded at the end of this financial year if there are no further delays. Despite all these set-backs, SMCRI produced excellent outputs in human capacity development (173 students of which 75% were from designated groups), analysed 13,552 samples in the laboratories, successfully completed 1511 data collection fieldtrips, attracted 233 users, uploaded >4,25 million observations and reached 2041 learners, 168 educators as well as 968 members of the public.

9. Future perspectives

Completing the roll-out

The single minded focus of the SMCRI staff in 2022/23 will be to spend the R50 million carry-forward by the end of Q3 and the 2022/23 budget by the end of Q4. To do this will require filling the employment vacancies and adhering to the strict timelines of the comprehensive procurement plan. In addition, a concerted effort will be made by the project managers and field teams to roll out the first phase of all the outstanding sentinel and satellite sentinel sites. Although this will impact on the outputs produced this year, it will ultimately result in even more outputs over the next 5 years.

Five-year plan

Following the roll-out, SMCRI will focus the next five years on achieving its six key objectives of transformation, impact of research infrastructure, impact of science engagement, excellence, internationalisation and sustainability. For SMCRI to continue excelling over the next five years will require:

- The implementation of a clear set of key performance indicators provided by the DSI for the SARIR projects.
- Rapid and accurate reporting on expenditure and performance as well as compliance with the increasingly complicated financial regulations from National Treasury.
- Setting up and regularly meeting with the Community of Practise Working groups for all 15 research platforms.
- A strong focus on knowledge translation for societal benefit that include the publication of technical and policy briefs aimed at improving local, district and provincial service delivery.
- Contributing key data sets to inform state of the environment reporting.
- Play a leading role in the development of coastal observation systems in Africa for Africa, that is innovative, affordable, easy to maintain, and yet produce high quality data that can fed into global models.

10. List of acronyms

ACEP	African Coelacanth Ecosystem Programme
ADCP	Acoustic Doppler Current Profiler
APP	Annual Performance Plan
ASCA	Agulhas System Climate Array
BELTER	Benthic Ecosystem Long-Term Ecological Research
BIOGRIP	BIOGeochemistry Research Infrastructure Programme
CEFAS	Centre for Environment, Fisheries and Aquaculture Science (UK)
CoP	Communities of Practice
CSD	Central Supplier Database
CSIR	Council for Scientific and Industrial Research
CT	Conductivity/Temperature
CTD	Conductivity/Temperature/Depth
DFFE	Department of Forestry, Fisheries and the Environment
DoEL	Department of Employment and Labour
DSI	Department of Science and Innovation
DST	Department of Science and Technology (old)
DWS	Department of Water and Sanitation
ECPTA	Eastern Cape Parks and Tourism Agency
EFTEON	Expanded Freshwater and Terrestrial Environmental Observation Network
GERI	Global Environmental Research Infrastructure
HAB	Harmful Algal Bloom
HCD	Human Capacity Development
HR	Human Resources
ICT	Information Communication and Technology
ILTER	International Long-term Ecological Research
IPBES	Intergovernmental Platform for Biodiversity and Ecosystem Services
KPA	Key Performance Area
KPI	Key Performance Indicator
LTER	Long-term Ecological Research
MTEF	Medium Term Expenditure Framework
NMU	Nelson Mandela University
NRF	National Research Foundation
NRM	National Resource Management
NSI	National System of Innovation
ObsDB	Observations Database
OTN	Ocean Tracking Network
PEDSAC	Port Elizabeth Deep Sea Angling Club
PELTER	Pelagic Ecosystem Long Term Ecological Research
PDP	Professional Development Programme
RIRP	Research and Innovations Reward Programme
ROV	Remotely-Operated Vehicle
RSET	Rod Set Elevation Table
RSLTER	Rocky Shore Long-Term Ecological Research
RU	Rhodes University
R/V	Research Vessel
SACTN	South African Coastal Temperature Network

SADCO	South African Data Centre for Oceanography
SAEON	South African Environmental Observation Network
SAIAB	South African Institute for Aquatic Biodiversity
SAPRI	South African Polar Research Infrastructure
SAMSA	South African Maritime Safety Association
SANAP	South African National Antarctic Programme
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SAPS	South African Police Service
SARIR	South African Research Infrastructure Roadmap
SAWS	South African Weather Services
SBLTER	Sandy Beaches Long-Term Ecological Research
SBRUVS	Stereo-Baited Remote Underwater Video System
SCM	Supply Chain Management
SMCRI	Shallow Marine and Coastal Research Infrastructure
SRIG	Strategic Research Infrastructure Grant
SS	Sentinel Sites
SSS	Satellite Sentinel Sites
TNPA	Transnet National Ports Authority
TXRF	Total X-ray Reflection Fluorescence
UCT	University of Cape Town
UFH	University of Fort Hare
UKZN	University of KwaZulu-Natal
UNIZUL	University of Zululand
US	University of Stellenbosch
UTR	Underwater Temperature Recorder
UWC	University of the Western Cape
WSU	Walter Sisulu University

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12. Appendix A: Human Capital Development outputs

12.1. Details of human capital development outputs (Students)

Surname, First name	Gender Male/ Female/ Non-Binary	Population Group (Black African, White, Asian, Coloured)	Citizenship (SA Permanent Resident, other (specify))	Institution at which the individual is employed or registered for a degree	Study level or Support Level (H, M, D, User, Collaborator, etc)	First year of registration (or collaboration or usage of RI)	Field of Study	Title of Thesis (OR Project)
Abdissa, Dele	Male	Black African	Other African Country	RU	PhD	2022		
Abrahams, Ameiroh	Female	Coloured	South African	University of the Western Cape	PhD	2021	Oceanography	Air-sea interaction along the Arctic region
Abrahams, Melissa	Female	Coloured	South African	UWC	MSc	2022		
Adams, Luther	Male	Coloured	South African	UCT	MSc	2019-2020	Ecology	Deep Secrets
Albano, Patricia	Female	White	International	University of Miami -Rosenstiel School	MSc	2019	ATAP	
Babane, Siviwe	Male	Black African	South African	University of KwaZulu-Natal	MSc	2018	Marine Biology	Towards understanding heat stress tolerance mechanisms of zooxanthellae in corals Anomastrea irregularis and Pocillopora verrucosa from the south coast of KwaZulu-Natal
Bailey, Dylan	Male	White	South African	Nelson Mandela University	PhD	2018	Oceanography	Ocean Dynamics of the Shelf and Bays of the Eastern Agulhas Bank: A Process-Oriented Numerical Modeling Study
Barrow, Christine	Female	White	South African	University of Cape Town	BSc (Hons)	2021	Oceanography	The influence of temperature on marine animal movement
Bizani, Mfundo	Male	Black African	South African	Nelson Mandela University	PhD	2015	Plankton Ecology	Zooplankton dynamics of Algoa Bay (Eastern Cape, South Africa) under varying oceanographic conditions.
Bornman, Eugin	Male	White	South African	Nelson Mandela University	PhD	2019	Ichthyology	The impact of algal blooms on the fish nursery function of estuaries using the Sundays Estuary as a case study
Braby, Laura	Female	White	South African	UCT	PhD	2018	Ecology	Captor Project
Brandt, Silke	Female	White	South African	UCT	PhD	2022		Agulhas Bank Connections
Brown, Kylan	Female	Coloured	South African	University of the Western Cape	MSc	2019	Microplastics	The movement of organic material and deposition of microplastics around the Swartkops estuary
Chiazarri, Brent	Male	White	South African	UKZN	MSc	2019	ACEP	Captor Project

Chioze, Ceica	Female	Black African	Other African Country	Nelson Mandela University	MSc	2021	Plankton Ecology	The Abundance and Distribution of Mesozooplankton Communities on the Mozambique Shelf
Conway, Jasmine	Female	White	International	University of Plymouth	PhD	2022	Biochemistry	Marine Natural Products
Cotiyane-Pondo, Phumlile	Male	Black African	South African	Nelson Mandela University	PhD	2019	Biogeography, Diatom taxonomy	Towards the biogeography of marine benthic diatoms along the coast of South Africa
Cottrant, Emy	Female	White	International	UCT	PhD	2022		
Currie, JC	Male	White	SA Permanent resident	UCT	Post Doc	2018	Ecology	Deep Secrets
Cweba, Sivuyisiwe Thando	Female	Black African	South African	UKZN	BSc (Hons)	2022		
D'Hotman, Jethan	Male	White	South African	UCT	MSc	2018	Ecology	Captor Project
Dalton, WN	Male	White	South African	UKZN	BSc (Hons), MSc	2017-2018	Ecology	Spatial Solutions
De Vos, DKL	Female	Coloured	South African	Rhodes University	MSc	2018-2019	Biochemistry	Deep Forests
Dines, Sasha	Female	White	South African	SU	PhD	2022		
Dloboyi, Asisipho	Female	Black African	South African	RU	MSc	2022		
Dlomo, Xolisa	Male	Black African	South African	Nelson Mandela University	PhD Post-doc	2015 2020	Oceanography	Coastal ocean dynamics of the Algoa Bay region
Dominy, Tayla	Female	White	South African	Rhodes University	MSc	2019	GIS	A Geospatial Analysis on the effect of environmental conditions on the space use patterns of four marine predators occurring in Algoa Bay, Eastern Cape, South Africa
du Plooy, Schalk	Male	White	South African	Nelson Mandela University	Post-doc	2019	Biogeochemistry	Structural influence on nutrient uptake in different stromatolite meso-fabrics
Duna, Oliver	Male	Black African	South African	Rhodes University	PhD	2019	Marine Biology	The effects of easterly and westerly winds on the dispersal, distribution and settlement of invertebrate larvae in the southeast coast of South Africa
Dyantyi, Siphelele	Male	Black African	South African	Rhodes University	MSc	2017	Ecology	Larval dispersal
Dzanibe, Oscar	Male	Black African	South African	UniZulu	BSc (Hons)	2018	Ecology	Canyon Connections
Edward, Josephine	Female	Black African	Other African Country	UWC	MSc	2018	Oceanography	Oceanography of Transkei shelf
Edworthy, Carla	Female	White	South African	Rhodes University	PhD	2018	Ichthyology	Does physiology determine tolerance and potential for acclimation to ocean acidification in coastal fishes with different life-history strategies?
Els, Jessica	Female	White	South African	Nelson Mandela University	MSc	2018	Estuarine Ecology	Ecosystem services of the Swartkops Estuary salt marsh and seagrass habitats focusing on carbon storage and the potential of these habitats as a nutrient filter
Engelbrecht, LD	Male	White	South African	UKZN	MSc, PhD	2018 -2022	Ecology	Spatial Solutions

Engelbrecht, Melindi	Female	White	South African	Nelson Mandela University	MSc	2020	Plankton Ecology	Investigating zooplankton dynamics in Algoa Bay using an Underwater Vision Profiler
Ewels, M	Female	White	South African	UKZN	BSc (Hons)	2018	Ecology	Spatial Solutions
Franken, Mari-Lise	Female	White	South African	UCT	MSc, PhD	2020-2022	Ecology	Deep Forests Project
Gayiza, M	Male	Black African	South African	Rhodes University	BSc (Hons)	2019	Ecology	Salpa Project
Gebe, Zimkhita	Female	Black African	South African	SAEON	Post-doc	2020-2021	Plankton ecology	Phytoplankton dynamics of the Algoa Bay Sentinel Site
Gibb (nee Weston), Ross-Lynne	Female	White	South African	Rhodes University	PhD	2018	Plankton Ecology & genetics	Mapping the phytoplankton of Algoa Bay
Gilmore, Jessica	Female	White	South African	UKZN	MSc	2018-2019	Ecology	Captor Project
Golla, TR	Male	Indian	International	UJ	Post Doc	2021	Ecology	Captor Project
Gornall, Jessica	Female	White	South African	Rhodes University	PhD	2019	Marine Biology	An evaluation of the relationship between the spatial and temporal distribution of spawning of chokka squid, *Loligo reynaudii*, and environmental variability
Govender, Ashrenee	Female	Indian	South African	ukzn	PhD	2018-2020	Ecology	Captor Project
Gwayese, Zodidi	Female	Black African	South African	ukzn	Msc	2017	Ecology	Spatial Solutions
Gwazani, Nothando	Female	Black African	South African	University of Fort Hare	MSc	2018	Remote Sensing	Multi-temporal assessment of chlorophyll-a concentration in estuarine waters: A case study of Sundays and Swartkops estuaries, Eastern Cape Province
Hart-Davi, Michael	Male	White	South African	NMU	MSc	2018	Ecology	Captor Project
Hawkes, Sarah	Female	White	South African	Nelson Mandela University	MSc	2022	Marine Biology	Food quality as a predictor of macroinvertebrate dietary consumption in modern supratidal microbialite ecosystems of Nelson Mandela Bay, Gqeberha
Hlophe, Nikeziwe	Female	Black African	South African	UniZulu	BSc (Hons)	2018	Ecology	Canyon Connections
Ho, Yi-Ting	Female	Asian	South African	UCT	MSc	2022		Agulhas Bank Connections
Hubot, Nathan	Male	White	International	University of Southampton	PhD	2019	Marine Biology	The role of jellyfish in nutrient cycling in two contrasted large marine ecosystems of South Africa
Irion, Dylan	Male	White	South African	UCT	PhD	2019		
Isemonger, Eric	Male	White	South African	Rhodes University	MSc	2017	Biochemistry	Marine Natural Products
Janna, Jamila	Female	Black African	South African	UKZN	BSc (Hons)	2018	Ecology	Canyon Connections
Jarvie, RA	Female	White	South African	Rhodes University	BSc (Hons)	2017	Biochemistry	Marine Natural Products
Kalinski, Jarmo	Male	White	SA Permanent resident	Rhodes University	PhD	2018	Biochemistry	Marine Natural Products
Kalyan, Brishan	Male	Indian	South African	Wits	MSc	2021		SAEON Sentinel Site
Keshnee, Rebecca	Female	Indian	South African	UKZN	BSc (Hons)	2018	Ecology	Canyon Connections

Kiandula, Wakisa	Male	Black African	Other African Country	RU	PhD	2022		
Lakane, Priscah Chuene	Female	Black African	South African	Nelson Mandela University	MSc	2021	Estuarine Ecology	DSI/NRF SARChI Shallow Water Ecosystems
Logan, Guy	Male	White	South African	UCT	MSc	2020 -2022	Ecology	Captor Project
Madonsela, Luthando	Female	Black African	South African	RU	PhD	2022		
Mafanya, Sandisiwe	Female	Black African	South African	Rhodes University	MSc	2017	Marine Biology	Use of eco-engineering to enhance indigenous bivalve (*Perna perna*) communities and biodiversity: Port of East London, South Africa, as a case study
Maja, Tumelo	Male	Black African	South African	UCT	MSc	2018	Ecology	Captor Project
Majola, Ntando	Female	Black African	South African	University of Zululand	MSc	2021	Ecology	Ecology and health status of unconsolidated sediments in marine and estuarine systems
Makoni, Gervase	Male	Black African	SA Permanent resident	Rhodes University	PhD	2017-2018	Biochemistry	Marine Natural Products
Malan, Niel	Male	White	South African	UCT	Post Doc	2018	Ecology	Captor Project
Malindi, Madoda	Male	Black African	South African	University of Fort Hare	MSc	2019	Remote Sensing	Application of Chlorophyll-a algorithms for algal bloom monitoring in Algoa Bay, Eastern Cape
Malongweni, Nwabisa	Female	Black African	South African	Nelson Mandela University	PhD	2018	Oceanography	Composition, dynamics and role of benthic nepheloid layers on the Agulhas Bank
Manare, Caroline	Female	Black African	South African	UCT	PhD	2022		Deep Connections
Mankuntshu, Elihle	Female	Black African	South African	RU	BSc (Hons)	2022		
Marwarwa, SZ	Female	Black African	South African	Rhodes University	BSc (Hons)	2017	Biochemistry	Marine Natural Products
Mataboge, Bontle	Female	Black African	South African	Rhodes University	MSc	2020	Ecology	Salpa Project
Mathe, Tumelo	Female	Black African	South African	University of Fort Hare	PhD	2018	Remote Sensing	Validation of in situ chl-a and hourly SST using remote sensing
Mazwane, Sixolile	Female	Black African	South African	Nelson Mandela University	PhD	2018	Plankton Ecology	Composition, dynamics and productivity of phytoplankton on the eastern and central Agulhas Bank
Mbandzi, Nokubonga	Female	Black African	South African	Nelson Mandela University	PhD	2018	Plankton Ecology	Zooplankton dynamics in the eastern and central Agulhas Bank
Mdluli, NM	Male	Black African	South African	UKZN	BSc (Hons), MSc	2018 - 2020	Ecology	Spatial Solutions, Canyon Connections
Mdodane, Mandilakhe	Male	Black African	South African	Nelson Mandela University	MSc	2021	Estuarine Ecology	DSI/NRF SARChI Shallow Water Ecosystems
Mfikili, Athi	Male	Black African	South African	Nelson Mandela University	PhD	2017	Geology	Evidence of late-Holocene tsunami deposits in South African estuaries
Mkhabela, Sibusiso	Male	Black African	South African	University of Zululand	MSc	2021	Ecology	Ecology and health status of unconsolidated sediments in marine and estuarine systems
Mkhize, SK	Male	Black African	South African	ukzn	MSc	2017-2018	Ecology	Deep secrets

Mkhize, Thembani	Male	Black African	South African	Nelson Mandela University	MSc	2019	Ichthyology	Habitat connectivity of a common fish species between estuarine and nearshore habitats in a shallow-water seascape.
Moss, Kerry	Female	White	South African	Nelson Mandela University	MSc	2019	Microplastics	Microplastics in the marine food chain of Algoa Bay
Motshwa, Nonhle	Female	Black African	South African	Rhodes University	MSc	2022	Ichthyology	Estimating the impact of exploitation on the acceleration and home range behaviour of roman, Chrysoblephus laticeps, using acoustic telemetry
Mpopetsi, Pule	Male	Black African	South African	Rhodes University	PhD	2018	Ecology	Salpa Project
Mukhari, Dinah	Female	Black African	South African	SAIAB	PhD	2022		
Muller, C	Male	White	South African	Rhodes University	PhD	2018-2020	Ecology	Salpa Project
Mutshekwa, Thendo	Male	Black African	South African	University of Venda	MSc	2019	Aquatic Sciences	Water quality of groundwater samples inoculated with different leave extracts
Mxo, Vuyo	Female	Black African	South African	SAIAB	MSc	2022		ATAP
Mzolo, BE	Male	Black African	South African	ukzn	BSc (Hons)	2017	Ecology	Deep secrets
Ndhlovu, Aldwin	Male	Black African	South African	Nelson Mandela University	Post-doc	2021	Biogeochemistry	Biomagnification pathways of heavy metals in estuaries: benthic macrofauna as effective pollutant bioindicators
Ndoto, Asiphe	Female	Black African	South African	Nelson Mandela University	MSc	2022	Estuarine Ecology	Comparing stable isotope ratios and metal concentrations between components of the benthic food web at the Swartkops Estuary
Ndwandwe, Skhumbuzo	Male	Black African	South African	University of Zululand	BSc (Hons), MSc	2018 - 2021	Ecology	Ecology and health status of unconsolidated sediments in marine and estuarine systems
Nefdt, Leila	Female	Coloured	South African	UCT	MSc	2017-2018	Ecology	Deep secrets
Nel, Marele	Female	White	South African	Nelson Mandela University	MSc	2018	Estuarine Ecology	A pilot study on the bioavailability of selected heavy metals in the sediments of the Swartkops Estuary
Newton, Summer	Female	White	South African	NMU	MSc	2021		BAF Oceans Alive
Njanje, Idris	Male	Black African	Other African Country	RU	PhD	2022		Marine Natural Products
Njapha, Noxolo	Female	Black African	South African	UniZulu	BSc (Hons)	2018	Ecology	Canyon Connections
Nkosi, Andile	Female	Black African	South African	UniZulu	BSc (Hons)	2018	Ecology	Canyon Connections
Nodo, Phakama	Female	Black African	South African	Rhodes University	PhD	2018	Ichthyology	An assessment of the nursery function of nearshore marine habitats for estuary-associated marine species in Algoa Bay, South Africa
Nsibande, Lungelo	Female	Black African	South African	University of Zululand	BSc (Hons), MSc	2018 - 2021	Ecology	Canyon connections, Ecology and health status of unconsolidated sediments in marine and estuarine systems
Ntsalaza, Marvin	Male	Black African	South African	University of Zululand	MSc	2021	Ecology	Ecology and health status of unconsolidated sediments in marine and estuarine systems

Ntsi, Nasipi	Female	Black African	South African	Rhodes University	MSc	2018	Biochemistry	Marine Natural Products
Nunes, Monique	Female	White	South African	Nelson Mandela University	PhD	2015	Estuarine Ecology	Microalgae as indicators of environmental change in the St Lucia estuarine system
Nxumalo, Lethiwe	Female	Black African	South African	UKZN	BSc (Hons)	2018	Ecology	Canyon Connections
Nyawo, Mpilo	Female	Black African	South African	Rhodes University	BSc (Hons), MSc, PhD	2017 - 2022	Ecology	Spatial Solutions, Canyon Connections
Ockhuis, Samantha	Female	Coloured	South African	Rhodes University	PhD	2018	Ecology	Captor Project
Olisah, Chijioke	Male	Black African	Other African Country	Nelson Mandela University	Post-doc	2021	Biogeochemistry	Occurrence and health assessment of organophosphate pesticides and organophosphate flame retardants in environmental matrices from selected estuaries in Eastern Cape Province, South Africa.
Oliver, Jody	Female	Indian	South African	NMU	PhD	2022		Deep Connections
Palan, KB	Male	Indian	South African	UKZN	MSc	2017	Ecology	Deep secrets
Parker-Nance, Shirley	Female	White	South African	Rhodes University	PhD	2016	Marine Ecology	Long-term reef monitoring system for the Agulhas Ecoregion
Passuni, Giannina	Female	Coloured	International	NMU	PostDoc	2018	Ecology	Seabird ecology of Algoa Bay
Pattrick, Paula	Female	White	South African	SAEON	PostDoc	2019	Plankton Ecology	Ichthyoplankton of Algoa Bay
Phillips, Moraea	Female	White	South African	Rhodes University	MSc	2015	Marine Conservation	Role of the Amathole Marine Protected Area in protecting vulnerable and threatened reef fish
Pillay, Humeshni	Female	Indian	South African	UCT	MSc	2022		
Pillay, Talicia	Female	Indian	South African	NMU	PhD	2018-2020	Marine Geology	Deep Forests
Pollard, Melissa	Female	White	South African	Nelson Mandela University	PhD	2021	Marine Biology	Shallow-water seascape connectivity: Micro-habitat utilization by a common estuarine-associated juvenile fish species in the estuary-ocean ecotone
Potts, Taryn	Female	Coloured	South African	Rhodes University	MSc	2017-2022	Biochemistry	Marine Natural Products
Ramanooj, Shanice	Female	Indian	South African	UKZN	BSc (Hons), MSc	2018 - 2020	Ecology	Canyon Connections
Rambran, R	Male	Indian	South African	UKZN	MSc			Captor Project
Ramsamooch, Masha	Female	Indian	South African	UKZN	BSc (Hons)	2018	Ecology	Canyon Connections
Rautenbach, Gustav	Male	White	South African	CPUT	BSc (Hons), MSc	2018 - 2020	Ecology	Canyon Connections
Reddy, Seshnee	Female	Indian	South African	Rhodes University	MSc	2019	Marine Biology	Larval assemblages in intertidal habitats; the use of man-made and natural structures
Remelepe, Khutso	Female	Black African	South African	UZKN	MSc	2018	Ecology	Spatial Solutions
Rogers, Toby	Male	White	International	UCT	PhD	2022		

Rohde, A	Female	White	South African	UKZN	BSc (Hons), MSc	2018 & 2020-2021	Ecology	Canyon Connections
Ross-Marsh, Erin	Female	White	South African	SU	PhD	2022		
Rukuni, Praxedes	Female	Black African	Other African Country	Nelson Mandela University	MSc	2019	Plankton Ecology	Evaluation of functional diversity indexes for the mesozooplankton in Algoa Bay as proxies to assess the stability of the pelagic food web.
Russo, CS	Female	White	South African	UCT	MSc	2017-2018	Oceanography	Oceanography of Transkei shelf
Rylands, Shakirah	Female	Coloured	South African	UCT	MSc	2022		Agulhas Bank Connections
Scarponi, Valentina	Female	White	International	Sussex University	PhD	2019		
Schauneweg, Carolina	Female	White	International	Carl van Ossietzky University	MSc	2022		
Schoeman, Renee	Female	White	South African	Nelson Mandela University	PhD	2018	Marine Biology	The behavioural and vocal development of southern right (*Eubalaena australis*) and humpback whale (*Megaptera novaeangliae*) calves along the Eastern Cape coast and the potential impacts of anthropogenic noise.
Shange, HM	Male	Black African	South African	NMU	MSc	2020	Ecology	Canyon Connections
Shibe, Sinothando	Female	Black African	South African	UKZN	MSc	2020 - 2022	Ecology	Deep Forests Project
Singh, Sohana	Female	Indian	South African	UCT	Post Doc	2018	Ecology	Captor Project
Skeels, Michael	Male	White	South African	Rhodes University	MSc	2018	Ecology	Salpa Project
Smit, Kaylee	Female	White	South African	NMU	PhD	2019		MAR RIP
Snow, Bernadette	Female	White	South African	Nelson Mandela University	PhD	2017	Socio-ecology	Linking people' needs, preferences and values to ecosystem services provided by marine phytoplankton of Algoa Bay, South Africa
Solomons, Gabrielle	Female	Black African	South African	RU	MSc	2022		Marine Natural Products
Somana, Zinzi	Female	Black African	South African	Rhodes University	MSc	2017	Marine Biology	Combining both morphological characterisitics and DNA barcoding to describe the distribution and phylogeny of larval invertebrates and fishes on the east coast of South Africa
Sonnekus, Martinus	Male	White	South African	Nelson Mandela University	PhD	2010	Plankton Ecology	Phytoplankton of the Southern Agulhas Large Marine Ecosystem (sACLME)
Sotshongaye, O	Female	Black African	South African	Rhodes University	MSc	2018-2019	Ecology	Larval fish dynamics within the coastal nearshore of the Eastern Cape, South Africa
Spiby, Kevin	Male	White	South African	CPUT	PhD	2022		
Stirnimann, Luca	Male	White	International	University of Cape Town	PhD	2017	Plankton Ecology	Zooplankton and phytoplankton dynamics in the open Southern Ocean and surrounding the Subantarctic islands
Taukoor, Sheveenah	Female	Indian	South African	UCT	PhD	2020	Oceanography	Port Alfred: a modelling approach
Truter (nee Raven), Hannah	Female	White	South African	Nelson Mandela University	MSc	2018	Marine Ecology	Habitat characterisation and epibenthic biodiversity in Algoa Bay, South Africa
Tsele, Tumi	Female	Black African	South African	RU	MSc	2022		

Tshingana, Bomikazi	Female	Black African	South African	University of Cape Town	PhD	2022	Benthic Ecology	Community and functional ecology of benthic macrofauna in nearshore sediment ecosystems
van der Heever, Grant	Male	Coloured	South African	SAEON	PhD	2022		Deep Secrets
Van der Walt, Kerry-Ann	Female	White	South African	Rhodes University	PhD	2018	Ichthyology	Thermal tolerance and the potential effects of climate change on coastal and estuarine organisms in the Kariega Estuary and adjacent coastline
Vorsatz, Lyle	Male	Coloured	South African	Rhodes University	PhD	2017	Estuarine Ecology	The role of microhabitats as nurseries within mangroves: an invertebrate and fish larval perspective
Waterworth, Samantha	Female	White	South African	Rhodes University	PhD	2018	Biochemistry	Marine Natural Products
Watson, Ralph	Male	White	South African	RU	PhD	2022		ATAP
Weston, Laura	Female	White	South African	UCT	PhD	2017-2020	Ecology	Deep secrets
Whitehead, Otto	Male	White	South African	NMU	Post Doc	2018	Ecology	Deep Secrets
Whitfield, Emily	Female	White	South African	Nelson Mandela University	MSc	2021	Estuarine Ecology	DSI/NRF SARChI Shallow Water Ecosystems
Winkler, AC	Male	White	South African	Rhodes University	Post Doc	2018-2019	Ecology	Salpa Project
Xulu, Mthokozisi	Male	Black African	South African	University of Zululand	MSc	2021	Ecology	Ecology and health status of unconsolidated sediments in marine and estuarine systems
Ziko, Bantony	Male	Black African	Other African Country	SAIAB	PhD	2022		ATAP

12.2. Details of human capital development outputs (Platform Users)

First name and surname	Gender Male/ Female/ Non-Binary	Population Group (Black African, White, Asian, Coloured)	Citizenship (SA Permanent Resident, other (specify))	Institution at which the individual is employed or registered for a degree	Study level or Support Level (H, M, D, User, Collaborator, etc)	First year of registration (or first year of collaboration or usage of RI)
Adams, Janine	Female	White	South African	Nelson Mandela University	Platform User	2018
Allen, Deonie	Female	White	International	University of Strathclyde	Platform User	2019
Allen, Steve	Male	White	International	University of Strathclyde	Platform User	2019
Anderson, Robert	Male	White	South African	University of Cape Town	Platform User	2021
Ansorge, Isabelle	Female	White	South African	UCT	Platform User	2020
Ariefdien-Malick, Malikah	Female	Coloured	South African	Real World Academics	Platform User	2021
Atkinson, Lara	Female	White	South African	SAEON	Platform User	2019
Backeberg, Bjorn	Male	White	South African	CSIR	Platform User	2017
Badenhorst, Stacey	Female	White	South African	Oceanographc Research Institute	Platform User	2018
Baker, Kelly	Female	White	South African	Dyer Island Conservation Trust	Platform User	2018

Bennett, Rhett	Male	White	South African	Wildlife Conservation Society	Platform User	2018
Bester, Marthan	Male	White	South African	University of Pretoria	Platform User	2021
Bobat, Ayesha	Female	Indian	South African	WILD Trust	Platform User	2021
Bodley, Mark	Male	White	South African	Intelligent Energy Trust	Platform User	2020
Booth, Tony	Male	White	South African	Rhodes University	Platform User	2018
Bornman, Eugin	Male	White	South African	SAEON	Platform User	2020
Bornman, Tommy	Male	White	South African	SAEON	Platform User	2017
Cotte, Cedric	Male	White	International	Muséum National d'Histoire Naturelle	Platform User	2021
Botes, Riaan	Male	White	South African	Independent Researcher	Platform User	2021
Dajka, Jan-Claas	Male	White	International	HIFMB, University of Oldenburg	Platform User	2021
Dalu, Tatenda	Male	Black African	Other African Country	University of Venda	Platform User	2019
Bouwer, Eddelene	Female	White	South African	Bay Hyperbaric Medicine	Platform User	2021
Campbell, Eileen	Female	White	South African	Nelson Mandela University	Platform User	2017
Erbe, Christine	Female	White	International	Curtin University	Platform User	2019
Carpenter-Kling, Tegan	Female	White	South African	BirdLife South Africa	Platform User	2022
Cawthra, Hayley	Female	White	South African	Council for Marine Geoscience	Platform User	2018
Chalmers, Russel	Male	White	South African	Aquatic Environmental Services	Platform User	2021
Giering, Sarah	Female	White	International	NOC, Southampton	Platform User	2019
Childs, Amber	Female	White	South African	Rhodes University	Platform User	2018
Holman, Luke	Male	White	International	Southampton University	Platform User	2018
Claassens, Louw	Female	White	South African	Rhodes University/Knysna Basin Project	Platform User	2020
Cliff, Geremy	Male	White	South African	KZN Sharks Board	Platform User	2018
Jury, Mark	Male	White	International	University of Puerto Rico Mayaguez	Platform User	2018
Cloete, Anton	Male	White	South African	Wild Coast Abalone	Platform User	2021
Kibungu, Cuthbert	Male	Black African	Other African Country	University of Fort Hare	Platform User	2018
Koubbi, Philippe	Male	White	International	Sorbonne University	Platform User	2021
Collier, Frank	Male	White	South African	Zwartkops Conservancy	Platform User	2022
Connan, Maelle	Female	White	South African (Permanent resident)	Nelson Mandela University	Platform User	2021
Cowley, Paul	Male	White	South African	SAIAB	Platform User	2021
Malawene, Bernadino	Male	Black African	Other African Country	Instituto Nacional de Investigacao Pesqueira	Platform User	2021
Currie, Jock	Male	White	South African	SANBI	Platform User	2021
McPhail, Kerry	Female	White	International	Oregon State University	Platform User	2018
da Silva, Charlene	Female	White	South African	DFFE	Platform User	2020

Daly, Ryan	Male	White	South African	Oceanographic Research Institute	Platform User	2019
de Vos, Lauren	Female	White	South African	WILD Trust	Platform User	2020
Deyzel, Shaun	Male	White	South African	SAEON	Platform User	2017
D'Hotman, Jethan	Male	White	South African	University of Cape Town	Platform User	2021
Dicken, Matt	Male	White	South African (Permanent resident)	KZN Sharks Board	Platform User	2018
Ortega-Cisneros, Kelly	Female	Coloured	International	Nelson Mandela University/UCT	Platform User	2019
Dorrington, Rosie	Female	White	South African	Rhodes University	Platform User	2019
Passuni, Giannina	Female	Coloured	International	Nelson Mandela University	Platform User	2018
Drobniewska, Natalia	Female	White	South African	South African Shark Conservancy	Platform User	2019
Penven, Pierrick	Male	White	International	IRD	Platform User	2020
Du Preez, Derek	Male	White	South African	Nelson Mandela University	Platform User	2018
du Toit, Aiden	Male	White	South African	Rhodes University	Platform User	2021
Ebert, Dave	Male	White	International	Honorary Research Associate	Platform User	2020
Elston, Chantel	Female	White	South African	SAIAB	Platform User	2021
Everett, Bernadine	Female	White	South African	Oceanographic Research Institute	Platform User	2021
Fallows, Chris	Male	White	International	Apex Expeditions	Platform User	2018
Poulton, Alex	Male	White	International	Heriot Watt University	Platform User	2018
Fallows, Monique	Female	White	International	Apex Expeditions	Platform User	2018
Favaretto, Bianca	Female	Indian	South African	Bayworld Centre for Research and Education	Platform User	2021
Fawcett, Sarah	Female	White	South African	University of Cape Town	Platform User	2017
Fearon, Giles	Male	White	South African	DFFE/SAEON	Platform User	2019
Fennessy, Sean	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Filmalter, JD	Male	White	South African	SAIAB	Platform User	2020
Fischer, Chris	Male	White	International	Osearch	Platform User	2019
Flam, Anna	Female	White	Other African Country	MMF	Platform User	2020
Floros, Camilla	Female	White	South African	Oceanographc Research Institute	Platform User	2018
Scott, Timothy	Male	White	International	University of Plymouth	Platform User	2020
Fourie, Amarein	Female	White	South African	Sustainable Seas Trust	Platform User	2021
Shayo, Salome	Female	Black African	Other African Country	Tanzania Fisheries Research Institute	Platform User	2020
Fourie, Fred	Male	White	South African	Sea Technology Services	Platform User	2018
Garratt, Pat	Male	White	South African	Two Oceans	Platform User	2018
Gennari, Enrico	Male	White	International	Oceans Research	Platform User	2018
Gibbons, Mark	Male	White	South African	University of the Western Cape	Platform User	2018

Goschen, W.S.	Male	White	South African	SAEON	Platform User	2018
Govender, Kogie	Female	Indian	South African	SAEON	Platform User	2021
Groeneveld, Johan	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Thiebault, Andrea	Female	White	International	Centre National de Recherche Scientifique	Platform User	2022
Guastella, Lisa	Female	White	South African	Independent Researcher	Platform User	2021
Gumbi, Armstrong	Male	Black African	South African	University of KwaZulu-Natal	Platform User	2020
Hammerschlag, Neil	Male	White	International	University of Miamo-Rosenstiel School	Platform User	2018
Harris, Jean	Female	White	South African	WILD Trust	Platform User	2018
Harris, Shael	Female	White	South African	Independent Researcher	Platform User	2018
Hayes, Des	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Hempson, Tessa	Female	White	South African	OWB	Platform User	2021
Hermes, Juliet	Female	White	South African (Permanent resident)	SAEON	Platform User	2021
Heynes, Elodie	Female	White	South African	KZN Museum	Platform User	2020
Hofmeyr, Greg	Male	White	South African	Bayworld Centre for Research and Education	Platform User	2021
Howell, Kerry	Female	White	International	Plymouth University	Platform User	2019
Huggett, Jenny	Female	White	South African	DFFE	Platform User	2018
Hughes, William	Male	White	International	Sussex University	Platform User	2018
Human, Lucian	Male	Coloured	South African	SAEON	Platform User	2018
James, Nicola	Female	White	South African	SAIAB	Platform User	2018
Jewell, Oliver	Male	White	International	Murdoch University	Platform User	2019
Job, Nancy	Female	White	South African	SANBI	Platform User	2021
Johnson, Ryan	Male	White	South African	Blue Ventures	Platform User	2019
Jordaan, Gareth	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Juby, Roxanne	Female	White	South African	SAIAB	Platform User	2021
Karenyi, Natasha	Female	Coloured	South African	University of Cape Town	Platform User	2019
Kock, Alison	Female	White	South African	SANParks, iCWild (UCT), HRA	Platform User	2019
Krug, Marjolaine	Female	White	South African (Permanent resident)	CSIR	Platform User	2018
Laing, Stuart	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Lamberth, Steven	Male	White	South African	DFFE	Platform User	2020
Lampen, Francios	Male	White	South African	Sea World	Platform User	2021
Lawrence, Cherie	Female	White	South African	Bayworld Centre for Research and Education	Platform User	2021
Lawrence, Cloverley	Female	Indian	South African	South African National Parks	Platform User	2021

Lemley, Daniel	Male	White	South African	Nelson Mandela University	Platform User	2019
Leroux, Kendyl	Female	White	South African	Oceanographc Research Institute	Platform User	2018
Lombard, Amanda	Female	White	South African	Nelson Mandela University	Platform User	2018
Loureiro, Carlos Ferreira	Male	White	International	University of Stirling	Platform User	2021
Louw, Nico	Male	White	South African	Nelson Mandela University	Platform User	2021
Luis Vutane, Delson	Male	White	Other African Country	MMF	Platform User	2020
Mackay, Andrew	Male	White	South African	Mount Croix Animal Hospital	Platform User	2021
MacKay, Fiona	Female	White	South African	Oceanographc Research Institute	Platform User	2018
Maduna, Sikhumbuso	Male	Black African	South African	Oceanographc Research Institute	Platform User	2018
Maggs, Jade	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Mah, Christopher	Male	Asian	International	Smithsonian	Platform User	2019
Makhado, Azwianewi	Male	Black African	South African	DFFE	Platform User	2021
Makoyi, Imkhitha	Female	Black African	South African	SAEON	Platform User	2021
Malick, Imtiyaaz	Male	Coloured	South African	SAEON	Platform User	2021
Maloney, Coleen	Female	White	South African	University of Cape Town	Platform User	2018
Mann, Bruce	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Marshall, Andrea	Female	White	Other African Country	MMF	Platform User	2021
Masikane, Ntuthuko	Male	Black African	South African	UniZulu	Platform User	2021
Matcher, Gwynneth	Female	White	South African	Research Associate	Platform User	2021
Matsha, Belicia	Female	Black African	South African	SAEON	Platform User	2021
Mbhele, Lungi	Male	Black African	South African	Bayworld Centre for Research and Education	Platform User	2021
Mccord, Meaghan	Female	White	South African (Permanent resident)	South African Shark Conservancy	Platform User	2019
McInnes, Alistair	Male	White	South African	Nelson Mandela University	Platform User	2019
McQuaid, Christopher	Male	White	South African	Rhodes University	Platform User	2019
Meekan, Mark	Male	White	International	AIMS	Platform User	2019
Meiklejohn, Ian	Male	White	South African	Rhodes University	Platform User	2019
Meyer, Michael	Male	White	South African	SA Whale Disentanglement Network	Platform User	2019
Mokumo, Mosihla	Male	Black African	South African	Nelson Mandela University	Platform User	2021
Morembo, Rosebud	Female	Black African	South African	University of Fort Hare	Platform User	2018
Morris, Tammy	Female	White	South African	SAEON	Platform User	2018
Mpanza, Sithembele	Female	Black African	South African	UniZulu	Platform User	2021
Mthembu, Vusi	Male	Black African	South African	Oceanographic Research Institute	Platform User	2020
Murray, Taryn	Female	White	South African	SAIAB	Platform User	2019

Mzimela, Mduduzi	Male	Black African	South African	UniZulu	Platform User	2021
Naidoo, Deandra	Female	Indian	South African	Oceanographc Research Institute	Platform User	2019
Naidoo, Merrisa	Female	Indian	South African	WILD Trust	Platform User	2020
Naidoo, Velosha	Female	Indian	South African	Oceanographc Research Institute	Platform User	2019
Nariensamy, Nivashni	Female	Indian	South African	UniZulu	Platform User	2021
Nel, Ronel	Female	White	South African	Nelson Mandela University	Platform User	2021
Newton, Summer	Female	White	South African	WILD Trust	Platform User	2020
Nharreluga, Bilardo	Male	Black African	Other African Country	MMF	Platform User	2020
Noundou, Xavier	Male	Black African	Other African Country	Rhodes University	Platform User	2018
Noyon, Margaux	Female	White	South African (Permanent resident)	Nelson Mandela University	Platform User	2018
Nozipiwo Hambaze	Female	Black African	South African	SAEON	Platform User	2022
Ntuli, Sandile	Male	Black African	South African	WILD Trust	Platform User	2020
Olbers, Jennifer	Female	White	South African	EKZN Wildlife	Platform User	2019
Ortega-Cisneros, Kelly	Female	Coloured	International	Nelson Mandela University/UCT	Platform User	2020
Otto, Hendrik	Male	White	South African	Sea Technology Services	Platform User	2019
Parker-Nance, Shirley	Female	White	South African	Rhodes University	Platform User	2021
Parkinson, Matt	Male	White	South African	SAIAB	Platform User	2021
Pattrick, Paula	Female	White	South African	SAEON	Platform User	2018
Paulet, Guy	Male	White	South African (Permanent resident)	South African Shark Conservancy	Platform User	2019
Pearton, Dave	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Pereira, Marcos	Male	White	International	CTV	Platform User	2019
Perissinotto, Renzo	Male	White	South African (Permanent resident)	Nelson Mandela University	Platform User	2018
Peterson, Yazeed	Male	Coloured	South African	DFFE	Platform User	2020
Petrik, Leslie	Female	White	South African	University of Western Cape	Platform User	2021
Photopoulou, Theoni	Female	White	International	St Andrew's University	Platform User	2019
Pichegru, Lorien	Female	White	South African (Permanent resident)	Nelson Mandela University	Platform User	2018
Plon, Stephanie	Female	White	South African (Permanent resident)	Nelson Mandela University	Platform User	2019
Porri, Francesca	Female	White	South African (Permanent resident)	SAIAB	Platform User	2018
Porter, Sean	Male	White	South African	Oceanographc Research Institute	Platform User	2018
Potts, Warren	Male	Black African	South African	Rhodes University	Platform User	2018

Pretorius, Liezl	Female	White	South African	Afrivet	Platform User	2021
Qwaba, Welly	Male	Black African	South African	WILD Trust	Platform User	2020
Rajkaran, Anusha	Female	Indian	South African	University of the Western Cape	Platform User	2018
Ramalepe, Khutso	Female	Black African	South African	Oceanographc Research Institute	Platform User	2018
Rasoanandrasana, Nirina	Female	Black African	Other African Country	Comoros University	Platform User	2018
Raw, Jacqueline	Female	White	South African	Nelson Mandela University	Platform User	2020
Riddin, Taryn	Female	White	South African	Nelson Mandela University	Platform User	2022
Rishworth, Gavin	Male	White	South African	Nelson Mandela University	Platform User	2019
Roberts, Mike	Male	White	South African	Nelson Mandela University	Platform User	2018
Rocke, Emma	Female	White	South African	University of Cape Town	Platform User	2018
Rubidge, Gletwyn	Male	White	South African	Nelson Mandela University	Platform User	2022
Ryan, Peter	Male	White	South African	University of Cape Town/FitzPatrick Institute	Platform User	2021
Samaai, Toufiek	Male	Coloured	South African	DFFE	Platform User	2021
Samoilys, Melita	Female	White	Other African Country	CORDIO	Platform User	2018
Sanders, Yvonne	Female	White	South African	Bayworld Centre for Research and Education	Platform User	2021
Santos, Carmen	Female	White	International	University of Agostinho Neto	Platform User	2018
Sauer, Warwick	Male	White	South African	Rhodes University	Platform User	2018
Scharler , Ursula	Female	White	South African	University of KwaZulu-Natal	Platform User	2018
Schleyer, Michael	Male	White	South African	Oceanographc Research Institute	Platform User	2019
Schumann, Eckart	Male	White	South African	Nelson Mandela University	Platform User	2019
Schutte, Quinton	Male	White	South African	UniZulu	Platform User	2021
Seakamela, M'du	Male	Black African	South African	DFFE	Platform User	2021
Shabangu, Fannie W	Male	Black African	South African	DFFE	Platform User	2021
Shannon, Lynne	Female	White	South African	University of Cape Town	Platform User	2020
Shirley, Andrea	Female	White	South African	Coega Development Corporation	Platform User	2020
Sibiya, Sandile	Male	Black African	South African	WILD Trust	Platform User	2020
Siddarthan, Venkatachalam	Male	Indian	International	Rhodes University	Platform User	2018
Sink, Kerry	Female	White	South African	SANBI	Platform User	2018
Smale, Malcolm	Male	White	South African	Bayworld Centre for Research and Education	Platform User	2018
Smit, AJ	Male	White	South African	University of the Western Cape	Platform User	2019
Smit, Kaylee	Female	White	South African	UCT/SANBI	Platform User	2021
Smith, Allan	Male	White	South African	University of KwaZulu-Natal	Platform User	2021
Smith, Marie	Female	White	South African	University of Fort Hare	Platform User	2018
Snow, Gavin	Male	White	South African	WITS	Platform User	2022

Solomon, Nikiwe	Female	Black African	South African	University of Cape Town	Platform User	2021
Speed, Conrad	Male	White	International	AIMS	Platform User	2019
Steyn, Paul-Pierre	Male	White	South African	Nelson Mandela University	Platform User	2021
Strydom, Nadine	Female	White	South African	Nelson Mandela University	Platform User	2017
Sumpton, Wayne	Male	White	South African	SAAMBR	Platform User	2019
Taylor, Claire	Female	White	South African	Two Ocean Aquarium	Platform User	2021
Tennant, Hayley	Female	White	South African	Sea World	Platform User	2021
Toiher, Ibrahim	Male	Black African	Other African Country	Comoros Fisheries Directorate	Platform User	2018
Towner, Alison	Female	White	South African	Dyer Island Conservation Trust	Platform User	2018
van Blerk, Paul	Male	White	South African	KZN Sharks Board	Platform User	2018
van der Merwe, Alleta	Female	White	South African	Stellenbosch University	Platform User	2020
van Niekerk, Lara	Female	White	South African	CSIR	Platform User	2021
van Schoor, Nikita	Female	White	South African	Oceanographc Research Institute	Platform User	2018
Veitch, Jennifer	Female	White	South African	SAEON	Platform User	2021
Vermeulen, Else	Female	White	South African	University of Pretoria	Platform User	2022
von der Meden, Charles	Male	White	South African	University of KwaZulu-Natal	Platform User	2021
von During, Bjorn	Male	White	South African	South African Shark Conservancy	Platform User	2019
Wasserman, Ryan	Male	White	South African	Rhodes University	Platform User	2019
Watson, Gill	Female	White	South African	PE Museum at Bayworld	Platform User	2018
Wege, Mia	Female	White	South African	University of Pretoria	Platform User	2021
Welman, Shaun	Male	Coloured	South African	Nelson Mandela University	Platform User	2022
Williams, Gary	Male	White	International	California Academy of Science	Platform User	2019
Williams, Lacey	Female	White	International	Apex Expeditions	Platform User	2018
Willows-Munro, Sandi	Female	White	South African	University of KwaZulu-Natal	Platform User	2019
Winkler, Alexander	Male	White	South African	Rhodes University	Platform User	2019
Wintner, Sabine	Female	White	South African	KZN Sharks Board	Platform User	2018
Woodall, Lucy	Female	White	International	University of Oxford	Platform User	2018
Zimmermann, Dave	Male	White	South African	SANParks	Platform User	2021

13. Appendix B: Knowledge outputs

13.1. Manuscripts published in peer reviewed Web of Science journals:

2017/18

1. Sonnekus, M.J.; Bornman, T.G. & Campbell, E.E. Phytoplankton and nutrient dynamics of six South West Indian Ocean seamounts. Deep-Sea Research II 136: 59 - 72
2. Rishworth, G.M.; Perissinotto, R.; Miranda, N.A.F.; Bornman, T.G. & Steyn, P.P. Phytoplankton community dynamics within peritidal pools associated with living stromatolites at the freshwater–marine interface. Aquatic Science 79: 357 – 370.
3. Rogers, A.D.; Alvheim, O., Bemanaja, E., Benivary, D., Boersch-Supan, P., Bornman, T.G., Cedras, R., du Plessis, N., Gotheil, S., Heines, A., Kemp, K., Kristiansen, J., Letessier, T., Mangar, V., Mazungula, N., Mørk, T., Pinet, P., Pollard, R., Read, J. & Sonnekus, T. Pelagic communities of the South West Indian Ocean seamounts: R/V Dr Fridtjof Nansen Cruise 2009-410. Deep-Sea Research II 136: 5 – 35. editorial http://dx.doi.org/10.1016/j.dsr2.2016.12.010
4. Waterworth, S.C.; Jiwaji, M., Kalinski, J.-C., Parker-Nance, S., Dorrington, R.A. A Place to Call Home: An analysis of the bacterial communities in two Tethya rubra Samaai and Gibbons 2005 populations in Algoa Bay, South Africa. Marine Drugs15: article 95http://dx.doi.org/10.3390/md15040095
5. McInnes, A.M.; Ryan,P.G.; Lacerda, M.I.; Deshayes,J.; Goschen,W.S. & Pichegru, L. Small pelagic fish responses to fine-scale oceanographic conditions - implications for the endangered African penguin. Marine Ecology Progress Series. 569: 187 – 203. DOI: 10.3354/meps12089
6. Dąbek, P.; Ashworth, M.P., Witkowski, A., Li, C., Bornman, T.G., Goncalves, V., Park, J. & Khim, J.S.Towards Multigene Phylogeny of the Cymatosiraceae (Bacillariophyta, Mediophyceae) I: Novel Taxa within Subfamily Cymatosiroideae based on morphological and molecular data. Journal of Phycology 53 (2): 342 – 360. http://dx.doi.org/10.1111/jpy.12501
7. Meyer, Bettina; Freier, Ulrich; Grimm, Volker; Groeneveld, Jürgen; Hunt, Brian P V; Kerwath, Sven; King, Rob; Klaas, Christine; Pakhomov, Evgeny A; Melbourne-Thomas, Jess; Murphy, Eugene J; Thorpe, Sally; Stammerjohn, Sharon; Wolf-Gladrow, Dieter A; Auerswald, Lutz; Götz, Albrecht; Halbach, Laura; Jarman, Simon; Kawaguchi, So; Krumpen, Thomas; Meiners, Klaus M; Nehrke, Gernot; Ricker, Robert; Summer, Michael; Teschke, Mathias; Trebilco, Rowan; Yilmaz, Noyan. 2017. The winter pack-ice zone provides a sheltered but food-poor habitat for larval Antarctic krill. Nature Ecology & Evolution 1, 1853–1861. doi:10.1038/s41559-017-0368-3
8. Nunes, M.; Adams, J.B., Bate, G.C. & Bornman, T.G. Abiotic characteristics and microalgal dynamics in South Africa's largest estuarine lake during a wet to dry transitional phase. Estuarine, Coastal and Shelf Science 198 A: 236 – 248. https://doi.org/10.1016/j.ecss.2017.09.009
9. Cotiyane, P.; Adams, J. & Rajkaran, A. Key factors that drive phytoplankton biomass and community composition in the urbanised Nahoon Estuary, South Africa. African Journal of Aquatic Science 42 (3): 245 – 257 https://doi.org/10.2989/16085914.2017.1373058
10. Bornman, T.G.; Fawcett, S.; Dorrington, R. & Suria, G. Phytoplankton of the Southern Ocean: preliminary data from the 2016/17 Antarctic Circumnavigation Expedition. Abstract 42. Paper presented at the 11th International Phycological Congress, Szczecin, Poland, August 2017 Phycologia 56 (4): 22 – 23. Abstract. https://doi.org/10.2216/0031-8884-56.sp4.1
11. Bornman, T.G.; Perrisinotto, R.; Dabek, P. & Rishworth, G. The diatoms of shore-platform extant stromatolite ecosystems in South Africa. Abstract 43. Paper presented at the 11th International Phycological Congress, Szczecin, Poland, August 2017 Phycologia 56 (4): 23 Abstract. https://doi.org/10.2216/0031-8884-56.sp4.1
12. Dabek, P.; Witkowski, A.; Bornman, T.G.; Gorecka, E. & Krzywda, M.Factors controlling the distribution of marine benthic diatoms along the coast of South Africa.Abstract 80. Paper presented at the 11th International Phycological Congress, Szczecin, Poland, August 2017Phycologia 56 (4): 39 – 40. Abstract https://doi.org/10.2216/0031-8884-56.sp4.1

13. Krzywda, M.; Dabek, P.; Gorecka E.; Li, C.; Bornman, T.G.; Cotiyane, P. & Witkowski, A.Temperature as a factor determining biogeographical distribution of the diatoms (Bacillariophyta) and the ecosystem processes off the coast of South Africa as a result of modern climate change. Abstract 223. Paper presented at the 11th International Phycological Congress, Szczecin, Poland, August 2017 Phycologia 56 (4): 107 Abstract https://doi.org/10.2216/0031-8884-56.sp4.1
14. Cowley PD, Bennett RH, Childs A-R, Murray TS. 2017. Reflection on the first five years of South Africa's Acoustic Tracking Array Platform (ATAP): status, challenges and opportunities. African Journal of Marine Science 39(4): 363-372.
15. Dames MH, Cowley PD, Childs AR, Bennett RH, Thorstad EB, Næsje TF. 2017. Estuarine and coastal connectivity of an estuarine-dependent fishery species, Pomadasys commersonnii (Haemulidae). African Journal of Marine Science 39(1): 111–120.
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18. Parker D, Kerwath SE, Naesje TF, Arendse CJ, Keulder-Stenevik FJ, Hutchings K, Clark BM, Winker H, Cowley PD, Atwood CG. 2017. When plenty is not enough: an assessment of the white stumpnose (Rhabdosargus globiceps) fishery of Saldanha Bay, South Africa. African Journal of Marine Science 39(2), 153-166.

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20. Dalu, T.; Magoro M., Tonkin J.D., Human, L.R.D., Perissinotto R., Deyzel S.H.P., Adams J.B. & A.K. Whitfield Hydrobiologia 818 :177 - 191 Assessing phytoplankton composition and structure within micro-estuaries and micro-outlets: A community analysis approach. https://doi.org/10.1007/s10750-018-3605-0
21. Dorrington, R.A.; Lombard A.T., Bornman T.G., Adams J.B., Hayley C., Deyzel S.H.P., Goschen W.S., Kiu K., Coetzee J.M., Matcher G.F., Mcquaid C., Parker-Nance S., Paterson A., Perissinotto R., Porri F., Roberts M., Snow B., van As H. & P. Vrancken. Working together for our oceans: A Marine Spatial Plan for Algoa Bay, South Africa SA Journal of Science 114 (3/4) : Article a0247 DOI: https://doi.org/10.17159/sajs.2018/a0247
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23. Melly, B.L.; McGregor, G.; Hofmeyr, G.J.G. & Plön, S. Spatio-temporal distribution and habitat preferences of cetaceans in Algoa Bay, South Africa. Journal of the Marine Biological Association of the United Kingdom. 98 (5) :1065 - 1079 doi: 10.1017/S0025315417000340
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26. Murray TS, Cowley PD, Bennett RH, Childs A-R. 2018. Fish on the move: Connectivity of an estuarine-dependent fishery species evaluated using a large-scale acoustic telemetry array. Canadian Journal of Fisheries and Aquatic Sciences.

27. Nodo P, James NC, Childs A-R, Nakin MDV. 2018. Response of demersal fish assemblages to an extreme flood event in a freshwater-deprived estuary in South Africa. Marine and Freshwater Research 69: 253-266.

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33. Lombard AT, Dorrington RA, Reed JR, Ortega-Cisneros K, Penry GS, Pichegru L, Smit KP, Vermeulen EA, Witteveen M, Sink KJ, McInnes AM, Ginsburg T. 2019. Key challenges in advancing an ecosystem-based approach to Marine Spatial Planning under economic growth imperatives. Frontiers in Marine Science 6: 146. doi: 10.3389/fmars.2019.00146.
34. Parker-Nance S, Hilliar S, Waterworth S, Walmsley T, Dorrington R. 2019. New species in the sponge genus Tsitsikamma (Poeciloscerida, Latrunculiidae) from South Africa. Zookeys 874: 101-126.
35. Weidberg N, Goschen W, Jackson JM, Pattrick P, McQuaid CD, Porri F. 2019 Fine scale depth regulation in invertebrate larvae around coastal fronts. Limnology and Oceanography 6: 785-802. doi: 10.1002/lno.11074.
36. Dalu, T., Magoro, M.L., Naidoo, L.S., Wasserman, R.J., Human, L.R.D., Adams, J.B., Perissinotto, R., Deyzel, S.H.P., Wooldridge, T., & Whitfield, A.K. 2020. Microphytobenthos diversity and community structure across different micro-estuaries and micro-outlets: Effects of environmental variables on community structure. Environmental Pollution, 260, 114097.
37. Wasserman, R.J., Whitfield, A.K., Deyzel, S.H.P., James, N.C., & Hugo, S. 2020. Seagrass (Zostera capensis) bed development as a predictor of size structured abundance for a ubiquitous estuary-dependent marine fish species. Estuarine, Coastal and Shelf Science, 238, 106694.
38. Muelbert JH, Nidzieko NJ, Acosta ATR, Beaulieu SE, Bernardino AF, Boikova E, Bornman TG, Cataletto B, Deneudt K, Eliason E, Kraberg A, Nakaoka M, Pugnetti A, Ragueneau O, Scharfe M, Soltwedel T, Sosik HM, Stanisci A, Stefanova K, Stéphan P, Stier A, Wikner J and Zingone A (2019) ILTER – The International Long-Term Ecological Research Network as a Platform for Global Coastal and Ocean Observation. Front. Mar. Sci. 6:527. doi: 10.3389/fmars.2019.00527

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39. Raw, J.L., Riddin, T., Wasserman, J., Lehman, T.W.K., Bornman, T.G., Adams, J.B. 2020. Salt marsh elevation and responses to future sea-level rise in the Knysna Estuary. African Journal of Aquatic Science 2020, 45(1–2): 49–64 https://doi.org/10.2989/16085914.2019.1662763
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41. Cotiyane-Pondo P, Bornman TG, Dabek P, Witkowski A and Smit AJ. 2020. Austral winter marine epilithic diatoms: Community composition and distribution on intertidal rocky substrate around the

coast of South Africa. Estuarine, Coastal and Shelf Science 242: 106837. https://doi.org/10.1016/j.ecss.2020.106837
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13.2. E-news articles published by SMCRI staff and students

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2. Hambaze, N. SAEON programme hones research and presentation skills. SAEON ENewsletter October 2018. http://www.saeon.ac.za/enewsletter/archives/2018/october2018/doc15
3. 27 November: SAEON newsletter article titled “The benefit of using adaptive, hypothesis-based sampling protocols to investigate larval fish dynamics” by Drs Pattrick, Goschen and Porri. http://www.saeon.ac.za/enewsletter/archives/2018/december2018/doc09.
4. Tim Parker-Nance “We proudly introduce South Africa’s new estuary information system” http://www.saeon.ac.za/enewsletter/archives/2019/february2019/doc01
5. Tarryn Swartbooi, Thulwaneng Mashifane, Thomas Mtontsi, Nozipiwo Hambaze and Jennifer Mohale: Title “Let’s “sea” chemistry at Scifest Africa 2019” http://www.saeon.ac.za/enewsletter/archives/2019/april2019/doc13
6. Nozipiwo Hambaze. August 2019. Thinking ‘out of the box’ about changing estuaries. http://www.saeon.ac.za/enewsletter/archives/2019/august2019/doc18
7. Athi Mfikili. August 2019. Capacity training for SAEON postgraduate student – first-hand experience in Europe. http://www.saeon.ac.za/enewsletter/archives/2019/august2019/doc08
8. Jennifa Mohale & Tarryn Swartbooi. August 2019. SEAmester 2019: Two perspectives. http://www.saeon.ac.za/enewsletter/archives/2019/august2019/doc10
9. Paula Pattrick and Shaun H.P. Deyzel. October 2019. First reference library of DNA barcodes of pelagic copepods from the Algoa Bay Sentinel Site. http://www.saeon.ac.za/enewsletter/archives/2019/october2019/doc03
10. Bailey and Bornman. Airborne remote-sensing platform supports long-term environmental research. SAEON E-news, Issue 5 2020. https://enews.saeon.ac.za/issue-05-2020/airborne-remote-sensing-platform-supports-long-term-environmental-research/
11. Article on the chamber was published in the Nelson Mandela University newsletter: https://lnkd.in/dBjUpqs
12. Chamber article in Linkedin: https://www.linkedin.com/posts/nelson-mandela-university_mandela-uni-home-to-eastern-capes-first-activity-6732661441955950592-mdgS
13. Yonela Mahamba and Rebotile Matabane. SAEON E-news article. SAEON highlights marine science careers at annual career summit. https://enews.saeon.ac.za/issue-02-2021/saeon-highlights-marine-science-careers-at-annual-career-summit/

14. Paula Pattrick, Nozipiwo Hambaze and Tommy Bornman. Operation Clean Spot: SAEON adopts a coastal area and pledges to keep it clean. SAEON E-news. https://enews.saeon.ac.za/issue-03-2021/operation-clean-spot-saeon-adopts-coastal-area-and-pledges-to-keep-it-clean/
15. Oko Sotshongaye, Rebotile Matabane and Thomas Mtontsi. SAEON celebrates Earth Day… virtually. SAEON E-news. https://enews.saeon.ac.za/issue-03-2021/saeon-celebrates-earth-day-virtually/
16. Hambaze, N., Ransom, C. 2021. Bringing the ocean to a deep rural area at Cofimvaba. https://enews.saeon.ac.za/issue-05-2021/bringing-the-ocean-to-a-deep-rural-area-at-cofimvaba/
17. Human, L. 2021. Elwandle Node extends its laboratory capacity. https://enews.saeon.ac.za/issue-05-2021/saeon-elwandle-node-extends-its-laboratory-capacity/
18. Nel, M., Adams, J., Rubidge, G., Human, L. 2021. The search for a hero plant in the fight against metal toxicity in the estuarine environment. https://enews.saeon.ac.za/issue-05-2021/the-search-for-a-hero-plant-in-the-fight-against-metal-toxicity-in-the-estuarine-environment/
19. Olisah C, Rubidge G, Human L, Adams J. (2022). The sequestration of organophosphate pesticides in common reed growing in an agricultural estuarine environment. SAEON E-newsletter. #1 2022. https://enews.saeon.ac.za/issue-01-2022/the-sequestration-of-organophosphate-pesticides-in-common-reed-growing-in-an-agricultural-estuarine-environment/

13.3. Website and database user statistics over the past 5 years

Site	Year	Users	New Users	Sessions	Page Views
SAEIS	2018	81	74	125	583
	2019	945	932	1389	3618
	2020	1229	1222	1584	3833
	2021	1849	1834	2460	6366
	2022	879	866	1288	4781
SMCRI	2018	54	48	82	194
	2019	247	237	344	829
	2020	385	380	523	1416
	2021	440	434	641	1601
	2022	300	294	418	809
EasiCAT	2018	15	15	25	84
	2019	109	108	236	1008
	2020	120	116	152	272
	2021	167	167	187	307
	2022	76	76	78	85
ObsDB WebAPI	2019	6	5	19	30
	2020	7	3	14	19
	2021	9	9	23	42
	2022	10	8	160	404
ObsDB Query	2018	3	2	6	30
	2019	20	20	36	57
	2020	35	32	47	67
	2021	50	50	114	218
	2022	39	33	234	766
ObsDB Admin	2022	34	32	255	1695

14. Appendix C: Verifiable platform users (2018/19 to 2021/22 only)

1. ABSS Chl-a data to UFH MSc (and GSN student) Nothando Gwazani.
2. ABSS CTD data (Aug-Sep 2018) to SAIAB PhD student Carla Edworthy.
3. VR2AR data from Bird Island (80m, Inner and Outer) and Woody Cape thermistor strings were downloaded by Imtiyaaz Malick and sent to Matt Parkinson at SAIAB.
4. Satellite SST images sent to Siphelele Dyantyi (RU) for his MSc project.
5. UTR data at St Croix sent to Dr Giannina Passuni (NMU post-grad).
6. VR2AR data for 60m Central ad 80m Bay Mouth was sent to Matt Parkinson, SAIAB.
7. ABSS PELTER CTD data (.hex files) for the months of August to November 2018 were made available to PhD students Carla Edworthy and Ross-Lynne Weston.
8. Algoa Bay physical data was sent to Dr Eckart Schumann.
9. ABSS CMP thermistor data were made available to Dr Alistair McInnes (Marine Apex Predator Research Unit, CMR, Nelson Mandela University). DUA signed and submitted on 11 January 2019.
10. Shaun Deyzel made ABSS PELTER CTD data available to Madoda Malindi (MSc, UFH) for application to the development of Algal bloom monitoring algorithms in Algoa Bay.
11. Shaun Deyzel started facilitating provision of coastal temperature data in support of a PhD study on the distribution and spawning of chokka squid, Loligo reynaudii, led by Jessica Gornall from Rhodes University.
12. Cape Recife ADCP data was provided to Olwethu Duna, MSc student at Rhodes University/SAIAB. Unfortunately, there was no Bird Island ADCP data available over the requested period.
13. Shaun Deyzel couriered a 90 micron mesh plankton net and cod-end bucket (Bongo components) to Thor Eriksen (SAIAB Technician based in Durban) in support of the ACEP funded project CAPTOR.
14. Imtiyaaz Malick assisted as skipper for Phakama Nodo for her nearshore benthic fish sampling in Algoa Bay.
15. Tarryn ran a set of nutrient samples for Eugin Bornman Sundays Estuary samples on the AA3
16. Shaun Deyzel made available ABSS PELTER CTD data (Dec 2018 to Mar 2019) to PhD students Ross-Lynne Weston and Carla Edworthy. These data transfers links to an ongoing data agreement between SAEON and both Ross-Lynne and Carla for the duration of their respective PhD projects.
17. Wayne Goschen and Shaun Deyzel made ABSS CMP data available to Giles Fearon.
18. Equipment loan agreement completed by Sean Fennessy (ORI) for ADCP power pack and 30m UTR string, including HOBO temperature loggers and waterproof shuttle.
19. Imtiyaaz Malick facilitated the loaning of YSI ProDSS multiparameter probe to Gavin Rishworth from the Nelson Mandela University Shallow Water Ecosystems Chair.
20. Imtiyaaz Malick facilitated the loaning of PAR Light meter to Samuel Motitsoe at Rhodes University.
21. Imtiyaaz Malick facilitated the completion of a loan agreement between SAEON and the Nelson Mandela University Shallow Water Ecosystem Research Chair for the use of the nodes pH probe for bona fide research.
22. SOLTICE (Dr. Margaux Noyon group) CR1 - 4 17 October 2018 samples analysed for nutrients on AA3.
23. SARChI Chair shallow water ecosystem stromatolite uptake samples analysed for nutrients on AA3.
24. 20 Hobo temperature loggers were couriered to Sue van Rensburg and are on loan to the GFW Node.
25. Nathan Hubot PhD student (Jelly export investigating the role of gelatin in zooplankton in the biological carbon pump) from Southampton University to use the biogeochemistry to analyse nutrient samples on the AA3.

26. Data user agreement received from Dr Kelly Ortega Cisneros (Nelson Mandela University, DUA_ELW_20190604_Cisneros) for ABSS PELTER data.
27. Bird Island Gully Temperature Probe (GTP) data provided to Phumlile Cotiyane (Nelson Mandela University, DUA_ELW_20190613_CotiyaneP)
28. 2015 PELTER CTD sent to Renee Schoeman (Nelson Mandela University PhD student, DUA_ELW_20190328_Schoeman)
29. Data User Agreement signed with Kerry Moss (MSc student, Nelson Mandela University: DUA_ELW_20190704_MossK
30. Platform User Registration concluded with Kerry Moss: PUR_ELW_20190704_MossK
31. Zolani under Lucienne's or Tarryn's assistance 7 Sunday's runs (Eugin Bornman) samples analysed for nutrients on AA3.
32. ABSS PELTER CTD for June and July 2019 made available to Kerry Moss by Shaun Deyzel (DUA_ELW_20190704_MossK)
33. ABSS CMP data were made available to Prof Ian Meiklejohn (RU) by Shaun Deyzel: DUA_ELW_20190506_MeiklejohnI.
34. Imtiyaaz Malick facilitated an asset loan agreement for two HOBO Underwater Temperature Loggers which was issued to Matt Parkinson (SAIAB, ALA_ELW_20190808_ParkinsonM).
35. Imtiyaaz set up, launched and sent two HOBO Temperature loggers to Matt Parkinson (SAIAB).
36. Imtiyaaz Malick facilitated loan agreement for Diving PAM Underwater fluorometer/spectrometer which was issued to Dr Paul- Pierre Steyn (Nelson Mandela University, ALA_ELW_20190823)
37. Imtiyaaz Malick facilitated an asset loan agreement with Dr Nikki James (SAIAB, ALA_ELW_20190828_JamesN) for the use of YSI ProDSS Multi-parameter probes for various student projects.
38. Data agreement signed with Dr Jennifer Veitch (Egagasini Node): DUA_ELW_20190826_VeitchJ
39. Shaun Deyzel delivered ABSS CMP data to Jessica Gornall (MSc, RU). DUA_ELW_20190220_GornallJ.
40. PURAA_ELW_200190531_DaluT.pdf (Dr Tatenda Dalu - University of Limpopo for use of AA)
41. PUR_ELW_20190807_WassermanJ.pdf (J Wasserman - SARChI SWE, lab use)
42. PUR_ELW_20190704_MossK (Kerry Moss MSc NMU - Lab use)
43. PUR_ELW_20190611_DuPlooyS (Dr Schalk Du Plooy, PostDoc - NMU, Lab use)
44. PUR_ELW_20190328_RukuniP (Plaxedes Rukuni, MSc NMU, Lab Use)
45. PUR_ELW_20190226_BornmanE (Eugin Bornman, PhD NMU, Lab use)
46. ALA_ELW_20190620_WassermanR (Dr Ryan Wasserman, Botswana International University of Science and Technology for use of HOBO T loggers)
47. ALA_ELW_20190506_RishworthG (Dr Gavin Rishworth, then SARChI SWE, YSI field work)
48. DUA_ELW_20190826_VeitchJ (ABSS CMP data)
49. DUA_ELW_20191006_EdworthyC_v2 (ABSS PELTER data)
50. DUA_ELW_20190704_MossK (ABSS PELTER data)
51. DUA_ELW_20190613_CotiyaneP (ABSS CMP data)
52. ABSS CMP ADCP data were sent to Olwethu Duna (PhD student, SAIAB/RU): DUA_ELW_20200227
53. Two data agreements were signed with Dr Jackie Raw (Nelson Mandela University) in collaboration with Lucienne Human (DUA_ELW_20200512_RawJ_RSET; DUA_ELW_20200512_RawJ_Sed).
54. 2nd ABSS CMP dataset sent to Andrea Shirley of CDC (DUA_ELW_20200525_CDC2)
55. ABSS CMP data (multiple UTR moorings, 2018-present) sent to PhD students Phakama Nodo (DUA_ELW_20200428_NodoP) and Carla Edworthy (DUA_ELW_20200615_EdworthyC)
56. ABSS CMP data and PELTER data were sent to PhD student Phumlile Cotiyani (DUA_ELW_20200623_CotiyaniP_UTR and DUA_ELW_20200623_CotiyaniP_Chl)
57. Data agreement signed by Dr Jackie Raw (Nelson Mandela University) for Knysna Estuary RSET data (DUA_ELW_20200709_RawJ2)

58. Data agreement signed by RU PhD student Jess Gornall for ABSS Port Alfred UTR Inner (UTR1) and Offshore (UTR13) temperature data (DUA_ELW_20200731_GornallJ)
59. Kariega Estuary CT logger data (2014-2018) sent to Louw Claassens (Director, Knysna Basin Project) (DUA_ELW_20200211_ClaassensL)
60. ABSS CMP data (UTR4_018 and UTR14_018) sent to Carla Edworthy (SAIAB, RU PhD student) (DUA_ELW_20180716_EdworthyC)
61. The following CMP Data was sent to SAIAB/RU PhD student, Carla Edworthy: Bird Island Outer UTR7_017, St Croix Offshore UTR8_017, Sundays River Offshore UTR4_019, Woody Cape East UTR3_022, Alexandria Dune Fields UTR7_018, Algoa Bay Central UTR14_019 (only Pos5) and Cape Recife Offshore UTR5_022 (only Pos4) (DUA_ELW_20180716_EdworthyC)
62. ABSS CMP data (various) to Shirley Parker-Nance - DUA_ELW_20200928_ParkerNanceS.
63. ADCP001_BI data (full set) to Dr Mark Bodley of Intelligent Energy Trust (IET) - DUA_ELW_2020102_BodleyM.
64. ABSS PELTER CTD data (2018-2019) to Shirley Parker-Nance - DUA_ELW_20200928_ParkerNanceS.
65. ABSS PELTER Nutrients/Phytoplankton data (2018-2019) to Shirley Parker-Nance - DUA_ELW_20200928_ParkerNanceS
66. ABSS CMP data (various) to Ross-Lynne Gibb - DUA_ELW_20200814_GibbR.
67. Kariega Estuary Physico-chemical data (2012-2017, 2019) with Dr Louw Claassens - DUA_ELW_20200211_ClaassensL.
68. ABSS CMP data to Sheveenah Taukoor (UCT) - DUA_ELW_20201103_TaukoorS
69. ABSS CMP data to Phumlile Cotiyane-Pondo (NMU/SAEON) - DUA_ELW_20201110_CotiyanePondo
70. Various SCUBA and mooring equipment were provisioned to Brian Godfrey (SOLSTICE/SARChI Ocean Sciences and Marine Food Security, NMU) to facilitate ongoing LTER (UTR network) work in Mozambique PUR_ELW_20210416_GodfreyB; ALA_ELW_20210416_GodfreyB.
71. RV Honckenii, jump camera system and crew were provisioned to Dr. Russel Chalmers of AES to facilitate the collection of benthic image data for the subtidal area off Pollock's Beach (5-30 m depth) PUR_ELW_20210408_ChalmersR
72. Benthic survey equipment (Jump camera, GoPro cameras etc.) was lent to Dr Natasha Karenyi (UCT) and Prof Leslie Petrik (PI, SANOCEAN project and UWC) to facilitate surveying of the seabed within False Bay. ALA_ELW_20210428_KarenyiN
73. ABSS PELTER Nutrients and Chlorophyll-a data sent to NMU MSc student Melindi Engelbrecht (). DUA_ELW_20200603_EngelbrechtM
74. Platform User Registration signed with the Acoustic Telemetry Array Platform (Prof Paul Cowley, ATAP lead) for use of the Hyperbaric Chamber Platform (SCUBA cylinders, medical oxygen and compressor fills) and Coastal Crafts Platform (RV Honckenii) PUR_ELW_20210517_ParkinsonM
75. ABSS CMP data made available to Tommy by Shaun for a collaborative project with Prof AJ Smit of UWC DUA_ELW_20210531_BornmanT
76. Use of the Fold-up tripod Jump Camera by Dr Natasha Karenyi (Department of Biological Sciences, University of Cape Town) for research and data collection in False Bay. (ALA_ELW_20210426_LeslieP) ALA_ELW_20210426_LeslieP.pdf
77. Shaun Deyzel supplied Melindi Engelbrecht (MSc student, NMU) with ABSS PELTER CTD data (2021-03-16) (DUA_ELW_20200603_EngelbrechtM) DUA_ELW_20200603_EngelbrechtM. EngelbrechtM_2021_Proof_Data_DUA_ELW_20200603_EngelbrechtM.pdf. EngelbrechtM_2021_Proof_Data_DUA_ELW_20200603_EngelbrechtM2.pdf
78. Imtiyaaz Malick and Mfundo Bizani provisioned the use of the 55 micron Plankton Net and Stereo Zoom Microscope to Ceyza Alfredo (National Institute of Fisheries Research of Mozambique/ Nelson Mandela University - Chair in Ocean Science and Food Security) (PUR_ELW_20210720_AlfredoC). PUR_ELW_20210720_AlfredoC.pdf

79. Imtiyaaz Malick provisioned the use of the Diving Pulse Amplitude Modulated Fluorometer to Dr Paul-Pierre Steyn (Botany Department, Nelson Mandela University) (PUR_ELW_20210723_SteynP) and facilitated the loan of the asset (ALA_ELW_20210720_SteynP). PUR_ELW_20210723_SteynP.pdf ALA_ELW_20210720_SteynP.pdf
80. Imtiyaaz Malick facilitated the loan of the Diving Pulse Amplitude Modulated Fluorometer to Frederick Mosihla (Nelson Mandela University, Chair in Shallow Water Ecosystems)(ALA_ELW_20210804_MosihlaF). ALA_ELW_20210804_MosihlaF.pdf
81. ABSS CMP data (UTR002_BII, UTR003, WC, UTR006_BIO30, UTR011_BIO80; 2011-2021) were supplied to UCT student Christine Barrow (DUA_ELW_20210805_BarrowC) DUA_ELW_20210805_BarrowC.pdf BarrowC_2021_Proof_Data_DUA_ELW_20210805_BarrowC.pdf
82. Imtiyaaz Malick provisioned the use of coastal craft R/V Hypnea to SANParks Scientist Cloverley Lawrence (PUR_ELW_20210821_LawrenceC). PUR_ELW_20210821_LawrenceC.pdf
83. ABSS CMP data (UTR002_BII, UTR003_WC, UTR004_SUN, UTR005_CR, UTR006_BIO30, UTR007_DUN, UTR008_SCW, UTR010_ABM, UTR011_BIO80, UTR014_ABC) were supplied to Erika Brown (WIO Ocean Accounts Community of Practice; internal project, no DUA reference) BrownE_2021_Proof_Data_WIO_OA_CoP_20210823.pdf
84. ABSS CMP data (UTR002_BII, UTR003_WC, UTR004_SUN, UTR005_CR, UTR006_BIO30, UTR007_DUN, UTR008_SCW, UTR010_ABM, UTR011_BIO80, UTR014_ABC) were supplied to Jan-Claas Dajka (HIFMB, Germany; DUA_ELW_20210817_DajkaJC) DUA_ELW_20210817_DajkaJC.pdf DajkaJC_2021_Proof_Data_DUA_ELW_20210817_DajkaC.pdf
85. Imtiyaaz Malick provisioned a multiparameter digital water quality meter to Russell Chalmers (Aquatic Ecosystem Services) (PUR_ELW_20210831_ChalmersR). PUR_ELW_20210831_ChalmersR.pdf
86. Shaun Deyzel supplied ABSS PELTER CTD data to Erika Brown (WIO Ocean Accounts Community of Practice; internal project, no DUA reference) BrownE_2021_Proof_Data_WIO_OA_CoP_20210910.pdf
87. Shaun Deyzel supplied ABSS PELTER CTD data to Jan-Claas Dajka (HIFMB, Germany; DUA_ELW_20210817_DajkaJC) DUA_ELW_20210817_DajkaJC.pdf – same as point 9.
88. DajkaJC_2021_Proof_Data_DUA_ELW_20210817_DajkaC2.pdf
89. Shaun Deyzel supplied ABSS PELTER CTD data to Kaylee Smit (UCT and SANBI; DUA_ELW_20210615_SmitK). DUA_ELW_20210615_SmitK.pdf
90. SmitK_2021_Proof_Data_DUA_ELW_20210615_SmitK.pdf
91. Shaun Deyzel supplied ABSS PELTER Zooplankton biomass, bulk chlorophyll and nutrient data (full set) to Jan-Claas Dajka (HIFMB, Germany; DUA_ELW_20210817_DajkaJC) DUA_ELW_20210817_DajkaJC.pdf – same as point 9.DajkaJC_2021_Proof_Data_DUA_ELW_20210817_DajkaC3.pdfDajkaJC_2021_Proof_Data_DUA_ELW_20210817_DajkaC4.pdf
92. Shaun Deyzel supplied ABSS PELTER Zooplankton biomass, bulk chlorophyll and nutrient data (full set) to Kaylee Smit (UCT and SANBI; DUA_ELW_20210615_SmitK) DUA_ELW_20210615_SmitK.pdf – same as point 13.SmitK_2021_Proof_Data_DUA_ELW_20210615_SmitK2.pdfSmitK_2021_Proof_Data_DUA_ELW_20210615_SmitK3.pdf
93. Shaun Deyzel supplied ABSS PELTER Zooplankton biomass, bulk chlorophyll and nutrient data (full set) to Erika Brown (WIO Ocean Accounts Community of Practice; internal project, no DUA reference) BrownE_2021_Proof_Data_WIO_OA_CoP_20210914.pdf
94. Shaun Deyzel respectively supplied ABSS CMP data (GTP005_WC; GTP006_HB; GTP015_BI; GTP017_SC) to Erika Brown (WIO OA CoP, internal project, no DUA reference) and Jan-Claas Dajka (HIFMB, Germany, DUA_ELW_20210817_DajkaJC) BrownE_2021_Proof_Data_WIO_OA_CoP_20210917.pdf DUA_ELW_20210817_DajkaJC.pdf – same as point 9. DajkaJC_2021_Proof_Data_DUA_ELW_20210817_DajkaC5.pdf
95. Imtiyaaz Malick facilitated the use of SAEON coastal craft platform (Ally-gator 480LE) by Dr Andrew Ndhlovu (Stellenbosch University) to collect samples at Swartkops Estuary as part of the South African Blue Carbon and Microbiome Project PUR_ELW_20211015_NdhlovuA

96. Imtiyaaz Malick facilitated the provision of R/V Honckenii for Emergency Medical Care (Nelson Mandela Univerisity) Aquatic Rescue Training and Emergency drills ().
    PUR_ELW_20211103_LouwN
97. Shaun Deyzel supplied ABSS ADCP data (ADCP001_BI deployments 001-010, ADCP002_CR deployments 001-015) to Dr Jan-Claas Dajka (HIFMB, Germany
    DUA_ELW_20210817_DajkaJC
98. Shaun Deyzel hosted Mr. Njabulo Mdluli (MSc student, UKZN) for training (facilitated by Dr. Margaux Noyon, NMU) and sample analysis using the ZooScan
    PUR_ELW_20211213_MdluliN
99. Imtiyaaz Malick facilitated the Platform User Registration of Bay Hyperbaric Medicine (signed Dr. Eddelene Bouwer) for the use of the Hyperbaric Chamber, compressor and oxygen (PUR_ELW_20211220_BHM) PUR_ELW_20211220_BHM
100. Imtiyaaz Malick facilitated the Platform User Registration of Brian Godfrey (Nelson Mandela University: Ocean Sciences and Marine Food Security; PUR_ELW_20220126_GodfreyB) for the provision of high-pressure refilling of SCUBA cylinders for research diving. Refer to high-pressure Compressor Logbook for details regarding use. PUR_ELW_20220126_GodfreyB
101. Imtiyaaz Malick facilitated the loan of heavy-duty acoustic releases and elliptical float to Fannie Shabangu (University of Pretoria - PUR_ELW_20220131_ShabanguF) in support if the Passive Acoustic Monitoring of Marine Mammals in the Aliwal Shoal Marine Protected Area.
    PUR_ELW_20220131_ShabanguF
102. Sean Bailey signed a Data User Agreement (DUA) with Dr Taryn Riddin (NMU) for Airborne Remote Sensing (ARS) imagery for the Swartkops Estuary (DUA_ELW_20220202_RiddinT), marking the first supply of a sub 10 cm accuracy processed Orthophoto, an output from the ARS Platform. DUA_ELW_20220202_RiddinT
103. Imtiyaaz Malick facilitated the registration of Matt Parkinson (SAIAB - PUR_ELW_20220203_ParkinsonM) as a user of the Hyperbaric Chamber Platforms High-pressure Compressor for filling SCUBA air cylinders in support of the Acoustic Tracking Array Platform. PUR_ELW_20220203_ParkinsonM
104. Riaan Weitz (Technician, SARChI Shallow Water Ecosystems) signed Vehicle Use Agreement (DApF_ELW_20220303_WeitzR) DApF_ELW_20220303_WeitzR
105. Leigh-Ann Smit (MSc student, NMU) signed Vehicle Use Agreement (DApF_ELW_20220303_SmitL) DApF_ELW_20220303_SmitL
106. Phumlile Cotiyane-Pondo signed a Platform User Registration (PUR) agreement with Dr. Gavin Snow (Wits) the use of microscopes in February (PUR_ELW_20220207_SnowG).
    PUR_ELW_20220207_SnowG
107. Sean Bailey signed a DUA with SST representative Tayla Gifford for aerial imagery of Algoa Bay coastal waters (DUA_ELW_20220209_GiffordT) DUA_ELW_20220209_GiffordT
108. Sean Bailey signed a DUA with Dr Taryn Riddin (NMU) for ARS imagery for the Kromme Estuary (DUA_ELW_20220211_RiddinT) DUA_ELW_20220211_RiddinT
109. Asiphe Ndoto (MSc Student NMU) signed Vehicle Use Agreement (DApF_ELW_20220215_NdotoA) DApF_ELW_20220215_NdotoA
110. Imtiyaaz Malick facilitated the loan of six electro-corrosive acoustic releases to Matt Parkinson (SAIAB - ALA_ELW_20220215_ParkinsonM) in support of the Acoustic Tracking Array Platform and the Passive Acoustic Monitoring of Marine Mammals along the South African Coastline.
    ALA_ELW_20220215_ParkinsonM
111. Dr Aldwin Ndhlovu (Postdoc NMU) signed Vehicle Use Agreement (DApF_ELW_20220214_NdhlovuA) DApF_ELW_20220214_NdhlovuA
112. Melissa Pollard (PhD SAIAB) and Phakama Nodo (Postdoc SAIAB) signed Vehicle Use Agreements (DApF_ELW_20220221_PollardM and DApF_ELW_20220221_NodoP)
    DApF_ELW_20220221_PollardM DApF_ELW_20220221_NodoP
113. Phumlile Cotiyane-Pondo signed a PUR agreement with Phakama Nodo and Melissa Pollard (both SAIAB) for the use of multiple platforms in their upcoming collaborative research project (PUR_ELW_20220221_NodoP) PUR_ELW_20220221_NodoP
114. Imtiyaaz Malick facilitated the loan of ADCP power adaptor and electronics module to Brian Godfrey (NMU, Ocean Sciences and Marine Food Security - ALA_ELW_20220223_GodfreyB)
    ALA_ELW_20220223_GodfreyB
115. Imtiyaaz Malick facilitated the loan of a portable underwater metal detector to Matt Parkinson (SAIAB - ALA_ELW_20220303_ParkinsonM) in support of the Acoustic Tracking Array Platform.
    ALA_ELW_20220303_ParkinsonM

116. Imtiyaaz Malick facilitated the loan of various diving gear and equipment to Matt Parkinson (SAIAB - ALA_ELW_20220309_ParkinsonM) in support of the Acoustic Tracking Array Platform. ALA_ELW_20220309_ParkinsonM
117. Tim Parker-Nance sent the last 5 years of St Francis Bay UTRs to Nonhle Mlotshwa (DUA_ELW_20220128_MlotshwaN) DUA_ELW_20220128_MlotshwaN
118. Shaun Deyzel signed a Platform User Agreement with Prof Lorien Pichegru and her collaborators for the use of SMCRI vessel and staff (PUR_ELW_20220311_PichegruL) PUR_ELW_20220311_PichegruL
119. Werner Kuntz signed a Vehicle User Registration agreement with Paula Pattrick (ABALOBI) for the use of a vehicle for a field trip 15-18 March (DApF_ELW_20220314_PattrickP) DApF_ELW_20220314_PattrickP
120. Shaun Deyzel signed a Platform User Agreement with Bomakazi Tshingana (UCT, PhD student) for the use of multiple platforms and staff for sampling in Algoa Bay and St Francis Bay in April/May 2022 (PUR_ELW_20220320_TshinganaB). PUR_ELW_20220320_TshinganaB

15. Appendix D: SMCRI capabilities available to Municipalities

Main hub	Capabilities available	Possible applications for Municipalities
A. Ocean Sciences Campus, Nelson Mandela University, Gqeberha (Nelson Mandela Bay). B. Sentinel Sites at: 1) Algoa Bay (from Oyster Bay to Port Alfred) 2) Natal Bight (Richards Bay to Durban) 3) Two-Oceans (Cape Town to Hermanus) 4) Marion Island C. Satellite Sentinel Sites at: 1) Namaquland 2) Mossel Bay 3) Tsitsikamma 4) Wild Coast (Dwesa) 5) Sodwana Bay D. Several research platforms also extend around the entire coastline, e.g. Airborne Remote Sensing, Acoustic Telemetry, Coastal Temperature Network, Estuarine Observation Network.	A. Main Hub: • Hyperbaric Chamber servicing the Eastern Cape • Coastal Biogeochemistry Laboratory ○ Nutrients ○ Heavy metals ○ C/N/S ○ Microplastics ○ Plankton B. Sentinel and satellite Sites: • Remote Operated Vehicles (ROVs), • Research vessels (small and large) • Light aircraft ○ Photogrammetry ○ Thermal & IR ○ LiDAR • Hourly underwater temperature data • Hourly ocean current and wave data • Real-time MetOcean data • Acoustic telemetry data (marine and estuarine species movement) • Hourly estuarine salinity and temperature data • Monthly coastal phytoplankton, zooplankton, benthic, fish and biogeochemistry surveys	• Coastal environmental management • Coastal resource management, e.g. resource availability (no. of whales, sharks, etc.) exploitation (no. of fishers) and illegal activities (poaching, illegal fishing, etc.) • Highly accurate 3-D models of the coastline for Risk and Vulnerability assessments and development of coastal set-back lines. • High resolution aerial photographs that can be used to identify land-use change. • Surveillance of risks to the socio-economy, e.g. red tides near aquaculture facilities or beaches, oil spills, industrial/sewage effluent spill, etc. • Aircraft and vessel search and rescue operations • Early warning of large swell and strong currents to municipalities, SAMSA, Transnet National Ports Authority (TNPA), National Sea Rescue Institute (NSRI) and Life Saving SA. • Water quality data of coastal and estuarine areas. • Use of data in models to predict currents and swell to assist with oil and effluent spill modelling, drifting object predictions, search and rescue operations, etc. • Hyperbaric chamber providing diver safety for municipal search and rescue, police and navy dive teams in the Eastern Cape • Assist municipalities with specialist marine and coastal environmental input on their EMPs, projects, impact assessments, etc.

16. Appendix E: Internal Audit findings

Audit finding	Agreed action	Follow-up/feedback on status of implementation of action plans	Resolved/not resolved	Due date
Although project plans were not achieved as agreed in funding agreements, KPI's were not amended and agreed with funders of projects for future financial years.	SMCRI agrees that although revised KPIs were formally discussed, those were not followed by conclusive paperwork and thus were not signed off by the contract managers, minuted, tracked and reported on. A better project management structure is required that allows for structured reporting.	Quarterly and Annual Reports to the DSI contain more detail on whether KPI's were achieved or not with comprehensive reasons provided. Minuted financial meetings have been held between the DSI and SAEON, but progress meetings specific to SAEON need to be set-up. The overall DSI meeting with all the SARIR projects do not allow for sufficient discussion of project plans and progress. Consolidating the NRF and DSI quarterly report into a single report has been completed	Improved, but requires additional intervention.	Q4 2021/22
Detailed Capital Investment Appraisal Documents were not produced for each major capital equipment purchase.	The COT for all major assets will be determined before proposals and funding agreements are finalized.	Detailed COTs are drawn up for the procurement of all capital procurements exceeding R500,000.	Completed	Q4 2021/22
Although the proposal included the estimated capital outlay to procure these items, estimates on the funding required to maintain and ensure the sustainable use of these equipment were either non-existent or deficient.	Life-cycle costs should be regularly reviewed against actual costs and changed circumstances or environments	Detailed life-cycle costs are drawn up for the procurement of all assets >R500,000. Life cycle costs depend on the quote of the successful bidder and are only drawn up once the bids have been awarded. Life cycle costs are regularly reviewed. In addition, SMCRI also produces Return on Investment (RoI) calculations for each of the large procurements.	Completed	Q4 2021/22

17. Appendix F: Description of research platforms

Name of Research infrastructure	Description	Unique contribution	Investment value	Lifecycle costs PA	Assessed/ emerging risk
Algoa Bay Sentinel Site Continuous Monitoring Platform	Network of more than 40 permanently moored in situ observatories measuring a series of physical properties of the coastal ocean between Port Alfred and Oyster Bay on the south-east coast of South Africa. Infrastructure research vessel capable of launching and retrieving moorings; subsurface buoys; anchor weights; rope, line, temperature recorders, ADCPs, moored Seabird CTDs; ADCP frames; SCUBA research dive equipment; consumables (including railway line anchors).	It is well established and one of the flagship programmes of the Elwandle and Egagasini Node. The Algoa Bay Sentinel Site, one of the best monitored coastal areas in Africa	R3 800,000	R150,000	Loss of equipment in the ocean due to lockdown reducing servicing opportunities
Algoa Bay Pelagic Ecosystem Long-Term Ecological Research Platform (PE-LTER)	PE-LTER is currently in its 11th year of full time operation. The main objective behind the PE-LTER was to establish a sustainable pelagic ecosystem LTER observatory in Algoa Bay. Infrastructure: research vessel capable of deploying a 120 kg CTD with mini-Niskin rosette sampler to ~100 m depth (davit with winch); secchi disc; zooplankton nets; phytoplankton nets; filtration system for chl-a; sample bottles; nutrient auto-analyzer; microscopes; field laptop; chemicals	The fundamental aims pursued are two-fold: 1) to improve our ability to detect, understand and predict environmental change within the Algoa Bay Sentinel Site, and 2) to collect, manage and archive quality assured, useful physical, chemical and lower trophic level biological data.	R2 500,000	R150,000	Loss of equipment in the ocean. Loss of data as a result of 3 months not sampled due to the lockdown.
South African National Coastal Temperature (SANCT) LTER Network	The SANCT builds on a network of Underwater Temperature Loggers and thermometer readings established around the coast of South Africa by a suit of different entities, e.g. SAWS, DFFE, EKZNW, UWC and KZNSB. Infrastructure: Anchor weights (0.5 m railway line); Star-Oddi Temperature loggers, consumables	SAEON is responsible for the gully UTRs in the Eastern Cape and the Western Cape up to Cape Agulhas, a coastline of approximately 1200 km. Unique dataset of nearshore temperature that cannot be determined using remote sensing products.	R220,000	R50,000	Loss of equipment in the ocean; theft
South African Estuaries	LTER of Knysna, Kromme, Gamtoos, Swartkops, Sundays and Kariega estuaries. Activities include maintenance	Unique long-term dataset of a variety of EOVs in some of the	R1 350,000	R150,000	Loss of equipment in the estuaries

Monitoring Network	of *in situ* C/T loggers and quarterly sampling of the water column from the mouth to the head of each estuary. Data collected include YSI multiprobe, secchi disc, PAR, chl-a and nutrients. Future plans also include annual airborne remote sensing information on all the estuaries around the coast. Nahoon and Nxoxo are additional mangrove estuaries monitored by RSETs for sediment elevation changes in addition to the salt marsh estuaries of Knysna, Kromme and Swartkops.	most important estuaries in South Africa. Annual airborne remote sensing data will be critical in development of estuarine management plans and the implementation thereof.			due to flooding; theft. Data loss due to one season not sampled as a result of COVID-19 lockdown.
Benthic Ecosystem LTER (BELTER) Platform	Long-term monitoring of subtidal reef fishes and invertebrates in Algoa Bay (Addo MPA) and the Tsitsikamma Marine Protected Area. Infrastructure: Two research vessels capable of deploying SBRUVs and research dive teams; SBRUVSs; jump cameras; SCUBA research dive equipment; cameras; video analyses software;	Long-term dataset of fish and invertebrate species distribution and biomass inside and outside of the world's oldest MPA as well as one of the recently declared MPAs.	R1 800,000	R100,000	Loss of equipment due to human error or environmental forces. Loss of winter data due to COVID-19 lockdown.
Airborne Remote Sensing Platform	Small high wing aircraft equipped with high-resolution still cameras, thermal and infrared sensors. The platform will fly the entire coastline of South Africa once a year and the Sentinel Sites twice a year, collecting high resolution georeferenced images of the coast. Downstream procurement includes LiDAR and Hyperspectral sensors.	High spatial and temporal resolution airborne remote sensing products of the entire coastline. Ability to quickly and in high resolution map the impact of extreme marine events, such as HABs, storm surges, pollution, oil spills, etc.	R8 000,000	R 200,000	Currently only 1 pilot trained, who has other duties as well.
Hyperbaric Platform	Eight seater decompression chamber installed at the SAEON Research Dive Unit on the Ocean Sciences Campus of NMU in PE.	Only functional hyperbaric chamber between Mossel Bay and Durban. This platform will serve the entire SCUBA dive community (research, commercial and recreational) in the event of diving medical emergencies.	R4 000,000	R180,000	Chamber must be available 24/7. Risk = not enough chamber operators and supervisors
Coastal Biogeo-chemistry Platform	State-of-the-art laboratory on the OSC of NMU, equipped with nutrient auto-analyser, Type 1 water purification system, carbon (CNS), metal (TXRF) analysers	Ability to quickly and effectively analyse nutrients, isotopes and carbon species from	R5 900,000	R 200,000	Instrument downtime. Oversubscription of samples.

	and a microplastic lab. Staff = 1 x biogeochemist and 1 x lab technician. Will require at least one more technician as well as interns to run optimally.	seawater and freshwater. The lab will analyse all the samples from the Sentinel Sites around SA as well as samples from researchers using the platforms.			Too few staff to handle all the instruments and samples.
Two Oceans Sentinel Site	The Two-Oceans Sentinel Site will extend from Cape Town to Betty's Bay and include False Bay. The Site will be set-up similar to the ABSS and will consist of a several LTER activities, e.g. Pelagic Ecosystem, CMP, COM, Kelp, Estuaries, etc.	Innovative, high-value marine technology infrastructure servicing a variety of aquaculture, fisheries & marine research stakeholders around the South African coast as a component of the Phakisa Oceans Economy policy initiative	R 8 000,000	R 550,000	Loss of equipment in the ocean
Natal Bight Sentinel Site	The Natal Bight Sentinel Site will extend from Durban to Richards Bay. The Site will be set-up similar to the ABSS and will consist of a several LTER activities, e.g. Pelagic Ecosystem, CMP, COM, Estuaries, etc.	Innovative, high-value marine technology infrastructure servicing a variety of aquaculture, fisheries & marine research stakeholders around the South African coast as a component of the Phakisa Oceans Economy policy initiative	R5 200,000	R550,000	Loss of equipment in the ocean
Marion Island Sentinel Site	The Marion Island Sentinel Site will be started in 2020/2021 to resurrect some of the long-term activities and deploy a suite of new sensors in the coastal zone (UTRs) and inland (wind sensors). A suitably qualified intern will be sent to spend a year on the island and maintain the RI (every year). This Sentinel Site will be established in collaboration with the SAMARF RI.	Marion Island has the longest datasets of all the subantarctic islands in the world. Many of the long-term activities have recently been terminated. Continuing the records and deploying new technology will provide vital insights into a changing climate in the subantarctic.	R 1 730,000	R 220,000	Loss of equipment in the ocean; ship availability; berth availability
Satellite Sentinel Sites	Satellite Sentinel Sites will be established between the Sentinel Sites along the West Coast, South Coast, Wild Coast and	The traditional research centres around the major	R20 000,000	R 250,000	Loss of equipment in

	northern KZN. These sites will be instrumented with Coastal Observation Moorings as a minimum. Additional instruments may be deployed depending on the site, e.g. a thermistor string has been deployed at the Sodwana Satellite Sentinel Site.	coastal cities are well studied and understood, but many parts of our coastline remain poorly studied it is vital that they be instrumented. These sites are also where the majority of people live that depend on the coat for the livelihoods.			the ocean; theft
Coastal data management Platform	All the data collected by the various RI platforms listed above are checked, verified and uploaded onto various databases, e.g. Observations Database, SAEIS, SACTN, etc.	All data produced is findable, accessible, interoperable and re-useable. Data products developed specifically to aid management of the coastline.	R 4 770,000	R 2 850,000	Insufficient hard storage space; Mitigated through cloud storage
Weather stations & laptops	Installed at 7 targeted schools in Grahamstown, Paterson, Uitenhage and Port Elizabeth (Elwandle Node) as well as 7 targeted schools in Cape Town and the West Coast (Egagasini Offshore Node)	The data is being used as part of the curriculum in maths, geography and science. SAEON has developed a teacher and learner resource on the creative use of this data	R 440,000	R 70 000 pa	Damage or loss of weather stations
Acoustic Tracking Array Platform (ATAP) – managed by SAIAB	ATAP consists of in situ telemetry receiver stations along the coast from Cape Town to Ponto De Oura. The ATAP manages the receiver network and a database of all detections. The SMCRI will improve upon the coverage of this mature platform and facilitate the expansion of research infrastructure up the West Coast.	Platform has expanded coverage to comprise over 100 listening stations. Over 1000 tagged animals representing > 30 different species currently being tracked. Complete buy-in from research community.	R 8 000,000	R 500,000	Loss of equipment in the ocean. Loss of data due to instruments retrieved prior to lockdown.
Coastal Craft Platform – managed by SAIAB	The Coastal Craft Platform will consist of at least three research vessels (> 9 m, < 25 tonne) based at two Sentinel Sites. These Coastal Craft are fully equipped with scientific instruments for carrying out oceanographic work, plankton sampling, benthic surveys, invertebrate collections, fishing, diving, sediment collection, habitat	Both CC Phakisa and CC uKwabelana are fully subscribed for ACEP and SMCRI research. Vessels provide unique coastal platform between large research ships	R55 000,000	R 1 590,000	Not enough available sea days to field all requests for boat time.

	and benthic mapping. The three vessels are CC Phakisa (Natal Bight Sentinel Site), CC uKwabelana (currently at ABSS and will go to NBSS to support CC Phakisa) and CC Observer (nearing completion, intended for the ABSS).	and smaller coastal vessels			
Marine Remote Imagery Platform (MAR-IP) – managed by SAIAB	MAR-IP offer underwater imaging equipment for exploratory and quantitative benthic, demersal and pelagic surveys of marine biota. This includes a SAAB Seaeye Falcon remotely operated vehicle (ROV) and variety of benthic and pelagic stereo-baited remote underwater video (sBRUVs), diver operated video (sDOV), a deep-lander and multi-imaging drop camera systems.	Platform capabilities stretches from the shallow subtidal to continental shelf depths. A range of platforms available to explore understudied ecosystems. MAR-IP involved in several global projects in South Africa as well as mainland and island nations in the South-West Indian Ocean.	R20 000,000	R 550,000	Loss of equipment in the ocean; flooded camera housings