

Research Infrastructure in Support of South Africa's Blue Economy

From rivers and estuaries to coastal waters and deep-sea ecosystems, the National Research Foundation–South African Institute for Aquatic Biodiversity (NRF-SAIAB) is South Africa's leading aquatic biodiversity research institute. It delivers the scientific knowledge needed for the sustainable use and protection of aquatic resources. Through specialised research platforms, national infrastructure and strategic partnerships, NRF-SAIAB provides the evidence base for fisheries management, biodiversity conservation, climate adaptation, aquaculture development and marine spatial planning. By linking science with policy and implementation, the Institute strengthens South Africa's capacity to build a resilient, inclusive and globally competitive Blue Economy.

NRF-SAIAB Research Platforms

Acoustic Tracking Array Platform (ATAP)

ATAP is South Africa's national aquatic animal tracking network, generating long-term movement data across 2,300 km of coastline. Since 2011, the platform has produced over 30 million data records across more than 60 marine and estuarine species, including commercially important fish, sharks, rays and turtles – among them Critically Endangered species. By mapping migration routes, nursery areas and habitat connectivity, ATAP directly informs fisheries regulation, marine protected area design and spatial planning, ensuring science-based ocean stewardship.

Aquatic Ecophysiology Research Platform (AERP)

AERP investigates how aquatic organisms respond to environmental stressors such as climate change, oxygen limitation and pollution. Through experimental and field research, the platform identifies resilience thresholds in key species, providing critical insights for climate adaptation strategies, conservation planning and sustainable resource management.

Aquatic Genomics Research Platform (AGRP)

AGRP applies DNA barcoding, environmental DNA (eDNA) and genomic sequencing to enhance biodiversity monitoring and fisheries science. Its genome-scale research capacity supports conservation, aquaculture, biosecurity and bioprospecting. As a growing national hub for genomic research, AGRP is expanding advanced sequencing and bioinformatics capabilities to strengthen biodiversity monitoring, climate resilience research and innovation within the Blue Economy.

National Collections Facility

The National Collections Facility preserves Africa's aquatic biodiversity – including fish, frogs, diatoms, snails and cephalopods – through curated voucher specimens that underpin taxonomy, species identification and long-term ecological monitoring. Embedded within this Collection, the National Aquatic Biodiversity Biobank preserves linked tissue and DNA samples, extending the scientific value of each specimen into the genomic era. Together, the Collections and Biobank provide a cohesive national resource that safeguards biodiversity knowledge, supports innovation, and ensures global accessibility for conservation planning and sustainable resource use for future generations.

SARChI Chair: Biological Control & Freshwater Alien Invasive Species Management

NRF-SAIAB's SARChI Chair develops sustainable biological control solutions to combat invasive freshwater species, including invasive aquatic weeds. The large-scale release of effective control insects is reducing water



weeds in dams and rivers, improving water security, dam resilience and ecosystem health. This long-term, evidence-based approach lowers management costs while protecting biodiversity and strengthening national water security.

Coastal and Ocean Sciences Team (COST)

COST is reshaping how urban coastlines are designed and managed. By integrating ecological engineering, Indigenous knowledge, and community partnerships, the team demonstrates how solutions embedded within built infrastructure can help restore ecosystem function in heavily modified environments.

These eco-engineered approaches improve water quality, support biodiversity, reduce contamination risks, and promote sustainable livelihoods, advancing climate-resilient coastal systems within the Blue Economy.

Freshwater Field Unit

The Freshwater Field Unit provides essential biodiversity assessments and field-based monitoring across inland water systems. Its work informs conservation planning, fisheries policy, aquaculture development and water resource management.

Through national partnerships, the Unit is generating critical data on inland fisheries potential and invasive species distribution, supporting food security, rural livelihoods and national development priorities. Ongoing taxonomic research continues to strengthen freshwater biodiversity inventories across southern Africa.

Geophysics Mapping Platform (GeMaP)

GeMaP uses hydroacoustic surveys to map South Africa's seabed and freshwater habitats (at depths of -1 to -850+ metres), guiding biodiversity monitoring and supporting partners including SAEON, Wildtrust, UniZulu and AEON. In 2025, GeMaP supported the NEKTON First Descent Mission in the Comoros. These spatial datasets inform management and monitoring of marine protected areas, coastal lakes, infrastructure planning, fisheries and global ocean mapping, with contributions to Seabed 2030 supporting a sustainable blue economy and ocean governance.

Marine Remote Imagery Platform (MaRIP)

MaRIP uses advanced camera systems to document marine biodiversity and habitats, supporting monitoring, fisheries assessments and conservation across South Africa's oceans. It has supported 96 researchers and 30+ postgraduate students from 18 countries, generating 50 000+ biodiversity records across ~600 species. In 2025, it led one of South Africa's deepest benthic surveys (to 2 350 m) and supported the NEKTON First Descent Mission in the Comoros. Through innovation and training, it advances evidence-based ocean management and builds Africa's marine research capacity.

Seascape Ecology Research Group

The Seascape Ecology Research Group studies how fish interact with their habitats and how climate change and human pressures affect coastal and estuarine ecosystems. By identifying critical nursery and climate-refuge habitats, the group informs fisheries management and national biodiversity planning. Linking seascape ecology science with policy and capacity development promotes ecosystem resilience and sustainable marine resource management.

Closing Statement

Through integrated science platforms, national research infrastructure and strategic partnerships, NRF-SAIAB provides the knowledge systems that enable sustainable growth across South Africa's aquatic environments.

By aligning biodiversity protection with economic opportunity, NRF-SAIAB advances a Blue Economy built on resilience, innovation and evidence-based stewardship.

NRF-SAIAB – Providing Research Infrastructure in Support of South Africa's Blue Economy.

