

**Maintenance of Ontario's Aquaculture Statistics Program:
AQUASTATS**

Final Report submitted to:

Ontario Ministry of Natural Resources

Submitted by:

Richard D. Moccia and David J. Bevan

Aquaculture Centre

University of Guelph



7th March 2012

Introduction

The primary objective of this project was to conduct a survey of the geographical distribution and production output of commercial aquaculture operations in Ontario for the calendar year 2011, in order to maintain our well-established industry database which has been under development since 1988¹. This database is utilized on an on-going basis to evaluate the performance characteristics of the industry, with the ultimate goal of assisting with the orderly development of aquaculture in this province. The information collected provides the content for the ongoing factsheet series AQUASTATS – Ontario Aquacultural Production Statistics. OMNR will use the data to support the Canadian Council of Fisheries and Aquaculture Ministers (CCFAM) aquaculture development initiatives. More specifically, the data will support the Sustainability Reporting Initiative led by Fisheries and Oceans Canada (DFO) and the “Provincial Aggregate Estimates”. Additionally, some of the compiled information will be forwarded to Statistics Canada as a part of the annual “Survey of Aquaculture Industry”. Both data sets are used by government and industry to assess provincial and national trends.

Methods

1) The AQUASTATS survey questionnaire was developed to collect information on:

- type of facility
- species raised
- annual production by species
- value of production by species
- employment by activity and duration

The survey frame was determined from previous surveys and knowledge of the industry participants. The frame was divided into two sections based upon expected scale of production. Facilities that were expected to produce more than approximately 5,000 kg or \$10,000 of sales per year were sent a detailed questionnaire (Long Format Questionnaire). All others were sent a simplified version (Short Format Questionnaire). A total of 82 surveys were distributed on Jan 7th 2012 (see Appendix I – III).

¹ Earlier factsheets are available online at: <http://www.aps.uoguelph.ca/aquacentre/information/publications.php>

2) The OMNR Aquaculture Licence provides additional data with respect to the DFO Provincial Aggregate Estimates:

- number of licences and leases by environment and species
- area under lease by environment and species
- number of aquaculture companies by activity and species
- fish escapes by cause of escape

INDUSTRY SNAPSHOT 2011

PROVISIONAL DATA

Major Species Produced	- rainbow trout
Minor Species Produced	- Arctic charr, brook trout, smallmouth and largemouth bass, cyprinid baitfish
Total Trout Production	- 3,700 tonnes
Farm-gate Value of Trout	- \$17.2 million
Economic Contribution	- \$60 million
Job Creation	- 145 person-years direct and - 150 person-years indirect employment

Results

In 2011, we estimate that Ontario fish farms produced 3,700 tonnes (8.01 million pounds) of rainbow trout, primarily for human consumption. This is a 9% decrease from the 4,060 tonnes produced in 2010. Survey questionnaires were received from 48% of the facilities surveyed accounting for 61% of the total production. Estimates for non-reporting facilities were based on prior surveys and personal experience.

Lake-based cage production of trout in the Georgian Bay area continues to dominate other land-based production systems, accounting for 86% of the total production (Figure 1). Arctic charr production is very limited and production has remained at nominal levels for several years now, approximately 15 tonnes annually. The production of brook trout and bass 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 45 facilities culture brook trout, bass and other species, with a total production of approximately 20-25 tonnes annually.

The total farm-gate value of the 3,700 tonnes of rainbow trout produced is estimated to be \$17.2 million, with an average price of \$2.12/lb (\$4.68/kg). The sale of charr, bass and other fish species is estimated to be an additional \$0.5 million in 2011. More than 40 facilities are involved with pond

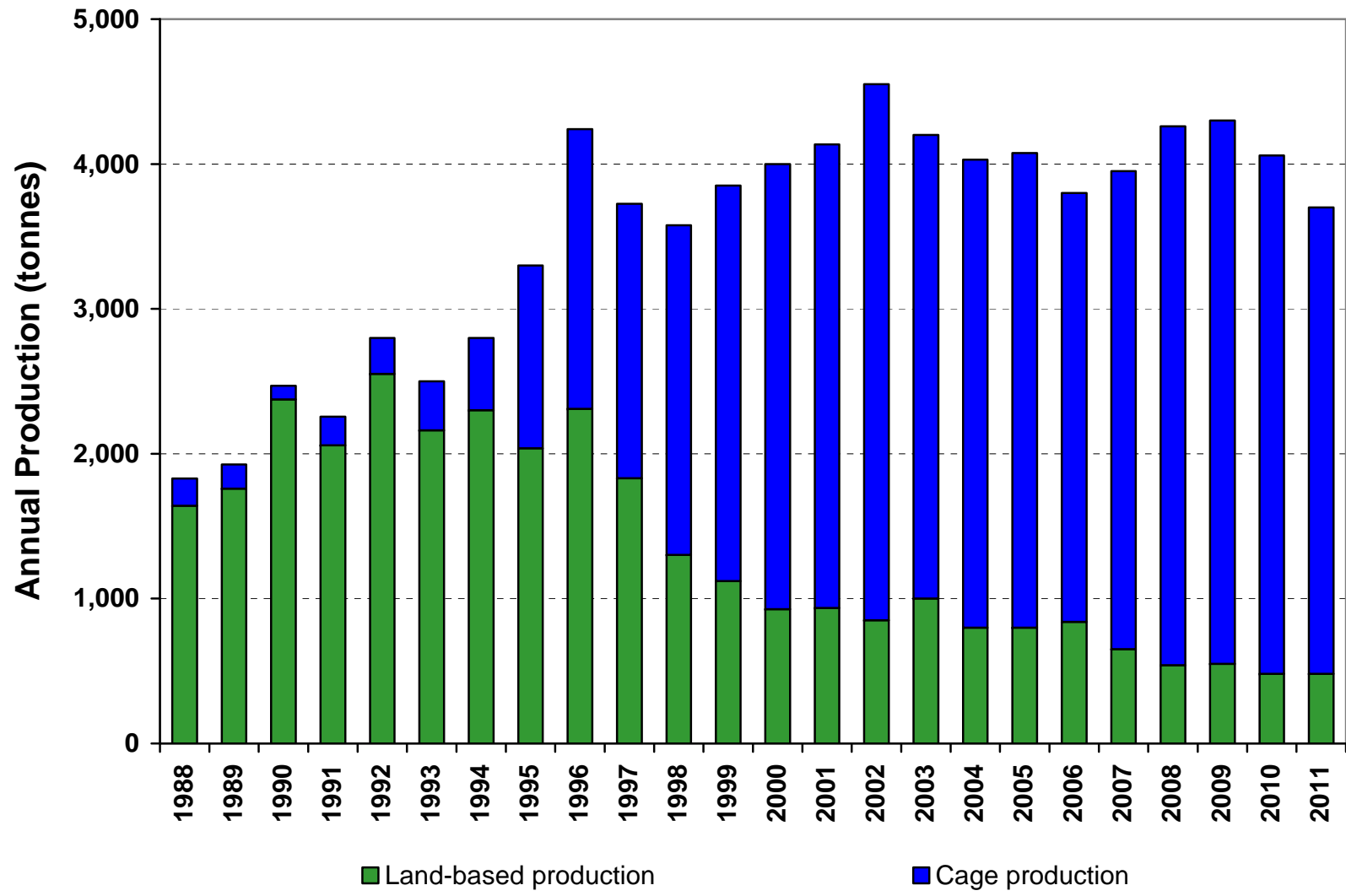
stocking, typically rainbow trout, brook trout and bass. The value of this aquaculture sector is conservatively estimated to be \$1.5 million annually.

In 2011, the Ontario aquaculture industry is estimated to have generated a total of 145 person-years of direct, on-farm employment. This consisted of 100 person-years of full-time employment (40 hours per week for 12 months) and 45 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.

The data reported to DFO, Provincial Aggregate Estimates and to Statistics Canada, Survey of Aquaculture Industry for 2010 are given in Appendix IV and V, respectively. Finalized data for 2011 will be reported to these federal agencies when requested.

Figure 1. Comparison of Ontario land-based and cage aquaculture between 1988 and 2011.



Appendix I. AQUASTATS Survey Introduction Letter



Department of Animal and Poultry Science
ONTARIO AGRICULTURAL COLLEGE

January 7th 2012

Ontario Aquaculture Statistics Survey - 2011

Dear Producer,

This is our **22nd AQUASTATS survey** of fish production in Ontario, made possible with a lot of support from you, the producer.

Over these 20+ years **Ontario aquaculture has evolved into a valuable component of the economy.** There have been several major milestones over this period. Open-water cage culture is now the dominant production method, the end product is primarily boneless fillets, several industry associations have evolved and legislative issues continue to dominate expansion opportunities.

This year **we need your assistance once again.** The enclosed questionnaire addresses four main areas: 1) quantity produced, 2) value of production, 3) employment and 4) structure of the industry. Please report information for the calendar year January 1st to December 31st, 2011.

If you feel that the questions do not apply to your situation, please return the questionnaire and indicate the reasons. We need to have all the questionnaires returned - either complete or incomplete to establish a true picture of the industry today. If you have any questions or comments about the questionnaire, please do not hesitate to contact us. **Please return the questionnaire before February 6th 2012.**

As previously, **all information will be treated in the strictest of confidence** and only composite industry statistics will be released.

Please accept our thanks for assisting us with this ongoing project.

Yours truly,

A handwritten signature in black ink that reads "R. Moccia".

Richard D. Moccia
Professor
Tel. 519-824-4120 ext. 56216
Email: rmoccia@uoguelph.ca

A handwritten signature in black ink that reads "David J. Bevan".

David J. Bevan
Research Assistant
Tel. 519-824-4120 ext. 52689
Email: dbevan@uoguelph.ca

Appendix II. AQUASTATS Questionnaire (Long Format)

AQUACULTURE CENTRE

University of Guelph
Guelph, Ontario N1G 2W1



ONTARIO AQUACULTURE SURVEY

January 1st to December 31st, 2011

1. **YEAR BUSINESS STARTED:** ID Number

2. **FEE-FISHING PRESERVE - exclusively:** Yes [] No []

3. **EMPLOYMENT:** 2011 (2012)

a. Full-time person-year(s)

b. Part-time person-year(s)

4. **SPECIES RAISED:**

- | | | |
|----------------------|---------------------|---------------------------|
| 1. Rainbow trout [] | 3. Arctic charr [] | 5. Cyprinid bait-fish [] |
| 2. Brook trout [] | 4. Tilapia [] | 6. Other |

	Number Sold	Selling Price (\$/1000)	Total Sales
5. EGGS SOLD	\$
6. FRY, UNDER 2 inches SOLD	\$
7. FINGERLINGS, 2 - 6 inches SOLD	Not applicable	\$

8. MARKET FISH PRODUCTION	2011	(2012)	lbs	kg	No.
8.1 10 - 16 oz (live weight)	[]	[]	[]
8.2 1 - 2½ lbs (live weight)	[]	[]	[]
8.3 Over 2½ lbs (live weight)	[]	[]	[]

9. MARKET FISH VALUE	Selling Price					Total Sales
	Ave.	Min.	Max.	\$/lb	\$/kg	
9.1 10 - 16 oz (live weight)	[]	[]	\$
9.2 1 - 2½ lbs (live weight)	[]	[]	\$
9.3 Over 2½ lbs (live weight)	[]	[]	\$

10. **SUMMARY OF PRODUCTION AND SALES - do NOT include sales of eggs, fry and fingerlings**

10.1 Total Weight of 'Market Fish' Rainbow Trout Sold	lbs	kg
		[]	[]
10.2 Total Value of 'Market Fish' Rainbow Trout Sold	\$		

The Aquaculture Centre is partly funded by the Ontario Ministry of Agriculture, Food and Rural Affairs

2011 PRODUCTION and SALES of OTHER SPECIES

SPECIES:

	Number Sold	Selling Price \$ / 1000	Total Sales
11. EGGS SOLD	\$
12. FRY, UNDER 2 INCHES SOLD	\$
13. FINGERLINGS, 2 - 6 INCHES SOLD	Not applicable	\$

	2011	(2012)	lbs	kg	No.
14.1 10 - 16 oz (live weight)	[]	[]	[]
14.2 1 - 2½ lbs (live weight)	[]	[]	[]
14.3 Over 2½ lbs (live weight)	[]	[]	[]

	Selling Price					
	Ave.	Min.	Max.	\$/lb	\$/kg	Total Sales
15.1 10 - 16 oz (live weight)	[]	[]	\$
15.2 1 - 2½ lbs (live weight)	[]	[]	\$
15.3 Over 2½ lbs (live weight)	[]	[]	\$

16. SUMMARY OF PRODUCTION AND SALES - do NOT include sales of eggs, fry and fingerlings

16.1 Total Weight of 'Market Fish' Sold		lbs	kg	
			[]	[]	
16.2 Total Value of 'Market Fish' Sold	\$				

COMMENTS:

.....

"I authorize and consent to the disclosure and use of the information below to the University of Guelph, Aquaculture Centre only for the purpose of general analysis on an aggregate basis as long as individual confidentiality is maintained."

Signature Date

ONTARIO AQUACULTURE SURVEY

Covering the Period:
January 1st to December 31st, 2011

Guidelines to Questions

Question:

1. **YEAR BUSINESS STARTED:** Refers to the year of first fish sales.
2. **FEE-FISHING PRESERVE - exclusively:** Please indicate if your business is exclusively that of Fee-fishing.
3. **EMPLOYMENT:** Full-time is defined as a person working 40 and over hours per week for 12 months of the year. Part-time includes all other work schedules.
Eg. owner and one assistant employed full-time throughout the year is reported as FULL-TIME = 2 person-years, and two seasonal assistants employed March - November (9 months) is reported as PART-TIME = 1.5 person-years (2 persons x 9 months = 18 person-months, divided by 12 = 1.5 person-years).
4. **SPECIES RAISED:** Please indicate the **current** species raised.

2011 PRODUCTION and SALES of RAINBOW TROUT ONLY

Please report ONLY the production and sale of RAINBOW TROUT in questions 5 through 10.

- 5 - 7. **EGGS, FRY AND FINGERLINGS SOLD:** Please report those fish **sold to other farms** for stocking, growing-out etc.
8. **MARKET FISH PRODUCTION:** Please report **all** fish sold:- e.g. for processing, wholesale, restaurant, farm-gate, pond-stocking and fee-fishing etc.
Report production in terms of LIVE WEIGHT.
9. **MARKET FISH VALUE:** Please report the selling price obtained over the calendar year.
10. **SUMMARY OF PRODUCTION AND SALES:** Please do NOT include sales of eggs, fry and fingerlings.

2011 PRODUCTION and SALES of OTHER SPECIES

- 11 - 16. For farmers raising species **other than** or in addition to **rainbow trout**, we would request that you complete questions 11 through 16 in a similar manner to the above.

Please state the species of fish produced.

Additional copies of the questionnaire are available for farms raising more than two species of fish. Please call us at (519) 824-4120 ext. 52689 for a copy.

Please mail this form in the enclosed self addressed envelope

Appendix III. AQUASTATS Questionnaire (Short Format)

AQUACULTURE CENTRE

University of Guelph

Guelph, Ontario N1G 2W1
 Tel: (519) 824-4120 Ext 52689
 Fax: 519-837-8867

Ontario Aquaculture Survey: 2011

NAME: LAST, First

Company

Address

City

Province

Postal code

Farm Statistics

1. Facility Type

Hatchery	<input type="checkbox"/>
Stocking	<input type="checkbox"/>
Food Producer	<input type="checkbox"/>
Recreational Fee-fishing	<input type="checkbox"/>
Other	<input type="checkbox"/>

2. Species Raised

Rainbow trout	<input type="checkbox"/>
Brook trout	<input type="checkbox"/>
Arctic charr	<input type="checkbox"/>
Bass	<input type="checkbox"/>
Other	<input type="checkbox"/>

3. Employment

	Full-time	Part-time
Zero	<input type="checkbox"/>	<input type="checkbox"/>
Less than 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.0 to 3.0	<input type="checkbox"/>	<input type="checkbox"/>
More than 3.0	<input type="checkbox"/>	<input type="checkbox"/>
Actual number	<input type="text"/>	<input type="text"/>

4. Total Production

Check units Lbs or No.

Zero	<input type="checkbox"/>
Less than 5,000	<input type="checkbox"/>
5,000 to 25,000	<input type="checkbox"/>
More than 25,000	<input type="checkbox"/>
Actual production (optional)	<input type="text"/>

Comments _____

"I authorize and consent to the disclosure and use of the above information to the University of Guelph, Aquaculture Centre only for the purpose of general analysis on an aggregate basis as long as individual confidentiality is maintained."

Signature _____

Date _____

The Aquaculture Centre is partly funded by the Ontario Ministry of Agriculture, Food & Rural Affairs

ONTARIO AQUACULTURE SURVEY

Covering the Period:
January 1st to December 31st, 2011

Guidelines to Questions

Question:

1. **FACILITY TYPE:**

Please tick **all** relevant boxes.

2. **SPECIES RAISED:**

Please tick **all** relevant boxes.

3. **EMPLOYMENT:**

Full-time is defined as a person working 40 and over hours per week for 12 months of the year. Part-time includes all other work schedules.

e.g. owner and one assistant employed full-time throughout the year is reported as:
FULL-TIME = 2 person-years, and

two seasonal assistants employed March - November (9 months) is reported as:
PART-TIME = 1.5 person-years
(2 persons x 9 months = 18 person-months, divided by 12 = 1.5 person-years).

4. **TOTAL PRODUCTION:**

Please report **all** fish sold:- e.g. for processing, wholesale, restaurant, farm-gate, pond-stocking and fee-fishing etc.
Report production in terms of either live **weight** or **numbers** of fish.

If you have any questions, please call us at (519) 824-4120 ext. 52689.

Please mail the form in the enclosed self addressed envelope before 6th Feb. 2012

Thank you

Appendix IV. DFO Provincial Aggregate Estimates

Number of aquaculture licences and leases by environment and species, Canada and provinces, year

	NL	PE	NS	NB	Atlantic	PQ	ON	MB	SK	AB	Prairies	BC	CAN
							2011						
Licence/Lease Type	Number of Licences												
Total							99						
Total Marine													
Marine finfish							NAP						
Salmon							NAP						
Other marine finfish							NAP						
Marine Shelfish							NAP						
Clams							NAP						
Mussels							NAP						
Oysters							NAP						
Scallops							NAP						
Other marine shellfish							NAP						
Marine Other							NAP						
Total Freshwater Finfish													
Rainbow trout							5						
Other trout							NAP						
Other freshwater							NAP						
Total Hatcheries							94						
Total Other							?						

Include only commercial sites and exclude recreational and research/institutional sites.

For multiple species under one licence report for each one.

Provide most current reference period.

NAV	Not available
NAP	Not applicable
X	Confidential

Area under lease by environment and species, Canada and provinces, year

	NL	PE	NS	NB	Atlantic	PQ	ON	MB	SK	AB	Prairies	BC	CAN
							2011						
Licence Type	Hectares												
Total							30						
Total Marine							NAP						
Marine finfish							NAP						
Salmon							NAP						
Other marine finfish							NAP						
Marine Shelfish							NAP						
Clams							NAP						
Mussels							NAP						
Oysters							NAP						
Scallops							NAP						
Other marine shellfish							NAP						
Marine Other							NAP						
Total Freshwater Finfish													
Rainbow trout							30						
Other trout							0						
Other freshwater							0						
Total Hatcheries							0						
Total Other							0						

Aquaculture lease area refers to Crown Land where aquaculture facilities are permitted to operate, including Land Use Permits or Permit/Licence to Occupy. Exclude all land-based facilities that are on private land.

For multiple species under one licence report for each one.

Provide most current reference period.

NAV	Not available
NAP	Not applicable
X	Confidential

Number of aquaculture companies by activity and species, Canada and provinces, year

	NL	PE	NS	NB	Atlantic	PQ	ON	MB	SK	AB	Prairies	BC	CAN
							2011						
Activity	Number of Companies												
Total							95						
Total Growers							NAP						
Marine finfish							NAP						
Salmon							NAP						
Other marine finfish							NAP						
Marine Shellfish							NAP						
Clams							NAP						
Mussels							NAP						
Oysters							NAP						
Scallops							NAP						
Other marine shellfish							NAP						
Marine Other							NAP						
Freshwater Finfish													
Rainbow trout							4						
Other trout							NAP						
Other freshwater							NAP						
Total Hatcheries							91						
Total Other							0						

Include only commercial operations.

For companies that are vertically integrated include all activities or operations.

Provide most current reference period.

NAV	Not available
NAP	Not applicable
X	Confidential

Fish escapes by cause of escape, Canada and provinces, year

	NL	PE	NS	NB	Atlantic	PQ	ON	MB	SK	AB	Prairies	BC	CAN
	2010?						2010						
Cause of escape	Number of Fish												
Total							1						
Equipment failure							0						
Handling							0						
Natural Event							weather related - details unknown						
Other (specify):						NAP	0						

Provide most current reference period and any historical data series.

NAV	Not available
NAP	Not applicable
X	Confidential

Aquaculture employment by activity and duration, Canada and provinces, year

	NL	PE	NS	NB	Atlantic	PQ	ON	MB	SK	AB	Prairies	BC	CAN
							2010						
	Number of Employees												
Total Employment							144						
Total Finfish							NAV						
Full time							NAV						
Part Time (<6 months)							NAV						
Part Time (>6 months)							NAV						
Total Shellfish							NAV						
Full time							NAV						
Part Time (<6 months)							NAV						
Part Time (>6 months)							NAV						
Total Other							NAV						
Full time							NAV						
Part Time (<6 months)							NAV						
Part Time (>6 months)							NAV						

Provide most current reference period and any historical data series.

NAV	Not available
NAP	Not applicable
X	Confidential

Appendix V. Statistics Canada Survey of Aquaculture Industry

Table 003-0001 Aquaculture, production and value, annual ⁽¹⁾

Survey or program details:

Aquaculture, production and value, Annual - 3479

Geography	Finfish and shellfish	Production	2005	2006	2007	2008	2009	2010
Ontario	Total aquaculture (including re-stocking) ⁽²⁾	Tonnes	4,075	3,800	4,100	4,260	4,300	4,060
Ontario	Total aquaculture	Tonnes	4,075	3,800	4,100	4,260	4,300	4,060
Ontario	Total finfish	Tonnes	4,075	3,800	4,100	4,260	4,300	4,060
Ontario	Salmon ⁽⁴⁾	Tonnes	-	-	-	-	-	-
Ontario	Trout ⁽⁴⁾	Tonnes	4,075	3,800	4,100	4,260	4,300	4,060
Ontario	Steelhead ⁽⁴⁾	Tonnes	-	-	-	-	-	-
Ontario	Other finfish ⁽³⁾	Tonnes	x	x	x	x	x	x
Ontario	Total shellfish	Tonnes	-	-	-	-	-	-
Ontario	Clams	Tonnes	-	-	-	-	-	-
Ontario	Oysters	Tonnes	-	-	-	-	-	-
Ontario	Mussels	Tonnes	-	-	-	-	-	-
Ontario	Scallops	Tonnes	-	-	-	-	-	-
Ontario	Other shellfish	Tonnes	-	-	-	-	-	-
Ontario	Total aquaculture (including re-stocking) ⁽²⁾	Dollars (x 1,000)	15,500	15,700	17,000	17,200	17,400	17,100
Ontario	Total aquaculture	Dollars (x 1,000)	15,500	15,700	17,000	17,200	17,400	17,100
Ontario	Total finfish	Dollars (x 1,000)	15,500	15,700	17,000	17,200	17,400	17,100
Ontario	Salmon ⁽⁴⁾	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Trout ⁽⁴⁾	Dollars (x 1,000)	15,500	15,700	17,000	17,200	17,400	17,100
Ontario	Steelhead ⁽⁴⁾	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Other finfish ⁽³⁾	Dollars (x 1,000)	x	x	x	x	x	x
Ontario	Total shellfish	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Clams	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Oysters	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Mussels	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Scallops	Dollars (x 1,000)	-	-	-	-	-	-
Ontario	Other shellfish	Dollars (x 1,000)	-	-	-	-	-	-

Legend:

.. Not available
x Suppressed to meet the confidentiality requirements of the Statistics Act

Footnotes

- 1 The production and value of aquaculture includes the amount and value produced on sites and excludes hatcheries or processing. Shellfish also includes some wild production. The data are collected from each of the provincial departments responsible for aquaculture.
- 7 Provinces with data not available are not included in the Canada totals.
- 2 Sales to outfitters: operations offering lodging and services for hunting, fishing and trapping.
- 4 Excludes other finfish for all provinces until 2005. Excludes other finfish for all provinces except Quebec beginning in 2006.
- 3 Other finfish data is only available at the Canada level and includes confidential data from the provinces.

Source:

Statistics Canada. Table 003-0001 - Aquaculture, production and value, annual