

Ontario Aquaculture Research
and Services Coordinating
Committee

A LONG TERM DEVELOPMENT
OUTLOOK FOR
AQUACULTURE IN ONTARIO

May 1993



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DEVELOPMENT OUTLOOK FOR
AQUACULTURE IN ONTARIO**

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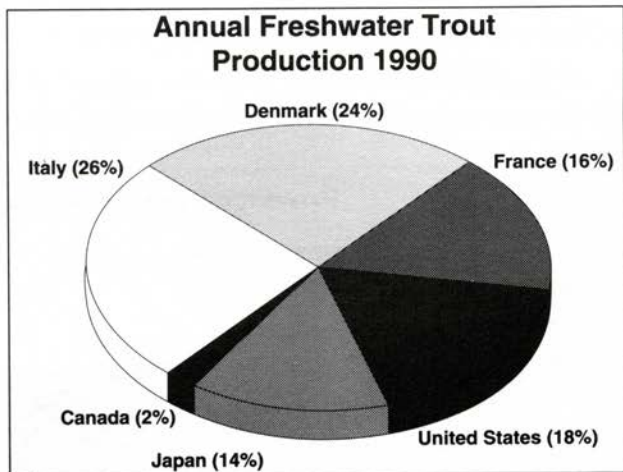
All figures and photographs provided by Richard Moccia with the exception of the "Sac Fry" photograph which was kindly supplied by Dr. Laura McKay.

INTRODUCTION

BACKGROUND

The future of the global aquaculture industry is very positive. Increases in world population as well as per capita consumption of seafood, coupled with a declining wild harvest fishery all contribute to this optimistic outlook. Many countries in the world utilize fish for half of their dietary source of animal protein. By contrast, in North America we only consume about 9% of our animal protein from seafood. There are many indications that our per capita consumption of all seafood products will rise substantially in the next decade. The demographic profile of the population is changing rapidly in large urban centres to include more fish-eating consumers. The general public is being educated about the important health benefits of consuming seafood, and they are recognizing that aquaculture can supply a fresh and safe food product. All this means that the total demand for aquaculture products will continue to rise, both regionally and globally. The aquaculture industry in Ontario has an ideal opportunity to capitalize on this increasing demand for seafood products.

However, to accomplish this, a comprehensive strategy is necessary to ensure the successful development of the Ontario industry into the next decade.

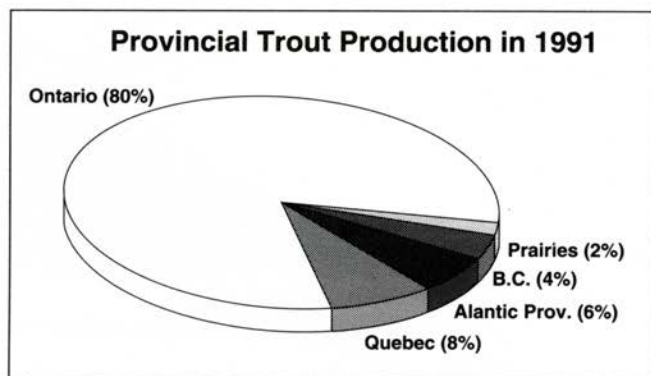


CURRENT STATUS AND OUTLOOK

The Ontario aquaculture industry began in 1962, and has grown to nearly 200 commercial fish farms producing over 2,700 tonnes per year of rainbow trout for human consumption. The industry is facing increasing competition from producers of farmed seafood products around the world. Periods of boom and bust in a developing sector of agriculture are predictable, due to rapidly changing market dynamics as well as production inefficiency inherent in many farm operations. In addition, rapid advances in technology, and an evolving legislative and regulatory environment, make it difficult for the industry to achieve stability during its early years of development. This results in ongoing rationalization and restructuring of the industry.

On the other hand, the decline in wild-harvest fisheries and changes in consumers eating habits, are providing opportunities for aquaculture to replace existing supplies as well as filling new demand. Trout typically sell at lower prices than salmon and cost less to produce. Trout have the potential to become a regular component in the diet rotation of North American consumers, in a manner similar to catfish in the southern U.S. The increase in public interest in seafood is creating an opportunity for Ontario farms since they produce a high quality, contaminant-free fish product.

At the present time, rainbow trout is the only species of economic importance permitted for culture in Ontario. Opportunities exist for the production and sale of other species that are being considered under proposed revisions to provincial legislation (Appendix II). Opportunities also exist for expanding the

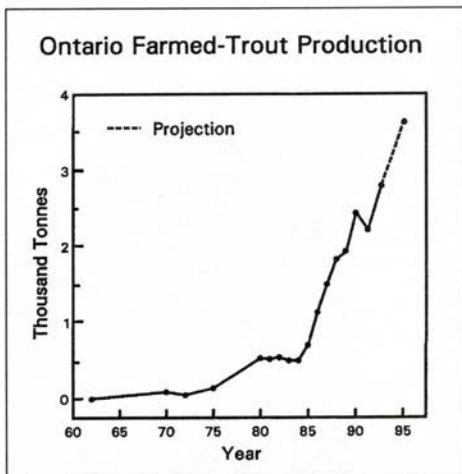


sport fishing market to supply angler demand in both private and public waters and through participation in government stocking programs.

Seafood consumption in Canada is low with a per capita level of only 8.5 kg. Canada exports a large percentage of its wild harvested fishery products to the U.S.A., Japan and Europe. In spite of Ontario's wide demographic profile, trout is not widely popular and is considered by many to be an expensive commodity. Throughout its 30 year history, the industry's production output has never been well synchronized with market demand. There is an urgent need to coordinate farm output with promotional and sales initiatives at the wholesale and retail levels.

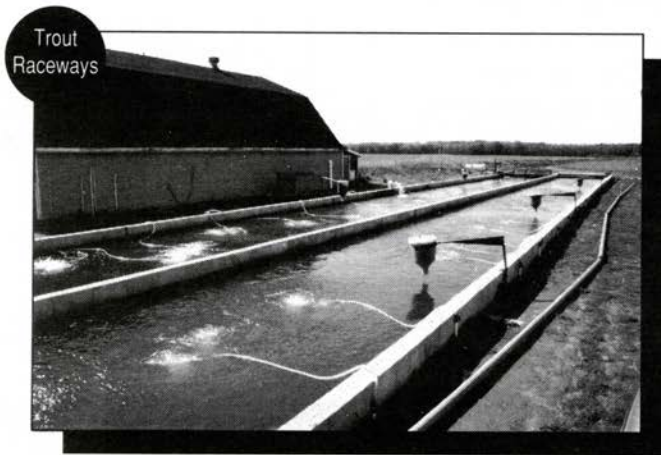
Orderly development of the aquaculture industry in Ontario requires consensus on the rational priorities and specific goals needed to guide both the public and private stakeholders through the next decade. The common objective is to enhance the production skills in the private sector, specifically as they relate to improving profitability of the primary farming unit. In addition, more efficient production technology and management systems need to be developed to assist in the overall competitiveness of the Ontario industry in the global marketplace.

This document has been developed by the Ontario Aquaculture Research and Services Coordinating Committee (Appendix III), and aims to provide a blueprint for future action by both government and industry.



MISSION STATEMENT:

To Promote Orderly Development
of the Aquaculture Industry in the
1990's and Beyond



GOALS:

1. To advocate the sustainable development of the aquaculture industry, while protecting the natural environment and aquatic resources.
2. To expand existing markets and identify new domestic and export opportunities.
3. To encourage diversification of the industry in terms of activities, species and products.
4. To ensure that the industry products are of consistent high quality and good nutritional value.
5. To increase public awareness and consumer confidence in aquaculture.
6. To enhance research and development and technology transfer for the aquaculture industry.

GOAL 1

To advocate the sustainable development of the aquaculture industry, while protecting the natural environment and aquatic resources.

The ecosystem approach must now be an integral component of all rational environmental and resource management strategies. The United Nation's call for sustainable development has been adopted by the Canadian government as a cornerstone of its policies. Sustainable development implies safeguarding for posterity, the integrity and health of all ecosystems. Recognizing that successful aquaculture is dependent upon high quality water and aquatic animals, the industry must take steps to protect and enhance the aquatic environment. In this regard, it is necessary to;

1. Regulate and monitor the introduction of species into bodies of water where they are non-indigenous (DFO, OMNR¹).
2. Establish guidelines for aquaculture effluent handling and treatment in Ontario (OMEE, OMNR).
3. Regulate labelling on fish feed bags to include ingredient listing, precise composition and expected waste generation at given feeding rates (AC, OMEE).
4. Encourage (and advise on) fish containment and aquaculture effluent control where new technology for the culture of alternative species is adopted (OMEE, OMNR).
5. Investigate more humane methods of fish handling and killing to ensure good husbandry and superior product quality, leading to Codes of Practice for Aquaculture (OAA, OMAF).

¹ Agencies underlined are those with suggested primary responsibility for action. Abbreviations are given in Appendix 1.



6. Provide technical expertise for aquaculture facility design (including retrofitting) to conform to effluent guidelines (DFO, OMAF, OMEE, OMNR, PS).
7. Improve recirculating systems to reduce water consumption, control waste discharge, eliminate escapement and provide appropriate conditions for warmer water species.
8. Encourage the culture of baitfish species which are indigenous to Ontario. Develop regulations for the commercial baitfish industry to control over-harvesting, illegal importation, spread of pathogens and transfer of exotic species (OMNR).
9. Initiate media response to represent aquaculture as an environmentally responsible industry and as an industry enhancing our natural resources and concerned with animal welfare (OMAE, OMNR).

Alma
Research
Station



GOAL 2

To expand existing markets and identify new domestic and export opportunities.

Total consumption of trout in Ontario is low, in spite of a population nearing 11 million. To date, there has been no organized attempt to capitalize on the diverse market opportunities and evolving demographics which exist in this province and neighbouring American states. Most of the industry's products are simply sold to seafood brokers, which fails to enhance the profile of our domestic industry. Improved market development will require that we;

1. Establish a generic marketing program for Ontario grown aquaculture products (EDC, OAA, ODC, OMAF, OMEDT).
2. Use information from market intelligence and commercial trend analysis to guide the development of value-added products, identify and exploit market opportunities, and implement product quality assurance programs (DFO, OMAF, OMET).
3. Fund and support advertising in the use of different aquaculture products, industry wide (OAA, OMAF).
4. Initiate media attention on aquaculture diversification in Ontario (AEC, OAA).
5. Test market new species, new product lines and environmentally responsible packaging (OAA, OMAF, OMEE, OMET).
6. Examine potential for networking with local seafood distributors (AEC, OAA).
7. Adopt proven technology to develop new product lines and post-harvest technology (OMAF, OMET).
8. Invite public participation in the aquaculture industry through student tours and speaking engagements (OAA with Public School Boards).

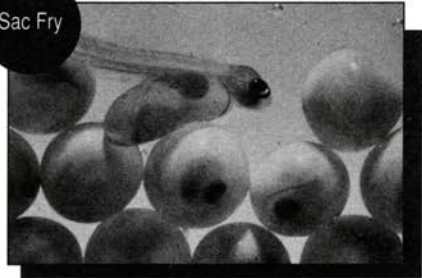


GOAL 3**To encourage diversification of the industry in terms of activities, species and products.**

Long-term development of aquaculture in this province cannot rely solely on the production of rainbow trout. Many new opportunities are available to farm other fish species, as technology and market demands evolve. There is a requirement for improved product development, packaging and presentation, to bring seafood sales into the modern day world of microwave ovens and fast foods. Successful diversification will require that we;

1. Amend Game and Fish Act, to expand the list of species permissible for culture (AEC, OAA, OMNR).
2. Review OMNR District Fisheries Management Plans to eliminate unnecessary restrictions on the culture of certain species in various locations (OAA, OMNR).
3. Explore opportunities to offer contract production for hatchery-dependent recreational fisheries (OAA, OMNR).
4. Continue to import appropriate species and stocks through the Alma Research Station and Quarantine Facility (ARS, DFO, OAA, OMNR).
5. Provide technical expertise for program development of innovative alternative species culture to members of the industry and the public (AEC, ARS, OMAF).
6. Provide training programs for the transfer of new technology in terms of species and products (AEC, OMAF, SSFC).
7. Inform the public and business sector of the investment potentials associated with an expanded species list (AEC, ODC, OMAF) by initiating articles in business magazines and the popular press.

Sac Fry



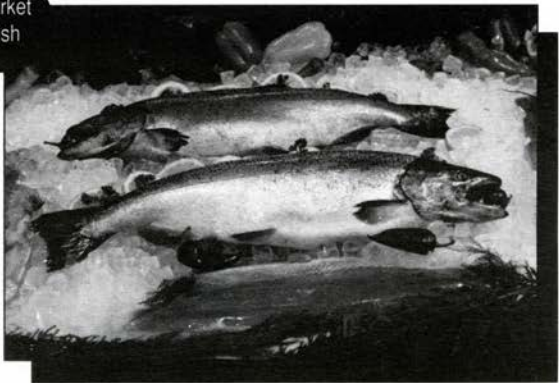
GOAL 4

To ensure that the industry products are of consistent high quality and good nutritional value.

To ensure consumer confidence, safety and satisfaction, the industry must develop codes of practice to maintain high product quality without compromising animal care. Inconsistency of product size, flesh colour and quality in general, must be overcome to meet consumer expectations. This requires that government and industry;

1. Take lead role in establishing quality control of products (OAA, OMAF).
2. Develop government endorsed quality assurance programs for aquaculture products (DFO, OAA, OMAF).
3. Implement a fish inspection program in Ontario for farm-raised fish, complementing the existing federal program (DFO, OMAF, OMNR).
4. Establish more expedient processes for the development and registration of drugs and chemicals required in aquaculture (AC, DFO, HWC, OMEE, OMNR).
5. Investigate the availability of existing technologies in food processing in other industries which may be adapted to aquaculture, leading to superior product quality, (OMAF).
6. Provide seminars, workshops and training programs on the responsible use of drugs and chemicals in aquaculture, and on processing and storage of aquaculture products. (AEC, OMAF, OMEE).

Market Fish



Adult
Trout



GOAL 5

To increase public awareness and consumer confidence in aquaculture.

Few consumers in Ontario are aware of the fact that a significant fish farming industry exists in this province. Knowledge of the availability and quality of locally farmed fish, as well as the ease of its preparation will contribute greatly to increasing demand. Effective industry promotion demands that we;

1. Establish legal definitions and labelling standards for aquaculture products in harmony with national and provincial requirements (DFO, HWC, OMAF).
2. Use available means to educate the public about aquaculture and the nature of its products, such as with the publication of brochures, cooking guides, magazine articles, speaking engagements to target audiences and radio and TV interviews. (DFO, OMAF).
3. In order to educate the adults of tomorrow, develop appropriate curricula for high school, University and College level students studying aquaculture (AEC, OMET, UG).

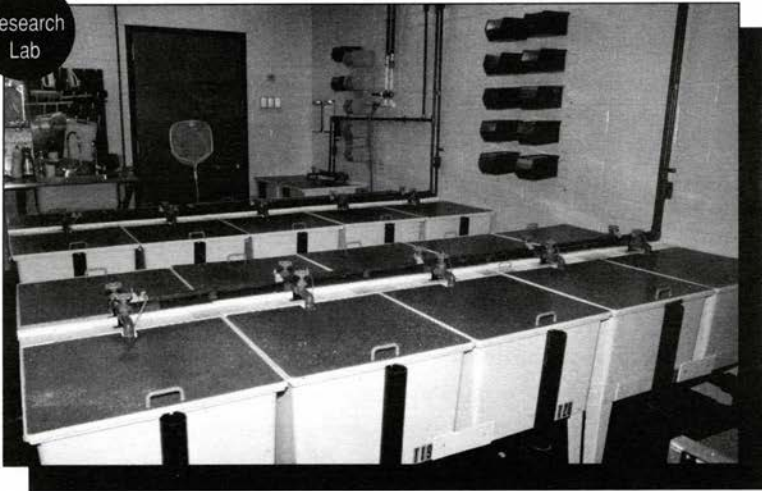
GOAL 6

To enhance research and development and technology transfer for the aquaculture industry.

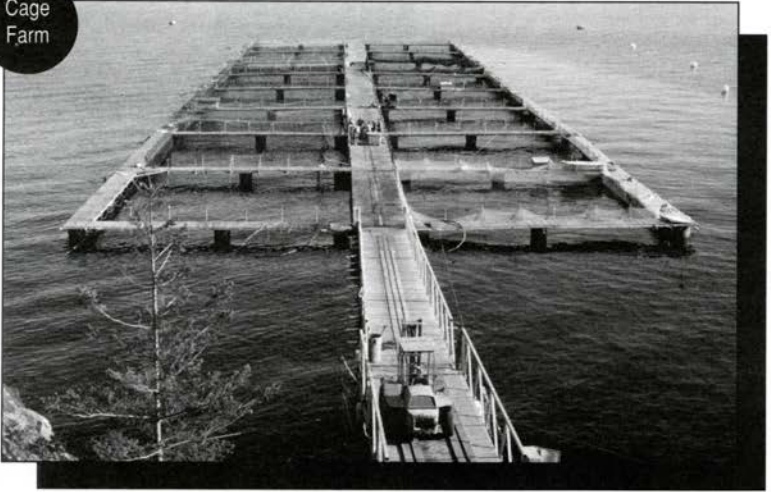
Maintaining the competitiveness of Ontario aquaculture requires ongoing improvements in everything from fish feeds to waste disposal. It will be important to support continued efforts in basic and applied research, and to improve effectiveness of the transfer of profitable technology to the private sector. Canada and Ontario have a wealth of scientific and business expertise in all areas of agriculture and fisheries science, and these strengths must be brought to bear on the challenges facing the developing commodity industry of aquaculture. To meet these goals, the industry and government must;

1. Fund research efforts to minimize the environmental effects of aquaculture.
2. Reduce significantly the cost of feeding trout through reformulation, improved processing techniques and feeding strategies, and fish meal replacement.

Research
Lab



Cage
Farm



3. Fund and promote research on the use of drugs and chemicals in aquaculture.
4. Continue to fund studies on fish diseases, in particular the interaction between farmed and wild fishes to develop effective prophylactic and therapeutic regimes for treatment.
5. Design economic models for forecasting and assessing the effects of new technology, as well as the efficiency of alternate production systems.
6. Establish expanded extension and support service programs to facilitate technology transfer, information dissemination and farm service assistance.
7. Establish a genetics and breeding program to optimize the genetic gain, thereby improving the production performance of rainbow trout and other species.
8. Fund research projects on the culture methods for alternative species.
9. Encourage the development of intensive, recirculating rearing systems to reduce water usage, enabling expansion of existing farms with limited water supplies, and economies of scale.
10. Develop reliable methods for detecting chemical residues in fish products.

APPENDIX II: LIST OF SPECIES PROPOSED TO BE ELIGIBLE FOR CULTURE IN ONTARIO

Lake sturgeon	<i>Acipenser fulvescens</i>
Atlantic salmon	<i>Salmo salar</i>
Brown trout	<i>Salmo trutta</i>
Brook trout	<i>Salvelinus fontinalis</i>
Lake trout	<i>Salvelinus namaycush</i>
Arctic char	<i>Salvelinus alpinus</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>
Coho salmon	<i>Oncorhynchus kisutch</i>
Pink salmon	<i>Oncorhynchus gorbuscha</i>
Rainbow trout	<i>Oncorhynchus mykiss</i> (formerly <i>Salmo gairdneri</i>)
Lake whitefish	<i>Coregonus clupeaformis</i>
Lake herring (cisco)	<i>Coregonus artedii</i>
Muskellunge	<i>Esox masquinongy</i>
Northern Pike	<i>Esox lucius</i>
Creek chub	<i>Semotilus atromaculatus</i>
White sucker	<i>Catostomus commersoni</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Fathead minnow	<i>Pimephales promelas</i>
Redbelly dace	<i>Phoxinus eos</i>
Finescale dace	<i>Phoxinus neogaeus</i>
Common shiner	<i>Notropis cornutus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>

Emerald shiner	<i>Notropis atherinoides</i>
Common carp	<i>Cyprinus carpio</i>
Goldfish	<i>Carassius auratus</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Channel catfish	<i>Ictalurus punctatus</i>
American eel	<i>Anguilla rostrata</i>
Largemouth bass	<i>Micropterus salmoides</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Bluegill	<i>Lipomis macrochirus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Walleye	<i>Stizostedion vitreum</i>
Sauger	<i>Stizostedion canadense</i>
Yellow perch	<i>Perca flavescens</i>
Tilapias	of the genera <i>Oreochromis</i> , <i>Sarotheradon</i> , <i>Tilapia</i>
Crayfish	<i>Orconectes immunus</i> <i>O. garulus</i> <i>O. propinquus</i> <i>O. rusticus</i> <i>Cambarus robustus</i> <i>C. bartonii</i>



APPENDIX III: THE ONTARIO AQUACULTURE RESEARCH AND SERVICES COORDINATING COMMITTEE

The Ontario Aquaculture Research and Services Coordinating Committee (OARSCC) was established in 1985, to provide a forum for the exchange of ideas between the industry and those government agencies that administer legislation or provide services to fish farmers in Ontario. This committee is part of a well established system of committees which coordinate agriculture research and services at both the federal and provincial levels. Representatives from the following groups or agencies constitute the membership of OARSCC.

Government Agencies (one representative each)

Department of Fisheries and Oceans Canada
Ontario Ministry of Natural Resources
Ontario Ministry of Agriculture and Food
Ontario Ministry of Environment and Energy

Industry

Ontario Aquaculture Association (four representatives)
Other Ontario Industry Members (two representatives)

University (one representative each)

Extension Coordinator (University of Guelph)
Research (University of Guelph or other Institution)

Other

One representative from either of the service, marketing, promotion, consumer, food safety and quality, business or other relevant sectors.