



ALMA AQUACULTURE RESEARCH STATION

University of Guelph, Office of Research

Historical Overview of Facilities, Operations and Accomplishments

The Ontario Ministry of Agriculture, Food and Rural Affairs, in conjunction with the Ontario Ministry of Natural Resources and Forestry, and the University of Guelph, established the Alma Aquaculture Research Station (AARS) in 1993 in order to assist the commercial fish farming industry in Ontario. The mandate for this new research facility and quarantine unit, was primarily to address two basic objectives. The Alma station is utilized as an upscale, pre-production research and development facility to undertake inter-disciplinary studies relevant to primary producers. Secondly, Alma also provides quarantine facilities for disease studies, and for the controlled importation of exotic species or strains of fish, to assist the private sector with diversification and the pursuit of new business opportunities. In addition, the AARS provides state of the art facilities for pilot testing and scale-up research, as well as being a venue for education, training, industry demonstrations and technology transfer to the private sector. Lastly, the research station provides space for tours, meetings, etc. to demonstrate aquaculture to government, academic communities and the general public.

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WEBSITES:

AARS
<http://www.aps.uoguelph.ca/aquacentre/aars/aars.html>

AQUACULTURE CENTRE
www.aps.uoguelph.ca/aquacentre

The Alma Aquaculture Research Station occupies the old site of Creekbank Trout Farm, a commercial trout rearing operation that existed in the 1970's and 1980's. It is located 37 kilometers north-west of the University of Guelph, and six kilometers west of the town of Alma. The property consists of ca. 25 hectares of land. The 2 ha fenced compound houses the station buildings and ponds. The remaining 23 ha is comprised of hardwood and/or cedar bush and field cultivated with alfalfa or conifers.

The Station consists of ten buildings and facilities with a total floor space of 2,670 m².

- Administration Building – 3 photoperiod wet labs, 1 wet lab, bench-lab, offices and conference rooms, washrooms and storage.
- Quarantine Building and Recirculation – 3 isolation/recirculation wet labs, office and standby power room.
- Hatchery Building – incubation room and 1 wet lab.
- Spawning Shed
- B/C Lab Building – 2 wet labs, office and bench lab.
- Utilities Building – work-shop, pole barn and feed storage room.
- Water Treatment Centre and Water Pumping Centre
- Waste-Water Treatment Centre
- Outdoor Facility – concrete circular rearing tanks and fibreglass raceway tanks.
- Residence

Timeline of the AARS

1986: conceptual design for AARS completed, joint OMAFRA/OMNRF request for Phase I funding.

1987: joint OMAFRA/OMNRF request approved, water well development, construction of new buildings and retrofit of old buildings, water well drilling commences.

1988: water well pump tests concluded.

1989: commissioning of Phase I development, Station Manager hired, Certificate of Approval issued to allow Phase I operation, AARS starts limited operations in the Quarantine facility, North-West Territories Arctic charr eggs received into Quarantine.

1990: Labrador Arctic charr eggs, spring-spawning Washington State eggs and domestic rainbow trout fingerlings received to commence station stocking.

1991: Standby generator commissioned, first experiment initiated, application to Management Board for Phase II funding, request for Phase II funding approved, initial releases of Arctic charr and Atlantic salmon from Quarantine to the private sector.

1992: Phase II construction of Administration Building, Water Treatment Centre and water delivery systems complete.

1993: Waste-Water Treatment Centre commissioned, amended Certificate of Approval issued to allow Phase II operation, Phase II wet laboratories become operational for fish.

April 1993: Alma Aquaculture Research Station fully operational

1995: Installation of fibreglass broodstock holding tanks.

1996: Retrofit completed to study feasibility for solar water heating.

1998: Installation of three new pumping wells.

2003: Retrofit completed to provide recirculation capabilities in Quarantine rooms.

2007: Pump-house and flow monitoring system installed,

2009: Installation of a single membrane covered frame structure (Coverall 'Titan') over outdoor circular tanks.

2010: Installation of ventilation system within Coverall 'Titan'.

2011: Installation of 10KV ground – mount seasonal tilt solar collector.

2015: Installation of concrete, mixed-cell raceways

2016: LED lighting retrofit

There are 365 fish rearing units at the AARS that allow for production and research of a full range of fish, from egg to broodstock. Specifically, there are Heath-type incubators (21), 2m hatching troughs (29), 5m raceways (6), 6m raceways (5), a 10 m raceway (1), 0.7m semi-square tanks (104), 1.0m semi-square tanks (119), 2.0m semi-square tanks (70) and 10m circular tanks (10).

Water Delivery Systems

Source Water. Ground water is taken from an aquifer 20-40m below grade using submersible pumps in three wells and surface mounted centrifugal-end pumps from three other wells. Total sustained flow can be up to 7,044 lpm.

Reuse Water. After the ground water is treated in the Water Treatment Centre to oxygenate and remove nitrogen gas from the water, it is passed through various indoor fish rearing units and then treated in the Waste-Water Treatment Centre. Up to 100% of the treated water can be passed through the Water Treatment Centre a second time and be used in various outdoor fish rearing units, after which time it is treated in the Waste-Water Treatment Centre and the station's outdoor ponds prior to discharge into a receiving stream.

Three independent recirculation and quarantine rooms provide 12 circular rearing tanks per room (tanks 400 L), with water temperature maintained between 8°C and 30°C, maximum biomass 360 kg, maximum feed rate 7 kg per room per day, recirculation exceeding 95% (less than 5% total volume replaced), lighting and feeding regimens fully controlled, licenced species include rainbow trout, arctic charr, Atlantic salmon, tilapia, yellow perch, sturgeon and whitefish with flexibility for other species.

Research Projects

Since 1993, more than 175 research projects have been conducted at the Alma Aquaculture Research Station.

Table 1. Primary Areas of Research Interest at AARS ¹

Breeding and Genetics	Nutrition
Culture Methodology	Product Development
Engineering and Systems Design	Reproduction and Management
Fish Behaviour	Reproductive Physiology
Fish Health	Telemetry Studies
Fish Welfare	Waste Management
Growth Physiology	

Industry and Other Partnerships

Various industrial partnerships and proprietary research for feed, pharmaceutical, engineering and other companies involved in the aquaculture industry.

Quarantine and Stock Transfers to the Private Sector

A three-year technology transfer program with industry in which several unique genetic lines of rainbow trout, Arctic charr and Atlantic salmon were made available to broodfish farms in Ontario. Tilapia, Sturgeon and Whitefish also produced.

Education, Training and Tours

Co-op work terms, practicum course supervision and Industry focused workshops are regularly conducted. Facility tours for educators, industry and the general public are frequently given.

¹ See "Research Highlights" for more detailed information
<http://www.aps.uoguelph.ca/aquacentre/aars/research.html>