Excerpts from Environmental Commissioner of Ontario's Reports to the Legislature (2000 to 2005). Sorted by Ministry/Issue

General Notes:

2000/2001 Annual Report - Ontario's commercial aquaculture industry has also grown considerably since its inception in 1962.
As of 1999, the industry was valued at approximately $60 million, producing over 4,000 tonnes of fish annually, 95 per cent of which is rainbow trout.
Annual growth 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 (though growth after 1996 has slowed somewhat, according to the Ministry of Natural Resources). Presently, most aquaculture facilities in Ontario are located in southern and central Ontario, but there has been recent expansion into Northern Ontario, particularly in the waters of Georgian Bay.
Future expansion is expected to continue, with an increasing concentration of farms anticipated along the shores of the Great Lakes, particularly Lake Ontario and Lake Huron, and Georgian Bay.
Most of the recently established large cage culture operations are in the Georgian Bay area, primarily centred in the North Channel area near Manitoulin Island.
As of 1998, the cage cultures in this area accounted for approximately 60 per cent of the total provincial output of farmed trout.

Aquaculture can have a negative impact on the natural water body where it is located. As with other forms of intensive animal production, intensive aquaculture systems can produce large quantities of polluting wastes.
The water quality impacts of land-based aquaculture operations are generally easily managed since the water from these operations is released at one point.
However, with cage culture operations, anything that is added to or released from the cages directly enters the water body.
Caged aquaculture operations do not treat their wastes and instead use the water body itself and the aquatic biota to treat their wastes through dispersion, dilution and decomposition.
This method has consequences similar to the practice of building taller smokestacks so that industrial air emissions can be carried away by the wind. While locating cage cultures in water with strong currents does quickly dilute wastes and prevent some of the short-term harm, the cumulative effects of many cage culture facilities on the ecosystem need to be considered and are of some concern.

2004/2005 Annual Report
Ontario's aquaculture operations include both "land-based" facilities such as dug ponds and concrete tanks, and "cage aquaculture" operations – cages floating in lakes or rivers.
Cage aquaculture in Georgian Bay and elsewhere in the Great Lakes accounts for roughly four-fifths of Ontario's farmed fish production and has attracted the most controversy.

Impacts:

2000/2001 Annual Report
An example of the damage that cage culture operations can cause occurred in 1997 in some of the bays in the North Channel of Lake Huron, near Manitoulin Island. There are many cage culture facilities in this area, and in the mid-1990s, the public began expressing concerns regarding the expanding industry. MOE inspected two aquaculture operations in the area in 1997, one of which was the LaCloche site. MOE found that the dissolved oxygen levels were extremely low throughout the bay where the LaCloche site was located. In fact, there was absolutely no oxygen present at all in the deeper parts of the water over an extremely large area (250 ha). The

water also had high phosphorous levels and algae. As a result, fish were not able to survive in the deep water of the bay and were forced to move to other areas of Lake Huron.

The biodiversity implications of aquaculture are another cause for concern. This includes the longterm impacts of escaped non-wild varieties on ecosystem health, disease introduction and exacerbation, and the development of antibiotic-resistant disease organisms. Netpens and cages are particularly susceptible to the escape of very large numbers of fish when damaged by storms, boats, and poor maintenance, and through accidents and everyday "leakage." Introduced varieties can harm natural ecosystems by interbreeding with native wild populations, thereby decreasing biodiversity and possibly breaking up local genetic adaptations that have developed for survival in that area.

Regulating the Aquaculture Industry

2000/2001 Annual Report

. . . The cage sector of the aquaculture industry arguably holds the most promise for significant growth, since inland development has been effectively suppressed by regulators. Currently, the combined effort by the Ministry of Natural Resources and the Ministry of the Environment to control cage operators through conditions imposed on their licences to culture fish threatens to stifle growth in that sector also.

This conflicting approach by Ontario's ministries will do little to improve the state of Ontario's aquatic ecosystems. However, the ministries do impose some conditions on the aquaculture licenses of cage culture facilities, such as those requiring the monitoring and maintenance of water quality around the cages. MNR is also currently developing new policies on aquaculture, some of which deal with minimizing the risk of escape of cultured fish into the natural environment (see Registry posting PB00E6001.)

Reducing the Environmental Impact of Cage Culture

2000/2001 Annual Report

New methods of minimizing the environmental impacts of aquaculture facilities are constantly being developed. Presently, cages are the most harmful form of aquaculture facilities in terms of nutrient pollution and impacts on biodiversity, since they externalize to the environment many of the adverse effects of operating the facility.

However, cages are not necessary to aquaculture: the fish species now raised in cages can also be raised in other types of facilities, such as man-made ponds, raceways and tanks.

Since the aquaculture industry in Ontario is expected to continue to increase, it is essential that government ministries and agencies work together to ensure that the aquaculture industry is sufficiently regulated to protect the environment.

MOE

2000/2001 Annual Report Supplement

In this decision the Ministry of the Environment, with the concurrence of Cabinet, approved a Declaration Order (O.C. 1998/2000 / MNR 54-1) declaring that "the construction, operation and maintenance of projects at existing fish culture stations" throughout Ontario are not subject to the Ontario *Environmental Assessment Act*" (*EAA*). An "environmental assessment" (EA) is a report or analysis relating to a specific project or development that includes a description of the expected environmental impacts of the project, actions that could prevent or mitigate these environmental impacts, and alternative methods to carrying out the project. Specifically, with this order MOE is

granting a request by the Ministry of Natural Resources to allow it to carry on with and complete many projects under its Fish Culture Program without first taking them through the process required for an EA, subject to some conditions. Without this Declaration Order, these projects under MNR's Fish Culture Program would require either individual EAs to be developed or the projects could not be initiated until a new Class EA was approved under the *EAA.*

ECO Comment:

Culturing fish for release into the natural environment raises concerns about habitat integrity, aquatic and wildlife health, biodiversity, and ecosystem stability. The EA process is designed to consider these types of impacts. Exempting the expansion and modification of fish culture stations from the EA process may eliminate an opportunity for MNR to address important issues prior to construction – particularly the cumulative effects from a number of smaller expansions.

While the ECO understands and agrees that some projects and activities that are exempted under the Declaration Order may have negligible environmental impacts, the exemption may be too broad and encompass projects that would benefit from an EA. The EA process is intended to ensure the longterm health of ecosystems by protecting their components and their biological foundations through the sustainable development of resources. Since the projects that are subject to Declaration Orders are exempted from the notice and comment opportunities under the *EBR,* these projects will not be subject to appropriate public scrutiny. This deficiency makes it essential that these projects receive the type of scrutiny found in an EA process.

2004/2005 Annual Report

ECO Comment

Despite taking 21 months to complete its review, MOE's response provided little new information and only vague commitments to improve the environmental performance of cage aquaculture operations. MOE's response may reflect the tension that currently exists between those federal and provincial ministries currently focused on growing the aquaculture industry, and those that are concerned about the environmental impacts of the industry.

The ECO is distressed that MOE trivialized the applicants' concerns about TP in water as being primarily aesthetic in nature. Although elevated phosphorus levels can cause algal blooms, they can also cause significant long-term ecosystem changes such as altering species composition, disrupting food chains, and causing the death of sensitive species in an area. MOE's decision to use 10 µg/L as the trigger level for TP allows large amounts of phosphorus to be added to Georgian Bay before abatement measures are considered. The ECO believes that MOE should not be using 10 µg/L as the trigger level for TP, and should not be relying on a water quality guideline that sanctions the degradation of high quality waters, i.e., better than PWQO levels.

The ECO believes that MOE has ignored the general PWQO that requires waters to be free of contaminating levels of substances that can form objectionable deposits such as fish feces and uneaten food. Furthermore, if sediment monitoring is done only every five years, early signs of degradation will not be detected. The ECO believes that more frequent sediment quality monitoring is required and that further consideration

should be given to doing more proactive benthic monitoring.

The ECO urges MOE to take a more proactive approach to defining water and sediment quality policies for cage aquaculture operations, including monitoring and reporting rules, best practices and abatement measures. Continuing to address water and sediment quality concerns on a case-by-case basis rather than developing clear policies does not address the concerns of the public and leaves the aquaculture industry without clear direction. The ECO urges MOE and MNR to work together to ensure that water and sediment quality conditions are added to aquaculture licenses, that they are enforced, and that water and sediment quality are not impaired by these operations.

MNR

2003/2004 Annual Report and Supplement

MNR provided a lengthy response to the applicants and included commentary on a number of the concerns raised by the applicants. However, the ECO does not believe that the reasons given by MNR for denying the application are appropriate, nor did MNR adequately respond to all of the concerns raised by the applicants.

In May 2004, MNR advised the ECO that it expects to post a decision notice for a proposal (PB00E6001) that has been on the Registry since February 2000 about aquaculture policies and procedures under the *Fish and Wildlife Conservation Act* soon.

It also did not provide any evidence that conditions in licences related to preventing and reporting escapements are being enforced. In addition, although MNR did indicate that it is participating in research related to aquaculture, no details were provided to support this statement.

In our 2000/2001 annual report, the ECO raised the same concerns about escapement as the applicants and urged the government to "ensure that the aquaculture industry is sufficiently regulated to protect the environment." To-date, no action has been taken. The ECO believes that the applicants wanted their concerns addressed at the policy and regulatory level rather than at the licensing level. Although the applicants have raised significant concerns about the adequacy of the current policies and regulations for aquaculture, MNR has failed to recognize these. The ECO believes that it is inappropriate to rely on the licence approval process to compensate for these inadequacies.

2003/2004 Annual Report Supplement

In May 2004, MNR advised the ECO that it expects to post a decision notice for a proposal (PB00E6001) that has been on the Registry since February 2000 about aquaculture policies and procedures under the *Fish and Wildlife Conservation Act* soon.

2004/2005 Annual Report

The ECO was pleased to see that MNR reached a decision on the aquaculture policies it proposed in 2000. For years, the aquaculture industry has been asking the Ontario government to provide clearer direction.
However, the failure to release the policy, Aquaculture on Crown Land, that will guide Great Lakes cage aquaculture is disappointing, as these operations represent

the majority of fish cultured in Ontario, and present the highest environmental risk. The ECO urges the ministry to formalize this key policy and related protocols that it is developing together with MOE, through a fully consultative process.
The focus of MNR's aquaculture policies is fish escapement and potential impacts on wild fish. These are valid concerns. However, other environmentally significant risks – to water quality, to aquatic plants and to bottom-dwelling animals – are not given due consideration. There are also no provisions for restoring environments degraded by fish farming. The ECO urges MNR to address the range of environmental risks and impacts, in collaboration with MOE and other interested agencies.

By invoking section 32 of the *EBR* and applying a Class Environmental Assessment, MNR is sidestepping the *EBR*'s consultation and appeal provisions for cage aquaculture operations in the Great Lakes. The ECO is disappointed that MNR is ignoring the spirit of the *EBR* and failing to provide full public consultation on most of these aquaculture licences, despite growing public interest and despite the clear intent of the *EBR*'s O. Reg. 681/94, Classification of Proposals for Instruments. This is especially disappointing, in light of MNR's commitment in July 2001 that the ministry would ensure these types of approvals were subject to the public consultation requirements of the *EBR*, a commitment made in response to a June 2001 ECO Special Report urging MNR to finalize its instrument classification regulation by amending O. Reg. 681/94. If MNR chooses to exempt Great Lakes cage aquaculture from this *EBR* requirement, the ECO urges the ministry to do so in a transparent and accountable manner: through a revision to O. Reg. 681/94, after

2005/2006 Annual Report

The ECO requested an update from MNR on the finalization of cage aquaculture policy…
…MNR stated that harmonized guidelines would provide clear direction on screening cage aquaculture projects under the Class EA for MNR Resource Stewardship and Facility Development Projects, where applicable. The ministry added that requirements for public and Aboriginal consultation will be identified for all cage aquaculture licence applications, and will meet or exceed those of the Class EA, the *Canadian Environmental Assessment Act* and the *EBR*.
The ECO notes that MNR did not commit to finalizing its own Aquaculture on Crown Land policy (FisPp 9.2.2), which was not released in August 2004 when MNR's 10 other policies on aquaculture were finalized.
The ECO urges MNR to finalize its cage aquaculture policy to ensure the protection of Georgian Bay and other public waters.

DFO

2004/2005 Annual Report

In 2001/2002, the ECO reported that enforcement of section 36 of the federal *Fisheries Act (FA)* by the Ministries of the Environment and Natural Resources was sporadic and inconsistent. Section 36(3) of the *FA* prohibits the discharge of deleterious substances into waters frequented by fish, unless the discharged substance is regulated under the Act. MNR and MOE were responsible for enforcing this prohibition on behalf of the federal Department of Fisheries and Oceans (DFO) between the mid-1970s and March 2004.

The ECO's 2001/2002 annual report also noted serious problems with implementation of the Fish Habitat Compliance Protocol ("the 1999 protocol") first published by the Fisheries

Habitat Advisory Group (FHAG) in 1999. FHAG consists of representatives from MOE, MNR, OMAF, Environment Canada, DFO, Parks Canada, the Coast Guard and Conservation Authorities. The 1999 protocol, and a subsequent revision issued in 2004, set out rules for the various federal and provincial agencies that administer and enforce water laws, regulations and policies, and it attempted to clarify roles and responsibilities. In 2002, FHAG established a Compliance Working Group (CWG) and tasked the CWG with revising the 1999 protocol, partly to respond to concerns raised in the ECO's 2001/2002 annual report. In February 2004, MNR and MOE representatives on the CWG advised the ECO that, beginning in April 2004, they would be piloting a revised FHC protocol ("the 2004 protocol"). One implication of the 2004 protocol is that DFO and Environment Canada are assigned lead roles in enforcement of the *FA*, with MOE and MNR providing support but not directly enforcing or prosecuting alleged *FA* contraventions. In practical terms, this means that Ontario residents are effectively barred from applying for *EBR* investigations of alleged *FA* contraventions because the *EBR* applies only to prescribed Ontario ministries. Indeed, since early 2004, ECO staff have advised members of the public that it is no longer possible to file *EBR* investigations related to alleged *FA* contraventions even though the *FA* is still listed as a prescribed Act for investigations under the *EBR*.

In September 2004, the CWG provided ECO staff with a detailed briefing on the status of the implementation of the 2004 protocol. The ECO was advised that the 2004 protocol was working well and that FHAG had developed a Web site which focuses on its activities and allows for tracking of investigations (www.fish-habitat.com).

For our 2004/2005 annual report, the ECO once again requested that both MOE and MNR provide updates on the implementation of the 2004 protocol and on the work of the CWG. Because MNR and MOE no longer led prosecutions of s. 36(3) of the *Fisheries Act* under the 2004 protocol, the ECO did not request updates on their prosecutions and related compliance activities.

Both MOE and MNR reported in their March 2005 progress updates that the CWG continued to meet to review implementation of the compliance protocol and coordinate activities. MNR stated that the CWG "is reviewing the results of the trial implementation and is updating the Protocol accordingly" and that the CWG has developed "a process to assist with local implementation and will include it in [an updated] protocol."

Despite this reassuring statement, the ECO also was advised by MNR and MOE staff that the 2004 protocol might have to be reviewed in light of the federal government's planned cuts to DFO, announced in the 2005 federal budget. In late February 2005, regional DFO staff were advised that up to 45 enforcement staff and biologists in Ontario would be laid off by 2007. These cuts may make it difficult for DFO to fulfil its proposed role as a lead enforcement agency under the 2004 protocol.

OMAF

2003/2004 Annual Report Supplement

The ECO agrees that OMAF was justified in denying this application for review. Under the *Environmental Bill of Rights*, legislation that has not been prescribed, such as the *NMA*, are not subject to application for review. The ECO has urged OMAF several times to prescribe the *NMA*, but OMAF has not yet agreed. Furthermore, the *NMA* was not

proclaimed at the time OMAF responded to the applicants. Since then, *NMA* has come into force and a regulation that is only applicable to livestock operations is now being phased-in. It is the ECO's understanding that OMAF intends to develop nutrient management regulations for aquaculture operations sometime in the future.

In our 2000/2001 annual report, the ECO raised the same concerns as the applicants regarding the impact of nutrients from fish waste on the surrounding water quality and urged the government to "ensure that the aquaculture industry is sufficiently regulated to protect the environment." To date, no action has been taken. The ECO continues to believe that regulations are required and urges OMAF to consider the concerns raised by the applicants when it develops the regulations.

Developing Issues

2004/2005 Annual Report

Human Pharmaceuticals in the Aquatic Environment: An Emerging Issue

In addition to being widely consumed by humans, pharmaceuticals are also used extensively in agriculture in Ontario to prevent and cure disease and enhance growth in animals. Four antibiotics are registered for use in aquaculture in Canada for therapeutic purposes only.

With the exception of synthetic estrogens and possibly a few other drugs, the question of whether the levels of pharmaceuticals in the environment are causing adverse impacts on wildlife and humans is, for the most part, either uninvestigated or difficult to answer conclusively. Except where controlled studies involving environmentally relevant exposures of organisms in their environments are possible, establishing causal relationships is challenging.

Nonetheless, the fact that pharmaceuticals are bioactive and, in some cases, toxic has raised concerns that adverse effects may be occurring, even at low doses. Some scientists are concerned about the possible additive or interactive effects resulting from the exposure of organisms to a "chemical brew" of pharmaceuticals and other contaminants. There may also be stages of development during which organisms are exquisitely sensitive to exposures of very tiny amounts.

Some researchers have postulated that trace pharmaceuticals could play a role in triggering sudden acute effects, such as sudden massive fish die-offs. Many researchers believe, however, that available evidence suggests that more subtle effects may be occurring, such as neurobehavioural changes, physical deformities, and abnormal reproductive system development, which tend to have latent onset.

The continuous flow of antibiotics into the environment has also raised concerns that new strains of bacteria may develop, multiply and travel through the environment, potentially harming wildlife and reaching humans through the consumption of fish and drinking water.