AQUASTATS
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Ontario Aquacultural Production in 1995 and Situation Outlook

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Summary

In 1995, the Ontario aquaculture industry produced approximately 3,300 tonnes of rainbow trout for human consumption, with a farm-gate value of $12.5 to 14 million. Limited quantities of Arctic charr, Atlantic salmon, tilapia and cyprinid baitfish were also produced. The industry generated approximately 250 person-years of direct employment plus another 250 person-years of indirect employment. Total economic contribution of the industry to Ontario's private sector is estimated at $50 million. Legislative reform occurred in 1995 permitting the culture of 26 new species of food-fish, 9 species of native baitfish, and 5 species of native crayfish. In response, the industry is expected to accelerate diversification of production in the next several years. Our estimates indicate that annual production of primarily rainbow trout should exceed 4,000 tonnes in 1996, and may reach 7,000 tonnes by the year 2000.

OVERVIEW

This factsheet summarizes data collected through ongoing annual surveys since 1988, conducted by the Aquaculture Extension Centre, University of Guelph, in consultation with federal and provincial government agencies as well as representatives of the private sector aquaculture industry in Ontario[1]. The information contained herein, compliments our earlier reports on production statistics for Ontario[2]. In addition to food-fish production, there is significant culture of numerous ornamental and tropical fish species in Ontario (mostly by home-hobbyists), as well as of gamefish species in government fish culture facilities, however, these are not included in our survey. Therefore, this factsheet deals solely with the current state of the food-fish production sector of the aquaculture industry in Ontario.

A total of 291 private-sector, fish production facilities were identified from Ontario Ministry of Natural Resources licence records, as well as in-house data files compiled since 1988. Responses to our survey questionnaire were combined with other information gathered from personal communications with farm owners and service providers, to arrive at the final production estimates presented here.

Rainbow trout continues to dominate food-fish production in Ontario, although other species are raised in very limited quantities including, brook trout, largemouth and smallmouth bass, Arctic charr, Atlantic salmon, tilapia and cyprinid baitfish.

PRODUCTION ESTIMATES

In 1995, we estimated that Ontario fish farms produced between 3,200 and 3,400 tonnes (7.0 and 7.5 million pounds) of rainbow trout, mostly for human consumption and pond stocking. This value was determined from a survey of the 61 largest farms in the province, conducted between November 1995 and March, 1996. The surveyed farms were either those facilities that produced over 5 tonnes (11,000 pounds) in 1993[2], or new facilities that were

expected to produce more than 5 tonnes in 1995. This group of 61 farms was estimated to account for over 95 % of the entire provincial production of food-fish, and therefore represented a statistically valid sample population from which to collect data. Production data was reported by 28 operations (46 % of all sampled), accounting for 1,133 tonnes (2.5 million pounds) of the estimated 1995 production output. Several of the major production facilities were not willing to disclose current production information because they wished data to remain proprietary. Estimates of production were made for all non-reporting farms, and were based upon review of previous data, as well as other information gathered through personal communication. All individual farm data either reported or estimated, is maintained in strictly confidential files, and only composite information is reported here.

GEOGRAPHICAL LOCATION OF INDUSTRY

Most aquaculture operations are located in Central or Southern Ontario, as well as the southernmost regions of Northern Ontario (Figure 1). This is largely the result of the availability of high quality water - both ground and surface-water supplies, as well as the proximity to a large population base, a well developed infrastructure for goods and services, and a hospitable climate.

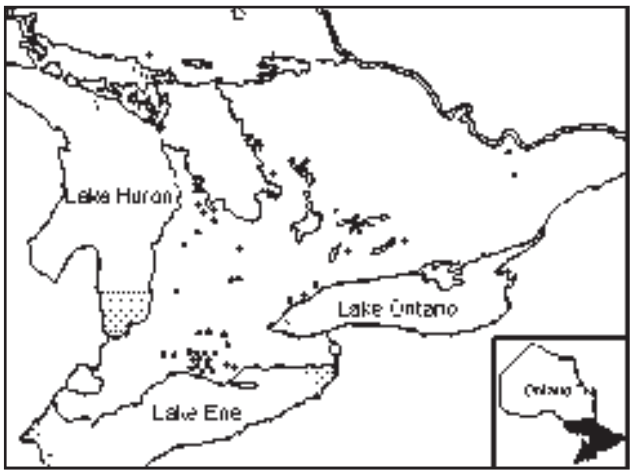

Figure 1: Distribution of fish farms in Ontario producing more than 5 tonnes in 1995.

GROWTH PATTERN OF ONTARIO AQUACULTURE

Annual growth in the Ontario aquaculture industry continues to increase, and follows a general trend which began in 1985 when both the number of farms and overall production output started to expand (Figure 2). This growth picture more or less parallels the performance of the aquaculture sector both nationally and internationally, and was a response to a variety of factors, including; an increase in the global demand for fishery and aquaculture products; a general decline in output from the wild-harvest fishery; shifts in the income levels of certain demographic groups; enhanced marketing initiatives for aquaculture products by the private and public sectors; shifts in philosophy about private property rights versus public resource management; a bullish international economy during the 1980's; consumer concerns about the quality and safety of wild-harvested fish; awareness of the health benefits of fish consumption; enhanced uptake by the investment community of technology-rich businesses like aquaculture, to name just a few. Demographic changes in the local and regional population have continued to fuel this demand-surge for Ontario, and improved organization and entrepreneurship within the private sector during the last decade have kept the opportunities alive. Marginal downturns in aquaculture output in Ontario during 1991 and 1993, resulted mainly from the overproduction of farmed-salmon, coupled with a rapid restructuring of that sector in Canada, plus regional economic uncertainties due to a shifting political climate and overall softening of the economy in Ontario. The net result was a temporary marginalization of the trout industry in this province during these two periods. Several of the smaller farms decided to cease operations during this period, and some of the larger ones began restructuring, aimed at increasing annual output, while attempting to reduce the unit costs of production. A sound strategy for agribusiness in the 90's.

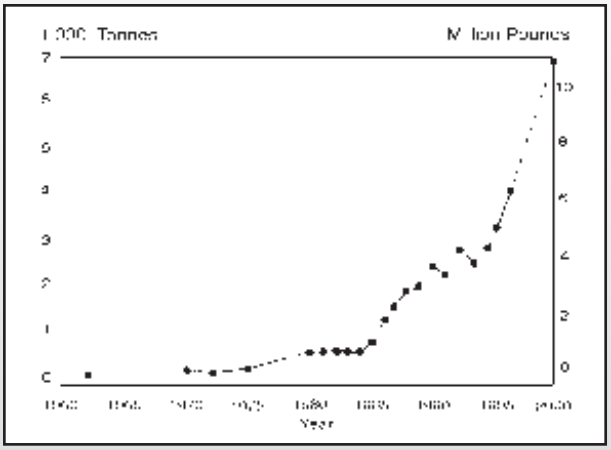

Figure 2: Ontario trout production from 1962 until present, with projections to the year 2000.

PRODUCT TRENDS

In recent years, there has been a steady trend towards producing rainbow trout around 1 kilogram (kg) live weight, aimed at the boneless fillet market. Farms which reported production by size-class, suggest that the trend towards producing a larger product has continued. Twenty-six farms reported their production by size class accounting for 1,103 tonnes (32% of total). Trout less than 0.5 kg accounted for 21% of this production, while trout between 0.5 and 1 kg and trout over 1 kg accounted for 56% and 23% of total production, respectively. The farms in Northern Ontario are beginning to have an impact upon the province's total production output, both in quantity and type of product. Typically, these farms are cage-culture facilities producing trout primarily in the 1 kg category.

PRICE AND ECONOMIC VALUE

Survey data on price structure was reported by 24 farms, accounting for 1,077 tonnes (32% of total). The reported, average farm-gate price of trout less than one pound was $2.18 per pound (range $1.50 to $4.00 per pound), while trout in the 1 to 2fi pound size-range averaged $1.77 per pound (range $1.67 to $5.00). Keep in mind that there may be limited markets available for some of the size ranges, especially for the smaller, higher-valued items, and large volume wholesale prices should not be expected to be higher than the floor prices reported here. Six farms reported sales of trout greater than 2 pounds, averaging $1.65 per pound.

In 1995, the Ontario industry is estimated to have generated a total of 250 person-years of on-farm employment. This consisted of 180 person-years of full-time employment (ie. 40 hours and over per week for 12 months of the year) and 70 person-years of employment as part-time labour. Indirect employment generated off-farm is conservatively estimated at 250 person-years.

SIZE DISTRIBUTION OF FARMS

Structurally, the Ontario industry is a composite of farms encompassing numerous small-scale part-time farms, with significantly fewer intermediate-scale facilities, and fewer still large-scale operations. In fact, nearly 90 % of the production total for the entire province comes from 45 farms, and of these 45, 4 alone account for nearly 50 % of the total output. This rather skewed production profile is typical of most emerging forms of farming activities.

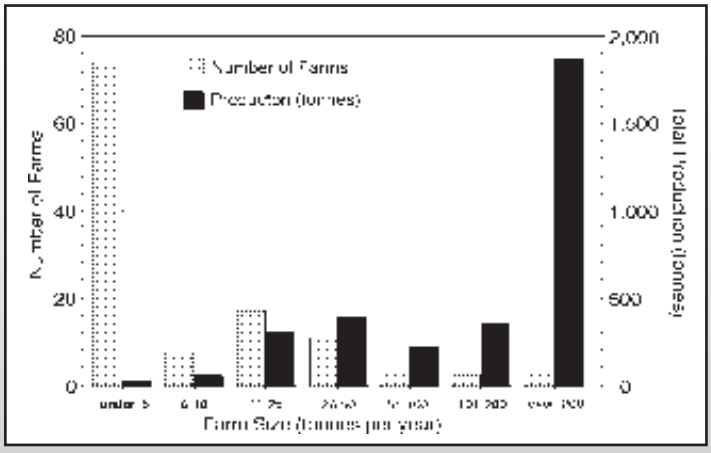

Figure 3: Size distribution of trout farms and their production.

FUTURE DEVELOPMENTS

Future expansion of the industry will continue in the province, with increasing concentration of farms anticipated along the shores of the Great Lakes, particularly Lakes Ontario and Huron, and Georgian Bay. Both land-based and near-shore, cage culture operations will develop, with the likelihood that most cage sites will produce between 100 and 300 tonnes per year, with only a few larger. This is based primarily on the limits of efficiency of scale, and the ability to mitigate environmental impacts in the surrounding watershed. As we predicted in our 1993 survey, cage-culture production will undergo this expansion in the next five years, owing mainly to the lower cost to access water, and the generally lower start-up capital costs. In the right location, optimum water temperatures facilitate relatively short production cycles, and the unit cost of production of cage-reared fish may be lower than in a land-based facility. Land-based farms will continue to be a combination of smaller facilities producing value-added products and based on groundwater supplies, as well as much larger, pump-ashore farms along the shores of larger lakes. There will be some growth in the number of production facilities using recirculation technology, but this is not likely to be significant in the near future, and will be restricted primarily to those warmwater species like tilapia which can now be legally grown and sold for human consumption. It is doubtful that large-scale recirculation facilities will economically raise a species like rainbow trout in the foreseeable future - at least based on today's state-of-the-art technology.

After more than a decade of negotiations with government, Ontario finally took the progressive step of legalizing the culture and sale of 42 different species or types of aquatic organisms (Table 1). Subject to a case-by-case site approval by government, it is now possible to culture and sell 28 species of food-fish, 9 native baitfish and 5 native crayfish species for either food, bait or recreational fishing purposes. There is good potential for development of commercial culture of Arctic charr, Tilapia sp., yellow perch, walleye, certain baitfish species and possibly lake sturgeon. Although the list is large, it is unlikely that any significant commercial production will occur over the next few years with most of the remainder of the permissible species. Production of rainbow trout will continue to be the mainstay of Ontario aquaculture for the next several years. Rainbow trout culture has considerable unrealized potential for growth in this province. We possess excellent technology and infrastructure to produce this species, as well as a highly experienced private sector that is finally emerging from the 'romantic pioneering phase' which facilitated growth of the industry but hindered more rapid improvements in production efficiency. Most new operations are commercial business ventures focused on producing high quality trout for profit. Properly promoted and marketed, we believe that there exists a large, untapped, domestic as well as regional export potential for trout products, especially fresh, boneless fillets at a reasonable price.

Finally, Ontario's regulatory and economic climate will continue to be the largest factors influencing the growth of aquaculture here. There is a healthy investment community in Ontario, however they are predictably wary of supporting a volatile new agribusiness, especially in a province with such unpredictable political and legislative constraints. Notwithstanding these facts, it is our opinion that aquaculture has a strong potential for continued growth in this province, and we anticipate that production may reach 7,000 tonnes by the turn of the century.

Table 1: List of species eligible for culture in Ontario as of November, 1995.

Lake sturgeon	*Acipenser fulvescens*	Common shiner	*Luxilus cornutus*
Atlantic salmon	*Salmo salar*	Golden shiner	*Notemigonus crysoleucas*
Brown trout	*Salmo trutta*	Emerald shiner	*Notropis atherinoides*
Brook trout	*Salvelinus fontinalis*	Common carp	*Cyprinus carpio*
Lake trout	*Salvelinus namaycush*	Goldfish	*Carassius auratus*
Arctic charr	*Salvelinus alpinus*	Brown bullhead	*Ameiurus nebulosus*
Chinook salmon	*Oncorhynchus tshawytscha*	Channel catfish	*Ictalurus punctatus*
Coho salmon	*Oncorhynchus kisutch*	American eel	*Anguilla rostrata*
Pink salmon	*Oncorhynchus gorbuscha*	Largemouth bass	*Micropterus salmoides*
Rainbow trout	*Oncorhynchus mykiss*	Smallmouth bass	*Micropterus dolomieu*
Lake whitefish	*Coregonus clupeaformis*	Bluegill	*Lepomis macrochirus*
Lake herring (cisco)	*Coregonus artedii*	Pumpkinseed	*Lepomis gibbosus*
Muskellunge	*Esox masquinongy*	Black crappie	*Pomoxis nigromaculatus*
Northern Pike	*Esox lucius*	Walleye	*Stizostedion vitreum*
Creek chub	*Semotilus atromaculatus*	Sauger	*Stizostedion canadense*
White sucker	*Catostomus commersoni*	Yellow perch	*Perca flavescens*
Bluntnose minnow	*Pimephales notatus*	Tilapia of the genera	*Oreochromis, Sarotheradon, Tilapia*
Fathead minnow	*Pimephales promelas*	Crayfish	*Orconectes immunus, O. virilis, O. propinquus, Cambarus robustus, C. bartonii*
Redbelly dace	*Phoxinus eos*		
Finescale dace	*Phoxinus neogaeus*		

1 Department of Fisheries and Oceans, Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Ministry of Natural Resources, Ontario Aquaculture Research & Services Co-ordinating Committee.

2 Moccia, R.D. and D.J. Bevan. Aquastats, Ontario Aquacultural Trout Production in 1988 with an Historical Perspective of the Industry's Development (OMAFRA Factsheet 89-113); Aquastats-1989 (FS91-007); Aquastats-1990 (FS91-050); Aquastats-1991 (FS92-150); Aquastats-1992 (FS94-001) and Aquastats-1993 (FS95-001).

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