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Lincoln Marine Science Centre research capacity expanded

The Lincoln Marine Science Centre (LMSC) is set to enter a new phase of leading edge research with the opening of Stage II of the Port Lincoln-based Centre.

A \$6.59 million development has nearly doubled the size of the Centre that will house around 35 permanent and visiting scientists and educational staff, and cater for increased student numbers.

Marine Innovation SA Steering Committee Chair and South Australian Research and Development Institute Executive Director, Affiliate Professor Rob Lewis, says SA's seafood industry success is built on the drive of industry, complemented by the ingenuity and innovation of marine scientists and fisheries managers.

"Much of this research and collaboration is taking place at the Lincoln Marine Science Centre, right at the industry's doorstep allowing the development of technology as the need is foreseen," Affiliate Professor Lewis said.

Flinders Deputy Vice Chancellor (Research) and Deputy Chair of the MISA Steering Committee, Professor Chris Marlin, said South Australia is already leading Australia and the world, developing the technology and research imperatives as the country's emerging aquaculture industry grows.

"The Lincoln Marine Science Centre is at the forefront for abalone, southern bluefin tuna and black mussel research and our wild fisheries research is widely recognised for its ground breaking ecosystem-based fisheries management research," Professor Marlin said.

MISA, a partnership between the South Australian Government, Flinders University, the South Australian Research and Development Institute (SARDI), the University of Adelaide, the South Australian Museum and SA seafood industries, was formed in September, 2005. It has successfully brought together South Australia's leading experts in marine science and seafood production, integrating research and development agencies, educational institutions, industry and government.

MISA supports four high priority research areas: seafood product quality and value-adding, aquaculture innovation, ecosystem services and biosecurity. Scientists now based at the LMSC enjoy the advantage of direct access to industry partners and work closely with them to meet industry needs.

Contact: Professor Rob Lewis, mob 0418 847 950
Professor Chris Marlin, mob 0419 855 359

Making news at Lincoln Marine Science Centre

Seafood Product Quality and Value-Adding

Dr Trent D'Antignana has developed, and is now trialling, vitamin 'hits' for tuna. The new approach involves the bulk injection of sardines – which are eaten by tuna – with liquid vitamins to improve the health and quality characteristics of tuna. The technology is now being trialled by Port Lincoln producers, Tony's Tuna.

Contact: 8683 2500

Newly appointed international shellfish food safety scientist, Dr Cath McLeod, is researching methods to detect and test viruses, thereby placing Australian shellfish amongst the safest to eat in the world, boosting potential export sales in the process.

Contact: 8207 7904, mob 0429 814 217

A collaboration of MISA food scientists has been examining packaging solutions and product flow through the supply process to extend the shelf life of locally produced shellfish. This work is providing benefit to South Australia's shellfish industry by increasing the proportion of time that product can be held in the market place and, ultimately, increasing profitability.

Contact: Dr Tom Madigan, 8207 7937, mob 0423 028 255

Aquaculture Innovation:

In a breakthrough for abalone breeders, MISA scientists have created a model to work out how many breeding pairs of farmed abalone are required to maximise return from genetic investment and ensure economically sustainable production. Project leader Steven Clark said the genetics research software that has been developed provides an economic analysis to the whole industry of the cost benefits of such a breeding program.

“Because abalone production is slow, one of the major improvements we can make is to increase the product's ‘speed to market’ and in this area nutrition and genetics are two things we can influence,” he said.

Contact: Steven Clarke 8207 5443, mob 0419 036 589

In a project that could add millions of dollars to Australia's yellowtail kingfish industry and potentially increase production several times over by 2015, MISA researchers, co-funded through the Australian Seafood CRC, are looking to optimise the environmental and biological conditions for larvae to increase production of high quality hatchery reared fingerlings.. The project aims to improve the survival and growth of yellowtail kingfish juveniles in marine hatcheries. This research will involve investigation of aspects such as feeding behaviour, environmental and nutritional factors, lighting conditions, rearing temperature, salinity, microbial management, weaning strategies and even tank colour and pattern.

Contact: Steven Clarke 8207 5443, mob 0419 036 589

Ecosystem Services

MISA scientists are looking to use Australian sea lions as 'ocean observers' to collect data from critical ocean habitats. With CTD (connectivity, temperature depth) loggers attached to their backs, the sea lions could collect information over a wide area at a range of depths to be transmitted in real time via satellite for analysis. In doing so, the sea lions will identify feeding 'hot spots' which are precisely the areas that scientists want to study.

Researcher Simon Goldsworthy says two sea lions currently equipped with 'conductivity temperature depth' loggers 'are, in effect, "an oceanographic platform that interacts with the environment".

"The sea lions target areas that have high prey availability which are the hotspots that we want to investigate because they are important for fisheries production and sustaining predator populations. They are effectively providing a means to prospect areas where we don't have existing observer systems. Once they have pinpointed the 'hotspots' we can use other observing platforms such as fixed moorings or research vessels to augment observations in these areas," he said.

Contact: 8207 5325, mob: 0428 102 831

Newly appointed MISA Shark Ecologist, Dr Charlie Huveneers, is tracking several fish species including white sharks around the world using an international ocean tracking system called the Australian Acoustic Tagging and Monitoring System (AATAMS).

To date approximately 50 white sharks have been tagged from two locations, the Neptune Islands near Port Lincoln and off the New South Wales coast. The Lincoln Marine Science Centre has provided a handy base for field operations. Dr Huveneers was responsible for the installation of the national tracking system in his former role as National Coordinator for AATAMS.

Last year SARDI scientists installed ten acoustic receivers off Glenelg to a distance of about eight kilometres. The local 'fish curtain' is monitoring the movements and alongshore migration of specially tagged fish off our metropolitan beaches, and is part of Australia's Integrated Marine Observing System – a major national research facility under the National Collaborative Research Infrastructure Strategy.

Dr Huveneers says that the fish curtain links into AATAMS, and will give scientists important insight into the movements of fish from sharks to whales, tuna, crustaceans, turtles, lobsters and even jellyfish, to help manage our marine species.

Most sharks species including pelagic sharks have a low reproductive rate (slow growth, late age at maturity and small litter size) making them particularly susceptible to over fishing. The information provided through acoustic telemetry will provide fisheries managers with a better understanding of the movements and critical habitats of the tracked species. White sharks are currently listed as Vulnerable under the *EPBC Act 1999*. The improved knowledge of their movements and migratory patterns could help decreasing interactions with fisheries, hence mortality due to bycatch.

Contact: Dr Huveneers 8207 5302 or 0405 635 257

Biosecurity

MISA is also responding to the Southern Hemisphere's biosecurity needs. At present there is no adequate aquatic biocontainment capability to counter biosecurity issues and facilitate marine pest and invasive species research. MISA is developing an initiative for a high level aquatic biocontainment facility to be established in South Australia. One aspect of this area of research is the development of DNA molecular diagnostics to detect pathogens, parasites and marine pests in ballast water.

Contact Dr Marty Deveney 8207 5434, mob 0401 121 969

Further information:

Associate Professor Sabine Dittmann
Director, Lincoln Marine Science Centre
Phone: (08) 8201 2007, LMSC 8683 2580

Background on MISA and Port Lincoln research programs can be found at:

<http://www.misa.net.au>