

# **BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING IN SEA CONCESSION AREA 14C BY TRANS ATLANTIC DIAMONDS (PTY) LTD**

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TRANS ATLANTIC  
DIAMONDS

## **Appendix 6: CVs of Specialists**

Aiden Biccard  
Kevin Schmidt  
Dr Kevin Hutchings  
Safiyya Sedick  
Simone De Villiers Louw  
Dr Adam Rees  
Vanessa Maitland

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:** 36 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, VHF short-range radio operator.

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

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

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

**PHONE:** +27-21-701 3420

**MOBILE:** +27-72-497 1512

**EMAIL:** [Aiden@anchorenvironmental.co.za](mailto:Aiden@anchorenvironmental.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

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### **SUMMARY PROFILE**

Aiden has more than ten years of research and consulting experience in the fields of marine and estuarine research and management, invertebrate systematics and taxonomy, specialist marine impact assessments, hydrocarbon, antifoulant and trace metal pollution and physico-chemical, ecological and biodiversity surveys of marine, estuarine and freshwater benthic habitats, mariculture and various fisheries surveys. He has recently reviewed the barnacle fauna of South Africa and has undertaken the specialist role of invertebrate taxonomist for various local and international clients. Aiden is author of 5 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, Somaliland and Mozambique. Aiden also has more than 15 years working experience as a class IV scientific diver/supervisor and small craft skipper.

## 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
2014-present	De Beers Marine Namibia	Namibia	<p><b>De Beers Marine Namibia Environmental Monitoring Programme in the Atlantic 1 Mining License Area: Annual Benthic Sampling Campaign</b></p> <p>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.</p>
2022	Anglo American/NatureMetrics	Namibia	<p><b>DNA-based sampling (eDNA &amp; metabarcoding) analyses for marine benthic fauna and sediment fauna at the Atlantic 1 marine mining site operated by Debmarine Namibia (DBMN).</b></p> <p>Project Leader – Sampling techniques include the use of a Van Veen grab and various sediment and water quality instruments; collection and preservation of water and sediment eDNA samples; collection, preservation and identification of voucher specimens for metabarcoding.</p>
2022	Transnet National Ports Authority	South Africa	<p><b>Baseline survey marine fauna, flora and antifouling contaminants Port of Durban.</b></p> <p>Invertebrate specialist - collection, preservation and identification of invertebrates. Data analysis and report writing.</p>
2021	WSP/DP World	Somaliland	<p><b>Coral relocation feasibility study as part of the upgrade of Berbera Port, Somaliland</b></p> <p>Marine biologist and scientific diver.</p>
2021	NAMDEB	Namibia	<p><b>NAMDEB's Offshore Environmental Monitoring Programme in the Midwater Mining License Area: Annual Benthic Sampling campaign</b></p> <p>Project leader - 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. Analyse data and prepare report.</p>

2021	South Africa	WWF-South Africa	<b>Environmental Specialist Benthic Monitoring programme for the Saldanha Bay Aquaculture Development Zone.</b>  Invertebrate specialist - collection, preservation and identification of invertebrates.
2020	South Africa	Department of Environment Forestry and Fisheries (DEFF)	<b>Environmental Specialist Monitoring of the Saldanha Bay Aquaculture Development Zone.</b>  Invertebrate specialist, scientific diver.
2019-2020	South African National Parks	South Africa	<b>Subtidal surveys of commercially important and indicator invertebrate and fish species within the Table Mountain Marine Protected Area.</b>  Scientific diver and supervisor.
2014-present	Pisces Environmental	Namibia	<b>Sandy beach macrofauna and sediment quality monitoring programme for the Elizabeth Bay Mining Licence Area, Namibia.</b>  Intertidal rocky shore, sandy beach and subtidal field surveys – data collection, collect and preserve invertebrate samples.
2018	Republic of Congo	The Biodiversity Company, Sintoukola Potash	<b>Oceanographic and benthic surveys and ecotoxicity trials to assess potential impacts of proposed potash processing discharge, jetty construction and transhipment of product.</b>  Invertebrate specialist - collection, preservation and identification of invertebrates.
2012-present	Saldanha Bay Water Quality Forum Trust (SBWQMFT)	South Africa	<b>Annual State of the Bay Monitoring programme (Saldanha and St. Helena Bay).</b>  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	<b>Desktop study of the potential impacts of marine and coastal mining on marine ecosystems and marine biota in South Africa</b>  Project Leader and Principal Author.
2018	Mainport Africa Shipping	South Africa	<b>Assessment of Biofouling Community of the NM Cherry Blossom.</b>  Project Leader – Supervision of team for project execution. Identify benthic invertebrate macrofauna, statistical analyses and writing of report.

2018	Republic of Congo	The Biodiversity Company, Kola Potash	<p><b>Oceanographic and benthic surveys and ecotoxicity trials to assess potential impacts of proposed potash processing discharge, jetty construction and transhipment of product.</b></p> <p>Senior consultant - collect, preserve and identify invertebrate specimens.</p>
2012-present	Umhlatuze Water	South Africa	<p><b>Environmental monitoring of the Richards Bay Pipelines.</b></p> <p>Senior consultant. Invertebrate specialist.</p>
2016-2017	Department of Water and Sanitation	South Africa	<p><b>Classification of and resource quality objectives for the water resources of the Berg and Breede water management areas.</b></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><b>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</b></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><b>Screen monitoring on De Beers Marine Namibia mining vessels in the Atlantic 1 Mining Licence Area: a pilot study.</b></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><b>Marine ecology impact assessment for a proposed beach enhancement initiative at Tinley Manor.</b></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><b>NAMDEB's Offshore Environmental Monitoring Programme in the Midwater Mining License Area: Annual Benthic Sampling campaign</b></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><b>Determination of the Ecological Reserve for the Klein Estuary</b></p> <p>Invertebrate Specialist – collect, preserve and identify invertebrate specimens and assess health of</p>

			the estuary based on results. Present findings at a workshop.
2015	Bergstan South Africa Consulting and Development Engineers	Mozambique	<b>Environmental scoping study for proposed upgrades to the cruise liner landing facilities at Portuguese Island, Mozambique</b>  Project Leader - photographic survey of intertidal and subtidal habitat, data analysis, report write-up.
2015	Pisces Environmental Services	Namibia	<b>Gecko Namibia Vision Industrial Park Development.</b>  Conduct baseline field survey of ichthyofauna using beach seine net.
2014-2016	Transnet National Ports Authority/Nemai Consulting	South Africa	<b>Baseline Environmental Monitoring of Sand Banks in the Port of Durban</b>  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	<b>Marine Ecology Specialist Study and Impact Assessment for Upgrades to Seawater Intake and Transfer Infrastructure at the Tronox Namakwa Sands Mine</b>  Project Leader – photographic survey of rocky shore habitat, data analysis, report write-up.
2014	Coastal & Environmental Services	South Africa	<b>Zirco Roode Heuwel Mine, Northern Cape, South Africa. Marine Specialist Study and Impact Assessment</b>  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	<b>Baseline survey and monitoring plan for abalone ranching concession area NC3</b>  Subtidal ecological survey.
2013	Cape Nature, Department of Environmental Affairs	South Africa	<b>Assessment of impacts of an oil spill on sandy beach and rocky intertidal communities in the Goukamma MPA.</b>  Invertebrate specialist – collect, preserve and identify invertebrates, train interns at DAFF on identification techniques.
2013	Transnet National Ports Authority	South Africa	<b>TNPA Alien Invasive Species Survey (Coega)</b>  Collection, preservation and identification of invertebrates.

2013, 2015-2016	Department of Agriculture, Forestry & Fisheries (DAFF)	South Africa	<b>Diving Surveys of the Eastern Cape Abalone Resource.</b> Subtidal abalone counts (transects) on snorkel
2012	A. R. Brink and Associates	South Africa	<b>Identification and Age Estimation of Fouling Cirripedia Collected from M. V. "DD Vogue"</b>
2012	Department of Agriculture, Forestry & Fisheries (DAFF)	South Africa	<b>Algoa Bay fin fish mariculture (DAFF)</b> 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	<b>Baseline Survey and EIA for Umhlanga Rocks tidal pool.</b> Transect and quadrat sampling of rocky shore habitat.
2012	Henwood & Nxumalo Consulting Engineers	South Africa	<b>Environmental Impact Assessment of Mzinto Bridge Repair.</b> Project Leader - collection, preservation and identification of invertebrates. Statistical analyses and writing of report.
2012	Nemai Consulting	South Africa	<b>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.</b> Research and analysis of data, report writing.
2012	Cape Action Plan for People & the Environment/Cape Nature/Marine & Coastal Management (MCM)	South Africa	<b>Gouritz Estuary Management Plan Review.</b> Review and evaluate proposed EMP according to the National Estuary Management Protocol. Present findings at a workshop.
2012	Pisces Environmental	Namibia	<b>Annual Rocky intertidal and sandy beach biota of Namibia's Pocket Beaches (NAMDEB Diamond Company, Namibia).</b> Field work, statistical analyses and report writing.
2012	Pisces Environmental	Namibia	<b>Scientific Diver and Supervisor for Bogenfels subtidal reef survey (NAMDEB Diamond Company, Namibia).</b> Field work (identify and quantify subtidal reef species).
2012	Cape Action Plan for People & the Environment/Cape Nature/Marine & Coastal Management (MCM)	South Africa	<b>Rapid determination of the Environmental Water Requirements for the Uilkraals Estuary.</b> Identify invertebrate specimens and assess health of the estuary based on results. Present findings at a workshop.

Feb 2012	Various companies	South Africa	<p><b>Marine specialist report and impact assessment for the reverse osmosis plant at Plettenberg Bay.</b></p> <p>Fish counts on SCUBA. Collection, preservation and identification of invertebrates. Statistical analyses and writing of report.</p>
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## PUBLICATION RECORD

### Scientific papers

Pfaff MC, Biccard A, Mvula PE, Olbers J, Mushanganyisi K, Macdonald A, Samaai T. (2022). Giants and titans: first records of the invasive acorn barnacles *Megabalanus tintinnabulum* (Linnaeus, 1758) and *Megabalanus coccopoma* (Darwin, 1854) on intertidal rocky shores of South Africa. *BioInvasions Records* 11 (in press).

Sedick S, Clarke D, Biccard A, Gihwala KA. (2022). A new species of Ninoe (Annelida: Lumbrineridae) from the continental shelf off southern Namibia. *Journal of the Marine Biological Association of the United Kingdom* (paper accepted February 2022).

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

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.

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

### 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, C. Swart, E.A. Brown, B.P. Mostert, J. Dawson, S Mtsokoba, A. Makhosonke and K. Schmidt. 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

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: Page 7 of 9



- 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, Turpie J, Dawson J, Gihwala K, Swart C, Sedick S, Wright A, Schmidt K, Weiss J, Makhosonke A, Mostert B, Brown E, Laird M, Conrad J, Parker A, Holloway M and Blecher I. 2021. The State of Saldanha Bay and Langebaan Lagoon 2021, Technical Report. Report No. AEC 1936/1 prepared by Anchor Environmental Consultants (Pty) Ltd for the Saldanha Bay Water Quality Forum Trust, October 2021.
- 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.
- Huthings, 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

### **KENNETH HUTCHINGS**

Born: 15 June 1972, South Africa  
Nationality: South African  
Languages: English excellent/Afrikaans good/ Xhosa fair  
Present occupation: Principal Consultant  
Work address: 8, Steenberg House, Silverwood Close, Tokai 7945 South Africa  
Drivers licence: Code 08, 30/07/1990  
Commercial dive qualifications: Class III scientific, Supervisor  
Commercial skippers ticket: Category B (< 9m, 40 NM, dive & night operations)  
Email: ken@anchorenvironmental.co.za

#### **SUMMARY PROFILE**

Dr Hutchings has more than 25 years of research and consulting experience in the fields of fisheries management, mariculture, estuarine research and management, marine and estuarine spatial planning, marine impact assessment, research and conservation strategy development, fishery socio-economic surveys and analyses, biological sampling and life-history analyses of fish (age and growth, reproduction, mortality, migration, diet, ecology), taxonomic methodology, population genetics, fisheries modelling, marine ecotoxicity trials, trace metal pollution and physico-chemical, ecological and biodiversity surveys of marine, estuarine and freshwater habitats. Dr Hutchings is experienced in developing estuarine and coastal management plans and in conducting public participation processes. Dr Hutchings is a research associate of the University of Cape Town's Marine Research Institute. He has excellent verbal and writing communication skills, is competent with most software packages used in scientific research and consulting projects. He has published 19 scientific papers and compiled more than 100 consulting reports. Dr Hutchings is comfortable working as part of a team in both a leadership and mentoring position or as a team member. Dr Hutchings has participated in international collaborative studies in Angola, Tanzania, Namibia, Sierra Leone, Republic of Congo, Somaliland and Mauritius. He has practical experience in several fishing sectors and has good understanding of most commercial fishing methods (hand, line, spear, pole, gill net, trammel, net, beach seine net, trap, longline, trawl and purse-seine). He has personally collected scientific data for the demersal trawl and longline hake fisheries, designed, implemented and managed fishery observer training programmes for line, longline, lobster trap and demersal trawl fisheries. He has project managed and completed two, three-year contract research projects for the South African

Department of Environmental Affairs and Tourism (Marine and Coastal Management) and numerous consulting projects for state and private sector clients.

#### **TERTIARY EDUCATION:**

PhD Zoology – Fish taxonomy, life history, ecology and management, UCT (2005)

M.Sc. Zoology (with distinction) – Fisheries management, UCT (2000)

B.Sc. (Honours - First Class) Marine Biology, UCT (1997)

B.Sc. Zoology & Environmental and Geographical Science, University of Cape Town (1994)

Distinction in Zoology

#### **RELEVANT WORK AND PROJECT EXPERIENCE**

- Principal Consultant, Anchor Environmental Consultants (1999-2022)
- PhD student, Line-fish research (under contract to MCM) (2001-2005)
- Research officer, Zoology Department, University of Cape Town (1998-2000)
- Demersal Trawl Fishery, scientific observer, University of Cape Town (1995)
- Commercial squid (freezer vessel), line-fish crew (deck boat), ski boat crew/skipper, Beach-seine fishing crew, boat-skipper, shore skipper, B & K fishing CC. Messrs. G. William, M. Johnson & B. Docke (1986-2006)

#### **MEMBERSHIP OF PROFESSIONAL BODIES/ORGANISATIONS**

- Professional Natural Scientist, the South African Council for Natural Scientific Professions (2014-present)
- Research Associate Marine Research Institute, Department of Biological Science, University of Cape Town (2006-present)
- Associate Technical Consultant, Marine Stewardship Council (2019-present)
- Linefish Scientific Working Group (1999-2001)

## SCIENTIFIC PUBLICATIONS

- ASCHE F, GARLOCK TM, AKPALU W, AMAECHINA EB, BOTTA R, CHUKWUONE NA, EGGERT H, HUTCHINGS K, LOKINA R, TIBESIGWA B & J K TURPIE 2020. Fisheries performance in Africa: An analysis based on data from 14 countries. *Marine Policy*, in press.
- HORTON M, KERWATH S, PARKER D, WINKER H, LAMBERTH S, & K. HUTCHINGS 2019 Age, growth and per-recruit stock-assessment of *Chelon richardsonii* in Saldanha Bay and Langebaan Lagoon, South Africa. *African Journal of Marine Science*, 41: 313-324
- PARKER D, SE KERWATH, TF NÆSJE, CJ ARENDSE, FJ KEULDER-STENEVIK, K HUTCHINGS, BM CLARK, H WINKER, PD COWLEY & CG ATTWOOD 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
- HUTCHINGS, K & C.G ATTWOOD 2013 Belman (*Umbrina robinsoni*) In: Mann BQ. (Ed). Southern African Marine Linefish Species Profiles. Special publication, Oceanographic Research Institute, Durban 9:165-166.
- HUTCHINGS, K. and M. H. GRIFFITHS 2010 - Life-history strategies of *Umbrina robinsoni* (Sciaenidae) in warm-temperate and sub-tropical South African marine reserves *African Journal of Marine Science* **32(1)**:37-53
- HUTCHINGS, K. and M. H. GRIFFITHS 2010 – Assessment of South African *Umbrina robinsoni* based on per-recruit models *African Journal of Marine Science* **32(3)**: 511–523
- HUTCHINGS, K. GRIFFITHS M. H. and S.J LAMBERTH 2010 - An investigation of the effect of temporal variation in growth rate of *Umbrina robinsoni* on biological reference point estimates calculated using per-recruit models. *African Journal of Marine Science* **32(3)**: 633–636
- CLARK, B.M., HUTCHINGS, K., and S.J. LAMBERTH 2009. Long-term variations in the composition and abundance of fish in the Berg estuary, South Africa. *Transactions of the Royal Society of south Africa* **64(2)**: 238-258
- LAMBERTH, S.J., VAN NIEKERK, L and K HUTCHINGS 2008 Comparison of, and the effects of altered freshwater inflow on, fish assemblages of two contrasting South African estuaries: the cool-temperate Olifants and the warm-temperate Breede. *African Journal of Marine Science* **30(2)**: 311–336.
- HUTCHINGS, K., CLARK, B.M., ATKINSON, L.J. and C. G. ATTWOOD 2008 - Evidence of recovery of the linefishery in the Berg River Estuary (Western Cape, South Africa) subsequent to closure of commercial gill netting. *African Journal of Marine Science*. **30(3)**: 507–517.

- HUTCHINGS, K., GRIFFITHS, M. H. and J. G. FIELD 2006 – Regional variation in the life history of the canary drum *Umbrina canariensis* (Sciaenidae), in South African waters. *Fisheries Research* **77**:312-325.
- GRIFFITHS, C. L., VAN SITTERT, L., BEST, P. B., BROWN, A. C., CLARK, B. M., COOK, P. A., CRAWFORD, R. J. M., DAVID, J. H. M., DAVIES, B. R., GRIFFITHS, M. H., HUTCHINGS, K., JERARDINO, A., KRUGER, N., LAMBERTH, S., LESLIE, R. W., MELVILLE-SMITH, R., TARR, R. and C. D. VAN DER LINGEN 2004 – Impacts of human activities on marine animal life in the Benguela: A historical overview. *Oceanogr. Mar. Biol. Ann. Rev.* **42**: 303-392.
- HUTCHINGS, K. and M. H. GRIFFITHS 2005 - Identity and distribution of southern African sciaenid fish species of the genus *Umbrina*. *African Journal of Marine Science* **27**(1): 1-22.
- HUTCHINGS, K. and S. J. LAMBERTH 2003 - The likely impacts of an eastward expansion of the gill-net fishery in the Western Cape, South Africa; Implications for Management. *Maine and Freshwater Research* **54**: 39-56.
- HUTCHINGS, K. and S. J. LAMBERTH 2002 – Catch and effort estimates for the gill and beach-seine net fisheries in the Western Cape, South Africa. *S. Afr. J. mar. Sci.* **24**: 205-225
- HUTCHINGS, K. and S. J. LAMBERTH 2002 - By-catch in the gill and beach-seine net fisheries in the Western Cape, South Africa, with implications for management. *S. Afr. J. mar. Sci.* **24**: 227-241
- HUTCHINGS, K., LAMBERTH, S. J. and J. K. TURPIE 2002 – Socio-economic characteristics of gill and beach-seine net fishers in the Western Cape, South Africa. *S. Afr. J. mar. Sci.* **24**: 243-262
- VAN TETS, I. G., HUTCHINGS, K. and S.W. NICHOLSON 2000 – Relative merits of using purified proteins and natural foods in studies of wildlife nutrition: the nitrogen requirements of a rodent pollinator. *African Zoology* **35**(2): 207-215.
- HUTCHINGS, K., LAMBERTH, S. J. and C. L. GRIFFITHS 1999 – Gill nets and line-fish, what is the catch? *SANCOR Occasional Report* **5**: 77-84

**PROJECT EXPERIENCE**

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
<b>2022</b>	<b>South Africa</b>	<b>Transnet National Ports Authority</b>	Baseline survey marine fauna, flora and antifouling contaminants Port of Durban. Principal consultant responsible for project management and implementation.
<b>2021-2022</b>	<b>South Africa</b>	<b>Diamond Coast Abalone</b>	Environmental Monitoring and stock assessment for abalone ranching concession Area NC4, Northern Cape. Principal consultant responsible for project management and implementation.
<b>2021-2022</b>	<b>South Africa</b>	<b>Department of Forestry, Fisheries and Environment (DFFE).</b>	Specialist monitoring programme and management recommendations for the Saldanha Bay Aquaculture Development Zone. Principal consultant responsible for project management and implementation.
<b>2021-2022</b>	<b>South Africa</b>	<b>Department of Forestry, Fisheries and Environment (DFFE).</b>	Review of independent stock assessment abalone ranching concession area EC1. Principal consultant responsible for review of stock assessment report, diving verification surveys and recommendations for sustainable future harvest quantities.
<b>2021-2022</b>	<b>South Africa</b>	<b>Trans Atlantic Diamonds</b>	Marine Specialist Studies and Basic Assessment Processes for offshore concession Areas 14A and 11C. Principal Consultant responsible for marine specialist reporting, basic assessment report review and oversight (EAP).
<b>2021</b>	<b>South Africa</b>	<b>Nsovo Environmental Consulting</b>	Marine ecology impact assessment for proposed DNG Energy (Pty) Ltd Busisiwe (Coega 1) and Cheyeza (Coega 2) Gas to Power facilities and associated infrastructure. Principal Consultant responsible for project review.
<b>2021</b>	<b>South Africa</b>	<b>V&amp;A Waterfront, Cape Town</b>	Marine specialist study and dispersion modelling for the East Pier District cooling plant outfall at the V&A Waterfront. Principal Consultant responsible for project review.
<b>2021</b>	<b>South Africa</b>	<b>Allan Gray (Pty) Ltd</b>	Effluent Quality Audit of the Awarded Coastal Waters Discharge Permit (2013/002/WC/VICTORIA & ALFRED) for the seawater cooling system and desalination plant at No. 1 Silo Square, V&A Waterfront. Principal Consultant responsible for project review.
<b>2021</b>	<b>South Africa</b>	<b>Guillaume Nel Environmental</b>	Estuarine constraints analysis for the proposed development on the remaining

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
		<b>Consultants</b>	extent 37 of farm 23 (Uitkomst), Paternoster. Principal Consultant responsible for project review and oversight.
<b>2021</b>	<b>South Africa</b>	<b>Habitat Link Consulting.</b>	Marina Martinique pipeline repair and maintenance. Marine Specialist Report: Assessment of impacts on intertidal and sub-tidal environment. Principal Consultant responsible for project review and oversight.
<b>2021</b>	<b>South Africa</b>	<b>Nomalungelo Faku</b>	Feasibility study for a pearl farm in the greater Nelson Mandela Metropolitan Area. Principal consultant responsible for project design, review and oversight.
<b>2021</b>	<b>Somalia</b>	<b>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (Kenya)</b>	Training on data and introduction to electronic data collection for fishery data collection officers at MoFMR, Kismayo. International fisheries expert responsible for project implementation.
<b>2021</b>	<b>South Africa</b>	<b>Guillaume Nel Environmental Consultants</b>	Estuarine Impact Assessment for Development of Erf 222 and 223, Weir Road, Milnerton. Principal consultant responsible for project review and oversight.
<b>2021</b>	<b>South Africa</b>	<b>PHS Consulting</b>	Marine specialist study and dispersion modelling for the proposed expansion of the West Point fish meal processing plant, St Helena Bay. Principal consultant responsible for project review and oversight.
<b>2021</b>	<b>South Africa</b>	<b>WWF-South Africa</b>	Environmental Specialist Benthic Monitoring programme for the Saldanha Bay Aquaculture Development Zone. Principal consultant responsible for project review and oversight.
<b>2021-2022</b>	<b>South Africa</b>	<b>Sea Harvest Corporation</b>	Coastal waters discharge permit Environmental monitoring. Principal consultant responsible for project review and oversight.
<b>2020-2021</b>	<b>South Africa</b>	<b>EDTEA KZN</b>	Development of an Estuary Management Plan for the Uthongathi Estuary, KzwaZulu-Natal. Project review.
<b>2020-2021</b>	<b>Sierra Leone</b>	<b>Iluka/Sierra Rutile/Digby Wells</b>	Environmental, Safety and Health Impact Assessment (ESHIA) review for mining of the Sembehun group of deposits in the Southern Province of Sierra Leone. Estuarine specialist.
<b>2020</b>	<b>South Africa</b>	<b>Western Cape Government</b>	Value of the Berg Estuary and Importance of Management Interventions. Biodiversity team leader and fisheries expert



<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
			responsible for research and reporting.
<b>2020-2021</b>	<b>South Africa</b>	<b>City of Cape Town Metropolitan</b>	Effluent Pipelines Biomonitoring Principal consultant responsible for project review and oversight.
<b>2020</b>	<b>South Africa</b>	<b>Department of Environment Forestry and Fisheries (DEFF)</b>	Fishery Independent Abalone Surveys. Principal consultant responsible for project implementation and oversight.
<b>2020</b>	<b>South Africa</b>	<b>Department of Environment Forestry and Fisheries (DEFF)</b>	Environmental Specialist Monitoring of the Saldanha Bay Aquaculture Development Zone. Principal consultant responsible for project review and oversight.
<b>2019</b>	<b>Mauritius</b>	<b>International Ocean Institute – African Region.</b>	Biofouling project in Port Louis harbour, Mauritius Phase III – dispersion modelling, BDI determination and sediment contamination. Principal consultant responsible for project review and oversight.
<b>2019</b>	<b>South Africa</b>	<b>Environment for Development Initiative, University of Gothenberg</b>	Completion of Fishery Performance Indicators (see Anderson et al 2015) for South African small pelagic, hake deep-sea trawl, west coast rock lobster and hake longline sectors. Principal consultant who undertook the research, consultation with industry completion of FPI spreadsheets and summary profiles.
<b>2019</b>	<b>South Africa</b>	<b>Doringbaai Abalone</b>	Risk and environmental assessment and public participation process to support a Phase 2 application to undertake abalone ranching. Project leader.
<b>2019-2020</b>	<b>South Africa</b>	<b>South African National Parks</b>	Subtidal surveys of commercially important and indicator invertebrate and fish species within the Table Mountain Marine Protected Area. Project leader.
<b>2019</b>	<b>Mozambique</b>	<b>Golder Mozambique/ Sasol Petroleum Mozambique Exploration Limitada</b>	Marine specialist impact assessment for proposed offshore explorations in shallow water portions of blocks 16 & 19, Inhambane and Sofala provinces, Mozambique. Project leader responsible for study design, implementation and reporting.
<b>2018-2019</b>	<b>Namibia</b>	<b>Namibian DeBeers</b>	Sandy beach, rocky intertidal and subtidal monitoring programme. Studies on the effects of mining activities and mitigation measures to avoid or minimise impacts on the affected environment. Sandy beach team leader, survey design, implementation, analysis and reporting.
<b>2018-2020</b>	<b>South Africa</b>	<b>Umhlathuze Water</b>	Environmental monitoring of the Richards Bay Pipelines. Project leader, physical oceanography and fish specialist.

Period	Country	Client	Project, Tasks
2018-2019	South Africa	Department of Agriculture, Forestry and Fisheries	Marine specialist impact assessment study for the declaration of proposed bivalve and finfish aquaculture development zones in Algoa Bay. Principal consultant responsible for marine ecological assessment, review of EIA, public presentation and stakeholder engagement.
2018	South Africa	Diamond Coast Aquaculture	Basic Assessment Process for proposed upgrades to the diamond coast aquaculture facility Kleinzee, northern cape
2018	South Africa	Port Nolloth Sea Farms Ranching (Pty) Ltd	Basic Assessment process for a proposed abalone holding and processing facility.
2018	Somaliland	WSP, DP World	Marine and coastal specialist Environmental, Health and Social Impact Assessment for proposed Berbera Port expansion.
2018	Namibia	Ministry of Mines and Energy	Marine benthic baseline study of intertidal and subtidal habitats in vicinity of new oil and gas terminal. Fish, sandy beach invertebrate and sea bird specialist.
2018	Republic of Congo	The Biodiversity Company, Kola Potash	Oceanographic and benthic surveys and ecotoxicity trials to assess potential impacts of proposed potash processing discharge, jetty construction and transshipment of product. Project leader.
2017	South Africa	Viking Fishing Group	Socio-economic assessment of a 60% reduction in Viking Fishing Group's allocation in the inshore demersal trawl fishery. Fisheries expert responsible for project supervision and review.
2017-2018	Sierra Leone	Sierra Rutile PTY Ltd	Fish and fisheries expert assess downstream impacts of rutile mining operation on downstream estuarine and marine habitats.
2017	South Africa	Southern Cross Salmon Pty Ltd.	On-site oceanographic monitoring and environmental impact assessment for proposed salmon sea cage farm, Saldanha Bay
2017, 2021	South Africa	National Nuclear Regulator	Marine and fisheries expert review of Thyspunt site safety report submitted by Eskom.
2016-2017	South Africa	Royal Society for the Protection of Birds	Design and conduct a feeding trial experiment to assess the uptake of the rodenticide brodifacoum by Tristan Rock lobsters <i>Jasus paulensis</i> . Principal consultant responsible for all aspects of the study, including permitting, experimental design and setup, data analysis and reporting.

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
<b>2016-2017</b>	<b>South Africa</b>	<b>Department of Water and Sanitation</b>	Classification of and resource quality objectives for the water resources of the Berg and Breede water management areas. Senior consultant responsible for status quo descriptions of estuaries in the two study areas and fish specialist for ecological reserve determination studies on nine estuaries.
<b>2016</b>	<b>South Africa</b>	<b>WorleyParsons RSA (Pty) Ltd and Oiltanking MOGS (Pty)</b>	Marine Impact Assessment for sea water intake and discharge facility at Saldanha Bay. Senior consultant responsible for report.
<b>2016</b>	<b>South Africa</b>	<b>MOGS (Pty) Ltd</b>	Marine baseline report for import facility for natural gas in Saldanha Bay.
<b>2016</b>	<b>South Africa</b>	<b>Port Owen Marina Authority</b>	ADCP measurement and analysis of current velocity in relation to tidal phase in the Berg River Estuary. Development of a timetable for disposal of dredge spoil that is compliant with conditions stipulated in the environmental authorization. Senior consultant responsible for survey and reporting.
<b>2016-2020</b>	<b>South Africa</b>	<b>DeBeers Marine Namibia</b>	Collaboration on survey design and statistical analysis of data collected as part of a long-term benthic monitoring programme. Scientific review of reporting.
<b>2016</b>	<b>South Africa</b>	<b>SE Solutions (Pty) Ltd and South32 Aluminium SA Limited</b>	Prepare marine and estuarine specialist study for EIA for a desalination plant in Richards Bay to supply Hillside Aluminium with process water. Study leader, field investigation and report compilation.
<b>2016</b>	<b>South Africa</b>	<b>City of Cape Town</b>	Preparation of estuary maintenance plan impact assessment reports for eight estuaries within the megacity boundaries. Study leader undertook site visits, liaised with city staff and compiled reports.
<b>2016</b>	<b>South Africa</b>	<b>Atlantic Salmon Pty Ltd.</b>	Deploy and retrieve an acoustic Doppler current profiler to measure currents at a proposed salmon farm site in St Helena Bay. Analyse and present data.
<b>2015-2016</b>	<b>South Africa</b>	<b>Mossel Bay Municipality</b>	Preparation an estuary management plan for the Hartenbos Estuary. Supervisory role in development of plans, presentation and chairing of public meeting.
<b>2014-2016</b>	<b>South Africa</b>	<b>Transnet National Ports Authority</b>	Field survey team leader for the implementation of a water, sediment quality and biological monitoring programme in the Port of Durban. Supervision of analysis and reporting.
<b>2014-</b>	<b>South Africa</b>	<b>Coega Development</b>	Assessment of impacts of wastewater

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
<b>2016</b>		<b>Corporation</b>	discharge from Coega Industrial Development Zone, Algoa Bay. Conduct oceanographic data analysis, marine and marine baseline study.
<b>2014-2016</b>	<b>South Africa</b>	<b>Nelson Mandela Bay Metro, GIBB</b>	Assessment of impacts of wastewater discharge from a new WWTW at Cape Recife, Algoa Bay. Oceanographic, bathymetry and ecological survey team leader, data analysis and reporting.
<b>2006-2021</b>	<b>Namibia</b>	<b>NamDeb Namibia</b>	Sandy beach macrofauna and sediment quality monitoring programme for the Bogenfels and MA1 Mining Licence Areas, Namibia. Studies reported on the effects of mining activities and mitigation measures to avoid or minimise impacts on the affected environment. Sandy beach team leader, survey design, implementation, analysis and reporting.
<b>2015</b>	<b>South Africa</b>	<b>NWJ Environmental</b>	Impact assessment for a proposed sand mining operation on the Umzumbe Estuary, KwaZulu-Natal. Ecological and physico-chemical estuarine survey design, implementation and reporting.
<b>2015</b>	<b>South Africa</b>	<b>Marutleng SHE Services</b>	Marine Impact Assessment Simonstown-Glencairn Railway Rehabilitation and Maintenance Work. Sandy beach and rocky shore survey design, implementation and reporting.
<b>2015</b>	<b>South Africa</b>	<b>AquaTech</b>	Risk assessment for in-water hull cleaning operations in the Port of Durban, South Africa. Contribution to methodology, supervision of sampling protocol, review of report.
<b>2015</b>	<b>Namibia</b>	<b>Pisces Environmental Services</b>	Gecko Namibia Vision Industrial Park Development. Compilation of baseline field survey ichthyofauna report.
<b>2014-2015</b>	<b>South Africa</b>	<b>South African Pelagic Fishing Industry Association</b>	Assessment of the socio-economic impacts of a reduction in the sardine minimum Total Allowable Catch (TAC). Project leader responsible for design, data collection by means of interviews with industry and fishery scientists, socio-economic analysis and reporting.
<b>2014</b>	<b>South Africa</b>	<b>Molapong Aquaculture</b>	Risk Assessment for culture of King and Coho salmon in South Africa. Reporting and review.
<b>2014</b>	<b>South Africa</b>	<b>Transnet National Ports Authority</b>	Assessment of potential impacts of the proposed Durban Dig Out Port of the annual sardine migration up the East coast of South Africa. Research and reporting.

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
<b>2014</b>	<b>South Africa</b>	<b>WWF-SA</b>	Assist with the development of a Fisheries Improvement Project for Small Scale Fisheries in the Kogelberg. Undertaking fisheries assessments using the Marine Stewardship Council benchmarking tool, workshops and reporting.
<b>2014</b>	<b>South Africa</b>	<b>Tronnox Namaqua Sands, Matzikamma Municipality, SRK</b>	Environmental impact assessment for an aquaculture facility at Doringbaai, Northern Cape. Assessment of sites for intake and discharge infrastructure and potential environmental impacts of proposed abalone and finfish aquaculture discharges on the marine environment.
<b>2014</b>	<b>South Africa</b>	<b>Cape Nature</b>	Rezoning and realignment of borders for Betty's Bay, Goukamma and Robberg marine protected areas in South Africa. Fisheries impacts, advice and review.
<b>2014-2017 2019 2020</b>	<b>South Africa</b>	<b>Port Nolloth Sea Farms Ranching (PTY) LTD. Diamond Coast Aquaculture. Diamond Coast Abalone</b>	Baseline survey and monitoring for abalone ranching concession areas NC2, NC3 and NC4. Team leader responsible for sub tidal ecological survey design, implementation and reporting.
<b>2013-2014</b>	<b>South Africa</b>	<b>iSimangaliso Wetland Park Authority</b>	Assessment of the hydrological, hydrodynamic and ecological functioning of the Lake St Lucia Estuarine System and formulation of recommendations for rehabilitation and improved management of the system. Responsible for an assessment of marine fishery impacts under past, present and future management scenarios.
<b>2013</b>	<b>South Africa</b>	<b>Cape Nature, Department of Environmental Affairs</b>	Assessment of impacts of an oil spill on sandy beach and rocky intertidal communities in the Goukamma MPA. Project leader responsible for field survey design and implementation.
<b>2013</b>	<b>South Africa</b>	<b>Department of Agriculture, Forestry &amp; Fisheries (DAFF)</b>	Development of a Strategy for Research in the Fisheries Sector. Principal consultant responsible for consultation, data acquisition and reporting.
<b>2013</b>	<b>South Africa</b>	<b>Transnet National Ports Authority</b>	Marine specialist study as part of an EIA for upgrading the General Maintenance Quay (GMQ) in the Port of Saldanha Bay. Field survey leader.
<b>2013</b>	<b>South Africa</b>	<b>Sea Harvest</b>	Assessment of fish factory effluent water quality. Sampling, analysis and reporting.
<b>2013, 2015-2016</b>	<b>South Africa</b>	<b>Department of Agriculture, Forestry &amp; Fisheries (DAFF)</b>	Diving Surveys of the Eastern Cape Abalone Resource. Study leader responsible for planning, implementation and reporting.

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
<b>2012</b>	<b>South Africa</b>	<b>South African National Parks</b>	Fisheries consultant for a study of the potential impacts of the Addo Elephant National Park Marine Protected Area on commercial fisheries and their value. Tasks included collection of data by means of interviews with fishing industry representatives and government scientists, data analysis and reporting.
<b>2012</b>	<b>Mauritius</b>	<b>Mauritius Oceanography Institute</b>	Diving team leader for alien species, and water and sediment quality assessment of Port Louis, Mauritius.
<b>2012</b>	<b>South Africa</b>	<b>Transnet National Ports Authority</b>	Marine specialist appointed to assess potential impacts of iron ore oxide (Fe <sub>2</sub> O <sub>3</sub> ) on the marine flora and fauna of Saldanha Bay. Analysis of storm water runoff.
<b>2012</b>	<b>South Africa</b>	<b>Amathole Water Board</b>	Marine specialist appointed to assess the suitability of different sites and the impacts of reverse osmosis desalination plant discharge on the marine environment.
<b>2010-2013</b>	<b>South Africa</b>	<b>Department of Agriculture, Forestry &amp; Fisheries (DAFF)</b>	Principal consultant as marine ecology and aquaculture specialist on an EIA for four Marine Aquaculture Development Zones (MADZs) in the Eastern Cape, South Africa. Project tasks included reviewing available technology and its suitability for use at each of the selected sites, identifying key risks and impacts that could arise from the culture of selected species on the sites including impacts on existing beneficial uses, and developing an Environmental Management and Monitoring Plan for each site as a whole as well as individual concession areas within each site.
<b>2011</b>	<b>South Africa</b>	<b>Department of Agriculture, Forestry &amp; Fisheries (DAFF)</b>	Principal consultant on a Strategic Environmental Assessment (SEA) to identify potential sea-based finfish aquaculture development zones (ADZ) off the South African coastline. The study entailed identifying and applying a suite of quantitative site selection criteria in a geographical information system (GIS) framework to identify suitable sites for sea based finfish culture in South Africa, taking account of environmental suitability, environmental sensitivity, and user conflict considerations.
<b>2011</b>	<b>South Africa</b>	<b>Element Consulting Engineers</b>	Marine specialist baseline report for a reverse osmosis desalination plant at Lamberts Bay. Responsible for sub-tidal ecological survey design, implementation,

Period	Country	Client	Project, Tasks
			analysis and reporting.
2011	South Africa	Really Useful Investments no 72 (PTY) LTD	Environmental assessment for the abalone ( <i>Haliotis midae</i> ) ranching right application (phase 2) in the Northern Cape (area NC2). Desktop research and reporting.
2011	South Africa	Council for Scientific and Industrial Research (CSIR)	Benthic macrofauna and fish baseline survey for a reverse osmosis desalination plant at Saldanha. Survey team leader responsible for design, implementation analysis and reporting.
2010	South Africa	Department of Environmental Affairs & Development Planning, Western Cape Government	Assessment of the effects of heavy metal accumulation from land based sources on the Diep River Estuary. Principal consultant on a study assessing trace metal pollution in the Diep estuary in the City of Cape Town, to investigate potential sources of pollution and to prepare management recommendations for addressing principal sources of pollution.
2010	South Africa	Port Owen Marina Authority	Assessment of Port Owen marina dredging activities on the Berg River estuarine fish and macrobenthos communities. Senior consultant responsible for survey and reporting.
2010	South Africa	Chand Environmental	Marine and coastal specialist appointed to assess the status and sensitivity of the coastal marine environment off Partridge Point on the Cape Peninsula, and likely impacts that would arise from development of the site.
2009-2019	South Africa	Various companies	Consultant on a series of environmental impact assessments for desalination plants at Sedgefield, Plettenberg Bay, Witsands, Saldanha Bay, Mossel Bay and Port Nolloth, and Cape Town. (7 separate appointments).
2009-2011	South Africa	Cape Action Plan for People & the Environment (C.A.P.E.)/Cape Nature/Marine & Coastal Management (MCM)	Consultant appointed to develop a management plans for the Olifants, Berg, and Uilkraals Estuaries, South Africa. (Three separate appointments). Projects entailed preparing situation assessments and strategic management plans for the Olifants, Berg and Uilkraals estuaries that included recommendations for establishment of a new marine protected area, terrestrial protected area, zonation plans for each of these elements, visitor management plans, and recommendations for institutional development. Consultant appointed for the implementation of the

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project, Tasks</b>
			Verloerenvlei estuary management plan. All projects included presentation of plans and consultation with stakeholder leading to the establishment of estuary management forums comprising management agency representatives and local stakeholders.
<b>2009-2011</b>	<b>South Africa</b>	<b>WWF-SA, Lotto Programme</b>	Scientific advisor on a shore-based fisheries monitoring programme coordinating a team of 20 fisheries monitors at six sites on the South and East coasts of South Africa. Tasks included on-going training, quality control and report reviews.
<b>2009-2010</b>	<b>South Africa</b>	<b>WWF-SA/Cape Action for People and the Environment (C.A.P.E.)</b>	Fisheries consultant for the preparation of marine and coastal spatial plans and socio-economic assessments for the Kogelberg Biosphere Reserve and Garden Route Initiative. The project involved mapping biodiversity pattern and processes in the marine and coastal environment, spatial mapping of economic value, good and services, and of threats to these ecosystems.
<b>2009</b>	<b>South Africa</b>	<b>West Coast District Municipality, Jeffares &amp; Green (Pty) Ltd</b>	Principal consultant on an assessment of the Jakkalsvlei estuary, the purpose of which was to describe and assess the ecological impacts of illegal excavation and infilling activities that took place during July 2008, and to draft rehabilitation plan to mitigate any impacts.
<b>2009</b>	<b>South Africa</b>	<b>City of Cape Town</b>	Consultant on project to prepare a situation assessment for the Coastal Monitoring Programme for the City of Cape Town (City of Cape Town). Preparation of an overview report on the conservation status and sensitivity of the City of Cape Town Coast including estuaries.
<b>2009</b>	<b>South Africa</b>	<b>Doug Jeffery Environmental Consultants</b>	Senior consultant on an assessment of the status and sensitivity of the coastal marine environment off Oudekraal on the Cape Peninsula with an assessment of potential constraints relating to impacts to the marine environment on the development of the site.
<b>2002, 2009, 2015-2018</b>	<b>South Africa</b>	<b>Department of Environmental Affairs &amp; Tourism: Marine and Coastal Management (DEAT: MCM)</b>	Estimation of west coast rock lobster catch and effort by the recreational fishery sector. Responsible for telephone survey data analysis and reporting. Project included a series of workshops aimed at resolving inconsistencies in previous



Period	Country	Client	Project, Tasks
			surveys and developing improved methodology for future surveys.
2009	South Africa	<b>Chand Environmental Consulting</b>	Marine and coastal specialist appointed to assess the status and sensitivity of the coastal marine environment off Oudekraal on the Cape Peninsula, and likely impacts that would arise from development of the site.
2008-2011	South Africa	<b>Century City Property Owners Association</b>	Principal consultant on a study to assess the effectiveness of a fish eradication programme conducted in the Century City wetlands and canals using the ichthyocide rotenone, and for development of recommendation for future management of the system
2007-2011	South Africa	<b>Resource Ballast Technology (Pty) Ltd</b>	Consultant appointed as independent assessor of efficacy of a newly developed ballast water treatment system and evaluation (risk assessment) of the residual toxicity of ballast water treated with the system. Project entailed verifying the efficacy of the ballast water treatment system as well as literature survey and laboratory toxicity testing to assess the residual acute and chronic toxicity of the treated ballast water to a variety of different organisms and potential risks posed by the treated ballast water to the environment and human health.
2007-2011	South Africa	<b>Department of Environmental Affairs &amp; Tourism: Marine and Coastal Management (DEAT: MCM)</b>	Scientific advisor of a fisheries monitoring programme designed to assess levels of fishing mortality, stock abundance indices and to evaluate the effectiveness of management measures for the commercial and recreational linefishery, tuna pole, hake longline, west coast rock Lobster, Inshore demersal trawl and hake handline fishing in South African waters. Scientific advisor was responsible for recruiting and training a team of fishery observers who were deployed on-board vessels and at strategic landing sites around the country, quality control of all data collected and review of data reports.
2007-2010	Ghana	<b>Tullow Oil Plc</b>	Consultant responsible for preparation of Environmental Impact Assessment, Environmental Overview and identification of Environmental Best Management Practise (BMP) required for seismic surveying and exploratory drilling for

Period	Country	Client	Project, Tasks
			offshore oil and gas resources in the Tano shallow water and Deep water blocks in Ghana. (Three separate EIA studies).
2006-2011	Tanzania	<b>International Conservation Union (IUCN)/Pangani Water Basin Office, Tanzania</b>	International mentor of the Estuary Team for a project entitled "Flows for People and the Environment: Supporting Sustainable Land Management in the Pangani Basin (Tanzania)". The estuary component of the project included conducting a health assessment of the Pangani estuary with the Tanzanian national team and the development of a flow assessment tool to guide allocation of freshwater flow in the system.
2006	South Africa	<b>Department of Science and Technology</b>	Investigation of stakeholder requirements and potential host institutions for the South African National Antarctic Programme (SANAP).
2005-2007	Angola	<b>BCLME Programme/ United Nation Development Programme (UNDP)/ UNOPS/Global Environment Facility (GEF)</b>	Consultant on a project aimed at assessing the status of biodiversity along the Angola coastline. The project entailed completing a series of field surveys at selected localities at approximately 100 km spacing along the Angolan coastline at which inshore fish, rock intertidal and sandy beach biota were surveyed. Data were analysed with a view to identifying biogeographic patterns in Angolan coastal fauna and flora.
2005-2007	South Africa	<b>Cape Action Plan for People &amp; the Environment (C.A.P.E.), Cape Nature, and Department of Environmental Affairs &amp; Tourism: Marine and Coastal Management (DEAT: MCM)</b>	Consultant on a biodiversity and economic assessment and development of an integrated conservation plan for CAPE estuaries. The project comprised filling estuary biodiversity data gaps (collection and collation of new botanical, fish and bird data for temperate South African estuaries).
2007, 2005	South Africa	<b>Transnet-National Ports Authority (Transnet NPA)</b>	Consultant on ballast water, flora and fauna survey in the Ports of Durban and Port Elizabeth. Surveys were conducted in representative examples of all habitat types present in the Port of Durban and Port Elizabeth to identify all species present in the port, including all alien and potentially cryptogenic species. Responsible for sampling and reporting.
2005	South Africa	<b>National Empowerment Fund (NEF)</b>	Principal consultant on a due diligence (feasibility) study to assess the feasibility of

Period	Country	Client	Project, Tasks
			a proposed eel aquaculture and processing operation in the Eastern cape, South Africa, focussing on biological, ecological, logistic and legislative considerations of the proposed project.
2001-2005	South Africa	<b>Department of Environmental Affairs &amp; Tourism: Marine and Coastal Management (DEAT: MCM)</b>	Project leader on a research programme that investigated the taxonomy, biology and management of South African Sciaenid fish of the genus <i>Umbrina</i> . Responsible for project design, sampling strategy, biological sampling and processing of samples to provide data on taxonomy, age and growth, reproduction and population genetics. Analysis and use of these data in stock assessments and management recommendations.
2005	South Africa	<b>Emross Consulting CC.</b>	Marine specialist for the assessment of the potential impacts of a boat launching site on the marine environment at Mbotyi River Mouth.
2004-2021	South Africa	<b>Saldanha Bay Water Quality Forum Trust (SBWQMFT)</b>	Senior consultant on a team appointed to develop a series of "State of the Bay" Monitoring Programme and Reports for Saldanha Bay and Langebaan Lagoon in 2004, and annually between 2008 and 2015. The project involved collation and analysis of historic data from a wide range of disciplines, identification of key indicators for the reporting system, as well as initiating new data collection and survey programmes, and the production of annual monitoring reports and yearly State of the Bay Reports.
2003-2005	South Africa	<b>Department of Water Affairs &amp; Forestry (DWAF)</b>	Estuarine and fisheries consultant on the Berg River Baseline Monitoring Programme. The objective of the baseline monitoring programme was to describe the natural and present state, including the natural variability, of those chemical, physical and biological characteristics of the river and its hydraulically linked systems (i.e. estuary, floodplains and groundwater) most likely to be affected by changes imposed after the construction of the Skuifraam Dam. The study spanned a period of three years and required a multidisciplinary approach. Duties included assisting specialists from a wide range of disciplines including water quality, sociology, macroinvertebrates, fish,

Period	Country	Client	Project, Tasks
			avifauna, vegetation and algae.
2001-2003	South Africa	Department of Environmental Affairs & Tourism/ Rhodes University	Fisheries specialist contracted to assist with an Economic Sectoral Study of the South African Fishing Industry. The consultant was responsible for collecting requisite data on the linefish, sector.
2001	South Africa	GEF/UNDP/IMO Globallast Programme	Fish scientist on a ballast water surveys in the Port of Saldanha. The objective of the study was to survey representative examples of all habitat types present in the ports with a view to developing a full list of all species including all alien and potential cryptogenic species in the port.
1999-2000	South Africa	Foundation for Research Development	Researcher on a project to assess the impacts of exploitation of wonderworm <i>Marphysa sanguinea</i> on bouldershore habitats on the Cape Peninsula, South Africa. The project included field surveys, literature review, statistical analysis of data and report production.
1998-2000, 2007-2011	South Africa	Department of Environmental Affairs & Tourism: Marine and Coastal Management (DEAT: MCM)	Scientific advisor and operations manager of an offshore, boat-based fisheries monitoring programme designed to supply and deploy scientific observers aboard fishing vessels for the inshore trawl, hake longline and west coast rock lobster fisheries. Responsibilities of the scientific advisor included ensuring that observers were trained to collect accurate data on the nature of fisheries operations, catch composition, by-catch mortality, fish biology, quantity and size range of discarded target species, and biological samples as required. Data were captured electronically and submitted to the client for use in stock assessment and resource management programme.
1998-2000	South Africa	Department of Environmental Affairs & Tourism: Marine and Coastal Management (DEAT: MCM)	Lead researcher on a 3-year project that assessed the catch, effort and socioeconomic status of the Western Cape gill and beach-seine net fisheries. Responsible for project design and implementation. Included sampling of commercial fish catches, conducting detailed socio-economic interviews with industry participants, experimental netting and interpretation of the findings into management recommendations.

## CURRICULUM VITAE

### SIMONE DE VILLIERS LOUW

#### ACADEMIC QUALIFICATIONS:

PhD Candidate Physical Geography 2022, Life and Environmental Science, University of Exeter  
MTECH Oceanography 2020, Department of Biodiversity and Conservation, Cape Peninsula University of Technology, 2020  
B-TECH Oceanography 2018, Department of Biodiversity and Conservation Cape Peninsula University of Technology, 2018  
Diploma in Marine Science 2017, Department of Biodiversity and Conservation 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:** 2022: Junior Consultant (Anchor Environmental Consultants)  
2019-2021: 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 taxonomy and biogeochemical seawater analysis. Her other interests include air-sea fluxes of marine aerosols, resilience of complex systems, and terrestrial biodiversity. Within Anchor, she is as a junior consultant, 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
2021-2022	South Africa	Stonehurst Mountain Estate	<b>Environmental compliance monitoring</b> Environmental Site Officer (ESO) duties and report writing
2021	South Africa	Trans Atlantic Diamonds	<b>Socio-economic assessments</b> Report writing, research study, and stakeholder engagement
2021	South Africa	Trans Atlantic Diamonds	<b>The State of Saldanha Bay and Langebaan Lagoon</b> Report writing, stakeholder engagement, and research study

2021	South Africa	Capital Propfund Pty Ltd	<b>Assessment of impacts to marine biota resulting from an environmental incidents</b> Ecotoxicity testing Data Analysis
2021	South Africa	Biogen Africa	Freshwater ecotoxicity testing Data Analysis
2019 – 2022	South Africa	Mhlathuze Water	<b>Marine environmental impact assessment effluent pipelines in Richard’s Bay</b> Whole effluent toxicity tests, laboratory work, analysis of data, reporting and management recommendations.
2019 – 2022 (ongoing)	South Africa	Saldanha Bay Water Quality Trust	<b>The State of Saldanha Bay and Langebaan Lagoon</b> Field work: sample collection (fish and macrofauna) Commercial diver, and enumeration of macrofauna samples
2019-2021 (ongoing)	South Africa	City of Cape Town	<b>Biomonitoring programme</b> Analysis and writing of technical progress report.
2021	South Africa	-	<b>Feasibility Study for Pearl Culturing in Algoa Bay South Africa</b> Report writing and research
2021 (ongoing)	South Africa	PROXA South Africa Pty (Ltd)	<b>Effluent monitoring</b> Water quality test
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	<b>SEAmester student.</b> 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

**Louw S, Sedick S, Swart C and B Clark.** 2022. Environmental compliance monitoring report for phase 4 of the Stonehurst Mountain Estate development. Monthly Report no. 1999/1-3 prepared by Anchor Environmental Consultants (Pty) Ltd for Stonehurst Mountain Estate. 55 pp.

**Louw S**, Sedick S and BM Clark. 2021. Socio-economic assessment for exploration and prospecting activities in South African Sea Area 14A. Report no. 1987/3 prepared by Anchor Environmental (Pty) Ltd for Trans Atlantic Diamonds (Pty) Ltd. 25pp.

**Louw S**, Sedick S, and BM Clark. 2021. Socio-economic assessment for exploration and prospecting activities in South African Sea Area 11C. Report no. 1987/5 prepared by Anchor Environmental (Pty) Ltd for Trans Atlantic Diamonds (Pty) Ltd. 25pp.

Dawson J, **Louw S**, and BM Clark. 2021. Ecotoxicity progress report: Assessment of impacts to marine biota resulting from an environmental incident at the Cornubia Ridge Logistics Park. Specialist Report no. 1988/1 prepared by Anchor Environmental Consultants (Pty) Ltd for Capital Propfund Pty Ltd (also known as Fortress). 14 pp.

Swart C, Hutchings K, and **Louw S**. 2021. Feasibility Study for Pearl Culturing in Algoa Bay South Africa. Report prepared by Anchor Environmental Consultants (Pty) Ltd 64pp.

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** and 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

**Adam Rees Ph.D.**

Consultant at Anchor Environmental Consultants | Marine Ecological Monitoring and Research

Tel: +27631286941 | Email: adam@anchorenvironmental.co.za

Date of birth: 11/05/1991 | Citizenship: British | Critical Skills Visa (Aquatic scientist) South Africa



I am an early-career marine benthic ecologist with a Ph.D. in applied marine ecosystems research and 3 years+ experience. I am currently a marine consultant for Anchor Environmental Consultants. Previously I was a postdoctoral researcher based at the University of Plymouth (UoP), England, and I am currently a consultant for the Blue Marine Foundation (eNGO) on a part time basis. I have experience in quantifying and assessing changes to benthic systems, affected by marine protected areas (MPAs), fisheries/offshore aquaculture, marine renewable energy installations and others. I am experienced in benthic ecosystems, data handling and statistical analyses (R, Python, Permanova (excellent), Excel (excellent)) of large quantitative datasets, ecological survey design, analysis of spatial data (ArcGIS (excellent) QGIS), boat and lab fieldwork and data collection, technical reporting and academic publishing, project management, stakeholder engagement, grant writing and I am competent at public speaking and disseminating science to a wide range of audiences. I am a SACNASP registered Professional Natural Scientist in Aquatic Science (Registration Number: 141530).

**Experience****Feb 2022- present**

2018-2022

**2020-present**

2018-2020

2017 (Feb-March)

2013 (May-Oct)

**Education**

2013-2018

2009-2012

**Position****Consultant** | Anchor Environmental Consultants PTY Ltd**Postdoctoral Researcher** | University of Plymouth, UK**Research Project Consultant** | Blue Marine Foundation, London, UK**UK Project Coordinator** | Blue Marine Foundation, London, UK**Field Research Assistant** | Wildlife Conservation Society, Gabon &, GEOMAR  
Helmholtz Centre for Ocean Research, Kiel.**Research Assistant** | University of Plymouth, UK**Qualification****PhD** in Marine Science (**NQF 10**), University of PlymouthThesis title: *The ecological effects of increasing potting density in the Lyme Bay Marine Protected Area*. Prof Martin Attrill (DoS) & Dr Emma Sheehan**BSc (Hons)** in Marine Biology & Coastal Ecology (**NQF 8**), University of Plymouth**Peer-reviewed publications**

- **Rees, A.**, Sheehan, E.V., Attrill, M.J. 2021. Optimal fishing effort benefits fisheries and conservation. *Scientific Reports* **11**, 3784 <https://doi.org/10.1038/s41598-021-82847-4>
- Davies, B.F.R., Holmes, L.A., Rees A., Attrill, M.J., Cartwright, A., Sheehan, E.V. 2021. Ecosystem Approach to Fisheries Management Works – how switching from mobile to static fishing gear improves populations of fished and non-fished species inside a Marine Protected Area. *Journal of Applied Ecology* <https://doi.org/10.1111/1365-2664.13986>
- Sheehan, E.V., Holmes, L.A., Davies, B.F.R., Cartwright, A., **Rees A.**, Attrill, M.J. 2021. Rewilding of Protected Areas Enhances Resilience of Marine Ecosystems to Extreme Climatic Events. *Frontiers in Marine Science* <https://doi.org/10.3389/fmars.2021.671427>
- Rees, S. E., Ashley, M., Evans, L., Mangi, S., Sheehan, E. V., Mullier, T., **Rees, A.**, Attrill, M. J. 2020. An evaluation of the social and economic impact of a Marine Protected Area on commercial fisheries *Fisheries Research* **235**, 105819-105819 <https://doi.org/10.1016/j.fishres.2020.105819>
- Davies, B.F.R., Attrill, M.J., Holmes, L., **Rees, A.**, Witt, M.J., Sheehan, E.V. 2019. Acoustic Complexity Index to assess Benthic Biodiversity of a Partially Protected Area in the Southwest of the UK. *Ecological Indicators*. DOI: [10.1016/j.ecolind.2019.106019](https://doi.org/10.1016/j.ecolind.2019.106019)
- Sheehan, E.V. **Rees, A.**, Bridger, D., Hall-Spencer, J.M. 2017. Strandings of NE Atlantic gorgonians. *Biological Conservation*. DOI: [10.1016/j.biocon.2017.03.020](https://doi.org/10.1016/j.biocon.2017.03.020)



### **Technical reports**

- Rees, A.**, Evans, V., Hashim, S. (2022) Resource Use survey report: Laamu Atoll, Maldives. A report to Blue Marine Foundation.
- **Rees, A.**, Sheehan, E.V., Attrill, M.J. 2019. The Lyme Bay experimental potting study. A report to the Department of Food and Rural Affairs (DEFRA) by research staff at the University of Plymouth on behalf of the Blue Marine Foundation. <https://tinyurl.com/t62gl8s>
  - Rees, S.E., Ashley, M., Evans, L., Mangi, S., Rodwell, L., Attrill, M., Langmead, O., Sheehan, E., **Rees, A.** 2016. An evaluation framework to determine the impact of the Lyme Bay Marine Protected Area and the activities of the Lyme Bay Consultative Committee on ecosystem services and human wellbeing. A report to the Blue Marine Foundation by research staff the Marine Institute at Plymouth University, Exeter University and Cefas. <http://hdl.handle.net/10026.1/6742>

### **Book chapters**

- Morgan, A., Sheehan, E., **Rees, A.**, Cartwright, A. 2020 Towards a Marine Socio-Ecology of Learning in the South West of England. In Joel B. Pontius, Michael P. Mueller, David A. Greenwood (eds). Hunting, Foraging, and Fishing for Food as Place-based Learning DOI:[10.1007/978-3-030-42814-3](https://doi.org/10.1007/978-3-030-42814-3)

### **Academic training**

<u>Course</u>	<u>Institute</u>
Data analysis in R	Online course, LinkedIn Learning
PERMANOVA+ statistical workshop	Marine Biological Association
Lab Based Teaching Methods and Practice	University of Plymouth, UK
Primer & PERMANOVA v7 statistical workshop	British Antarctic Survey, UK
GIS training - Coastal and Marine GIS course	ABPmer, UK

### **Other relevant training & skills:**

Formal training STCW Safety at Sea certificate  
 RYA VHF radio certificate  
 First Aid certificate  
 100+ recognised hours of conservation volunteering awarded by V-Inspired

Other relevant skills and achievements:

- Using media to publicise research
- Scientific video analysis methods & benthic taxonomy
- Adobe photoshop & illustrator, formal infographic training accredited by [Infohackit](https://www.infohackit.com/)
- Clean driving license

### **Professional Memberships**

Marine Conservation Research Group, University of Plymouth: <https://tinyurl.com/gpq2psa>  
 Marine Biological Association  
 British Ecological Society  
 South African Council for Natural Scientific Professions (SACNASP)

### **Key Meetings & Conferences**

2020&2021 **Invited speaker:** Southwest Marine Ecosystems Conference, Plymouth, UK  
 2019 **Organising committee and contributing speaker:** The Berwickshire Shellfish Symposium, Eyemouth, Scotland, UK  
 2019 **Invited speaker:** Severn Estuary Ecological Research Forum (SEERF), Bristol, UK  
 2017 **Invited speaker:** Marine Protected Areas Conference, Poole UK  
 2016 **Contributing speaker:** 4<sup>th</sup> International Marine Conservation Congress, Newfoundland, Canada 30<sup>th</sup> - 3<sup>rd</sup> August, 2016. Presentation: 'The Lyme Bay experimental potting project'

**Teaching Experience**

2017-2020	<u>Lecturer</u> Guest lecturer, MSc Marine Conservation, University of Plymouth, UK
2020	<u>Supervisor</u> MSc. Project title: <i>Understanding fine-scale fishing activities of under 10 metre fishing vessels in the Lyme Bay MPA, through the use of high resolution spatial data</i> . Awarding institution: Newcastle University
2019	MSc. Project title: <i>Social and spatial dynamics of recreational fishing and diving within the Berwickshire Marine Reserve</i> . Awarding institution: Heriot-Watt University MRes. Project title: <i>Comparative analysis of potting bycatch data</i> : Awarding institution: University of Plymouth
2014-2018	<u>Demonstrator</u> Led laboratory practicals (specimen dissection, taxonomy, natural history, research methods, ecological investigations and analysis) Led field practicals (rocky shore ecological surveys, benthic video surveys, boat-based marine quantification surveys)

**Media coverage of research**

TV	Aired interviews for 'Big Blue UK', BBC; 'Countryfile', BBC; 'Britain's Secret Seas', BBC. <u>Lyme Bay Case Study Film</u> by the Blue Marine Foundation:
Press	<a href="https://tinyurl.com/7scj5zhm">https://tinyurl.com/7scj5zhm</a> <a href="https://theecologist.org/2020/jan/10/letter-lyme-bay">https://theecologist.org/2020/jan/10/letter-lyme-bay</a>
Animation	<a href="https://youtu.be/Xm2emllf0c">https://youtu.be/Xm2emllf0c</a>

<b>Period</b>	<b>Country</b>	<b>Client</b>	<b>Project/tasks</b>
<b>2021</b>	<b>UK</b>	<b>Blue Marine Foundation</b>	Feasibility study for siting on Marine National Parks around the UK. Collation of spatial data, social, economic and environmental data. GIS mapping, Marine Spatial Planning. Data analysis report writing
<b>2021-2022</b>	<b>Maldives</b>	<b>Blue Marine Foundation</b>	GIS mapping and spatial analysis, quantitative analysis of resource use (fisheries, tourism, fish exporters, local councils). Fisheries use, Catch per unit effort, Vessel Monitoring Systems. Report writing, data collection, data analysis semi-quantitative interviews/questionnaires consultation with industry and stakeholders
<b>2021-2022</b>	<b>Maldives</b>	<b>Blue Marine Foundation</b>	Socio-economic data collection, quantitative and qualitative data collection and analysis, reporting. Economic fisheries data
<b>2013-2017</b>	<b>England</b>	<b>DEFRA</b>	PhD reporting to government. Progress annual reporting regarding assessment of benthic impacts of inshore pot fishing on benthic ecosystems. Underwater video monitoring, baited remote underwater video monitoring, image and video analysis, impact of potting on fisheries. Boat based fieldwork, fisheries observer study. Quantitative data collection on fisheries catch per unit effort, population health,

			biometric data collection from crustacean fisheries. Data analysis, report writing and presentation of government
<b>2019</b>	<b>England</b>	<b>Blue Marine Foundation</b>	Field data collection of herring spawning events. Genetic comparison between herring populations. Identification of spawning events and habitat. Report writing and analysis
<b>2021-2022</b>	<b>England</b>	<b>Blue Marine Foundation</b>	Feasibility assessment of oyster restoration. Particle dispersal, larval dispersal and Larval settlement models. GIS analysis, site assessment and report writing
<b>2021</b>	<b>UK</b>	<b>Blue Marine Foundation</b>	Fisheries inside English Marine Protected areas. Review and analysis of fisheries management in England inshore and offshore MPAs. Mapping, report writing and presentation of results
<b>2017,2018, 2021,2022</b>	<b>England</b>	<b>Natural England</b>	Lyme reporting on annual monitoring. Long-term monitoring time series data from ecosystem assessment – underwater video. Multivariate data analysis and reporting
<b>2017</b>	<b>Gabon</b>	<b>GEOMAR</b>	Fieldwork tracking juvenile turtles in the nearshore waters of Gabon. Acoustic telemetry, spatial data, remote sensing.
<b>2014-2021</b>	<b>England</b>	<b>Offshore shellfish Ltd</b>	Mariculture (offshore mussel farm) environmental impact. Underwater video, grab sampling, infaunal analysis, sediment status. Assemblage composition analysis – infaunal and epifaunal analysis. Video (towed video, ROV, baited video) analysis

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## **CURRICULUM VITAE**

**KEVIN MIKUS SCHMIDT [USA Citizen, SA Permanent Resident]**

SACNASP: Professional Natural Scientist #117752

### **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

**POSTAL ADDRESS:** 8 Steenberg House, Silverwood Close, Tokai, Cape Town, 7945

**CELL PHONE:** (+27) 079-724 6702

**E-MAIL:** KevinS@anchorenvironmental.co.za

**WORK PHONE:** (+27) 021-701 3420 ext. 220

**FAX:** (+27) 021-701 5280

**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.

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**SELECT PROJECT EXPERIENCE:**

Period	Employer	Country	Clients	Project, Tasks
Dec 2021 – Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	Namibia	DeBeers Marine Namibia DBMN; Anglo American Future Smart Mining (FSM)	<b>DESIGN OF A SEDIMENT GENERATION CONTROL AND LONG-TERM EFFECTS PREDICTIVE MODEL &amp; MONITORING SYSTEM</b> MetOcean remote sensing expert MATLAB specialist – big data reference library and indexing Development of far-field wave and particle tracking models (Delft-3D)
April 2021 – Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	Saldanha Bay, South Africa	WWF South Africa	<b>ENVIRONMENTAL MONITORING AS REQUIRED BY THE SAMPLING PLAN FOR THE SALDANHA BAY AQUACULTURE DEVELOPMENT ZONE (ADZ)</b> Commercial scientific diver for one full benthic macrofauna survey in April 2021 and two annual benthic chemical surveys, one in April 2021, with second following in April 2022. Analysis of historical data (macrofauna and sediment physicochemical) and finalisation of a scientific paper
Jan 2022 – Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	Durban, South Africa	Transnet SOC Ltd	<b>BASELINE SURVEY OF MARINE FAUNA, FLORA AND ANTIFOULING CONTAMINANTS TO ASSESS CHANGES IN FAUNA AND FLORA IN THE PORT OF DURBAN FOR A PERIOD OF 12 MONTHS</b> Scientific commercial diver Equipment technician
Dec 2021 – Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	Kwazulu-Natal, South Africa	Nemai Consulting	<b>HYDRODYNAMIC MODELLING STUDY TO UNDERSTAND THE SALINITY DRIVERS AND EFFECTS WITHIN THE MZIMKHULU ESTUARY, KWAZULU-NATAL</b> Hydrodynamic model specialist (ArcSWAT) for Basic Assessment process and a Water Use Licence Application (WULA) on behalf of the Ugu District Municipality for the proposed development of a weir in the Umzimkhulu River
Oct 2021 – Dec 2021	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2021 BENTHIC SAMPLING CAMPAIGN</b> At sea scientist/ shift leader – worked with a team of 10 scientists to collect

				and preserve 1000+ grab and 2000+ sediment samples aboard a survey vessel (DP Star) for 6 weeks at sea. GIS specialist – selection of sampling sites and visualisation of bathymetry
September 2021	Anchor Environmental Consultants Pty Ltd	Mossel Bay, South Africa	Mossel Bay Municipality	<b>ENVIRONMENTAL MAINTENANCE MANAGEMENT PLAN (EMMP) FOR THE GREAT BRAK ESTUARY.</b> 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. Deployable sensor technician: developed mooring system for <i>in-situ</i> CTD (AquaTROLL 600)
Aug 2021- Current [ONGOING CAMPAIGN]	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 BENTHIC SAMPLING CAMPAIGN</b> 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.
June 2021 – July 2021	Anchor Environmental Consultants Pty Ltd	South Africa West Coast	Trans Atlantic Diamonds (Pty) Ltd	<b>MARINE SPECIALIST IMPACT ASSESSMENT FOR EXPLORATION AND PROSPECTING ACTIVITIES IN CONCESSION AREA 12b</b> 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 Calculated proportion of the average national total catch made within concession area
June 2021 – July 2021	Anchor Environmental Consultants Pty Ltd	Olifants Estuary, South Africa	Mineral Sand Resources (Pty) Ltd (MSR); Tormin Mineral Sands Project	<b>ESTUARINE AND FRESHWATER SPECIALIST STUDY</b> Coastal hydrology specialist: developed a SWAT Hydrologic model to simulate ephemeral stream flow

				rates and days flowing per year using remotely sensed climate inputs
Apr 2021 – May 2021	Anchor Environmental Consultants Pty Ltd	Greenland	De Beers Group	<p><b>ENVIRONMENTAL MITIGATION ASSESSMENT FOR PLANNED GEOPHYSICAL SURVEY ON THE WEST GREENLAND CONTINENTAL SHELF</b></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, Lump sucker, Cod, Snow Crab)</p>
Feb 2021 – June 2021	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	V&A Waterfront Management Authority	<p><b>ECONOMIC ASSESSMENT OF RECREATIONAL SAILING IN CAPE TOWN: MAKING THE CASE FOR INVESTMENT IN THE PROPOSED GRANGER BAY MARINA</b></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><b>GIS SPECIALIST</b></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 - Jan 2022	Anchor Environmental Consultants Pty Ltd	Saldanha, South Africa	Sea Harvest Corporation (Pty) Ltd	<p><b>UPDATED DRAFT COASTAL WATERS DISCHARGE PERMIT (CWDP)</b></p> <p>Scientific commercial diver Equipment technician for Aquatroll200 CTD</p>

Oct 2020 – Dec 2020 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	St Helena Bay, South Africa	St Helena Bay Water Quality Trust	<p><b>MARINE GIS SPECIALIST FOR ANNUAL STATE OF THE BAY REPORT</b></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 pertaining to temperature, oxygen, salinity, nutrients, and pH), sediment quality (particle size, total organic carbon and nitrogen), and ecological indicators (benthic macrofauna).</p>
Nov 2019- Aug 2021	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<p><b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 BENTHIC SAMPLING CAMPAIGN</b></p> <p>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).</p>
May – July 2020	Anchor Environmental Consultants Pty Ltd	Somerset West, Cape Town, South Africa	Rheinmetall Denel Munition RF (Pty) Ltd	<p><b>Field Scientist</b></p> <p>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.</p>
Apr 2020 – Current [ONGOING]	Anchor Environmental Consultants Pty Ltd	South Africa	Aqunion, Portion 2 of Klipfontein Farm no 711	<p><b>ENVIRONMENTAL MONITORING AND STOCK ASSESSMENT ACTIVITIES FOR AQUINION ABALONE RANCHING IN THE NORTHERN CAPE (AREA NC 4)</b></p> <p>Aqunion have recently regained access to area NC 4 and would like to resume</p>



				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><b>Commercial/ Scientific Diver</b> 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><b>Marine GIS Specialist</b> 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><b>Remote Sensing Specialist</b> 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><b>Fishery Independent Abalone Surveys (FIAS) in Robben Island MPA</b> 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><b>City of Cape Town Effluent Pipelines Biomonitoring</b> Scientific diver to deploy, maintain, and retrieve subsurface mussel moorings to investigate the performance and effects of the</p>

				domestic effluent outfalls offshore of Hout Bay, Camps Bay and Green Point
Nov 2019- Jan 2021 [5 YEAR SURVEY]	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	Table Mountain National Parks/ SAN Parks	<b>Commercial/ Scientific Diver</b> Collect quantitative data on commercially and ecologically important indicator fish assemblages 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	<b>Hydrologic Specialist</b> 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. <b>Remote Sensing Specialist</b> 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.
Jan 2019- Dec 2019 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Namibia, South Africa	De Beers Marine Namibia	<b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 PLUME MODELLING CAMPAIGN</b> 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. <b>Remote Sensing Specialist</b> Gather historic remotely sensed/reanalysis air-sea interface data to assess hydrodynamic characteristics of large portions of the Atlantic 1 MLA.
Apr 2019- Jan 2020	Anchor Environmental Consultants Pty Ltd	Cape Town, South Africa	Atlantic Salmon	<b>Data Analyst, Report Writing</b> Conducting an impact analysis using Delft3D near shore modelling for the proposed construction of an Atlantic Salmon aquaculture effort in port of Cape Town. <b>Remote Sensing Specialist</b> Gathered and validated remotely sensed weather data (wind, temperature, humidity, solar radiative flux) to force near-field models of hydrodynamic properties within the waterfront.

2019 [ANNUAL REPORT]	Anchor Environmental Consultants Pty Ltd	Elizabeth Bay, Namibia	Pisces Environmental Services Pty Ltd/ De Beers Marine Namibia	<b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2019 ECOLOGICAL IMPACT CAMPAIGN</b> 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	<b>Scientist, Diver, Remote Sensing Specialist</b> 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	<b>Commercial/ Scientific Diver</b> Collect quantitative data on commercially and ecologically important indicator invertebrate species (rock lobster, abalone, alikleukel, 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	<b>Data analyst, report writing</b> 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	<b>Scientist, report writing</b> 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	<b>Scientist</b> 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	<b>Scientist/ Co-author of Report</b> <b>Estuarine impact assessment for the MOZAL Matola River pipeline</b> During field work, collected sediment samples using Van veen grab, deployed SeaBird SeaCAT CTD,

				skipped 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	<b>Commercial/ Scientific Diver</b> 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	<b>DE BEERS MARINE NAMIBIA: ENVIRONMENTAL MONITORING PROGRAMME: ATLANTIC 1 MINING LICENSE AREA 2018 BENTHIC SAMPLING CAMPAIGN</b> 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	<b>Commercial/ Scientific Diver</b> 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)	<b>Commercial/ Scientific Diver</b> 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	Cape Town, South Africa	De Beers Marine Namibia	Lab work

	Consultants Pty Ltd			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)	<b>Scientific Diver, Lecturer, Technician</b> 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	<b>Onboard Scientist (1 month cruise)</b> 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	<b>Remote Sensing Data Analyst, Report Writing, Lead Author</b> 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)	<b>MSc Applied Marine Science, Marine Research Institute Student</b> 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.

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- 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

## 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 Guèrin, 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).

Sadr, K and Gribble, J., 2010, The stone artefacts from the Vredenburg Peninsula archaeological survey, west coast of South Africa, *Southern African Humanities* 22: 19–88.

Gribble, J., 2009, HMS Birkenhead and the British warship wrecks in South African waters in *Proceedings of the Shared Heritage Seminar*, University of Wolverhampton, 8 July 2008

Gribble, J., Parham, D. and Scott-Ireton, D., 2009, Historic Wrecks: Risks or Resources? In *Conservation and Management of Archaeological Sites*, Vol. 11 No. 1, March, 2009, 16–28.

Gribble, J. and Athiros, G., 2008, *Tales of Shipwrecks at the Cape of Storms*, Historical Media, Cape Town.

Gribble, J., 2008, The shocking story of the ss Mendi, in *British Archaeology*, March/April 2008.

Gribble, J., 2007, The Protection of the Underwater Cultural Heritage: National Perspectives in light of the UNESCO Convention 2001 by Sarah Dromgoole, in *The International Journal of Nautical Archaeology*, 36, 1, pp 195-6.

Gribble, J., 2006, The Sad Case of the ss Maori, in Grenier, R., D. Nutley and I. Cochran (eds) *Underwater Cultural Heritage at Risk: Managing Natural and Human Impacts*, pp 41-43, ICOMOS, Paris

Gribble, J., 2006, Pre-Colonial Fish Traps on the South Western Cape Coast, South Africa, in Grenier, R., D. Nutley and I. Cochran (eds) *Underwater Cultural Heritage at Risk: Managing Natural and Human Impacts*, pp 29-31, ICOMOS, Paris.

Forrest, C.S.J., and Gribble, J., 2006, The illicit movement of underwater cultural heritage: The case of the Dodington coins, in *Art and Cultural Heritage: Law, Policy and Practice*, (ed B.T. Hoffman), New York, Cambridge University Press.

Forrest, C.S.J., and Gribble, J., 2006, Perspectives from the Southern Hemisphere: Australia and South Africa, in *The UNESCO Convention for the Protection of the Underwater Heritage: Proceedings of the Burlington House Seminar, October 2005*, JNAPC / NAS.

Gribble, J., 2003, "Building with Mud" – Developing historical building skills in the Karoo, in ICOMOS South Africa, in *The Proceedings of Symposium on Understanding and using urban heritage in the Karoo*, Victoria West, South Africa, 3-5 March 2002.

Forrest, C.S.J., and Gribble, J., 2002, The illicit movement of underwater cultural heritage: The case of the Dodington coins, *International Journal of Cultural Property*, Vol II (2002) No 2, pp 267-293.

Gribble, J. 2002, The Past, Present and Future of Maritime Archaeology in South Africa, *International Handbook of Underwater Archaeology* (eds Ruppe and Barstad), New York, Plenum Press.

Thackeray, F. and Gribble, J., 2001, Historical Note on an Attempt to Salvage Iron from a Shipwreck, *Looking Back*, Vol 40, November 2001, pp 5-7.

Gribble, J., 1998, Keeping Our Heads Above Water – the development of shipwreck management strategies in South Africa, *AIMA Bulletin*, Vol 22, pp 119-124.

Gribble, J. 1996, Conservation Practice for Historical Shipwrecks, *Monuments and Sites of South Africa*, Colombo, Sri Lanka, ICOMOS 11th General Assembly.

Gribble, J. 1996, National Databases on Monuments and Sites, *Monuments and Sites of South Africa*, Colombo, Sri Lanka, ICOMOS 11th General Assembly.

Sadr, K, Gribble, J, & Euston-Brown, G L, 1992 The Vredenburg Peninsula survey, 1991/1992 season, *Guide to Archaeological Sites in the South-western Cape*, Papers compiled for the South African Association of Archaeologists Conference, July 1992, by A.B. Smith & B. Mutti, pp 41-42.

Smith, AB, Sadr, K, Gribble, J, & Yates, R., 1992 Witklip and Posberg Reserve, *Guide to Archaeological Sites in the South-western Cape*, Papers compiled for the South African Association of Archaeologists Conference, July 1992, by A.B. Smith & B. Mutti, pp 31-40.

Smith, AB, Sadr, K, Gribble, J & Yates, R., 1991, Excavations in the south-western Cape, South Africa, and the archaeological identity of prehistoric hunter-gatherers within the last 2000 years, *The South African Archaeological Bulletin* 46: 71-91.