

Recirculating Aquaculture Systems (RAS) Technology Workshop

Thursday 23 – Friday 24 May 2019



Topics that will be covered during this workshop



An introduction to recirculating systems

- Defining recirculating systems
- RAS compared to other production systems
- Reasons to use recirculating technology

Critical considerations before designing recirculating systems

- Impact of feed on growth, metabolism and water quality
- Critical water quality parameters
- Tank hydraulics
- Solids waste generation
- Dissolved nutrient generation
- Oxygen uptake
- Disease control

Component options for use in recirculating production systems

- Solids removal
- Nutrient removal
- Dissolved gas addition and removal
- Heating and cooling of air and water

Developing an appropriate design for your aquaculture application

- An introduction to the Mass Balance design approach
- System examples from around the USA and Europe

Management of recirculating systems

- Monitoring and control
- Daily operations
- Harvesting and fish transfer methods
- Emergency systems and procedures

Waste management issues

- Waste Generation
- Waste Treatment Options
- Waste Disposal

Economic considerations in creating, evaluating, and operating recirculating systems

- Capital investment costs
- Variable costs
- Fixed costs

ABOUT THE RAS WORKSHOP

Aquaculture, as a business, seems to be able to capture the imagination of a wide variety of individuals worldwide. Recirculating aquaculture technology (systems that recondition and re-use water) is the latest sector in aquaculture to have attracted attention and considerable venture capital. This workshop is designed for a broad audience. We will seek to provide non-biased, research-based information to those that are interested in, or those using recirculating aquaculture fish production systems. The information presented comes either from the first-hand research results and experiences of the presenters or those of collaborators or colleagues around the world. Workshop registration includes a technical workbook, memory stick with applicable resource materials.

ABOUT OUR PRESENTERS



Dr. Tom Losordo

Managing Partner of Losordo & Associates and recent Principal Scientist for Pentair Aquatic Eco-Systems, a US based aquaculture engineering and science company. Dr Losordo has been involved in aquaculture for more than 40 years and has extensive experience in the research, development, design and installation of recirculating aquaculture systems worldwide. He is a Past President of the World Aquaculture Society and the Aquacultural Engineering Society.



Mr. Dennis DeLong

Principal Consultant for Aquatic Technologies International. Mr DeLong has also been involved the aquaculture industry for some 40 years. He managed aquaculture and aquaponics workshops and training for Pentair Aquatic Eco-Systems from 2011 to 2017 and has 20 years experience in North Carolina designing, building and operating RAS facilities.



Dr. Andrew Forsythe

NIWA Chief Scientist for Aquaculture and Biotechnology. Dr Forsythe has a long association with RAS technology including work in Germany and Canada in both marine and freshwater environments. After completing a Doctor of Veterinary Medicine, he provided veterinary services to Canada's west coast salmon farming industry, then led the adoption of RAS throughout Marine Harvest Canada's freshwater operations. He has been with NIWA since 2005, leading the company's aquaculture science centre.



Dr. Javed R. Khan

RAS scientist with NIWA. Dr Khan has a Ph.D in fish physiology and bioenergetics, focusing on the effects of a fish's environment on physiological performance. He has also completed two post-doctoral studies in Denmark looking at the effects of RAS conditions on salmonid welfare and performance.

NIWA's Northland Marine Research Centre



The Northland Marine Research Centre (NMRC) is located on 8.2 hectares of freehold coastal industrial land in Ruakaka, Northland, approximately two hours' drive from Auckland.

The facility supports NIWA and commercial aquaculture research and hosts Moana New Zealand's Blue Abalone operations. The facility has consent and capacity to supply and discharge up to 4 cubic metres per second of seawater, using the legacy assets of the former Marsden A and B power stations. The site has a commercial fish farm licence covering 45 potential species. A recently completed infrastructure upgrade will facilitate complete site development for research and commercial use.

The current operation supplies 350 litres per second of seawater supply (10-micron filtration, UV light treatment, and ozone treatment) to our research and commercial end-users. Source water is monitored with a dedicated multi-parameter Sonde

(input and discharge) and all research areas are supplied with oxygen from a central (liquid oxygen) system. Point 4 regulation is provided throughout. Building Management Systems (BMS) -based central monitoring and control provides continuous systems management. Particulate waste is intercepted and managed by anaerobic digestion.

The facility operates 192 tanks, providing 1510 cubic metres of rearing space including multiple broodstock and future broodstock tanks (three species) with automatic photothermal control, replicate investigative- scale larval rearing tanks, a 42-tank feed trial unit with photothermal control and a 6-tank high efficiency recirculating aquaculture system for the investigation of stock and system performance under intensive production conditions and a commercial scale (approximately 1 million per annum) marine fish hatchery and juvenile production facility.



**Aquatic Technologies
International, Inc.**



For more information, please contact

Daina Witehira-Dunn

Office Manager

Northland Marine Research Centre

Ruakaka

Email: daina.witehira-dunn@niwa.co.nz