

FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING IN SEA CONCESSION AREA 11C BY TRANS ATLANTIC DIAMONDS (PTY) LTD

Trans Atlantic Diamonds (Pty) Ltd
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Appendix 6: CVs of Specialists

Aiden Biccard
Kevin Schmidt
Safiyya Sedick
Simone De Villiers Louw
John Gribble

Anchor Environmental Consultants
8 Steenberg House, Silverwood Close, Tokai, South Africa
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CURRICULUM VITAE

AIDEN BICCARD

BORN: 3 April 1985, Cape Town, South Africa

AGE: 35 years

NATIONALITY: South African

ACADEMIC QUALIFICATIONS:

MSc. Marine Zoology, 2012, University of Cape Town

BSc. (Hons) Marine Ecology, 2007, University of Cape Town

BSc. Botany and Zoology, 2006, University of Cape Town

OTHER QUALIFICATIONS: Medically in date scientific/commercial class IV diver, class IV diving supervisor, category C small craft skipper with dive endorsement

LANGUAGE PROFICIENCY: English (Excellent), Afrikaans (Good)

COUNTRY EXPERIENCE: South Africa, Namibia, Mozambique, Republic of Congo.

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EMAIL: Aiden@anchorenenvironmental.co.za

EMPLOYMENT HISTORY: 2012-Present – Marine Invertebrate Specialist/Marine Biologist Consultant, Anchor Environmental Consultants

2007-2012 – Part-time Research Assistant/Demonstrator, University of Cape Town & Anchor Environmental

SUMMARY PROFILE

Aiden Biccard has a background in zoology, botany and ecology. He has worked on nutrient cycling in the marine environment and now specialises in invertebrate taxonomy and systematics. He has recently reviewed the cirripede fauna of South Africa and undertaken a specialist role of invertebrate taxonomist for the De Beers Marine Namibia Environmental Monitoring Programme and the annual Saldanha Bay Water Quality Forum Trust State of the Bay monitoring among others. Aiden is author of 3 peer-reviewed scientific publications and many specialist reports in his capacity as a taxonomist. Aiden has undertaken biodiversity field surveys and assessments in South Africa, Namibia, Republic of Congo and Mozambique.

MEMBERSHIP OF PROFESSIONAL BODIES/ORGANISATIONS

Member of The Golden Key Honour Society (2007-)

Member of The South African Society of Systematic Biology (2008-)

SELECTED PROJECT EXPERIENCE

Date	Client	Country	Task
2019-2020	South African National Parks	South Africa	Subtidal surveys of commercially important and indicator invertebrate and fish species within the Table Mountain Marine Protected Area. Scientific diver and supervisor.
2014-present	Pisces Environmental	Namibia	Sandy beach macrofauna and sediment quality monitoring programme for the Elizabeth Bay Mining Licence Area, Namibia. Intertidal rocky shore, sandy beach and subtidal field surveys – data collection, collect and preserve invertebrate samples.
2014-present	De Beers Marine Namibia	Namibia	De Beers Marine Namibia Environmental Monitoring Programme in the Atlantic 1 Mining License Area: Annual Benthic Sampling Campaign Project Leader – Survey techniques include the use of a Van Veen grab, sediment and water quality instruments, manned submersible surveys, drop camera and benthic tow camera systems. Identify benthic invertebrate macrofauna, analysis of underwater video footage, statistical analyses and writing of report.
2018	Republic of Congo	The Biodiversity Company, Sintoukola Potash	Oceanographic and benthic surveys and ecotoxicity trials to assess potential impacts of proposed potash processing discharge, jetty construction and transshipment of product. Senior consultant.
2012-present	Saldanha Bay Water Quality Forum Trust (SBWQMFT)	South Africa	Annual State of the Bay Monitoring programme (Saldanha and St. Helena Bay). Invertebrate specialist - collection, preservation and identification of invertebrates. Rocky shore intertidal surveys. Initiating new data collection and survey programmes. Statistical analyses and writing of report.
2018	Council for Geoscience /Department of Mineral Resources	South Africa	Desktop study of the potential impacts of marine and coastal mining on marine ecosystems and marine biota in South Africa Project Leader and Principal Author
2018	Mainport Africa Shipping	South Africa	Assessment of Biofouling Community of the NM Cherry Blossom. Project Leader – Supervision of team for project execution. Identify benthic invertebrate macrofauna, statistical analyses and writing of report.
2012-present	Umhlathuze Water	South Africa	Environmental monitoring of the Richards Bay Pipelines. Senior consultant. Invertebrate specialist.

Date	Client	Country	Task
2016-2017	Department of Water and Sanitation	South Africa	<p>Classification of and resource quality objectives for the water resources of the Berg and Breede water management areas.</p> <p>Senior consultant responsible for status quo descriptions of estuaries in the two study areas and invertebrate specialist for ecological reserve determination studies on nine estuaries.</p>
2016	De Beers Marine Namibia/University of Namibia	Namibia	<p>The use of underwater video footage as a tool in the assessment of mining related impacts on the hard-bottom benthic environment in Southern Namibia</p> <p>Student supervisor for a Masters Project at the University of Namibia – experimental design and development of a method to assess video footage collected aboard the manned submersible, JAGO.</p>
2016	De Beers Marine Namibia	Namibia	<p>Screen monitoring on De Beers Marine Namibia mining vessels in the Atlantic 1 Mining Licence Area: a pilot study.</p> <p>Project Leader – Experimental design and conceptualisation. Development and implementation of screen monitoring protocol of biota aboard mining vessels.</p>
2016	Tongaat Hulett Developments	South Africa	<p>Marine ecology impact assessment for a proposed beach enhancement initiative at Tinley Manor.</p> <p>Intertidal Sandy beach field surveys – collect and preserve invertebrate samples, photographic survey of intertidal and subtidal habitat.</p>
2015-2016	NAMDEB	Namibia	<p>NAMDEB's Offshore Environmental Monitoring Programme in the Midwater Mining License Area: Annual Benthic Sampling campaign</p> <p>Conceptualisation of study involving site selection and experimental design. Lead a team of 9 assistants to collect and preserve grab and sediment samples aboard a survey vessel for 1 month at sea. Identify benthic invertebrate macrofauna.</p>
2015	Department of Water and Sanitation	South Africa	<p>Determination of the Ecological Reserve for the Klein Estuary</p> <p>Invertebrate Specialist – collect, preserve and identify invertebrate specimens and assess health of the estuary based on results. Present findings at a workshop.</p>
2015	Bergstan South Africa Consulting and Development Engineers	Mozambique	<p>Environmental scoping study for proposed upgrades to the cruise liner landing facilities at Portuguese Island, Mozambique</p> <p>Project Leader - photographic survey of intertidal and subtidal habitat, data analysis, report write-up.</p>

Date	Client	Country	Task
2015	Pisces Environmental Services	Namibia	Gecko Namibia Vision Industrial Park Development. Conduct baseline field survey of ichthyofauna using beach seine net.
2014-2016	Transnet National Ports Authority/Nemai Consulting	South Africa	Baseline Environmental Monitoring of Sand Banks in the Port of Durban Field survey assistant for the implementation of a water, sediment quality and biological monitoring programme in the Port of Durban.
2014	SRK Consulting	South Africa	Marine Ecology Specialist Study and Impact Assessment for Upgrades to Seawater Intake and Transfer Infrastructure at the Tronox Namakwa Sands Mine Project Leader – photographic survey of rocky shore habitat, data analysis, report write-up.
2014	Coastal & Environmental Services	South Africa	Zirco Roode Heuwel Mine, Northern Cape, South Africa. Marine Specialist Study and Impact Assessment Project Leader - transect and quadrat sampling of rocky shore habitat, data analysis, report write-up.
2014, 2016	Port Nolloth Sea Farms Ranching (PTY) LTD.	South Africa	Baseline survey and monitoring plan for abalone ranching concession area NC3 Subtidal ecological survey.
2013	Cape Nature, Department of Environmental Affairs	South Africa	Assessment of impacts of an oil spill on sandy beach and rocky intertidal communities in the Goukamma MPA. Invertebrate specialist – collect, preserve and identify invertebrates, train interns at DAFF on identification techniques.
2013	Transnet National Ports Authority	South Africa	TNPA Alien Invasive Species Survey (Coega) Collection, preservation and identification of invertebrates.
2013, 2015-2016	Department of Agriculture, Forestry & Fisheries (DAFF)	South Africa	Diving Surveys of the Eastern Cape Abalone Resource. Subtidal abalone counts (transects) on snorkel
2012	A. R. Brink and Associates	South Africa	Identification and Age Estimation of Fouling Cirripedia Collected from M. V. "DD Vogue"

Date	Client	Country	Task
2012	Department of Agriculture, Forestry & Fisheries (DAFF)	South Africa	Algoa Bay fin fish mariculture (DAFF) Deployment, recovery and servicing of ADCP's and thermistor strings. Single-beam echo bathymetry survey. Grab sample collection of benthic macrofauna. Preservation and identification of invertebrate fauna.
2012	Ethekwini Municipality	South Africa	Baseline Survey and EIA for Umhlanga Rocks tidal pool. Transect and quadrat sampling of rocky shore habitat.
2012	Henwood & Nxumalo Consulting Engineers	South Africa	Environmental Impact Assessment of Mzinto Bridge Repair. Project Leader - collection, preservation and identification of invertebrates. Statistical analyses and writing of report.
2012	Nemai Consulting	South Africa	Specialist study to assess marine ecological impacts of offshore sand winning associated with the deepening, lengthening and widening of berth 203 to 205, container terminal, Port of Durban. Research and analysis of data, report writing.
2012	Cape Action Plan for People & the Environment/Cape Nature/Marine & Coastal Management (MCM)	South Africa	Gouritz Estuary Management Plan Review. Review and evaluate proposed EMP according to the National Estuary Management Protocol. Present findings at a workshop.
2012	Pisces Environmental	Namibia	Annual Rocky intertidal and sandy beach biota of Namibia's Pocket Beaches (NAMDEB Diamond Company, Namibia). Field work, statistical analyses and report writing.
2012	Pisces Environmental	Namibia	Scientific Diver and Supervisor for Bogenfels subtidal reef survey (NAMDEB Diamond Company, Namibia). Field work (identify and quantify subtidal reef species).
2012	Cape Action Plan for People & the Environment/Cape Nature/Marine & Coastal Management (MCM)	South Africa	Rapid determination of the Environmental Water Requirements for the Uilkraals Estuary. Identify invertebrate specimens and assess health of the estuary based on results. Present findings at a workshop.
Feb 2012	Various companies	South Africa	Marine specialist report and impact assessment for the reverse osmosis plant at Plettenberg Bay. Fish counts on SCUBA. Collection, preservation and identification of invertebrates. Statistical analyses and writing of report.

PUBLICATION RECORD

Scientific papers

Biccard, A. and Griffiths, C.L. (2016). Additions to the barnacle (Crustacea: Cirripedia) fauna of South Africa. *African Zoology* **51**, 99-116.

Biccard A & Midgley JJ. 2009. Rodent pollination in *Protea nana*. *South African Journal of Botany* **75**, 720–725.

Whitehead O, Biccard A & Griffiths CL. 2011. South African pelagic goose barnacles: substratum preferences and influence of plastic debris on abundance and distribution. *Crustaceana* **84** (5-6), 635-649.

Research Thesis

Biccard, A. 2012. Taxonomy, Systematics and Biogeography of South African Thoracic Cirripedia. MSc. Thesis, University of Cape Town, 160 pp.

Consulting Research Reports

Biccard A, Hutchings K, Wright AG, Mostert BM, Sedick S and Clark BM. 2020. The State of St Helena Bay 2020. Report No. AEC 1908/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the St Helena Bay Water Quality Trust. Pp 113.

Biccard, A., K. Gihwala, B.M. Clark, S. Sedick, E.A. Brown, B.P. Mostert, C. Swart, S Mtsokoba, B. Tshingana, A. Masosonke and J. Dawson. 2020. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2018 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. AEC 1807.

Biccard A, K Gihwala, BM Clark, EA Brown, BP Mostert, A Masosonke, C Swart, S Sedick, B Tshingana and J Dawson. 2019. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2017 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1775/1.

Biccard A, Gihwala K, Clark BM, Mostert B, Brown E, Hutchings K, Massie V and M Melidonis. 2018. Desktop study of the potential impacts of marine mining on marine ecosystems and marine biota in South Africa – Final report. Report prepared by Anchor Research & Monitoring (Pty) Ltd for Council for Geoscience. Report no. 1795/1.

Biccard A, Gihwala K, Clark BM, Harmer RW, Brown EA, Mostert BP, Wright AG & A Masosonke. 2018. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2016 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1726/1.

Biccard A, Clark BM, Brown EA, Duna O, Mostert BP, Harmer RW, Gihwala K & AG Wright. 2017. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2015 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1527/4.

- Biccard A, Clark BM & EA Brown. 2016. De Beers Marine Namibia Environmental Monitoring Programme in the Atlantic 1 Mining Licence Area: 2014 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1527/4.
- Biccard A & BM Clark. 2016. De Beers Marine Namibia Environmental Monitoring Programme in the Atlantic 1 Mining Licence Area: 2013 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1527/3.
- Biccard A & BM Clark. 2015. Environmental Scoping Study for Proposed Upgrades to the Cruise Liner Landing Facilities at Portuguese Island, Mozambique. Report prepared for Bergstan South Africa Consulting and Development Engineers.
- Biccard A. 2014. Snowgoose 2014 Grab Sampling Campaign – Observations and Review. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. pp. 8.
- Clark BM, Hutchings K, Biccard A, Brown E, Dawson J, Laird M, Gihwala K, Swart C, Makhosonke A, Sedick S, Turpie J. and Mostert B. 2020. The State of Saldanha Bay and Langebaan Lagoon 2020, Technical Report. Report No. AEC 1876/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the Saldanha Bay Water Quality Forum Trust, October 2020.
- Clark BM, Hutchings K, Wright AG, Mostert B, Brown E, Dawson J, Louw S, Biccard A & Massie V. 2020. Mhlathuze Water Environmental Monitoring Programme for the Richards Bay Offshore Outfalls Region 2019/2020 Survey, Technical Report. Report No. 1800/4 prepared by Anchor Research and Monitoring (Pty) Ltd for Mhlathuze Water, March 2020. 239pp (Appendix 1 Raw Data attached separately).
- Duna O, Clark BM, Biccard A, Hutchings K, Harmer R, Mostert B, Brown E, Massie V, Makunga M, Dlaku Z & A Makhosonke. 2016. Assessment of mining-related impacts on macrofaunal benthic communities in the Northern Inshore Area of Mining Licence Area MPT 25-2011 and subsequent recovery. Technical Report. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (PTY) Ltd. Report no. 1646/1.
- HUTCHINGS, K. & A BICCARD 2015. Gecko Namibia Vision Industrial Park Development Baseline Field Survey Report: Surf Zone Fish. Prepared for: Pisces Environmental Services (Pty) Ltd.
- Laird MC, Biccard A & BM Clark. 2013. Marine Alien Invasive Species Survey Within the Port of Ngqura. Report prepared for Transnet National Ports Authority.
- Mostert BP, Biccard A, Duna O & BM Clark. 2016. Baseline survey of the benthic marine environment in the South African diamond mining Concession areas: 1B and 1C. Report prepared for Alexkor and Placer Resource Management by Anchor Environmental Consultants. Report no. 1696/1.
- Pulfrich A, Hutchings K, Biccard A & BM Clark. 2015. Survey of Sandy-Beach Macrofaunal Communities on the Sperrgebiet Coastline: Consolidated Beach Monitoring Report – 2015. Report to NAMDEB Diamond Corporation (Pty) Ltd. Oranjemund. Namibia. pp. 86.
- Pulfrich A, Hutchings K, Biccard A, Clark BM & MC Laird. 2014. Survey of Sandy-Beach Macrofaunal Communities on the Sperrgebiet Coastline. Consolidated Beach Monitoring Report: 2014. Prepared for: NAMDEB Diamond Corporation (Pty) Ltd.

CURRICULUM VITAE

KEVIN MIKUS SCHMIDT [US Citizen]

ACADEMIC QUALIFICATIONS:

MSc Applied Marine Science, 2016, University of Cape Town – Marine Research Institute
BSc (Hon Equivalent) Environmental Science, 2013, University of Delaware – College of Earth,
Ocean and Environment

OTHER QUALIFICATIONS:

Medically in date Class IV Scientific/ Commercial Diver (South Africa), SAMSA Cat B Skipper with
dive endorsement (South Africa), PADI Staff Instructor #329403, Technical/ Rebreather Diver

SKILLS:

Scientific Diving, Matlab, Big Data Management, Satellite Imagery, Remotely Sensed Reanalysis
Climate Data, ArcGIS, ArcSWAT Hydrologic Modelling, Google Earth Engine, Delft3D Hydrodynamic
Modelling, Adobe Lightroom/ Premier Pro, MS suite, R-Studio

LANGUAGE PROFICIENCY: English (Excellent), German (Basic)

COUNTRY EXPERIENCE: North America, Caribbean, South Africa, Namibia, Mozambique, Madagascar

OCEAN EXPERIENCE: Northern & Southern Atlantic, Caribbean, Southern Ocean, Indian Ocean

ECOSYSTEM EXPERIENCE: Air – Sea Interface, Upwelling Systems, Pelagic Zone, Coral Reefs, Seagrasses,
Mangrove Forests, Kelp Forests, Intertidal and Nearshore Rocky Reefs, Soft/ Hard
Benthos, Wetlands, Coastal Watersheds

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EMPLOYMENT HISTORY: Dec 2017 – Current: Marine Consultant (Anchor Environmental Consultants)
2017: PADI Instructor/Technician, MASS Diving
2016-2017: Analyst, Researcher, Author, CSIR-SOCCO
2015-2016: UCT Graduate Research, Ma-Re, CSIR-SOCCO
2014: PADI Instructor/Technician for Reef Divers
2009 – 2013: University of Delaware Research, UMBC REU
2006 – 2014: Baltimore Aquarium

SUMMARY PROFILE: Kevin has an undergraduate degree (BSc and Hon) in Marine Ecosystem Sciences from the University of Delaware and a graduate degree (MSc) in Applied Marine Sciences from the University of Cape Town. During his undergraduate degree, he investigated the influence of anthropogenic climate change upon community dynamics of coral reef and their associated ecosystems. During his graduate degree, he collaborated with scientists from the Southern Ocean Carbon and Climate Observatory (SOCCO) to investigate the wind field variability of the Southern Ocean using WaveGlider technology and remotely sensed satellite reanalysis data. In January of 2017 he published his MSc findings in the American Meteorological Society (AMS) Journal of Atmospheric and Ocean Technology (JTECH). Since then, Kevin has been actively incorporating satellite-derived data “on the ground”; performing validation and extrapolation tasks to broaden the spatial and temporal coverages of atmospheric, land and oceanographic variable datasets. With his expertise in querying global repositories, he can provide his peers and clients holistic and globally unique data inputs for impact assessments, variability studies and computational fluid dynamic models. Kevin intends to use these remotely sensed environmental variables, satellite imagery, and machine learning to bridge the gap between ecology and oceanography and to increase the efficacy of ecological surveying techniques and the strategic implementation of conservation management strategies.

SELECT PROJECT EXPERIENCE:

Period	Employer	Country	Clients	Project, Tasks
September 2021	Anchor Environmental Consultants Pty Ltd	Mossel Bay, South Africa	Mossel Bay Municipality	<p>ENVIRONMENTAL MAINTENANCE MANAGEMENT PLAN (EMMP) FOR THE GREAT BRAK ESTUARY.</p> <p>Remote Sensing specialist: provided climate data from ECMWF ERA-5, rainfall data from 2000-2021 for select locations to corroborate with historic stream-flow gauge records. Processed within MATLAB.</p> <p>Deployable sensor technician: developed mooring system for <i>in-situ</i> CTD (AquaTROLL 600).</p>
Aug 2021- Current [ONGOING CAMPAIGN]	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<p>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 BENTHIC SAMPLING CAMPAIGN</p> <p>Marine GIS specialist, remote sensing specialist for various projects within the annual geophysical survey report. Ski-Monkey benthic camera system: pre cruise calibration using SeaGIS, CAL, and TransectMeasure software to enable post cruise analysis to include length and area measurements from video imagery.</p>
June 2021 – July 2021	Anchor Environmental Consultants Pty Ltd	South Africa West Coast	Trans Atlantic Diamonds (Pty) Ltd	<p>MARINE SPECIALIST IMPACT ASSESSMENT FOR EXPLORATION AND PROSPECTING ACTIVITIES IN CONCESSION AREA 12b</p> <p>Marine GIS specialist, remote sensing specialist: prepared maps of marine protected areas, ecological-biologically significant areas, coastal threat and protection status, average annual reported commercial and local fisheries effort and catch metrics for the region, overlaid with location of concession area</p> <p>Calculated proportion of the average national total catch made within concession area</p>
June 2021 – July 2021	Anchor Environmental Consultants Pty Ltd	Olifants Estuary, South Africa	Mineral Sand Resources (Pty) Ltd (MSR); Tormin Mineral Sands Project	<p>Estuarine and Freshwater Specialist Study</p> <p>Coastal hydrology specialist: developed a SWAT Hydrologic model to simulate ephemeral stream flow rates and days flowing per year using remotely sensed climate inputs</p>

Apr 2021 – May 2021	Anchor Environmental Consultants Pty Ltd	Greenland	De Beers Group	<p>ENVIRONMENTAL MITIGATION ASSESSMENT FOR PLANNED GEOPHYSICAL SURVEY ON THE WEST GREENLAND CONTINENTAL SHELF</p> <p>Marine GIS specialist, remote sensing specialist: general mapping of Greenland, Sea ice extent, Sea surface temperature (SST) spatial analysis for coastal Greenland and surrounding oceans using ArcGIS, Matlab and ERA-5 derived remotely sensed data. Mapped areas of concern and closed areas for all marine mammals (beluga, bowhead whale, narwhal and walrus) deemed particularly sensitive to geophysical surveys relative to the proposed survey area. Mapped historic catch of sensitive fisheries (Northern Shrimp, Halibut, Lumpfish, Cod, Snow Crab)</p>
Feb 2021 – June 2021	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	V&A Waterfront Management Authority	<p>Economic Assessment of Recreational Sailing in Cape Town: Making the case for investment in the proposed Granger Bay Marina</p> <p>Questionnaires were designed and face to face interviews were undertaken with representatives from the six main marinas and yacht clubs in the Greater Cape Town area as well as a number of stakeholders from the boat building and boat repair industry. An online survey was disseminated to members of the yacht clubs and marinas in Cape Town and visiting vessels to these clubs.</p>
Nov 2020 – May 2021	Anchor Environmental Consultants Pty Ltd	Sierra Leone, West Africa	Sierra Rutile Limited	<p>GIS specialist</p> <p>Delineate watershed boundaries around two active mining operations, collate historic satellite imagery in Google Earth Engine for use in a machine-learning driven supervised classification effort to identify and isolate sensitive habitats for focused <i>in-situ</i> sampling.</p>
Oct 2020 – Dec 2020 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	St Helena Bay, South Africa	St Helena Bay Water Quality Trust	<p>Marine GIS specialist for annual state of the bay report</p> <p>Prepared data on a variety of physical and biological parameters, including activities and discharges affecting the health of the Bay (fish processing and wastewater discharge), water quality in the Bay itself (historical data</p>

				pertaining to temperature, oxygen, salinity, nutrients, and pH), sediment quality (particle size, total organic carbon and nitrogen), and ecological indicators (benthic macrofauna).
Nov 2019- Aug 2021	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 BENTHIC SAMPLING CAMPAIGN Marine GIS specialist, remote sensing specialist for various projects within the annual geophysical survey report. Ski-Monkey benthic camera system: post-campaign processing of spatio-temporal data collected during the 2019 campaign to assess mining-related impacts on epifaunal communities inhabiting hard substrata and subsequent recovery after mining. Investigation into the applications of machine learning image annotation. Prepared data on a variety of physical and biological parameters; historical data pertaining to temperature, oxygen, salinity, nutrients, and pH), sediment quality (particle size, total organic carbon and nitrogen), and ecological indicators (benthic macrofauna).
May – July 2020	Anchor Environmental Consultants Pty Ltd	Somerset West, Cape Town, South Africa	Rheinmetall Denel Munition RF (Pty) Ltd	Field Scientist Worked in the field to sample sediment, macrofauna and water quality parameters as part of the environmental monitoring and management programme for Rheinmetall Denel Munition coastal waters discharge permit.
Apr 2020 – Oct 2020	Anchor Environmental Consultants Pty Ltd	South Africa	Aqunion, Portion 2 of Klipfontein Farm no 711	ENVIRONMENTAL MONITORING AND STOCK ASSESSMENT ACTIVITIES FOR AQUNION ABALONE RANCHING IN THE NORTHERN CAPE (AREA NC 4) Aqunion have recently regained access to area NC 4 and would like to resume ranching activities (seeding and harvesting stock) and the required monitoring surveys. In addition to the monitoring surveys, Anchor undertook an independent stock assessment of the six sites seeded to date.

2018 – Current [ANNUAL REPORT] [ONGOING]	Anchor Environmental Consultants Pty Ltd	Saldanha, Cape Town	Saldanha Bay Water Quality Forum Trust (SBWQMFT)	<p>Commercial/ Scientific Diver As part of the annual State of the Bay Monitoring programme in Saldanha Bay, for two weeks in March of 2020 worked as a diver to operate a low-pressure compressor vacuum system to collect and sieve sediment samples for identification of benthic invertebrates. Performing bi-monthly visits to Geelbek reserve to retrieve in-situ CTD, download data, clean sensor and replace for annual monitoring of freshwater variability in the lagoon.</p> <p>Marine GIS Specialist Prepared data on a variety of physical and biological parameters, including activities and discharges affecting the health of the Bay (fish processing and wastewater discharge), water quality in the Bay itself (historical data pertaining to temperature, oxygen, salinity, nutrients, and pH), sediment quality (particle size, total organic carbon and nitrogen), and ecological indicators (benthic macrofauna).</p> <p>Remote Sensing Specialist Using Google Earth Engine, accessed historic Sentinel2 Imagery and conducted a supervised classification effort to map the spatio-temporal variability of invasive phragmites, aquatic seagrasses, and salt marsh within Saldanha Bay and Langebaan.</p>
Mar 2020	Anchor Environmental Consultants Pty Ltd	Robben Island, South Africa	City of Cape Town Department of Environmental Affairs, Branch: Fisheries Management	<p>Fishery Independent Abalone Surveys (FIAS) in Robben Island MPA Scientific diver to sample abalone length measurements along a series of 20 transects around Robben Island.</p>
Jan 2019- Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	City of Cape Town, Marine Outfalls Monitoring Plan	<p>City of Cape Town Effluent Pipelines Biomonitoring Scientific diver to deploy, maintain, and retrieve subsurface mussel moorings to investigate the performance and effects of the domestic effluent outfalls offshore of Hout Bay, Camps Bay and Green Point</p>
Nov 2019- Jan 2021 [5 YEAR SURVEY]	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	Table Mountain National Parks/ SAN Parks	<p>Commercial/ Scientific Diver Collect quantitative data on commercially and ecologically important indicator fish assemblages</p>

				at 60+ designated sites within the TMNP Marine Protected Area.
Nov 2019- July 2020	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	UN Environment: Ecosystem Services	<p>Hydrologic Specialist Prepared an ArcSWAT hydrologic model of the Thukela Watershed to assess the impacts of land use classification change (to degraded landscapes) and invasive vegetation on stream, nutrient and sediment transport in Kwazulu-Natal, South Africa.</p> <p>Remote Sensing Specialist For the period of 1979-2014, gathered and validated historic precipitation, temperature, wind, relative humidity, solar radiative flux for use as input into hydrologic model.</p>
Jan 2019- Dec 2019 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<p>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 PLUME MODELLING CAMPAIGN Preparing equipment for deployment (ADCP, thermistor array, CTD) to collect data for use in a Delft3D near field model of sediment plume dispersion from actively mining vessels.</p> <p>Remote Sensing Specialist Gather historic remotely sensed/ reanalysis air-sea interface data to assess hydrodynamic characteristics of large portions of the Atlantic 1 MLA.</p>
Apr 2019- Jan 2020	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	Atlantic Salmon	<p>Data Analyst, Report Writing Conducting an impact analysis using Delft3D near shore modelling for the proposed construction of an Atlantic Salmon aquaculture effort in port of Cape Town.</p> <p>Remote Sensing Specialist Gathered and validated remotely sensed weather data (wind, temperature, humidity, solar radiative flux) to force near-field models of hydrodynamic properties within the waterfront.</p>
2019 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Elizabeth Bay, Namibia	Pisces Environmental Services Pty Ltd/ De Beers Marine Namibia	DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 ECOLOGICAL IMPACT CAMPAIGN

				Baseline marine surveys and annual monitoring of intertidal and subtidal rocky shores and beaches in the Sperrgebiet National Park, Namibia, for Namdeb Diamond Corporation
Nov 2019 - June 2020	Anchor Environmental Consultants Pty Ltd	Matola, Mozambique	Golder Associados Moçambique Limitada/ Sasol Petroleum Mozambique Exploration Limitada	Scientist, Diver, Remote Sensing Specialist Prepare initial baseline report for offshore seismic exploration in area north of Bazaruto Archipelago National Park (BANP), north of Inhassoro. Project suspended, pending client.
Nov 2019- July 2020 [5 YEAR SURVEY]	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	Table Mountain National Parks/ SAN Parks	Commercial/ Scientific Diver Collect quantitative data on commercially and ecologically important indicator invertebrate species (rock lobster, abalone, alikreukel, kelp and sea urchins) at 87 designated sites within the TMNP Marine Protected Area.
2019- Current [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Richards Bay, South Africa	Mhlathuze Effluent Monitoring Program	Data analyst, report writing Developed MATLAB scripts to automatically process and generate baseline models and display historic and current trendlines of sediment and heavy metal (Al, Fe, As, Cd, Cu, Cr, Hg, Ni, Pb, Zn) toxicity data gathered during the annual monitoring program. Used to assess impacts associated with the discharge of effluent through three municipal sea outfalls in Richards Bay.
2019	Anchor Environmental Consultants Pty Ltd	Stillbai, South Africa	Doug Jeffery Environmental Consultants	Scientist, report writing Wetland and Stream Assessment for proposed construction of arterial road. Compilation of historic imagery, use of ArcGIS to delineate watershed.
2019	Anchor Environmental Consultants Pty Ltd	Mossel Bay, South Africa	Mossel Bay Municipality	Scientist Estuary survey conducted using track and gill nets, also acted as photographer for fish identification.
2019	Anchor Environmental Consultants Pty Ltd	Maputo, Mozambique	Conseng and JG Afrika (Pty) Ltd, Mozal Aluminium Smelter	Scientist/ Co-author of Report Estuarine impact assessment for the MOZAL Matola River pipeline During field work, collected sediment samples using Van veen grab, deployed SeaBird SeaCAT CTD, skippered boat during bathymetry profiling of the river, and photographed bird populations. Processed low-cost high-resolution

				bathymetry profiles using MATLAB and Garmin's quickdraw contour function.
Apr 2018- Mar 2020	Anchor Environmental Consultants Pty Ltd	Breede River, South Africa	Turnkey Water Solutions, Hessequa Local Municipality	Commercial/ Scientific Diver Performed bi-monthly visits to retrieve in-situ CTD positioned at the outflow of a recently developed solar powered desalination plant. Downloaded data, cleaned sensor and replaced. Also performed SeaBird SeaCAT CTD dips to validate in situ data, as well as water quality, sediment and macrofauna sampling one year after the desalination plant had been operating.
Jan 2018 – Dec 2018 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2018 BENTHIC SAMPLING CAMPAIGN Scientist – work with a team of 9 scientists to collect and preserve grab and sediment samples aboard a survey vessel for 1 month at sea. Deployment of towed Ski-Monkey benthic camera system to assess mining-related impacts on epifaunal communities inhabiting hard substrata and subsequent recovery after mining. Identification of benthic invertebrate macrofauna, statistical analyses and report writing.
2018	Anchor Environmental Consultants Pty Ltd	South Africa, 4 miles offshore Algoa Bay	Mainport Africa	Commercial/ Scientific Diver Diving under the <i>NM Cherry Blossom</i> , collected samples and photographs of biofouling community from locations on NM Cherry Blossom: port side bow; starboard side bow; port bilge keel; starboard bilge keel; port sea chest.
2018 - 2019	Anchor Environmental Consultants Pty Ltd	Saldanha, Cape Town	Saldanha Bay Water Quality Forum Trust (SBWQMFT)	Commercial/ Scientific Diver As part of the annual State of the Bay Monitoring programme in Saldanha Bay, for two weeks in March of 2018 and 2019, worked as a diver to operate a low-pressure compressor vacuum system to collect and sieve sediment samples for identification of benthic invertebrates.
2017-2018	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	De Beers Marine Namibia	Lab work At Anchor Environmental's in house lab, processed sediment samples through sieves and extracting benthic invertebrates for identification and classification.

Seasonally 2014, 2016, 2018	Reef Divers	Nosy Be, Madagascar	Operation Wallacea (UK)	Scientific Diver, Lecturer, Technician Stereo-Video Fish Assemblage Surveying, Coral/ Invert Benthic Line Transect Surveying, Rugosity and Habitat Assessment (3D Modelling).
2016	GEOMAR - Helmholtz- Zentrum für Ozeanforschung Kiel	South Africa (Cape Town) – Brazil (Rio de Janeiro)	FS METEOR CRUISE M124	Onboard Scientist (1 month cruise) Performed a cross-oceanic basin lower atmosphere/upper ocean physical and biogeochemical survey along approximately 30°S in the sparsely sampled South Atlantic Ocean. - Use of Acoustic Doppler Current Profilers, CTDs, uCTD/ RapidCast systems, Multinets (Hydrobios), Sunphotometers (Microtops)
2016-2017	Southern Ocean Carbon and Climate Observatory (SOCCO)	Cape Town, South Africa	CSIR – Cape Town	Remote Sensing Data Analyst, Report Writing, Lead Author Processed data from Waveglider deployments from 2015-2016 (post MSc graduation). Submitted research to American Meteorological Society Journal for Atmospheric and Ocean Technology (AMS JTECH), in final form July 2017, and published online December 2017. “Evaluation of satellite and reanalysis wind products with <i>in situ</i> Wave Glider wind observations in the Southern Ocean”
2015-2016	University of Cape Town	Cape Town, South Africa	University of Cape Town/ CSIR/ Southern Ocean Carbon and Climate Observatory (SOCCO)	MSc Applied Marine Science, Marine Research Institute Student Remote sensing (satellite derived ocean products) validation task with <i>in situ</i> measurements by WaveGlider technology. Application of MATLAB for statistical and data analysis.

PUBLICATION RECORD

Project Reports

Biccard, A, BM Clark and KM Schmidt. 2021. Environmental Mitigation Assessment for Planned High Resolution Geophysical Surveys on the West Greenland Continental Shelf. Report prepared for De Beers Group by Anchor Environmental Consultants (Pty) Ltd. Report no. AEC 1925/1.

Biccard, A., K. Gihwala, B.M. Clark, S. Sedick, C. Swart, E.A. Brown, B.P. Mostert, J. Dawson, S Mtsokoba, A. Makhosonke and K. Schmidt. 2020. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2019 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. AEC 1840.

Turpie, J.K., Letley, G., Schmidt, K., Weiss, J., O'Farrell and Jewitt, D. 2020. Towards a method for accounting for ecosystem services and asset value: Pilot accounts for KwaZulu-Natal, South Africa, 2005-2011. Available at: <https://seea.un.org/content/knowledge-base>

Dawson J, Schmidt KM and B Clark. 2019. Water quality monitoring of the estuarine environment at the reverse osmosis plant on the Breede River Estuary, Witsand, South Africa. Report no. 1831/2 prepared by Anchor Environmental Consultants (Pty) Ltd for Turnkey Water Solutions. Pp 19.

Wright, A.G., Schmidt, K., Mostert, B., Swart, C., Clark, B. 2019. ESTUARINE SPECIALIST REPORT FOR THE MOZAL MATOLA RIVER PIPELINE, MOZAMBIQUE: ESTUARINE IMPACT ASSESSMENT.

Thesis

Schmidt, K.M., S. Swart, C. Reason, and S. Nicholson, 2017: Evaluation of Satellite and Reanalysis Wind Products with In Situ Wave Glider Wind Observations in the Southern Ocean. J. Atmos. Oceanic Technol., 34, 2551–2568, <https://doi.org/10.1175/JTECH-D-17-0079.1>

References available on request

CURRICULUM VITAE

SAFIYYA SEDICK

ACADEMIC QUALIFICATIONS:

MSc Zoology, 2018, Stellenbosch University

BSc (Hons) Biodiversity and Conservation Biology, 2014, University of the Western Cape

BSc Marine Biology & Ocean and Atmospheric Science, 2013, University of Cape Town

Additional Certifications

Marine Mammal Observer - Joint Nature Conservation Committee (JNCC)

Seafarer Medical Certification - South African Maritime Safety Authority (SAMSA)

Personal Survival Techniques - South African Maritime Safety Authority (SAMSA)

Competency in Security Awareness - South African Maritime Safety Authority (SAMSA)

COUNTRY EXPERIENCE: South Africa, Namibia

LANGUAGE PROFICIENCY: English (Excellent), Afrikaans (Good)

POSTAL ADDRESS: 8 Steenberg House, Silverwood Close, Tokai 7945

PHONE: +27-21-7013420

E-MAIL: safiyya@anchorenvironmental.co.za

EMPLOYMENT HISTORY: 2018-present: Consultant (Anchor Environmental Consultants)

2018 : Trainee (International Seabed Authority)

2017-2018: NRF Intern (South African Environmental Observation Network)

SUMMARY PROFILE

Safiyya has degrees in Zoology, Biodiversity & Conservation Biology, Marine Biology and Ocean & Atmospheric Science. She has working experience as a biodiversity expert, conservation biologist and marine invertebrate taxonomist. She is particularly interested in deep sea mining and has worked with organisations such as the International Seabed Authority. Her other interests include conservation planning, climate change and biodiversity. Safiyya has worked on a wide range of projects since she completed her university education in 2018, including the De Beers Marine Namibia Benthic Environmental Monitoring Programme, the State of the Bay Monitoring Programme for the Saldanha Bay Water Quality Forum Trust, the Richards Bay Outfalls Environmental Monitoring Programme, various Environmental Impact Assessment studies and a management plan for the Mhlathuze Estuary.

SKILLS: PRIMER v6 (Plymouth Routines in Multivariate Ecological Research), STATISTICA, SPSS (Statistical Package for Social Sciences), GRADISTAT, ESTIMATE S (Biodiversity Estimation), MEGA v7 (Molecular Evolutionary Genetics Analysis), MS Suite.

SELECT PROJECT EXPERIENCE

Period	Country	Clients	Project, Tasks
2020-Present	South Africa	City of Cape Town	Project Leader Construction of moorings, trace metal analysis and report writing.
2018 - Present	South Africa	De Beers Marine Namibia	Taxonomist De Beers Marine Namibia Environmental Monitoring Programme in the Atlantic 1 Mining License Area: Annual Benthic Sampling Campaign.
2019 - Present	South Africa	Saldanha Bay Water Quality Trust	Taxonomist, field scientist The State of Saldanha Bay and Langebaan Lagoon.
2019 - Present	South Africa	Mhlathuze Water	Taxonomist, toxicity testing Mhlathuze water environmental monitoring programme for the Richards Bay offshore outfalls.
2020 - Present	South Africa	KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs	Stakeholder management & Report writing The development of an Estuary Management plan for the uThongathi Estuary.
2020	South Africa	St. Helena Bay Water Quality Trust	Taxonomist The State of St Helena Bay.
2020	South Africa	City of Cape Town	Taxonomist, field scientist Biodiversity Assessment of select tidal pools in the Cape Town Metropoli
2019	South Africa	Rheinmetall Denel Munition	Taxonomist, field scientist Environmental monitoring and management programme for Rheinmetall Denel Munition Coastal Waters Discharge Permit.
2019 - 2020	South Africa	Department of Agriculture, Forestry and Fisheries (DAFF)	Stakeholder management Algoa Bay Sea-based Aquaculture Development Zone.

PUBLICATION RECORD

Steffani N, **Sedick S**, Rogers J, Gibbons MJ. 2015. Infaunal benthic communities from the inner shelf off Southwestern Africa are characterized by generalist species. PLoS ONE 10 (11):e0143637. doi:10.1371/journal.pone.0143637

Kara J, Simon CA, Clark DM, **Sedick S**. 2021. A checklist of priority species from South Africa with notes on diversity and taxonomic status. In review.

Sedick S, Simon CA. 2019. The description of three new *Syllis* species from the south coast of South Africa. Zootaxa 4688(4): 585-598.

Sedick S, Clark D, Biccard A, Gihwala K. 2021. The description of a new species of Lumbrineridae (Annelida) from southern Namibia. In prep.

Sedick S, Clark D, Gihwala K, Swart C. 2021. The description of a new species of Nereis (Annelida, Nereididae) from the shallow waters of southern Namibia. In prep.

CONSULTING REPORTS

- Sedick S**, Simone L, Hutchings K and Clark BM. 2021. City of Cape Town, Effluent Pipelines Biomonitoring, Field and Data Report no. 1865/4 prepared by Anchor Research & Monitoring (Pty) Ltd. 24pp.
- Sedick S**, K, Hutchings K and Clark BM. 2021. City of Cape Town, Effluent Pipelines Biomonitoring, Annual Report no. 1865/4 prepared by Anchor Research & Monitoring (Pty) Ltd. 36pp.
- Gihwala K, Wright AG, Mostert B, **Sedick S**, Biccard A, Mtsokoba S and K. Hutchings. 2021. PetroSA Vleesbaai Outfall Monitoring Programme: 2020 Survey. Specialist Report no. 1917/1 prepared by Anchor Research and Monitoring (Pty) Ltd for PetroSA. 107 pp.
- Dawson J, **Sedick S**, Hutchings K and Clark BM. 2021. uThongathi Estuary Management Plan Stakeholder Consultation Report. Specialist report no. 1905/10 prepared by Anchor Research & Monitoring (Pty) Ltd for the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA). 140 pp
- Biccard A, Gihwala K, Clark BM, **Sedick S**, Swart C, Brown EA, Mostert BP, Dawson J, Mtsokoba S, Makhosonke A and Schmidt K. 2021. De Beers Marine Namibia Benthic Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2019 Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. AEC 1840/2.
- Swart C, Clark BM and **Sedick S** 2021. Marine Environmental Impact Assessment for the Proposed Pedestrian Path to Connect the Two Parts of the Hermanus Cliff Path Via Poole's Bay, South Africa. Report prepared by Anchor Environmental Consultants (Pty) Ltd for Ecosense Environmental Consultants (Pty) Ltd. 54 pp.
- Gihwala K, Wright AG, Mostert B, **Sedick S**, Biccard A, Mtsokoba S and K. Hutchings .2021.PetroSAVleesbaai Outfall Monitoring Programme: 2020 Survey. Specialist Report no. 1917/1prepared by Anchor Research and Monitoring (Pty) Ltd for PetroSA. 107pp
- Clark BM, Dawson J and **Sedick S**. 2020. The development of an estuary management plan for the uThongathi Estuary. Inception Report no. 1905/1 prepared by Anchor Research & Monitoring (Pty) Ltd for the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs (KZNEDTEA). 19 pp.
- Biccard, A., K. Gihwala, B.M. Clark, **S. Sedick**, E.A. Brown, B.P. Mostert, C. Swart, A. Makhosonke, B. Tshingana, A. Makhosonke and J. Dawson. 2020. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2017 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. AEC 1807.
- Biccard A, Hutchings K, Wright AG, Mostert BM, **Sedick S** and Clark BM. 2020. The State of St Helena Bay 2020. Report No. AEC 1908/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the St Helena Bay Water Quality Trust. 113 pp.

Brown E, **Sedick S**, Hutchings K, Wright AG and Clark BM. 2020. Biodiversity Assessment of select tidal pools in the Cape TOWN Metropole. Specialist Report no. 1902/1 prepared by Anchor Research & Monitoring (Pty) Ltd for City of Cape Town. 43 pp.

Clark BM, Hutchings K, Biccard A, Brown E, Laird M, Gihwala K, Swart C, Makhosonke A, **Sedick S**, Turpie J. and Mostert B. 2020. The State of Saldanha Bay and Langebaan Lagoon 2020, Technical Report. Report No. AEC 1876/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the Saldanha Bay Water Quality Forum Trust, September 2020.

Biccard, A., K. Gihwala, B.M. Clark, E.A. Brown, B.P. Mostert, A. Makhosonke, C. Swart, **S. Sedick**, B. Tshingana and J. Dawson. 2019. De Beers Marine Namibia Environmental Monitoring Programme: Atlantic 1 Mining Licence Area 2017 Benthic Sampling Campaign. Report prepared for De Beers Marine Namibia by Anchor Environmental Consultants (Pty) Ltd. Report no. 1775/1.

Mostert B., **Sedick S.** & B.M. Clark. 2019. Environmental impact and monitoring programme for Rheinmetall Denel Munition Coastal Waters Discharge Permit. Report no. 1852/1 prepared by Anchor Research and Monitoring (Pty) Ltd for Rheinmetall Denel Munition RF (PTY) LTD 54 pp.

Clark B, Massie V, Hutchings K, Biccard A, Brown E, Laird M, Gihwala K, Swart C, Makhosonke A, **Sedick S**, Turpie J & Vermaak N. 2019. The State of Saldanha Bay and Langebaan Lagoon 2019, Technical Report. Report No. AEC 1841/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the Saldanha Bay Water Quality Forum Trust, September 2019.

CONFERENCES & WORKSHOPS

2021 3rd Annual Workshop For The Promotion Of Sustainable Development Of Africas Deep Seabed Resources In Support Of Africas Blues Economy - International Seabed Authority (ISA)

2021 DNA barcoding workshop series: From theory to practice

2019 Workshop For The Promotion Of Sustainable Development Of Africas Deep Seabed Resources In Support Of Africas Blues Economy - International Seabed Authority (ISA)

2015 Zoological Society of Southern Africa (ZSSA)

2014 Southern African Marine Science Symposium

CURRICULUM VITAE

SIMONE DE VILLIERS LOUW

ACADEMIC QUALIFICATIONS:

MTECH Oceanography 2020, Cape Peninsula University of Technology, 2020
B-TECH Oceanography 2018, Cape Peninsula University of Technology, 2018
Diploma in Marine Science 2017, Cape Peninsula University of Technology, 2017

OTHER QUALIFICATIONS:

Medically in date scientific/commercial class IV diver, SSI open water diver, PYA level 2 powerboat licence, and Marine Mammal Observer (JNCC accredited).

COUNTRY EXPERIENCE: South Africa,

LANGUAGE PROFICIENCY: English (Excellent), Afrikaans (Excellent)

POSTAL ADDRESS: 8 Steenberg House, Silverwood Close, Tokai 7945

PHONE: +27-21-7013420

E-MAIL: simone@anchorenvironmental.co.za

EMPLOYMENT HISTORY: 2015-Present: – Lab technician/Researcher (Anchor Environmental Consultants)
2018: Marine Biology tutor, Cape Peninsula University of Technology, Marine Jun
2017: Nov 2017: Internship at the Advanced Adaptronics Manufacturing Technology Department of CPUT (AMTL CPUT)

Simone Louw has a background in oceanography, marine ecology and biology. Her Mtech project focussed on biogeochemical factors influencing sea-algae in the Southern Ocean, Marginal Ice Zone. She has had training and experience in scientific and field-based laboratories which have made her highly competent in phytoplankton taxonomy and biogeochemical seawater analysis. Her other interests include high tiered mesocosm studies, resilience of complex systems, and climate tipping points. Within Anchor, she is as a Laboratory technician and Researcher, responsible for ecotoxicology studies and invertebrate macrofauna identification. She also takes part in water quality field surveys for the State of Saldanha Bay and Langebaan Lagoon, and is a qualified Marine Mammal Observer and commercial diver. Simone also has extensive sea going experience and has participated in several research surveys off the coast of South Africa and in the Southern Ocean on the R/V Dr. Fridtjof Nansen and the R/V SA Agulhas II, respectively.

Period	Country	Clients	Project, Tasks
2019 – 2022 (ongoing)	South Africa	Mhlathuze Water	Marine environmental impact assessment effluent pipelines in Richard's Bay Whole effluent toxicity tests, laboratory work, analysis of data, reporting and management recommendations.
2019 – 2022 (ongoing)	South Africa	Saldanha Bay Water Quality Trust	The State of Saldanha Bay and Langebaan Lagoon Field work: sample collection (fish and macrofauna) Commercial diver, and enumeration of macrofauna samples
2019-2021 (ongoing)	South Africa	City of Cape Town	Biomonitoring programme Analysis and writing of technical progress report.
2021	South Africa		Pearl farm feasibility study Report writing
19/01 – 25/01/2018	South Africa	R/V Dr. Fridtjof Nansen	Collection of water samples whilst underway and CTD casts, subsequent filtering and chlorophyll-a analysis. Phytoplankton identification using inverted light microscope (off board).

01/07 – 12/07/2019	South Africa	R/V SA Agulhas II	SEAmester student. Zooplankton taxonomy, DNA extraction, light microscopy and standard spectrophotometric nutrient analysis.
18/07 – 12/08/2019	South Africa	R/V SA Agulhas II	Collection of water samples form underway and CTD, subsequent filtering, and processing for dissolved oxygen and chlorophyll-a. Phytoplankton identification using inverted light microscope (off board).
11/10 – 21/11/2019	South Africa	R/V SA Agulhas II	Coordinating a team, preparing sampling equipment and documentations, scheduling of meetings, concurrently serving as liaison between international participants. On-board duties included processing of sea ice samples, subsequent filtering, and salinity, dissolved oxygen and chlorophyll-a analysis. Phytoplankton identification using inverted light microscope (off board).

MTEch THESIS

Factors influencing sea-ice algae abundance, community composition, and distribution in the marginal ice zone of the Southern Ocean during winter.

PUBLICATION RECORD — TECHNICAL REPORTS

Sedick S, **Louw S**, Hutchings K and Clark BM. 2021. City of Cape Town, Effluent Pipelines Biomonitoring Field and Data report no. 1865/4 prepared by Anchor Research & Monitoring (Pty), July 2021. 24pp.

Mostert B, **Louw S**, Gihwala K, Hutchings K and Clark BM. 2020. City of Cape Town, Effluent Pipelines Biomonitoring, Field and Data Report no. 1865/3 prepared by Anchor Research & Monitoring (Pty) Ltd, June 2020. 24pp.

Clark B, Hutchings K, Wright AG, Mostert B, Dawson J, **Louw S** & Biccard A. 2021. Mhlathuze Water Environmental Monitoring Programme for the Richards Bay Offshore Outfalls Region 2020/2021 Survey, Technical Report. Report No. 1800/14 prepared by Anchor Research and Monitoring (Pty) Ltd for Mhlathuze Water, January 2021. 256pp.

Louw S., Wright A.G., Hutchings K and Clark B.M. 2021. Marine Environment Impact Assessment for Mhlathuze Water Effluent Pipelines, Richards Bay - Progress Report. Specialist Report no. 1856/09-19 prepared by Anchor Research & Monitoring (Pty) Ltd for Mhlathuze Water, April 2021. 14 pp.

CONFERENCES AND WORKSHOPS

Speaker at the SCALE Symposium, UCT Oceanography Department, South Africa	- 2019
Speaker at the ASCA Symposium, Marine Research Aquarium, South Africa	- 2018

APPENDIX 2: SPECIALIST CV – JOHN GRIBBLE

Name: John Gribble
Profession: Archaeologist
Date of Birth: 15 November 1965
Parent Firm: ACO Associates cc
Position in Firm: Senior Archaeologist
Years with Firm: 4
Years of experience: 30+
Nationality: South African
HDI Status: n/a

Education:

1979-1983 Wynberg Boys' High School (1979-1983)
1986 BA (Archaeology), University of Cape Town
1987 BA (Hons) (Archaeology), University of Cape Town
1990 Master of Arts, (Archaeology) University of Cape Town

Employment:

- ACO Associates, Senior Archaeologist and Consultant, September 2017 – present
- South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit, 2014 – 2017 / Acting Manager: Archaeology, Palaeontology and Meteorites Unit, 2016-2017
- Sea Change Heritage Consultants Limited, Director, 2012 – present
- TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology, 2011-2012
- EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology, 2009-2011
- Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine, 2005-2009
- National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist, 1996-2005
- National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office, 1994-1996

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (No. 043)
- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Member: Chartered Institute for Archaeologists (CIfA), United Kingdom
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:

I have more than 30 years of combined archaeological and heritage management experience. After completing my postgraduate studies, which were focussed on the vernacular architecture of the West Coast, and a period of freelance archaeological work in South Africa and aboard,

I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. As the Heritage Officer: the Boland I was involved in day to day historical building control and heritage resources management across the region. In 1996 I became the NMC's first full-time maritime archaeologist in which role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU Limited, a marine geosurvey company based in Southampton to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy based in Romsey, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I set up Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change provides archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy. It also actively pursues opportunities to raise public awareness and understanding of underwater cultural heritage through educational and research projects and programmes, including some projects being developed in South Africa.

Projects include specialist archaeological consultancy for more than 15 offshore renewable energy projects and more than a dozen offshore aggregate extraction licence areas.

In addition to managing numerous UK development-driven archaeological projects, I have also been involved in important strategic work which developed guidance and best practice for the offshore industry with respect to the marine historic environment. This has included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector, and the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry. In 2013-14 I was lead author and project co-ordinator on the Impact Review for the United Kingdom of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. In 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South African in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was also appointed Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant.

I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and have served as a member of its Bureau since 2009.

I have been a member of the Association of Southern African Professional Archaeologists for more than twenty years and am accredited by ASAPA's CRM section. Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project' and serve on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee.

Books and Publications:

Gribble, J. and Scott, G., 2017, *We Die Like Brothers: The sinking of the SS Mendi*, Historic England, Swindon

Lloyd Jones, D., Langman, R., Reach, I., Gribble, J., and Griffiths, N., 2016, Using Multibeam and Sidescan Sonar to Monitor Aggregate Dredging, in C.W. Finkl and C. Makowski (eds) *Seafloor Mapping along Continental Shelves: Research and Techniques for Visualizing Benthic Environments*, Coastal Research Library 13, Springer International Publishing, Switzerland, pp 245-259.

Athiros, G. and Gribble, J., 2015, *Wrecked at the Cape Part 2*, The Cape Odyssey 105, Historical Media, Cape Town.

Gribble, J. and Sharfman, J., 2015, The wreck of SS Mendi (1917) as an example of the potential trans-national significance of World War I underwater cultural heritage, *Proceedings of the UNESCO Scientific Conference on the Underwater Cultural Heritage from World War I*, Bruges, 26-28 June 2014.

Gribble, J., 2015, Underwater Cultural Heritage and International Law. Cambridge by Sarah Dromgoole, in *South African Archaeological Bulletin*, 70, 202, pp 226-227.

Athiros, G. and Gribble, J., 2014, *Wrecked at the Cape Part 1*, The Cape Odyssey 104, Historical Media, Cape Town.

Gribble, J., 2014, Learning the Hard Way: Two South African Examples of Issues Related to Port Construction and Archaeology, in *Dredging and Port Construction: Interactions with Features of Archaeological or Heritage Interest*, PIANC Guidance Document 124, pp 97-107.

UK UNESCO 2001 Convention Review Group, 2014, *The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001: An Impact Review for the United Kingdom*, ISBN 978-0-904608-03-8.

Sadr, K., Gribble, J. and Euston-Brown, G., 2013, Archaeological survey on the Vredenburg Peninsula, in Jerardino et al. (eds), *The Archaeology of the West Coast of South Africa*, BAR International Series 2526, pp 50-67

Gribble, J. and Sharfman, J., 2013, Maritime Legal Management in South Africa, *Online Encyclopaedia of Global Archaeology*, pp 6802-6810.

Gribble, J., 2011, The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001, *Journal of Maritime Archaeology* 6:1 77-86.

Gribble, J., 2011, The SS Mendi, the Foreign Labour Corps and the trans-national significance of shipwrecks, in J. Henderson (ed.): *Beyond Boundaries, Proceedings of IKUWA 3, The 3rd International Congress on Underwater Archaeology*, Römisch-Germanische Kommission (RGK), Frankfurt.

Gribble, J., 2011, Competence and Qualifications, in Guérin, U., Egger, B. and Maarleveld, T. (eds) *UNESCO Manual for Activities directed at Underwater Cultural Heritage*, UNESCO - Secretariat of the 2001 Convention, Paris.

Gribble, J. and Leather, S. for EMU Ltd., 2010, *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector*. Commissioned by COWRIE Ltd (project reference GEOARCH-09).

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