

# **Ontario Aquaculture Sector Profile - 2014**

## **FACT PACK**

## **Purpose of the Fact Pack**

This document is designed to ensure that at the start of our Research Prioritization and Strategic Planning Workshop, that everyone in the room has a similar understanding of the sector and the environment within which we planning, as well as important historic and potential future trends.

Please take the time to review and reference the information throughout our workshop so as to draw upon throughout the day. The contents of the fact pack are the following:

1. Ontario aquaculture sector fast facts
2. Ontario aquaculture sector profile
3. Ontario aquaculture contribution to the provincial economy
4. Ontario Aquaculture Markets: Competitive Advantage
5. Ontario Aquaculture: Regulatory aspects
6. Ontario Aquaculture: Future Strategic Planning, Prospects and Needs
7. OMAFRA information Alma Research Station and Aquaculture research in Ontario

## Ontario Aquaculture Sector Fast Facts - 2013<sup>1</sup>

<b>Major Species Produced</b>	- Rainbow trout
<b>Minor Species Produced</b>	- Arctic Char, brook trout, smallmouth & Largemouth bass, cyprinid baitfish and tilapia
<b>Total Rainbow Trout Production</b>	- 3,580 tonnes
<b>Total Other Fish Production</b>	- 210 tonnes
<b>Farm-gate Value of Rainbow Trout</b>	- \$18.0 million
<b>Farm-gate Value of Other Fish</b>	- \$1.2 million
<b>Economic Contribution</b>	- \$60 million
<b>Job Creation</b>	- 172 person-years direct and - 150 person-years indirect employment
<b>Projected Production of Rainbow Trout</b>	- approximately 4,100 tonnes in 2014

## Aquaculture – General Information<sup>2</sup>

- Aquaculture is the fastest growing food production sector in the world and produces about 50% of the aquatic food production.
- Canada is one of the world's key suppliers of farmed salmon, produced almost entirely in BC and New Brunswick.
- Canada ranks 27<sup>th</sup> in global aquaculture production and 20<sup>th</sup> in terms of value of production.
- Rainbow trout are the number one freshwater fin fish farmed in Canada.
- More than 85% of Canada's fish and seafood is exported, mainly to the USA.
- Most of Canada's trout production is in Ontario, 2% of the national production value.
- Canada is an ideal place for aquaculture because of the abundance of fresh and salt water thus; most of our provinces participate in aquaculture.
- Aquaculture in Canada generates over \$2 billion in economic activity, but has 'flat-lined' over the past decade due to regulatory uncertainties.

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<sup>1</sup> Source: Moccia, R.D, D.J. Bevan, 2014. Maintenance of Ontario's Aquaculture Statistics Program: 2013 AQUASTATS, Final Report Submitted to: Ontario Ministry of Natural Resources, Aquaculture Centre, Alma-University of Guelph.

<sup>2</sup> Aquaculture Fact Sheet, prepared by Farm & Food Care Ontario, 519-837-1326, [info@farmfoodcare.org](mailto:info@farmfoodcare.org), [www.farmfoodcare.org](http://www.farmfoodcare.org).

## Ontario Aquaculture Sector Profile

In 2013, we estimate that Ontario fish farms produced 3,580 tonnes (7.89 million pounds) of rainbow trout, primarily for human consumption. This is a 3.2% decrease from the 3,700 tonnes produced in 2012. Survey questionnaires were received from 47% of the facilities surveyed accounting for 95% of the total production. Estimates for non-reporting facilities were based on prior surveys and personal experience.

Lake-based cage production of rainbow trout in the Georgian Bay area continues to dominate other land-based production systems, accounting for 89% of the total production (Figure 1). Land-based production of Arctic char and tilapia is limited to a few facilities in southern Ontario. The production of brook trout, bass and other species is primarily geared towards pond stocking and recreational purposes. These operations provide an important diversity to the industry although quantifiable information is scarce. Our records suggest that approximately 55-60 facilities culture Arctic char, tilapia, brook trout, bass and other species, with an estimated total production of 210 tonnes in 2013.

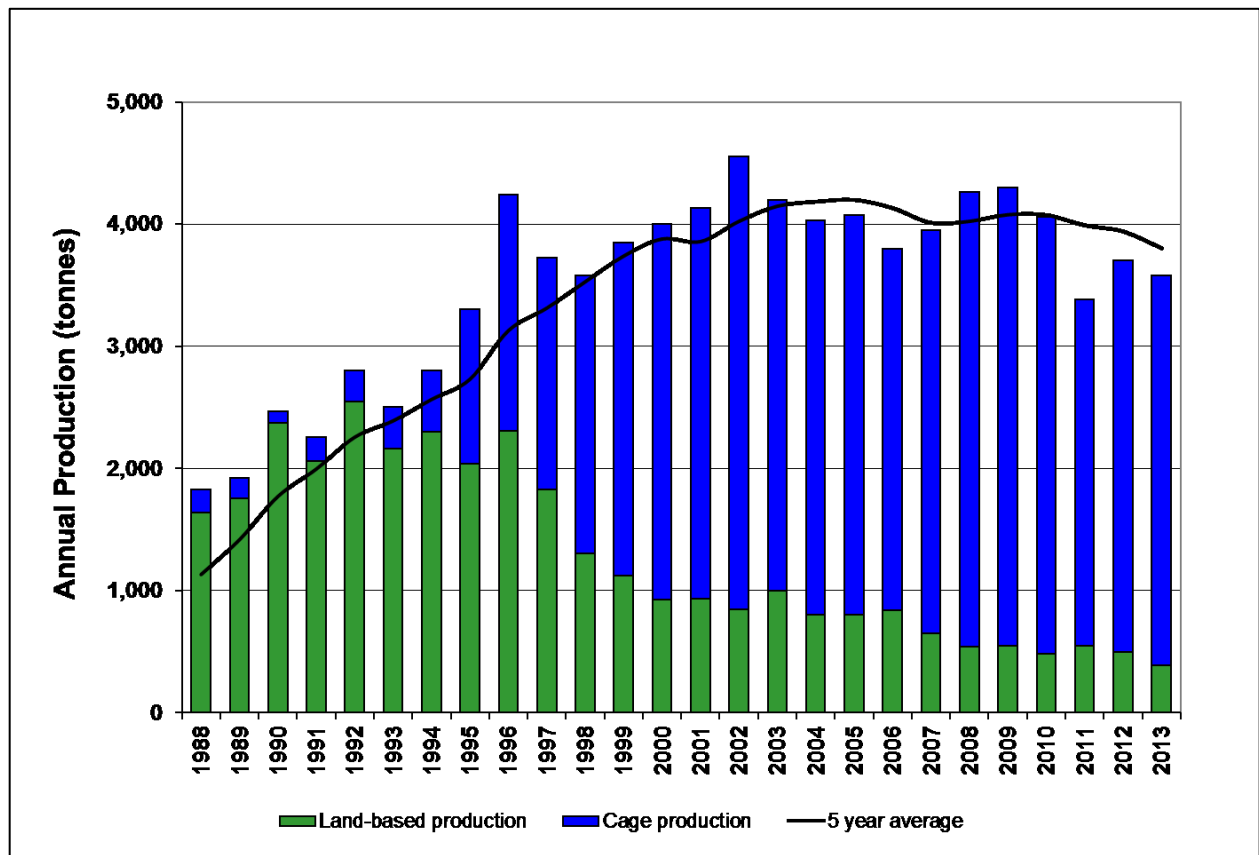
The total farm-gate value of the 3,580 tonnes of rainbow trout produced is estimated to be \$18.0 million, with an average price of \$2.28/lb (\$5.02/kg). The sale of Arctic char, tilapia, brook trout, bass and other fish species is estimated to be an additional \$1.2 million. More than 40 facilities are involved with pond stocking, typically rainbow trout, brook trout and bass. The value of this aquaculture sector is conservatively estimated to be \$1.5 million annually. In 2013, the Ontario aquaculture industry is estimated to have generated a total of 172 person-years of direct, on-farm employment. This consisted of 107 person-years of full-time employment (40 hours per week for 12 months) and 65 person years of part-time employment. Indirect employment is conservatively estimated at 150 person-years.

The total annual contribution that aquaculture makes to the Ontario economy is estimated to be \$60 million, with additional economic value realised via the recreational and aquaria trade.<sup>3</sup>

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<sup>3</sup> Source: Moccia, R.D, D.J. Bevan, 2014. Maintenance of Ontario's Aquaculture Statistics Program: 2013 AQUASTATS, Final Report Submitted to: Ontario Ministry of Natural Resources, Aquaculture Centre, Alma-University of Guelph, pg.4

**Comparison of Ontario land based and cage aquaculture between 1988 and 2013<sup>4</sup>**



<sup>4</sup> Source: Moccia, R.D, D.J. Bevan, 2014. Maintenance of Ontario’s Aquaculture Statistics Program: 2013 AQUASTATS, Final Report Submitted to: Ontario Ministry of Natural Resources, Aquaculture Centre, Alma-University of Guelph., pg. 5

## Ontario Aquaculture Contribution to the Provincial Economy<sup>5</sup>

In October 2006, the Northern Ontario Aquaculture Association (NOAA) initiated a study to examine the economic impacts of the cage culture industry in Ontario. A key objective of the study was to measure the economic impact of the cage culture industry through an analysis of direct and indirect economic benefits to the local and provincial economy.

The direct economic impacts (sales and jobs) associated with the Ontario cage culture industry were identified through a review of secondary data and key informant interviews with cage culture operators while the indirect economic impacts (sales and jobs) were identified through a survey of 'aqua-related' businesses that provide goods and services to the cage culture operators.

Unlike forestry, mining and agriculture, the aquaculture industry is a relatively new economic sector in Ontario. Lake based cage culture operations were established in the in the mid-late 1980s and have since come to represent the dominant production system in Ontario in terms of total fish production. Rainbow trout is the main fish species produced by the 7-8 cage culture operators in Ontario with most of these operations located in northern Lake Huron.

The cage culture industry makes an important contribution to community and regional economies in Ontario. In terms of direct benefits, Ontario cage culture operators produced a total of 3,275 tonnes of rainbow trout in 2005 which had a total farm gate value of \$12.5 million. The total employment associated with this production activity amounted to 50 full-time equivalent jobs.

With respect to the indirect impacts, cage culture industry linkages with local and regional suppliers of goods and services generate significant economic benefits across a range of industry sectors including manufacturing, retail and wholesale trade, construction, transportation, and business services. The results from this study indicate that these businesses generated an estimated \$38.2 million in cage culture related sales and sustained a total of 179 full-time equivalent jobs. Collectively, cage culture operators and the businesses they deal with generated a total of almost \$51 million in sales and supported 229 full-time jobs. This includes a substantial number of jobs in the value added sector with two major processing facilities located in Ontario.

The study determined that the cage culture industry sustains employment in numerous Northern Ontario communities including Little Current, Espanola, Manitowaning, Kagawong, Gore Bay, Mindemoya, Evansville, Val Caron, Parry Sound, Sudbury and North Bay. The bulk of this employment activity is linked to cage culture production and businesses that provide marina supplies and service, cage fabrication and maintenance supplies and service, construction/building materials, and processing. All of the cage culture production jobs and at

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<sup>5</sup> Source: Harry Cummings & Associates, 2007, Economic Impact of the Cage Culture Industry in Ontario, Funding by: FedNor, and NOAA. March 2007.

least 30% of the indirect jobs related to cage culture production are located in Northern Ontario.

The cage culture industry is also providing employment in a number of communities in Southern Ontario including Hanover, Fergus, Guelph, Kitchener, New Hamburg, St. Thomas, Woodstock, Holland Centre, Dunnville, Embro, Elmira, New Dundee, Shelbourne, Coburg and Toronto. The bulk of this employment activity is linked to businesses that are providing fish feed supplies, fingerlings, and processing.

The Ontario cage culture industry also sustains a small number of jobs in the Atlantic provinces where several fish feed suppliers and netting and rigging suppliers are based. The economic multipliers associated with the Ontario cage culture industry are substantial. The study determined that the cage culture industry has an employment multiplier of 4.5 and a sales expenditure multiplier of 4. These multipliers suggest that every job in cage culture production sustains an additional 3.5 jobs in the wider economy while every dollar in farm gate sales generates an additional 3 dollars in the wider economy.

Using slightly more conservative multipliers and assuming a 10% annual increase in production it is estimated that the Ontario cage culture industry could be producing as much as 8,400 tonnes of rainbow trout in 10 years. The direct on-farm employment associated with this production would amount to approximately 130 full-time equivalent jobs with a further 389 full-time indirect jobs sustained in the wider economy. In terms of sales, the total annual farm gate receipts at the end of the 10th year of production would amount to almost \$34 million with a further \$84 million in indirect sales related to businesses that deal with cage culture operations.

Cage culture operators and the businesses they deal with identified a number of industry strengths. A key strength relates to the experience and resourcefulness of the cage culture operators and industry stakeholders who helped build the industry from the ground up over a short span of 20 years. The commitment of operators to engage and take the lead in science based research and development initiatives was also cited as an important feature of the industry. Operators are passionate about seeing the industry succeed and believe the industry has considerable potential for future expansion. Aqua-related businesses strongly support the expansion of the cage culture industry and believe Ontario has substantial bodies of fresh water to accommodate further growth. Industry stakeholders also recognize the importance of the industry in supporting small businesses in Northern Ontario and providing stable employment in rural communities.

In terms of challenges, the key issue as identified by cage culture operators and the businesses they deal with is the lack of functional government regulations and guidelines which is preventing cage culture operations from expanding existing sites and accessing new sites. With the Ontario cage culture industry being “held back”; operators believe that competitors from other regions of Canada and international producers are gaining a competitive advantage.

There is also concern that regulatory bodies are being misinformed and influenced by special interest groups such as environmental activists. Industry stakeholders would like to see objective science based regulations as the only standard used for determining policy and guidelines. Cage culture production represents a first generation industry in Ontario and operators feel they have not been adequately recognized for the substantial work and research they have undertaken to establish the industry over the last 20 years while complying with all of the regulations.

This study has found that the cage culture industry in Ontario produces important economic benefits for rural communities across Ontario including many communities in Northern Ontario. The industry is productive and entrepreneurial. It has also demonstrated its ability to diversify local economies and provide stable employment. The industry has even greater future economic potential for Ontario and the province possesses considerable freshwater resources for supporting the expansion of the industry. For the cage culture industry to thrive and maintain its economic viability, regulatory agencies will need to make a strategic commitment to address institutional barriers and enable its future growth.



## Ontario Aquaculture Markets: Competitive Advantage<sup>6</sup>

A range of biophysical, technological and demographic factors suggest that aquaculture in Ontario has every opportunity to compete and succeed, owing to the following competitive advantages:

- A biophysical resource base well suited for the production of trout (i.e. water supplies, production sites, etc.);
- Potential to increase exports to the U.S., which is increasingly dependent on imported seafood and where the market for trout is supply-limited;
- A considerable potential and need for agricultural diversification and latent infrastructure to support development;
- Favourable currency exchange rates;;
- Leading freshwater aquaculture R&D capacity, namely at the University of Guelph, Fisheries and Oceans Canada's Experimental Lakes Area, Environment Canada's Canadian Centre for Inland Waters;
- Established infrastructure for transportation, communication, low-cost energy, etc.;
- An available skilled and trainable labour pool; and
- Knowledgeable and experienced aquaculture management with a desire to support sustainable development and expand operations.

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<sup>6</sup> Source: Canadian Aquaculture Systems Inc., 2009. Strategy for Sustainable Aquaculture Development in Ontario, March 2009.

## **Ontario Aquaculture: Regulatory Aspects<sup>7</sup>**

The Northern Ontario Aquaculture Association continues to push forward with regulatory modernization efforts for aquaculture in Ontario. In 2011, the association began working closely with the Ontario Federation of Agriculture, who are the agriculture sector leads for Ontario's 'Open for Business' Act. There have now been two major meetings in 2013 at Queen's Park, led by Premier Kathleen Wynne and with representation by senior MNR, MOE, and OMAF people. There will be a third meeting in March 2014 that is specifically about aquaculture.

Our major 'asks' have been for an extended licence term (from 5 years to 20 years), which will provide our industry with greater owner-operator security and increase investment attractiveness; and a hearing (appeal) process for aquaculture that is similar to those available to other provincially licensed resource sectors. The Open for Business initiative was undertaken by the Government of Ontario to create faster and more streamlined government to business services that respond to the needs of business while saving time and money. One of the more than 100 amendments includes establishing a modern risk-based approach to environmental approvals, which could save businesses time and money on approvals.

As part of this initiative, the government has been establishing collaborative working relationships between government and key business stakeholders in order to drive economic growth. As the leading advocate for Ontario farmers, the Ontario Federation of Agriculture (OFA) became the lead and spearheaded consultations with the farm and agri-food sector. This initial consultation process is complete. It worked so well that an ongoing forum in which to present regulatory changes was needed to make Ontario farm businesses run smoother. Nearly two years after the first meetings, Open for Business representatives continue to meet, bringing together relevant ministries to discuss problematic regulations.

So far, the group has managed to hold positive discussions with government ministries representing agriculture and food, transportation, environment, labour, finance, industry, economic development, energy, natural resources, and aquaculture.

OFA representatives are pleased with the progress the Open for Business consultations have made in addressing red tape issues in order to support successful farming and agri-business in Ontario. Meetings are held up to four times per year with ministry staff to raise issues and identify items requiring follow-up from specific ministries. The OFA will continue to facilitate these discussions for as long as there is a need, thus ensuring prosperous and sustainable farms. Our requests are being heard as this provincial shift towards economic development and job creation continues. We will continue to keep the pressure on!

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<sup>7</sup> Source: 2013 Annual Review, Northern Ontario Aquaculture Association

## *Nutrient-Phosphorous Sediment Policy Update*<sup>8</sup>

NOAA continues to push for an agreement on the approach to sediment management and policy development as part of our regulatory modernization efforts.

Sediment policy development work is slowly moving forward. Discussions up to Spring 2012 utilized a collaborative approach that allowed for input from First Nations, academia, industry, non-governmental environmental organizations, and both federal and provincial government agencies. The Spring 2012 meeting was highly productive and produced the following objectives:

- To receive and discuss the report of the technical team describing a benthic monitoring program for aquaculture operations in Ontario;
  - To reach consensus on the monitoring program;
  - To provide input on potential triggers associated with the monitoring program;
  - To provide input on mitigation and compliance activities for consideration; and
  - To determine next steps in development and implementation of the monitoring program.
- The meeting was facilitated by DFO and MNR, with cooperative consensus on many points and an excellent relationship building effort from all participants. At the end of 2012, only these components were still missing:
- Management tools - mitigation and compliance; and
  - Industry concerns to be addressed in sampling protocols.

It became evident by mid-2013, through the release of a 'revised' set of MNR/MOE Sediment Licence Conditions that the collaborative process had fallen off the rails. NOAA worked to reinstate the enabling consensus approach and meetings were once again scheduled to bring the process back to an all inclusive approach to sediment policy development. DFO performed an intense Science Review comparing the two documents.

Scheduling challenges in late 2013 resulted in a failure to bring the collaborative group back to the table to review the rationale for changed objectives and altered monitoring approaches. A meeting was held in early 2014 and a more thorough review of the science based approach was conducted.

Despite NOAA's best efforts to stay the course, forward progress continues to be hampered by changes to regulatory agencies' approaches to sediment management. Equally troubling is the ever changing cast of regulatory staff that oversee aquaculture policy development.

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<sup>8</sup> Source: 2013 Annual Review, Northern Ontario Aquaculture Association

## *Wild Fisheries Assessment and Monitoring Protocol<sup>9</sup>*

The 2012 new cage site application evoked a review process of historical wild fisheries assessment and monitoring protocols as well as further interpretation of the Coordinated Guide for Aquaculture's requirements for wild fisheries monitoring.

The Ontario Ministry of Natural Resources (MNR) embarked on a lengthy internal process to assess needs and processes. Industry is not in support of massive lethal gill netting and is openly encouraging non-lethal technology such as hydroacoustics and digital imagery. This has been identified as a research priority by the association. There is currently a movement towards a 5 to 7 year research project that will explore new monitoring options. Through informed dialogue, there has been a new wild fisheries monitoring program agreed to by MNR in advance of the ground proofing of new non-lethal methods.

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<sup>9</sup> Source: 2013 Annual Review, Northern Ontario Aquaculture Association.

## **Ontario Aquaculture: Future Strategic Planning, Prospects and Needs**

As a long standing board member of the Canadian Aquaculture Industry Alliance (CAIA), the Northern Ontario Aquaculture Association's Executive Director, Karen Tracey, was asked to sit as a member on the National Industry Government Working Group. As such, Karen, and the Ontario aquaculture industry she represents, is intimately involved in the development and guidance of the much needed National Aquaculture Strategy and the introduction of a federal Aquaculture Act.

In response to the 'Strategy for Sustainable Aquaculture Development in Ontario', developed in the summer of 2009 (5 years ago), NOAA has the following update to outline in terms of Strategic Action Items:

**1. Establish intergovernmental and government/industry committees and forums to advance sustainable aquaculture in Ontario.**

*√ Completed. As of 2012, NOAA is a member of the Aquaculture Management Committee (AMC).*

**2. Establish an Ontario Aquaculture Advisory Board (OAAB).**

*√ Completed. Incorporated into AMC.*

**3. Establish an Ontario Aquaculture Research & Development Advisory Committee.**

*√ Completed. Incorporated into AMC.*

**4. Improve security of tenure for aquaculture operators.**

*√ Ongoing.*

**5. Establish a comprehensive Ontario Aquaculture Policy rooted in the principles of science based resource stewardship and adaptive management.**

*√ Ongoing.*

**6. Develop a harmonized and streamlined site selection and application process based on sound science and with appropriate service standards.**

*√ Ongoing. New licence applications are moving forward.*

**7. Enhance the efficiency and effectiveness of operational policy and regulations governing aquaculture.**

*√ Ongoing. Open for Business process moving forward.*

**8. Review and implement the 'Best Management Practices for Sustainable Aquaculture in Ontario' developed in 2006.**

√ Ongoing. Will be completed by fall of 2014.

**9. Implement a domestic trout broodstock program.**

√ Deferred to a Feasibility Study due to budgetary and logistics challenges.

**10. Support development of a national aquaculture certification standard.**

√ Completed. CAIA led/NOAA coordinated 2 year eco-certification study. Most farms are now eco-certified under various standards.

**11. Develop and implement a Communications Strategy for Ontario aquaculture.**

√ 90% completed.

**12. Explore the benefits of a Site Restoration Bond Fund to safeguard site remediation.**

X To be completed or reassessed.

**13. Engage social scientists to conduct research and development pertaining to the socio-economic aspects of aquaculture development.**

√ Sector of focus in CAIA led Canadian Socio-Economic Study. NOAA to conduct further review beyond 2014.

**14. Establish a cage aquaculture demonstration farm project to develop and evaluate innovative technologies and practices designed to enhance the social and environmental sustainability of the sector.**

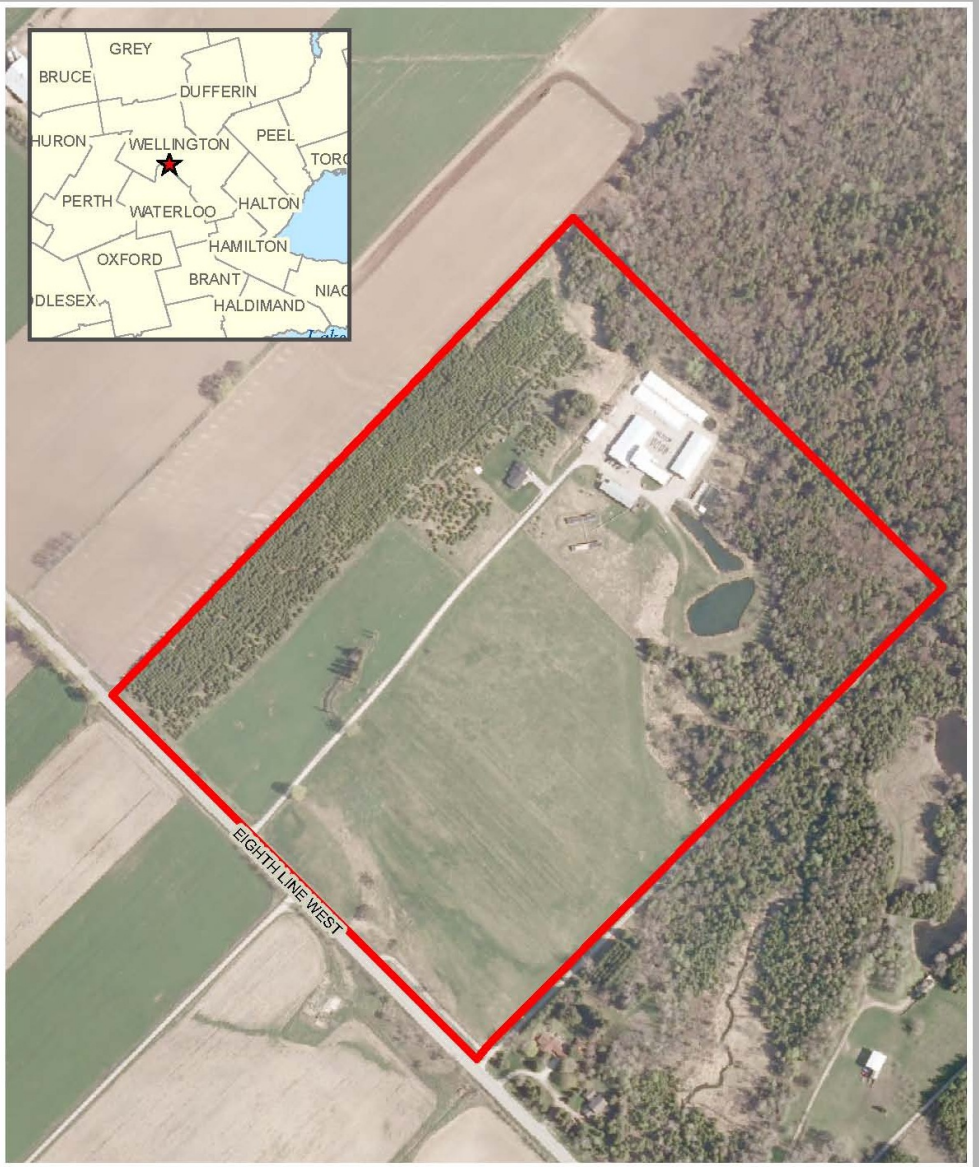
√ Stalled due to lack of previously available DFO funds. Talks ongoing in 2014 to assist with facilitation of private research station.



# **ARIO Infrastructure Portfolio**

## **Alma Research Station**

July 2014



ALMA.mxd  
Aug. 2011 © Queen's Printer for Ontario 2011  
For illustrative purposes only.  
\*Areas and Limits to be confirmed by survey.







## Alma - Profile

- Land: 51 acres
- Buildings: 9 – 34,399 sf
- Aquaculture Research - Facilities for quarantine and re-circulation, hatchery, indoor/outdoor holding tanks, laboratory, administration
- Quarantine facility for controlled importation of exotic species or strains of fish
- 365 tanks (90 to 60,000 litres) with capacity for 70-200,000 fish
- Land used for nutrient management
- Water taking permit for up to 1,500 gallons per minute
- Provincial resource – used by other ministries and other levels of government (including Federal)
- Research Focus: Aquaculture research on several fish species relevant to Ontario and Canada. Quarantine facility for the controlled importation of exotic species or strains of fish.
- Station is the only facility of its kind in Ontario and one of only three in Canada.
- Very automated facility. Few staff. Very cost effective to operate.

## OMAFRA/U of G Partnership

- 12 fish research projects since 2008 in the Production Systems, Emergency Management and Product Development and Enhancement research themes:
  - Production systems - genetic improvement and fish health.
  - Emergency Management - detection and surveillance
  - Product development and Enhancement - food processing.

## New Directions (open competitive)

- 2 projects (\$284,000)
  - Environmental impact

# Aquaculture Research

## New Directions

Assessing the efficacy of subsurface flow constructed wetland cells for their treatment of land-based fish farm discharge	B. Wootton Fleming College	84,000
Innovative approaches to water treatment for land based fish farms for recirculation and discharge	B. Wootton Fleming College	200,000

## OMAFRA/U of G Partnership - Production Systems

The effects of ration reduction on the growth, feed conversion, fillet yield and flesh pigmentation of rainbow trout and its economic implications to large-scale rainbow trout culture	R. Moccia	17,000
Improving the management of bacterial coldwater disease in rainbow trout aquaculture via autogenous vaccination and family susceptibility.	J. Lumsden	83,000
Molecular pedigree analysis for the establishment of an elite rainbow trout broodstock with maximal growth and spawn-timing performance	R. Danzmann	150,000
Better control of bacterial cold water disease by the development of an effective <i>Flavobacterium psychrophilum</i> vaccine	J. MacInnes	95,000
Investigating radiation bystander effects in fish: implications to resource management, environment and farm animal health	R. Moccia	
The application of genomic approaches to rainbow trout aquaculture	R. Danzmann	
Effects of stressor hormones on reproductive success, and early embryo development of rainbow trout	J. Leatherland	20,000
Evolutionary, developmental and physiological genetics of Salmonid fishes	R. Danzmann	47,000
Infrastructure support for Arctic Char aquaculture research	Ferguson	

## OMAFRA/U of G Partnership - Emergency Management

Burkholderia-like bacterium and epitheliocystis in rainbow and lake trout	J. Lumsden	18,000
Rapid diagnostic techniques and susceptibility of commercially important fish species for the surveillance of Spring Viremia of Carp in Ontario	J. Lumsden	72,800

## OMAFRA/U of G Partnership - Product Development

Cost-effective processing technologies to improve the value to aquaculture species of products and by-products	D. Bureau	50,400
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