

SARDI Aquatic Sciences Facilities

SOUTH
AUSTRALIAN
RESEARCH &
DEVELOPMENT
INSTITUTE
PIRSA

SARDI Aquatic Sciences has many unique facilities to achieve its goal of world class marine research. The innovative and practical research conducted by SARDI Aquatic Sciences enhances the State's economic growth and enables the conservation of natural resources. The scientific personnel at SARDI Aquatic Sciences' undertake a diverse range of activities to investigate and understand the fisheries and aquaculture industries of South Australia and the temperate ecosystems in which they operate. SARDI Aquatic Sciences is based at the South Australian Aquatic Sciences Centre (SAASC).

Many of the facilities are available for others to use on a fee for service basis.

South Australian Aquatic Sciences Centre (SAASC)

The SAASC is a purpose-built marine and freshwater research laboratory complex located at West Beach, Adelaide. With more than 120 research and technical staff, administrative staff and postgraduate positions, it is one of the most comprehensive research facilities of its kind in Australia.

Some of the general features of the Centre include:

- *Lecture Theatre* - 110 seat lecture theatre with the full suite of audio-video facilities
- *Conference Room* - with seating capacity for 40, a/v equipment and teleconferencing facilities
- *Library* – specialist and comprehensive aquatic sciences reference library

Building Management System (BMS)

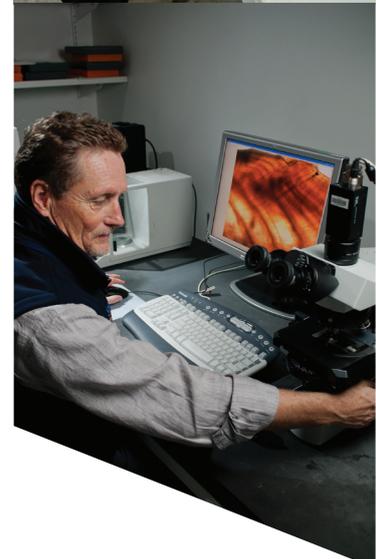
The BMS is at the heart of the sophisticated computer monitoring system at SAASC. This system controls and monitors the building environment, and all fish life support systems including water supply, water temperature, aeration and filtration. The system is capable of monitoring, maintaining and controlling tanks in the aquarium room and can log a range of tank parameters (eg salinity, dissolved oxygen, pH) direct to a computer data base for later analysis.

Seawater and Freshwater Supply

Four inlet / outlet pipes which extend various distances to 1.5 km offshore are designed to deliver on-site by gravity a maximum of 1500 L of seawater per minute. Primary treatment consists of automated primary filters and three 50 KL settlement tanks before storage in two 100 KL tanks. Delivery to indoor and outdoor aquaria is via graded sand filtration after which the water can be filtered further or Ultra-Violet (UV) sterilised as needed. Waste water is treated by sand filtration and chlorination before discharge. The entire system can be placed in recirculation mode for a short time if required. Freshwater can be provided at 500 L per minute from an underground bore on the site. Monitoring of both inlet and outlet water is undertaken to ensure water quality standards are met.

Pool Farm

The pool farm has 80 fibreglass tanks of various sizes for research; thirty-six 1 KL, thirty-six 5 KL, four 10 KL and four 20 KL. Filtered seawater, recirculated seawater, fresh bore water and aeration can be supplied to the tanks. The system allows researchers the opportunity to conduct replicated experiments that mimic commercial farming or natural environment conditions, thereby providing more valid results.



Indoor Aquaria Room

The 250 square metre indoor aquaria room is serviced with 200 L of salt water per minute and 150 L of freshwater per minute and has 32 temperature programmable tank points (15–30°C). A large number of moveable, free standing tanks of varying sizes provide for a highly versatile work environment enabling experiments to be conducted simultaneously under a range of conditions with sufficient replication. Available tanks range in capacity from small vessels to 2 KL fibreglass and plastic tanks.

Shellfish Hatchery

This hatchery is designed to support the shellfish aquaculture and fishing industries, from hatchery technical developments in new species to investigation of advanced techniques such as selective breeding, cryopreservation and ploidy manipulation in various species including abalone, oysters, scallops, mussels and cockles. It consists of broodstock conditioning, spawning, larval and spat rearing facilities and laboratories and equipment required for research on shellfish reproduction biology, immunology, physiology, genetics and biotechnology. The facilities have also been used for observing the impacts of various environmental parameters on native shellfish species.

Finfish Hatchery

The finfish hatchery is used for the conditioning of broodstock, egg incubation, larval grow-out and the production of live feeds. The purpose of this hatchery is to supply researchers with fertilised eggs, larvae and fingerlings for research into morphological and ontogenetic development in optimised controlled environments. The hatchery is also set-up for rearing fingerlings under semi-commercial conditions to supply to industry for pilot scale assessment of grow-out on commercial farms. Species investigated to date include King George whiting, mulloway, snapper, southern bluefin tuna and yellowtail kingfish.



Algal Production & Analytical Facility

Microalgae are produced in a range of vessels from 250 mL flasks to 500 L plastic bags to support shellfish and finfish aquaculture research and development at SARDI, pilot scale commercial production trials on farms, environmental studies and on-site training courses. SARDI's microalgal collection is also used by the University of Adelaide and Flinders University students and some commercial shellfish hatcheries. The state-of-the-art continuous production system utilises pasteurised sea water and produces a range of algal species with the desired nutritional profile 24 hours per day.

The Algal Biofuels Facility, established under the National Collaborative Research Infrastructure Strategy (NCRIS) and hosted by SARDI, provides infrastructure and expertise supporting research into growing algae, processing algae for by-products and the analysis of algal products and by-products. There are nine 20 KL raceways and two 7.5 KL photobioreactors outdoors for algal production, computer controlled LED and carbon dioxide aquaria / tank systems indoors for physiological studies, and a wide range of analytical equipment in dedicated laboratories for monitoring the performance of algae, the quality of water in which they are grown, and the quality of algal products produced.

A dedicated algal tank system has also recently been established, enabling the operation of up to twentyfour 4 KL tanks for both ecosystem and production research.



Laboratories

Spacious, well-equipped laboratories include a dedicated wet laboratory for primary sample processing with direct access to a preserved sample store and walk-in cold (4°C) and freezer (−30°C) rooms. All laboratories are fitted with freshwater and seawater supplies, ample bench space and computer network connections.

The aquaculture laboratories provide researchers with direct access to the necessary facilities for researching live animals, including a large autoclave, balances, microscopes, laminar flow station (for a sterile working environment), feed preparation equipment (feed mixer, cold press-extruder and dryer), milli-Q water system, filtered seawater supply, and an image analysis system.

A modern fish-aging laboratory has been established for otolith reading. The laboratory has specialised embedding and sectioning equipment, binocular and compound microscopes, and the latest computer image analysis systems for the enhancement of the otolith images and rapid fecundity analyses.



Controlled Environment Rooms (CER)

Four programmable controlled environment rooms are available to enable the simulation of a range of seasonal or climatic conditions. Each CER is supplied with electricity, together with ambient seawater and freshwater. Room temperature (0-40°C), humidity (0-100%), day length and light intensity can be controlled. Each CER has facilities to recirculate water within small aquaria or tanks.

Off-site Facilities

South Australian Aquatic Biosecurity Centre (SAABC)

The SAABC, co-located with the University of Adelaide at its Roseworthy Campus, north of Adelaide, provides researchers with highly secure conditions for the study of aquatic pathogens and pests that threaten our marine ecosystems and fisheries. Its size and flexibility means that it can accommodate several projects simultaneously. The Physical Containment Level 2 facility includes marine and freshwater recirculation facilities and a unit comprising filters, a heater and UV system, together capable of decontaminating all described life stages of aquatic pathogens and all aquatic pests. Tanks of 3 L, 200 L and 5 KL are installed with a recirculated water supply, biofilters, aerators and UV sterilisation.

Lincoln Marine Science Centre

Located on the shores of Boston Bay in Port Lincoln, the Lincoln Marine Science Centre (LMSC) is ideally suited to marine research and tertiary education. The LMSC, used as a regional research centre by SARDI, Flinders University, Primary Industries and Regions (PIRSA), the Shellfish Quality Assurance Program and TAFE Port Lincoln, underwent a major expansion in 2009. It provides modern facilities for research, extension and teaching.

Aquatic Sciences Mount Gambier

The research centre at Mount Gambier acts as a base of operations for fisheries research into southern rock lobster and abalone. The site is a part of the PIRSA regional office complex. The building houses several research and administration staff based in the State's South East. Field equipment is stored locally at a secure compound.

Southern Australian Integrated Marine Observing System (SAIMOS)

The SAIMOS, funded by the National Collaborative Research Infrastructure Strategy (NCRIS) and hosted by SARDI, provides infrastructure and expertise supporting research into the role of the Southern Ocean on South Australia's climate, marine ecosystems and seafood production. SAIMOS includes a range of cutting edge oceanographic equipment, including gliders, HR radar (for measuring wave height and period), moorings, underwater current meters, water samplers and water quality sensors.

Research Vessels

The 28 metre long, 200 tonne marine research vessel, Ngerin, is designed for biological and oceanographic studies in coastal and offshore waters of South Australia. It is equipped with trawl equipment, hydraulic winch, computer facilities, wet and dry laboratories, seawater tanks and communication and navigation systems. A fleet of smaller vessels are also available to support coastal and freshwater research.

North Arm Store

SARDI Aquatic Sciences has a mooring and storage facility at North Arm on the Port River. This facility houses important field equipment, smaller coastal research vessels and, when in port, is the berth of the Ngerin.



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