Salmon Stocks, Habitat, and Aquaculture

Foreword

To Canadians, salmon represents strong and deep ties to our heritage. Salmon has sustained families and communities for generations and has contributed significantly to the economies of British Columbia and the Maritime provinces. Salmon is also a key part of the recreational sports fishing industry on both coasts. Canada is the fourth largest farmed salmon producer in the world; salmon aquaculture provides substantial economic benefits for coastal and rural communities.

In recent years, however, salmon stocks on both the east and the west coasts have been under intense pressure, and Atlantic salmon commercial fisheries in the Maritime provinces have been closed for many years to safeguard the resource. There has been considerable discussion of the effects of salmon aquaculture on wild salmon and the marine environment, including opposition to net-pen salmon farming operations from environmental groups and negative media coverage.

The Auditors General of Canada, British Columbia and New Brunswick are tabling separate reports to their respective legislatures on salmon-related issues. Between 1997 and 2000, the Auditor General of Canada conducted three audits that focussed on Pacific salmon, and this year it completed a follow-up of these audits in collaboration with the two provincial audit offices. The Auditor General of British Columbia examined the provincial government's role in sustaining wild salmon, and the Auditor General of New Brunswick looked at salmon aquaculture in that province.

Fisheries and Oceans Canada is responsible for ensuring that salmon and their habitat are protected, and it is the lead federal agency for aquaculture development. The provincial governments in British Columbia and New Brunswick have strongly supported the development of aquaculture in their provinces. In British Columbia, various provincial departments are responsible for managing lands and natural resources in ways that sustain wild salmon.

Our three audits were performed concurrently; our offices participated jointly in certain audit-related processes and shared information on a regular basis. As a result, we were able to accomplish more with less duplication of effort and achieve a broader view and understanding of the issues.

Wild salmon and their habitat

The purpose of policy is to provide a broad framework for a shared vision to guide decisions and activities. Canada's policy on salmon and salmon aquaculture should set clear objectives for managing both wild and farmed salmon and the interactions between them. At the federal level, Fisheries and Oceans Canada has been struggling since 2000 to finalize a wild salmon policy designed to conserve the genetic diversity of wild salmon and protect their habitat. Stakeholders have called for the policy to be finalized to clarify how conservation should be implemented and how fisheries should be managed. At the provincial level, British Columbia does not have a clear vision and an overarching strategy for wild salmon sustainability.

Two of our three audits noted gaps in policy implementation. Fisheries and Oceans Canada, for example, has never reported on the status of fish habitat conservation in Canada or assessed the effectiveness of its Habitat Policy. These continue to be significant challenges for the Department. Similarly, reporting by provincial ministries and agencies in British Columbia on performance relating to sustaining wild salmon is weak.

Salmon aquaculture

All three audits identified gaps in coordination between the federal and provincial governments. Despite numerous committees, agreements, and protocols between the two provinces and the federal government, problems still exist. For example, there are concerns about how long it takes to secure approvals for aquaculture sites, a key aspect of regulating salmon aquaculture.

The three audits also found significant gaps in the scientific knowledge about the potential effects of salmon aquaculture. Fisheries and Oceans Canada's Aquaculture Policy Framework expresses a strong commitment to developing a sustainable aquaculture industry in Canada. But when assessing applications for aquaculture sites, the Department needs to apply more credible, science-based criteria to ensure that approved sites are properly located. It has had difficulty assessing the cumulative effects of salmon aquaculture on wild salmon stocks. And it has to determine how to control the deposit of deleterious substances by salmon aquaculture operations. Wild salmon and habitat remain susceptible to the effects of salmon aquaculture.

In New Brunswick, auditors found that stakeholders have yet to share a common vision of sustainable aquaculture. Therefore the Province lacks a comprehensive strategy for aquaculture development and the management of significant risks. In addition, there are deficiencies in both the monitoring of aquaculture activities and the enforcement of compliance. For example, the provincial government does not adequately monitor aquaculture producers' compliance with the terms of their leases and aquaculture licences. Unlike British Columbia, New Brunswick does not monitor escapes from salmon cages, nor does it require that escapes be reported.

The Salmon Aquaculture Policy Framework of the Province of British Columbia calls for relocating a number of sites that are poorly located and implementing new siting criteria, but key issues remain undecided. British Columbia's guidelines, and siting decisions made in New Brunswick, are based on scientific information that is less than complete.

Need for prompt, concerted action

Concerns about salmon and salmon aquaculture are not new, and neither are attempts to improve the state of the resource and its habitat. But progress has been slow. In the meantime, some salmon populations are in trouble, habitat loss continues to occur, and it is not known what long-term effects salmon aquaculture is likely to have on the natural resource or the environment.

Prompt, concerted action is required if the salmon fisheries and salmon aquaculture are to be sustainable. It is also imperative that more than a single level of government be involved in the solution. The collaboration of a variety of agencies within each government and between governments is essential. We urge our respective governments to take immediate action on these important issues.

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The chapter "Fisheries and Oceans Canada—Salmon Stocks, Habitat, and Aquaculture" is available on the Office of the Auditor General of Canada Web site (www.oag-bvg.gc.ca). For copies, contact

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New Brunswick Salmon Aquaculture

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New Brunswick Salmon Aquaculture

Background

1. The New Brunswick salmon aquaculture industry generated 39,000 metric tonnes of fish in 2002 with a total value of $195 million, making it the largest grossing agri-food commodity produced in the Province. By comparison, the second most valuable commodity was potatoes which had a value of $126 million for that year. Of the revenue generated by salmon aquaculture, an estimated 75% comes from exports to the United States. The remainder comes from Canadian sales. The salmon aquaculture industry in New Brunswick creates thousands of direct and indirect jobs for provincial residents and is a source of millions of tax dollars. As a result, it has had a positive impact on the quality of life of many New Brunswickers, particularly those in the Charlotte County area.

2. With the approval of various departments of the Province and the government of Canada, the salmon aquaculture industry uses coastal Crown lands and waterways to grow out hatchery salmon smolts to market size. The Department of Agriculture, Fisheries, and Aquaculture is the lead provincial agency in the development of the provincial aquaculture industry, and administers leasing of Crown lands to aquacultural producers and licensing of associated cage culture operations. It is also responsible for ensuring that terms of legislation, leases and licenses are complied with by producers. The Department of the Environment and Local Government issues environmental approvals, administers pertinent environmental legislation, and takes steps to ensure that producers comply with the terms and conditions of their Certificates of Approval to Operate. The government of Canada also assumes some responsibility in developing the industry, managing associated environmental risks, and doing research through the Department of Fisheries and Oceans, and Environment Canada.

3. The first salmon aquaculture site was approved for New Brunswick in 1978 and commenced operations in 1979. The present number of 96 sites was reached in 2000. All provincial marine finfish

aquaculture sites are located in the Bay of Fundy area, and most are stocked entirely with salmon. A few producers in the region are also stocking other species of finfish (e.g. halibut) on a trial basis in an attempt to reduce their reliance on a single species and take advantage of growing markets for those species. Salmon production continues to rise, having nearly tripled between 1998 and 2002.

Table I - Bay of Fundy Salmon Aquaculture Data – 1998 to 2002

Year	Number of Sites	Volume (Metric tons)	Estimated # of Fish @ 4 kg each	$ Value (in thousands)
1998	78	14,232	3,588,000	106,678
1999	87	22,000	5,500,000	150,000
2000	96	29,100	7,275,000	181,500
2001	96	33,900	8,475,000	180,010
2002	96	38,900	9,725,000	194,500

4. Infectious salmon anemia (ISA), a potentially fatal viral disease of salmon, has resulted in significant financial losses to the industry. It first arrived in the Bay of Fundy in the mid-1990s. Since then, the Department of Agriculture, Fisheries, and Aquaculture (DAFA) has concentrated much of its effort on attempting to reduce the incidence of that disease.

5. As a result of salmon cage culture operations, residues (fish waste and potentially operational waste, uneaten feed, and other residues) end up on the sea bed under cages. Since 2002, the Department of the Environment and Local Government (DELG) has had responsibility for monitoring the environmental conditions under cage sites and enforcing provincial environmental standards. Prior to that, DAFA was responsible for environmental monitoring and enforcement.

6. Despite the economic benefits associated with the industry, stakeholders such as traditional fishers, the Atlantic Salmon Federation and the Conservation Council of New Brunswick have expressed concerns about the growth of salmon aquaculture in the Bay of Fundy region. In fact, most recent applications to develop new aquaculture sites have been strongly opposed by certain stakeholder groups. Opposition relates to potential negative impacts on the Bay of Fundy eco-system, conflicts over coastal land use, and the loss of traditional fishing grounds.

Why the Office of the Auditor General looked at salmon aquaculture

7. Our Office mission statement is as follows:

We promote accountability by providing objective information to the people of New Brunswick through the Legislative Assembly.

8. Because of the economic activity it creates, and the potential environmental and social impacts it may have, we consider the salmon aquaculture industry to be very significant to New Brunswickers. Further, significant amounts of provincial resources are being used to manage risks associated with the industry. Consequently, we feel that a project to look at provincial involvement in the salmon aquaculture industry is of value to the Legislative Assembly.

9. Our key findings and recommendations refer to salmon aquaculture. However, we feel that they may also be applied to other finfish species, an area that is likely to grow in importance in the future as the Province and the aquaculture industry continue in their efforts to commercialize the production of halibut, cod and other finfish species.

Scope

10. Our objective for this project was:

To determine whether Province of New Brunswick programs ensure that New Brunswick salmon cage culture operations are economically, environmentally, and socially sustainable.

11. In working towards achieving this objective, we focused on key risks associated with the salmon aquaculture industry in New Brunswick that could potentially have a negative impact on the sustainability of salmon cage culture operations, and the extent to which those risks are being managed.

12. In completing our work, we interviewed employees of the Department of Agriculture, Fisheries and Aquaculture, the Department of the Environment and Local Government, the Department of Natural Resources, Business New Brunswick, the two New Brunswick salmon aquaculture associations that existed at the time of our work, and other New Brunswick aquaculture industry stakeholders. We reviewed legislation, commercial aquaculture licenses, aquaculture leases, and environmental Certificates of Approval to Operate. We also reviewed provincial policies, along with various other documents prepared by provincial departments,

the aquaculture industry, and other organizations both inside and outside New Brunswick. We also performed detailed testing of certain regulatory activities associated with the licensing and monitoring of coastal cage culture operations.

13. Our work was performed concurrently with related audit projects undertaken by the Office of the Auditor General of Canada and the Office of the Auditor General of British Columbia. We worked cooperatively with those two offices as part of our audit process.

Results in brief

Risks associated with the salmon cage culture industry

14. There are many risks associated with the New Brunswick salmon cage culture industry that are of public concern. Those risks may be broken down into three categories as follows:

- **Economic risks are risks that may impact on the economic viability of the industry as a whole, thereby threatening underlying jobs and economic activity (e.g. fish diseases like Infectious Salmon Anemia).**

- **Environmental risks are risks that may impact negatively on the environment, fish and wildlife, or the ecosystem in general (e.g. pollution in coastal waters caused by waste from cage culture sites).**

- **Social risks are risks that Crown lands and waterways, and other public resources used for the aquaculture industry may be better used for other purposes or that prior users of those public resources may be displaced (e.g. displacement of traditional fishers by the salmon cage culture industry).**

15. We feel that the Province has a responsibility to ensure that risks of public concern are considered and, where it is cost effective to do so, are managed. Current provincial programs address risks to some extent but there is no coordinated risk management system.

Comprehensive provincial strategy for salmon aquaculture

16. We feel that the Province should develop a comprehensive provincial strategy for the salmon aquaculture industry. Such a strategy would provide a basis for provincial decision making in connection with the industry. The process of developing that strategy should include consultation with all involved organizations to develop consensus on:

- **goals and objectives for aquaculture that strike a balance between competing interests (i.e. economic, environmental, and social);**

- **the publicly-significant risks associated with the industry that should be managed;**

- **who should manage identified risks, how those risks should be managed, and who has ultimate responsibility for ensuring that those risks have been adequately managed;**

- **a list of performance indicators that can be used for public reporting purposes as a means of evaluating the effectiveness of the Province in carrying out the strategy; and**

- **approaches for dealing with pressing strategic issues such as, for example, using an integrated coastal zone management approach to address the issue of space limitations for salmon cage culture sites in New Brunswick.**

Research

17. At present, provincially-funded research is primarily development related. Additional environmental research is needed to reduce current gaps in knowledge about how the cage culture industry interacts with the eco-system in the Bay of Fundy area, and therefore what level of salmon aquaculture is truly sustainable. Such knowledge would provide the basis for development of improved regulatory standards. Until sufficient research has been completed and applied to the development of regulatory standards, regulators and others cannot be certain if current aquaculture practices are completely innocuous, or if they are causing temporary or even permanent damage to our environment. We therefore recommended that the Province advocate for federal completion of environmental research where knowledge gaps currently exist in areas of concern to New Brunswick.

Regulatory activities

Department of Agriculture, Fisheries and Aquaculture (DAFA)

18. DAFA is responsible for issuing new and amended commercial aquaculture licenses. DAFA is also responsible for ensuring that terms of the *Aquaculture Act* and Regulation, aquaculture leases, and Commercial Aquaculture licenses are complied with. We were pleased to note that a new monitoring and enforcement section was set up in DAFA during 2003. However, only selected monitoring activities have commenced to date, so monitoring of producer compliance with provincial standards and related enforcement activities remains inadequate.

For example, there is no monitoring for compliance with license terms limiting species and strains of fish that may be stocked or the maximum holding unit capacity of cages on sites.

19. We noted examples during our work where new and amended commercial aquaculture licenses were issued by DAFA before all related approvals were received from the government of Canada and/or DELG. Additionally, we noted one case where on-site activity was allowed prior to issuance of the license. We recommended that provincial aquaculture licenses should not be issued or amended, nor should onsite activities be allowed, until all necessary regulatory approvals have been obtained.

20. Because stocking levels directly affect the impact of a cage site on fish health and the environment, an approved production limit is set as a term of each commercial aquaculture license. There is much anecdotal and some documentary evidence that overstocking of cage sites has been widespread in New Brunswick. For example, in one case we reviewed the producer had introduced enough fish to nearly double the approved production limit shown on their license. Some work has commenced on monitoring and enforcing approved production limits, but we have recommended that DAFA enhance efforts in this area by expanding the information it obtains from producers and ensuring that actual sales from a site do not exceed approved production limits.

21. We also recommended that consideration be given to transferring responsibility for setting approved production limits, and for monitoring and enforcing compliance with them, to DELG. We based this recommendation on the fact that stocking levels appear to have the most significant impact on the mandate of that department.

22. Further, we recommended that producer compliance with key license terms such as species and strains of fish that may be stocked, the maximum holding unit capacity of cages on a site, and the maximum stocking density permitted at the site be monitored and enforced. That is not currently the case.

Department of the Environment and Local Government (DELG)

23. DELG is responsible for issuing new and amended environmental Certificates of Approval to Operate to all producers. It is also responsible for ensuring that terms of environmental legislation and environmental Certificates of

Approval to Operate are complied with by producers. DELG assumed this responsibility in 2002 and is still in the process of implementing certain necessary regulatory activities.

24. DELG determined in its 2003 testing that environmental conditions were below target levels at 35% of Bay of Fundy cage culture sites, up from 30% in 2002 testing. All of those sites were therefore in need of remediation. At the time of our audit, all remediation plans were well into the process of being developed for sites found to be in need of remediation as a result of 2002 testing.

Department of Natural Resources (DNR)

25. DNR transfers administration and control over parcels of Crown land to be used for aquacultural purposes to DAFA after conducting a departmental review of the proposed site for acceptability. DNR has no direct monitoring and enforcement responsibilities in connection with that land once it is transferred to DAFA, but does bear ultimate responsibility for the management of Crown lands under the *Crown Lands and Forests Act*.

26. DNR typically monitors compliance with lease terms for Crown lands under its own management. DAFA acts as the lessor of Crown land used for aquacultural purposes but does no monitoring of producer compliance with aquaculture lease terms. Consequently, we recommended that DNR ensure that DAFA is monitoring compliance with aquaculture leases over Crown land transferred to DAFA. In conjunction with this, we recommended that DNR and DAFA develop and sign a memorandum of understanding for aquaculture that clearly defines the duties of each department in relation to this land. We feel this is an important step in ensuring that necessary regulatory activities in connection with Crown land are completed.

Access to/sharing of information

27. The *Aquaculture Act* restricts provincial departments from accessing producers' financial information for any reason. DAFA applies section 29 of the Act to restrict provincial departments from disclosing to the public any individual site information considered confidential and to limit the documentary information that can be shared between departments. These restrictions may limit the ability of provincial departments to effectively monitor and enforce provincial operating and environmental standards. They may make coordination of provincial activities with those of federal departments more difficult. And they may also preclude public

policy decisions being taken in an environment of transparency. For example:

- **DAFA does not disclose certain documentary information about individual sites to other provincial departments that might be useful to them in carrying out monitoring and enforcement activities. We do not feel that their restriction is supported by the *Aquaculture Act* and believe that DAFA should seek a legal opinion to clarify the matter.**

- **The lack of access to financial information may make it more difficult or impossible for DAFA to build an enforceable case against producers who are suspected of overstocking their sites.**

- **Significant limits are placed on the amount of information disclosed publicly pursuant to applications for new aquaculture sites. For example, the public is not provided with information on the proposed size of a farm nor the number of fish to be stocked. This makes it difficult for the public and stakeholders to provide meaningful input.**

28. We also noted that DELG does no regular public reporting of the environmental rating of individual aquaculture sites, nor any other specifics from monitoring activities associated with those sites. This is pursuant to the wishes of producers. It does provide such information in response to formal requests under the provincial *Right to Information Act*. By comparison, the Province of British Columbia routinely makes such information public.

29. We consequently recommended that DAFA take appropriate steps to ensure that sufficient information is accessible by provincial departments and reported publicly. Further, where legal restrictions apply, we recommended that DAFA give consideration to proposing changes to the existing *Aquaculture Act* and Regulation to remove those restrictions.

Reporting on program effectiveness

30. We recommended that DAFA, DELG and DNR establish procedures to measure and report on the effectiveness of provincial programs that impact on the salmon cage culture industry. Such reporting should be clearly linked to the objectives of those programs. Current annual reports of those departments provide no such reporting. Legislators need this

information to make informed judgements about the industry and provincial involvement in it, as do New Brunswick citizens.

Other

31. The salmon aquaculture industry in the Bay of Fundy is subject to the risk of catastrophic losses. Recently serious economic losses have occurred as a result of ISA and the threat of losses due to severe weather conditions is always present. Producers do not appear to have adequately insured themselves against the risk of catastrophic losses. This creates an economic risk for the Province. We recommended that DAFA develop a strategy covering industry compensation for catastrophic losses, in consultation with industry and the government of Canada. We further feel that producers should bear primary responsibility for managing the risk of catastrophic losses by carrying adequate insurance and/or other means as necessary.

32. DAFA has taken a number of steps to reduce the risk of fish disease occurring at salmon cage culture sites on the Bay of Fundy. It has developed the Bay of Fundy Marine Aquaculture Site Allocation policy that addresses disease transmission issues through careful siting of farms, moving to single year class farming within particular areas, and other practices. It has also developed a draft fish health policy, which is expected to be approved in final form during 2004, that includes a harvest boat protocol under which harvest boats are now being certified. Based on 2003 results, it appears that DAFA's efforts have helped control the incidence of ISA. However, we would caution that it is risky to draw a firm conclusion from the single year of positive data that has been reported.

Risks associated with the salmon cage culture industry

33. The paper *"Managing Risk in the New Economy"* published in January 2001 by the AICPA/CICA Risk Advisory Services Task Force, defines risk as:

> *the chance of something happening that will have an impact on objectives. It is measured in terms of consequences and likelihood.*

34. It defines the risk management process as:

> *the systematic application of management policies, procedures, and practices to the tasks of establishing the context, identifying, analyzing, assessing, managing, monitoring and communicating risk.*

35. Implicit in all provincial programs is that there is a risk (or risks) that must be managed. In order for the Province to become involved, that risk must be:

- significant enough to legislators and New Brunswick citizens to warrant using provincial resources in its management; and

- most effectively and efficiently managed by the Province (i.e. as opposed to some other organization).

36. Typically, governments manage risk by setting standards through legislation, licenses, leases, environmental Certificates of Approval to Operate, or some other legally enforceable means. They then monitor activities to ensure that those standards are being complied with and take enforcement action where necessary.

37. In general, we believe that the Province needs to have a good understanding of the significant public risks associated with the aquaculture industry and their potential consequences. It needs to decide which of those risks it must manage on behalf of legislators and New Brunswick citizens and which are better managed by other organizations. It also needs to ensure that where other organizations can better manage a particular risk, they are in fact doing it, for example by ensuring that producers carry adequate insurance against catastrophic losses.

38. For the most part, we believe that provincial departments have a good understanding of risks associated with the aquaculture industry and are attempting to manage those judged as important to legislators and New Brunswick citizens. However, we feel that a more formal approach to identifying risks associated with salmon aquaculture and clearly establishing responsibility for managing those risks would prevent an important risk area from "falling through the cracks", leading to significant problems later on.

39. There are three categories of risk related to the aquaculture industry that are of concern to the New Brunswick public. They are:

- **Economic risks** - risks that may impact on the economic viability of the industry as a whole, thereby threatening the underlying jobs and economic activity.

- **Environmental risks** – risks that may impact negatively on the environment, fish and wildlife, or the ecosystem in general.

- **Social risks** – risks that Crown lands and waterways, and other public resources used for the aquaculture industry, may be better used for other purposes or that prior users of those public resources may be displaced.

40. All three categories of risk must be managed adequately to realize the goal of a sustainable salmon aquaculture industry.

41. A list of risks associated with the salmon aquaculture industry had not been developed by the time of our audit. With the assistance of DAFA, DELG, DNR and input from representatives of Business New Brunswick, the two industry associations that existed at the time of our work, the Conservation Council of New Brunswick, and the Atlantic Salmon Federation, we prepared such a list. Identified risks are presented in Table IIA. Some associated risk management techniques that could be used are presented in Table IIB.

Table IIA – List of risks associated with the salmon aquaculture industry

Description of risk	Category of risk			Looked at in this project?
	Economic	Environmental	Social	
Salmon disease and parasites	Yes	Yes	No	Yes
Single-species reliance (i.e. salmon)	Yes	No	No	Yes
Reliance on US market/lack of alternate markets	Yes	No	No	Yes
Industry not competitive	Yes	No	No	Yes
Lack of protection for the industry against catastrophic losses	Yes	No	No	Yes
Negative perception of the industry	Yes	No	No	Yes
Lack of space in NB for industry growth	Yes	No	No	Yes
Delays in moving product due to border security issues	Yes	No	No	No
Problems with food safety	Yes	No	Yes	No
Problems with food quality	Yes	No	No	No
Fish escapes	Yes	Yes	No	Yes
Transmission of diseases from farmed salmon to wild stocks	Yes	Yes	No	No
Negative impacts on environment from discharge of contaminants from cage sites into coastal waters feces, feed residue, therapeutants, etc.)	Yes	Yes	Yes	Yes
Inappropriate/inefficient use of Crown Lands resulting from the assignment of Crown lands and waterways for aquacultural use (i.e. Crown lands and waterways used for the aquaculture industry may be better used for other purposes, prior users of those public resources may be displaced, and/or financial returns to the Province from Crown lands are not optimized.)	Yes	No	Yes	No
Inefficient operations. e.g. poor feed conversion rate (i.e. weight of fish and other materials used for feed compared with weight of fish actually produced)	Yes	Yes	Yes	No
Damage to adjoining land and/or nearby beaches by aquaculture operations	Yes	Yes	Yes	No

Table IIB – List of some potential risk management techniques				
Risk Management Strategy	**Categories of risks it could be used to manage**			**Discussed in this Report?**
	Economic	**Environmental**	**Social**	
Preparing, implementing, and maintaining an overall plan for sustainable aquaculture in New Brunswick	Yes	Yes	Yes	Yes
Coordinating developmental and regulatory activities between the two levels of government	Yes	Yes	Yes	Yes
Ensuring that sufficient research has been completed upon which to base comprehensive public standards for the industry	Yes	Yes	No	Yes
Ensuring that effective and enforceable legislation, regulations, and standards are in place.	Yes	Yes	Yes	Yes
Ensuring industry compliance with provincial legislation, regulations, and standards	Yes	Yes	Yes	Yes
Ensuring that decision-makers (i.e. program managers, legislators, stakeholders, and taxpayers) obtain sufficient, accurate and timely information about the industry and the Province's involvement with it.	Yes	Yes	Yes	Yes

42. In the remainder of this section, we look at a number of the key risk areas for aquaculture and the extent to which the potential risk management techniques identified above are being employed. We also provide recommendations where we feel risks could be managed more efficiently or effectively. Note that the discussion of some of the key risk areas and management techniques is deferred until the next section where we look at provincial regulatory activities specifically related to salmon aquaculture cage sites.

43. We would also note that while we did not look specifically at provincial involvement in the management of food safety risks of farmed salmon, we do feel that adequate application of some of the risk management techniques identified above (e.g. ensuring industry compliance with provincial legislation, regulations, and standards) may have positive impacts on food safety risk as well.

Provincial strategy for the salmon aquaculture industry

44. Under the 1989 Canada-New Brunswick Memorandum of Understanding on Aquaculture Development (MOU), New Brunswick has primary responsibility for the management and development of the aquaculture industry in consultation with Fisheries and Oceans Canada. The Department of Agriculture, Fisheries and Aquaculture (DAFA) represents the Province on the MOU Steering Committee. DAFA and, more recently, the Department of the Environment and Local Government (DELG) have

undertaken significant roles related to the industry. Further, the Department of Natural Resources (DNR) has involvement as the holder of the Crown land upon which aquaculture operations are based and due to its "protection" responsibilities for fish and wildlife habitat. Business New Brunswick has also played a role by providing financial support to the industry.

45. Federally, the Department of Fisheries and Oceans (DFO), Environment Canada, the Atlantic Canada Opportunities Agency, and other organizations are involved in regulating, doing research related to, and/or funding the industry.

46. At the time of our work, two producer organizations existed in New Brunswick: the New Brunswick Salmon Growers Association and the Aquaculture Association of New Brunswick.

47. Industry stakeholders include the Atlantic Salmon Federation, the Conservation Council of New Brunswick, the Bay of Fundy Fishermen's Association, the Eastern Charlotte Waterways Association, and private citizens groups.

48. All these organizations have different objectives, priorities and interests in relation to the industry. For example, consider the somewhat different priorities in connection with aquaculture represented in the following mission/objective statements taken from 2002/2003 departmental annual reports.

> *"To promote sustainable growth of the Agriculture, Fisheries, and Aquaculture sectors through innovative partnerships, targeted policies and programs resulting in greater prosperity for New Brunswickers." (DAFA)*
>
> *"Healthy environment, strong communities" (DELG)*
>
> *"To provide social and economic opportunities on Crown land that are consistent with maintaining a naturally diverse and healthy environment. To protect and enhance the value of Crown land."*
>
> *"To protect and manage the full range of fish and wildlife species, habitat and biodiversity across the New Brunswick landscape."*
>
> *"To sustainably manage consumptively-used fish and wildlife species." (DNR)*

49. We feel that an important role of the Province is to establish and maintain a balance between competing interests, both internal and external to government. A number of organizations we talked to have the perception that the Province favours development of the salmon aquaculture industry over other considerations and gives most weight to potential economic benefits in its decision making. A representative of one organization stated, *"Licensees can put pressure on developmental agencies and make life difficult for those agencies who might be the naysayers in the process."* On the other hand, industry representatives have indicated that governments are unduly restricting development of the industry. There seems to be no shared vision of "sustainable aquaculture" in New Brunswick. In fact, the various organizations listed above often work at cross purposes.

50. In our opinion, a comprehensive strategy for the development and management of finfish aquaculture in New Brunswick is needed. Such a strategy would be extremely useful in:

- ensuring that all significant risks are identified;
- clearly identifying responsibility for managing those risks and ensuring that they are being adequately managed;
- setting goals and objectives that strike a balance between competing interests (i.e. economic, environmental, and social); and
- providing a basis for provincial decision making in connection with the industry (e.g. in setting the form and content of legislation, leases, and licenses).

51. However, both levels of government, the aquaculture industry, and key stakeholders must be involved in developing that strategy in order to realize those benefits.

52. A past recommendation from the report of the Premier's Round Table on Environment and Economy entitled, "Towards Sustainable Development in New Brunswick" supports our opinion:

> *Develop, by 1995, land use plans for coastal zones and marine ecosystems, giving priority to drainage basins where pollution and land use have a substantial impact on marine resources and ecosystems. This should include a*

> *comprehensive long-term plan for the development and management of aquaculture in New Brunswick, with the objective of increasing the present value without compromising the quality of the environment or endangering native species.*

53. A follow up done by the Round Table in 2000 included the following comment:

> *With regard to aquaculture, the Round Table continues to be concerned that the industry be both viable and non-polluting. The Round Table has presented recommendations to government with regard to finfish aquaculture in the Bay of Fundy and recommends that they be incorporated in the long-term plan for the development and management of the aquaculture industry. ...*

54. DAFA has developed, in cooperation with DELG, DNR, Bay of Fundy producers, and other stakeholders, the Bay of Fundy Marine Aquaculture Site Allocation Policy. It is the only provincially-generated document that begins to come close to fulfilling the role of a comprehensive provincial strategy for aquaculture. It includes the statement, *"This Policy is founded on the basic principle of ensuring sustainable aquaculture development based on consideration of all applicable economic, environmental and social factors."*

55. Specific objectives of the policy include:

- To ensure the economic sustainability of aquaculture development.
- To ensure that aquaculture development is conducted in an environmentally-sustainable manner.
- To provide a policy framework that facilitates the restructuring of the Atlantic salmon marine aquaculture sector.
- To provide a policy framework that encourages diversification and development of alternate species.
- To ensure that site allocation decisions are timely and undertaken within a transparent and equitable process.

56. DAFA spearheaded development of the policy primarily to address the development issues, particularly disease management, for

which it has responsibility. While the policy does address many strategic areas, we do not consider it to be a comprehensive provincial aquaculture strategy. In particular:

- it does not address best uses for Crown land or other social implications of the industry;
- it does not focus in much depth on environmental areas;
- it does not identify risks associated with practicing aquaculture in the Bay of Fundy, nor establish who is responsible for managing those risks; and
- it does not include performance indicators with which progress in achieving policy objectives can be measured.

57. Since a sustainable aquaculture industry appears to be a primary goal of the Province, we feel that an appropriate first step in developing a provincial strategy would be to adopt a definition for sustainable aquaculture. Such a definition would, in effect, serve as a mission statement for provincial involvement with the industry.

58. The federal DFO website provides an excellent model for defining sustainable aquaculture.

> *The Government of Canada has accepted the definition of sustainable development as first proposed by the World Commission on Environment and Sustainable Development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*
>
> *...Aquaculture in the context of sustainable development incorporates the following elements:*
>
> - *maintaining or enhancing the quality of life and the environment for present and future generations;*
> - *adopting an ecosystem approach and respecting the interests and values of all resource users and considering those interests and values in decision making;*

- *identifying, planning, developing, operating, harvesting, processing, and when necessary disposing of aquacultural products in the most efficient, competitive and environmentally responsible manner, using best practices;*

- *respecting constitutionally protected Aboriginal and treaty rights;*

- *creating and sharing knowledge to promote innovation, continuous learning and efficiency;*

- *securing the participation of stakeholders, individuals and communities in decision-making to ensure best use of aquatic space; and*

- *making decisions in a fair, transparent and inclusive manner.*

59. A further model is provided by the government of Scotland. It has built an aquaculture strategy around the World Commission on Environment and Sustainable Development definition of sustainability noted above. The 2003 document "A Strategic Framework for Scottish Aquaculture" includes the following three guiding principles.

- *Economic – Aquaculture should be enabled to make a positive contribution to the Scottish economy through being internationally competitive in the marketplace and economically viable at a national level.*

- *Environmental – The industry should work in harmony with nature, managing and minimizing transient environmental impacts, and avoiding significant, cumulative, long-term or irreversible changes to ecological systems, to cultural remains or to valued landscape and scenery.*

- *Social – Aquaculture should foster strong community links, recognizing and supporting the needs of local communities and working with community initiatives to manage local environments for mutual benefit. It must be integrated within its community, liaising locally and nationally on all appropriate matters.*

Recommendation - provincial strategy for the salmon aquaculture industry

60. We recommended the Province develop and implement a comprehensive strategy for the development of a sustainable New Brunswick aquaculture industry, including establishing performance indicators that can be used for public reporting purposes. The process of developing that strategy should include consultation with all involved organizations to develop consensus on how aquaculture should be practiced in New Brunswick and how associated risks should be managed. A good starting point would be the development and adoption of a common definition for "sustainable aquaculture."

Departmental responses

61. *DAFA agrees with the recommendation. DAFA supports the development and implementation of a comprehensive strategy for the aquaculture sector. This strategy will build upon the policies and strategies such as the Site Allocation Policy and environmental management guidelines that have already been developed and implemented in support of sustainable aquaculture development. As a relatively new industry, aquaculture in this Province continues to adapt to new information and technology; therefore this should be an evolving strategy. The development of strategies and policies does involve consultation with stakeholders; however, it should be noted that consensus is not always possible to achieve. In the development of a comprehensive strategy, the primary focus in consultation with stakeholders will be placed on policies and regulations to support sustainable development.*

62. [DELG] *agrees with the recommendation, and will work with the other affected agencies toward the development of strategy for sustainable aquaculture.*

63. [DNR supports the recommendation.] *In particular, we strongly support a planned approach to determine the number of aquaculture sites the Bay of Fundy area can sustain, as well as production levels which would adequately address issues of environmental sustainability in relation to our provincial mandate under the* Crown Lands and Forests Act.

Coordination between government regulators

64. Because of the number of federal and provincial government departments involved in regulating the aquaculture industry in New Brunswick, coordination has been difficult. A representative of DELG explained the problem this way.

> *... The big issue is coordination in the truest sense of the word. i.e. achieving agreement between regulators. All*

regulators are aware of one another's activities, and there is ample opportunity to discuss and attempt to coordinate, but these are largely limited to information exchanges as unanimity is often difficult to achieve.

65. As discussed in the previous section, the priorities of each provincial department involved with the aquaculture industry are somewhat different. The same would be true of involved federal departments. It is therefore not surprising that coordination problems have arisen because government regulators are not all working towards common goals in relation to the salmon aquaculture industry. During our work we noted a number of federal/provincial and intra-provincial coordination problems.

- There is some duplication of effort between the two levels of government despite the existence of a memorandum of understanding between Canada and New Brunswick. For example, similar information must be provided to both levels of government by site applicants in order to complete necessary environmental reviews. Given the limitations on public resources, regulatory activities should be completed efficiently and effectively (i.e. once by the appropriate regulator).

- There are problems with the timeliness of regulatory review processes, particularly those associated with approving new site applications and applications for changes in existing license terms. Some of these problems may arise due to delays on the part of applicants in providing requested information, but many could be addressed through better coordination.

- Because of the relative complexity of the aquaculture industry, producers are required to deal with the two levels of government and various departments within those governments. Industry representatives have noted a lack of consistency between federal and provincial regulations and the messages received from various industry regulators. We feel it is very important that a consistent message is provided to industry and that information is shared between levels of government to make the process as efficient as possible for the industry.

66. In 1999, the Canadian Council of Fisheries and Aquaculture Ministers (CCFAM), of which the provincial Minister of Agriculture, Fisheries and Aquaculture is a member, set up a task group on aquaculture to act as a conduit for information and discussion, and to address various issues including coordination. Other efforts to better

coordinate federal/provincial regulation are ongoing. However, it is apparent from our findings that work remains to be done in this area. For example, we feel that it would be worthwhile for the Province to advocate for revisions to the existing Canada-New Brunswick Memorandum of Understanding on Aquaculture Development to better reflect and clarify current practices and issues of concern.

Recommendations – coordination between government regulators

67. We recommended that affected provincial departments work with federal departments, CCFAM and/or other federal/ provincial committees as necessary to rectify ongoing coordination problems between the two levels of government.

68. We recommended the Province advocate for revisions to the existing Canada-New Brunswick Memorandum of Understanding on Aquaculture Development to better reflect and clarify current practices and issues of concern.

69. Further discussion and recommendations related to certain of these coordination issues appear later in this report.

Departmental responses

70. *DAFA agrees with the recommendation*[s]. *A federal/ provincial integrated policy framework is currently being pursued to harmonize the existing regulatory framework, identify common goals, establish funding arrangements to deliver programs, establish reporting mechanisms, and provide a framework for bilateral implementation agreements.*

71. [DELG] *recognizes the necessity of resolving these coordination issues, and will continue to work toward their resolution as recommended.*

Fish health

72. Management of the risk of fish disease is intrinsic to the success of the aquaculture industry in New Brunswick, and therefore to the continuance of the economic benefits provided to New Brunswickers by the industry. Failure to manage this risk properly could lead to such negative outcomes as economic loss to industry, the transmission of disease to wild Bay of Fundy salmon stocks that are listed under the federal *Species at Risk Act*, and potentially even the closing of the US border to New Brunswick salmon products for bio-security reasons.

73. Practices which increase the risk of fish disease include:

- Overstocking aquaculture sites puts stress on fish stocks, and makes them more susceptible to illness.

- Close proximity of sites facilitates the transmission of disease between sites.

- Uncontrolled movement of vessels between aquaculture sites increases the risk that diseases will be transmitted from infected sites to non-infected ones.

- Introducing smolts into an aquaculture site when there are mature fish still on site may allow existing disease to propagate. A fallow period is needed to ensure any existing disease is eradicated.

- Uncontrolled access to and usage of wharf facilities can allow cross contamination to occur.

74. The disease that has caused and continues to cause a significant risk to the provincial finfish aquaculture industry is infectious salmon anemia (ISA), a disease that first appeared in New Brunswick in the mid-1990s. DAFA takes the threat posed to the industry's continued economic viability by ISA very seriously, devoting more of its resources to managing this risk area than any other. The 2002/2003 DAFA annual report states, *Restructuring of the salmon aquaculture industry with respect to best fish health management practices is still the number one priority.*

75. The *Aquaculture Act* provides the Minister of DAFA with a powerful, albeit ultimately costly, tool with which to control the spread of existing fish disease.

> *19(2) If satisfied on reasonable grounds that disease, parasites, toxins or contaminants are present, the Minister may direct a licensee to take such measures as the Minister considers necessary to prevent the spread of the disease, parasites, toxins or contaminants.*
>
> *19(3) The Minister under subsection (2) may direct a licensee to quarantine or to destroy or otherwise dispose of aquacultural produce, in accordance with the direction of the Minister.*

76. Initially, ISA was controlled solely by issuing ministerial depopulation orders. Such orders continue to be issued as needed. However, DAFA has developed detailed operating practices for the industry as a preventative measure to reduce the likelihood of ISA occurring in the first place. The Bay of Fundy Site Allocation Policy, for example, was developed primarily as a tool for addressing disease

transmission issues through careful siting of farms, moving to single year class farming within particular areas, and other practices. DAFA has also developed a draft fish health policy that includes a harvest boat protocol under which harvest boats are now being certified. In 2001, the current fish health surveillance regime was developed under an earlier draft version of the fish health policy. DAFA also requires that ISA management plans be prepared and followed for ISA positive sites. The fish health policy is expected to be approved in final form during 2004.

77. Based on the 2003 results shown in the following table, the Department's efforts seem to be having an impact. However, we would caution that it is risky to draw a firm conclusion from only one year of positive data.

Table III – Recent Incidents of Infectious Salmon Anemia – Bay of Fundy

	2001 Year Class	2002 Year Class	2003 Year Class*
Number of sites affected	15	16	2
Number of cages affected	68	135	2
Number of fish removed (approximate)	1,025,000	2,500,000	20,000

* May 2003 to March 2004

78. We would note that the potential overstocking of cage sites, and the risk to fish health it represents, has not been adequately managed to date. This issue is discussed in more detail in the section of this report covering the monitoring and enforcement of provincial standards.

Industry compensation for catastrophic losses

79. The salmon aquaculture industry in the Bay of Fundy is subject to the risk of catastrophic loss. Recently serious economic losses have occurred as a result of ISA and the threat of losses due to severe weather conditions is always present.

80. Such losses can have a significant economic effect on the industry as a whole and the area therefore warrants the involvement of the Province. Regulation 91-158, Section 12.1 under the *Aquaculture Act* states:

> *(a) the licensee have and maintain insurance ... for the financial loss that may be incurred by the licensee as a result of an order by the Minister for the destruction of Atlantic Salmon stock cultivated by the licensee,*

> *(b) the licensee provide evidence satisfactory to the Registrar upon payment of the annual license fee ... with respect to the licensee's compliance with* [the insurance requirement].

81. Section 12.1, in effect, requires producers to insure themselves against the potential of losses being incurred from depopulations ordered due to the presence of disease in cage sites. However, it does not specifically state that the insurance must be adequate to cover all potential losses.

82. Prior to 1999, the industry lost millions of salmon to ISA. A series of ad-hoc compensation programs paid out approximately $44 million to farmers, of which $26 million is to be funded by the government of Canada. In 1999, under the terms of the last compensation agreement, the industry was required to form a compensation fund, currently known as the East Coast Compensation Fund, to cover losses incurred as a result of ministerial depopulation orders. The fund is administered by the industry, but given the current one cent per fish levy being charged, there is some question whether the fund is collecting sufficient revenues to fully cover potential losses from ministerial orders. There was no way for us to confirm the adequacy of the fund as DAFA does not assess adequacy in their follow-up. They simply check to ensure that fund levies have been paid by producers.

83. The *Aquaculture Act* and Regulation do not require producers to carry insurance against weather-related or other potential losses. Because no legislative requirements are placed on producers to insure against these other potential catastrophic losses, DAFA does not check for producer insurance against such losses. However, based upon a recent industry request for compensation related to 2003 losses from superchill, a request that was denied by the Province, it appears as though the industry is underinsured in this area.

84. DAFA representatives indicated that setting up the adhoc compensation programs that were in place up to 1999 consumed a lot of administrative resources. They would prefer to have a permanent producer-funded compensation system similar to the Crop Insurance program that compensates traditional farmers for certain types of crop losses. Such a program could provide protection against production diseases and weather-related losses. Additionally, the National Aquatic Animal Health Program (NAAHP), a new program under development by the federal government, is planned to include a provision to compensate producers for ordered depopulations of fish

stocks (i.e. a safety net), similar to the compensation regime already in place for livestock farmers.

85. In summary, producers do not appear to have adequately insured themselves against the risk of weather-related and other catastrophic losses, and industry-generated funding available to cover ministerial depopulation orders at present may be inadequate. So, in the event of a catastrophic loss that impacted on a significant portion of the industry, the only available option would be adhoc government funding. Ultimately, this creates an economic risk for the Province.

86. We feel that DAFA should develop a strategy covering industry compensation for catastrophic losses, in consultation with industry and the government of Canada. We further feel that producers should be managing the risk of catastrophic losses by carrying adequate insurance and/or by other means as necessary.

Recommendations - industry compensation for catastrophic losses

87. We recommended that DAFA consider recommending that Regulation 91-158, Section 12.1 be amended to require producers to carry adequate insurance to protect them against losses resulting from ministerial depopulation orders.

88. We recommended that DAFA develop a strategy covering industry compensation for catastrophic losses, in consultation with industry and the government of Canada. The strategy should clearly establish who is responsible for managing the risks of catastrophic losses and how those risks are to be managed. In general, we feel that producers should be assigned responsibility for managing this risk.

89. We recommended the Province advocate for government of Canada implementation of compensation provisions of the National Aquatic Animal Health Program as proposed.

Departmental response

90. *DAFA is unable to support this* [first] *recommendation. It is not possible for producers to obtain insurance to protect against losses from ministerial depopulation orders. Discussions have been initiated with the federal government to create programs parallel to the federal* Animal Health Act *and/or business risk management programming that exists for the agricultural sector in Canada.*

91. *DAFA agrees with the* [second] *recommendation. DAFA has played a lead role in discussions with the federal government to*

assess and develop a business risk management program similar to agriculture. DAFA does not feel that the industry should be solely responsible for managing risk that is completely out of their control.

92. *DAFA agrees with the* [third] *recommendation. For several years DAFA has been advocating the need for a national aquatic animal health program to manage diseases and losses.*

Market risks

93. Three key market risks can be identified in connection with the New Brunswick aquaculture industry.

- The industry is heavily reliant on the United States market for sales. Approximately 75 percent of all salmon produced is sold into that market. Development of other markets, particularly within Canada, would reduce associated risks such as currency fluctuations and access to markets.

- Approximately 95 percent of the industry's revenue is generated from sales of one species, Atlantic salmon. This degree of reliance on one species subjects the industry to risks of changing consumer preferences and a collapse of the industry if salmon can no longer be produced or sold. Such risks would be reduced by the commercial development of alternative species.

- The industry is in direct or indirect competition with aquacultural producers in other jurisdictions, most particularly in Chile and to a lesser extent the US. Associated risks include the risk that New Brunswick product will not be price competitive or that product quality will be below that available elsewhere. This risk is somewhat mitigated by New Brunswick's close proximity to key east coast markets. This allows New Brunswick to provide fresh fish to those markets, whereas competitors may only be able to provide frozen product. Development of value added products may further reduce the risks associated with direct competition with lower-price producers of whole fish.

94. Some of these risks must necessarily be managed by the industry. However, we do feel that the Province has a legitimate role as the coordinator for risk management efforts in certain areas given the overall economic impact of the industry on New Brunswick. Ultimately, if the industry does not thrive, the Province may be called upon to provide support to producers and/or unemployed workers.

95. The Province has taken some steps to manage market risks in cooperation with other levels of governmental and non-governmental

organizations. For example, we note that DAFA has development strategies for alternate species (e.g. halibut). Additionally, research on alternate species has been funded. And certain programs managed by such organizations as Agri-food Canada, ACOA, Export Development Canada, DAFA, and Business New Brunswick target various market development opportunities for the industry. Our concern is that clear goals and objectives do not appear to have been defined for provincial involvement in market risk management activities.

Recommendation - market risks

96. We recommended the goals and objectives for provincial involvement in market risk management be clearly defined as part of the development of a provincial strategy for salmon aquaculture.

Departmental response

97. *DAFA agrees with the recommendation.*

Public perception of salmon aquaculture

98. An important risk that must be managed is the risk that the aquaculture industry will be perceived negatively by consumers, landowners, environmental groups, other stakeholders, and ultimately, the legislators and citizens of New Brunswick. Negative outcomes for the industry if that risk is not managed might include, for example, a lack of consumer support of farmed New Brunswick salmon, or a lack of taxpayer support for allocating resources to support the industry (e.g. for development funding or disease management).

99. In fact, the aquaculture industry has received a significant amount of negative media attention. Every potential new aquaculture site is contested and negative articles about the industry appear in provincial newspapers regularly. Stakeholders have cited a lack of monitoring and enforcement of the industry and a lack of transparent reporting to the public as being two key problems with the way the Province regulates the industry. They also indicate concerns about the sustainability of the industry, particularly relating to the potential for environmental damage.

100. DAFA has recently taken some positive steps towards managing the risk of negative public perception of the industry. There has been more opportunity for public discussion of issues provided through the Bay of Fundy Stakeholders Forum, a forum organized by DAFA. We were also pleased to note that a monitoring and enforcement section was recently established within DAFA and that it has commenced activities.

101. However, we feel that substantive changes need to be made by the Province to improve public perception about the salmon cage culture industry. For example, involving stakeholders in the establishment of a provincial strategy for the salmon aquaculture industry as previously recommended would be of benefit. Additionally, monitoring and enforcement activities need to be enhanced. Further, more detailed public reporting about the industry is needed. Recommendations that address these issues appear later in this report.

Space limitations for salmon aquaculture in New Brunswick

102. Essentially, a lack of space for future growth of the salmon aquaculture industry is less a risk than a fact. It is recognized by the Province, industry, and stakeholders that additional sites for salmon aquaculture are now at a premium in New Brunswick. Consider the following.

- The Fundy Coast provides the only waters suitable for finfish aquaculture in New Brunswick.
- There are currently 96 finfish aquaculture sites on the Fundy Coast, almost all of which stock salmon. Many of the sites are grouped in close proximity within particular small coastal bays.
- Certain areas of the Bay of Fundy have been set aside for the exclusive use of the traditional fishery. Industry attempts to move into traditional fishing areas have brought the industry into conflict with the traditional fishery.
- Available, unused areas of the Bay of Fundy are not suitable for aquaculture given the present technology available. Most are exposed coastal or open ocean sites.
- Because of disease management and/or environmental problems, there are a number of current sites which DAFA and/or DELG would like to relocate.
- The environmental carrying capacity of the Bay of Fundy is not well understood at present. Therefore, uncertainty exists about the optimal number of sites the Bay can support without negatively affecting the environment.

103. DAFA has indicated that some research is being conducted with respect to the viability and new technology associated with offshore production. However, moving into offshore production would introduce a new set of risks to manage as well. This issue is crucial to the future direction of the aquaculture industry in New

Brunswick. We therefore feel that it must be addressed as part of the provincial strategy for the industry as previously recommended.

Recommendation – space limitations for salmon aquaculture in New Brunswick

104. We recommended the provincial salmon aquaculture strategy address existing space limitations for cage culture sites in New Brunswick. That strategy should include a planned approach for determining the number of sites the Bay of Fundy area can sustain in the long term and a process to be followed in moving towards that target.

Departmental response

105. *DAFA agrees with the recommendation. Such a strategy, however, must reflect the evolution of technology, farm management practices and science. The issue about space limitations for cage culture sites and expectations of growth of the industry would be an integral part of a comprehensive strategy.*

Research

106. A great deal has been learned about aquaculture in New Brunswick since the industry started in 1978. However, despite the knowledge base already in place there is much research still needed. In fact, a senior DAFA staff member stated that *"with aquaculture everyone is always guessing."*

107. Research is important because it provides provincial departments with a basis for establishing the regulatory standards that will support a sustainable aquaculture industry for New Brunswick. The Aquaculture Environmental Coordinating Committee is in place that brings together representatives from DAFA, DELG, DFO, Environment Canada and the industry. The Committee is responsible for identifying aquaculture environmental research priorities and providing advice to DELG on the maintenance of the environmental management guidelines currently being used by that department. It also provides a forum for discussion of proposed additional environmental standards. No similar committee exists in relation to development-related research or standards. DAFA handles this role on its own.

108. In fact, DAFA is the only provincial department with access to funds for research activities related to the aquaculture industry. It acts as a liaison between funding agencies such as AquaNet, the New Brunswick Innovation Foundation, the Atlantic Innovation Fund, and the industry itself and researchers at the University of New Brunswick, the New Brunswick Research and Productivity Council, and other locations. At present, provincially-funded research is primarily development oriented (i.e. fish health or alternate species

research). Provincial departments rely on the federal government, particularly DFO and Environment Canada, to do the research upon which provincial environmental standards will be based.

109. We were informed by various parties that knowledge gaps exist in the following areas that are of interest in New Brunswick, all of which may have implications for the aquaculture industry:

- the carrying and waste processing capacity of the Bay of Fundy in relation to salmon cage culture sites;
- the impact of salmon cage culture sites in the Bay of Fundy on other species (wild salmon, lobster, marine mammals, etc.);
- the impact of cage culture sites in the Bay of Fundy on traditional fisheries (impact on spawning grounds, fish populations, disease transfer, etc.);
- the impact of fish escapes from Bay of Fundy cage culture sites on the eco-system;
- the potential problems to be overcome if offshore cage culture sites are to be developed in the Bay of Fundy (navigation, how to monitor environmental impacts, etc.);
- the potential for development of advanced waste management techniques for cage culture sites;
- options for the effective remediation of sites;
- determining whether and to what extent aquaculture may be contributing to algal blooms in the Bay of Fundy; and
- the disease profiles of alternate species that are currently being commercially developed such as cod and halibut, and impacts they might have on the existing salmon aquaculture industry and the environment.

110. Most of these knowledge gaps are in environmental areas and may have a huge impact on issues related to sustainability. For example, The North Atlantic Salmon Conservation Organization (NASCO), an organization *"established to promote the conservation, restoration, enhancement and rational management of salmon stocks in the North Atlantic Ocean through international co-operation,"* recently agreed to a *"Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and*

Transgenics on the Wild Salmon Stocks." In that document are a list of general measures to minimise the impacts of siting and operation of aquaculture activities including:

> *Salmon aquaculture facilities should only be located where hydrographical, epidemiological, biological and ecological standards can be met. Factors which may be taken into consideration include: availability of water supply and receiving waters for discharge; water quality and exchange; water depth; site protection; separation distances between aquaculture facilities; and distance from salmon rivers ...*

111. Canada is a "contracting party" in NASCO. Therefore the document would appear to be applicable to New Brunswick salmon cage culture sites. But in order for the Province to fully comply with that international siting requirement, much more research is needed.

112. More generally, knowledge gaps identified above must be reduced before the Province can develop a sufficient understanding of how the cage culture industry interacts with the eco-system of the Bay of Fundy area, and therefore what level of salmon aquaculture is truly sustainable from an environmental perspective. Only then can appropriate regulatory standards be set in areas such as nutrient loading and water quality where no standards currently exist. And until that research has been completed and applied to the development of regulatory standards, regulators and others cannot be certain if current aquaculture practices are completely innocuous, or if they are causing temporary or permanent damage to our environment.

Recommendation – research

113. We recommended the Province, through the Aquaculture Environmental Coordinating Committee, advocate for federal Department of Fisheries and Oceans and Environment Canada completion of environmental research where knowledge gaps currently exist in areas of concern to New Brunswick.

Departmental responses

114. *DAFA agrees with the recommendation.*

115. *DELG agrees with the intent of the recommendation, and will introduce a motion to the Committee to prepare appropriate correspondence to accomplish this end.*

Regulatory activities

116. We performed detailed reviews and testing of regulatory activities of DAFA, DELG, and DNR in three areas related to salmon cage culture sites. These included:

- the new site approval process;
- changes to commercial aquaculture licenses and environmental Certificates of Approval to Operate; and
- monitoring of industry compliance with terms of provincial legislation, aquaculture leases, commercial aquaculture licenses, and environmental Certificates of Approval to Operate.

117. This section covers our findings and recommendations relating to those regulatory activities, including discussion of access to and reporting of information about onsite activities at cage culture sites. The following table presents data related to recent licensing decisions.

Table IV – Licensing Decisions – Bay of Fundy

	2001	2002	2003	2004
New Sites				
Approved	9	0	1	0
Rejected	7	9	2	4
Withdrawn/deferred	0	3	2	3
Under review/pending	0	0	0	3
Production increase				
Approved or temporarily renewed	5	7	8	0
Rejected	2	3	2	7
Deferred/Under review/pending	0	0	6	6
Boundary Expansion				
Approved	1	3	0	0
Rejected	0	0	0	2
Deferred	1	1	2	0
New Species Added				
Approved – Permanent or temporary	*N/A*	*N/A*	*N/A*	3
Under review	*N/A*	*N/A*	*N/A*	5
N/A – Not available				

New sites

118. Under the *Aquaculture Act* and Regulation, all cage culture producers must be licensed by the Province. An applicant for a new site must complete an application form that is assessed by the Department of Agriculture, Fisheries, and Aquaculture (DAFA). However, before that license is approved, certain other approvals must have been obtained including:

- A License of Occupation from the Department of Natural Resources (DNR). Once DNR signs this document, DAFA provides the producer with an Aquaculture Occupation Permit on

behalf of the Province as an interim step in the process of leasing land to an applicant.

- An aquaculture lease. DAFA signs this lease on behalf of the Crown for land for which administration and control was previously approved for transfer to DAFA by DNR.

- Environmental certificates of "Approval to Construct" and "Approval to Operate". These are provided by the Department of the Environment and Local Government (DELG) upon completion of a successful environmental review.

- Various approvals from federal organizations including the Department of Fisheries and Oceans (DFO), the Canadian Coast Guard, and Environment Canada.

119. The approval process is intended, taken collectively, to ensure that the site under consideration is appropriate for aquaculture from economic, environmental and social perspectives. Further, the aquaculture lease, commercial aquaculture license, provincial environmental Certificate of Approval to Operate, and associated federal approvals serve to establish a set of standards with which the applicant must comply on an ongoing basis.

120. Discussions relating to a particular site application between regulators from the two levels of government are facilitated by the Aquaculture Site Evaluation Committee (ASEC). It is comprised of representatives of DAFA, DELG, DNR, DFO, the Canadian Coast Guard, and ACOA (if federal funding is being considered). ASEC makes a recommendation regarding each site to the Minister of DAFA. Dissenting opinions are recorded in ASEC's minutes.

121. We reviewed the approval process for one recently-approved site. We noted that all interested parties appeared to have been consulted, although DAFA files indicated that there was a great deal of public opposition to the site. We also noted that for the most part the approval process appeared to have been completed in accordance with documented procedures. However, we did note some areas of concern which are discussed in the sections that follow.

Timing of approvals

122. Final federal *Navigable Waters Protection Act* approval for the site was received nineteen days after the date on the commercial aquaculture license issued by DAFA. There is information on file at DAFA that indicates that the federal decision was still in doubt at the date the license was issued. Information on file also indicates that on-

shore cage construction, site set-up, and introduction of smolts at the site all took place prior to the license date. We assume that DAFA authorized this activity. Had the federal government not approved the site it could have been embarrassing and potentially costly to both the Province and the producer. The related DELG environmental Certificate of Approval to Operate was also issued significantly later than the date on the aquaculture license.

123. During our review of the file discussed above we noted copies of correspondence from DAFA addressed to DFO indicating provincial frustration with federal "delays" in issuing approvals. From a provincial perspective there appears to be an issue of timeliness surrounding the site approval process. We feel that DAFA should work with involved regulators to try to improve the turnaround for site applications.

124. Regardless of that, however, we feel that provincial aquaculture licenses should not be issued, nor should onsite activities be authorized, until all necessary approvals have been received. We understand that applicants need substantial lead time to ensure that smolts are available when needed to stock cage sites. Consequently, we feel that DAFA should ensure that potential applicants are well informed about the time currently involved between application and full regulatory approval of a new site and the necessity of providing requested information on a timely basis. However, from a public perspective, ensuring that an appropriate site approval process has been completed should be the priority of the Province.

125. One option that might be considered to both alleviate timing concerns for new site applications and allow for a more knowledgeable review of applications by regulators is the adoption of an integrated coastal zone management system. Under such a system, certain areas would be designated for aquaculture, and other areas for other activities. Economic, environmental, and social factors would be considered in establishing the zones. This option has been adopted in other jurisdictions including Norway and Chile. DELG is undertaking an initiative to facilitate the integrated coastal zone management approach, although not directly related to aquaculture.

126. The creation of zones for aquaculture may facilitate the creation of a pool of pre-approved sites thereby significantly reducing the turnaround time for new applications. It would also allow for more knowledgeable reviews by environmental, fish and wildlife regulators by allowing them to develop aquaculture-related expertise around specific zones rather than for the entire Bay of

Fundy. Consequently, we feel that the Province should investigate the option of setting up an integrated coastal zone management system in developing a provincial strategy for aquaculture.

Availability of wharf facilities

127. Upon commencing operations, the operator of the site we tested was denied access to the local wharf for safety reasons. An alternate wharf was located, but it will not be adequate to handle the level of activity that will be required as the stocked fish mature. This problem may have been avoided had the operator been required to provide proof of access to a suitable wharf as part of the application process. However, this was not part of the provincial approval process at the time when this application was processed. We understand that in the future DAFA will be requiring proof that an applicant has consulted with the local harbour authority as part of the site approval process.

Determination of approved production levels

128. During our review, we could find no documented rationale for the production level that was eventually approved for the site.

- The application requested an approved production level based upon the opinion of the applicant's accountant that *"... in our opinion, this site will need a minimum approved production level of 300,000 smolts before it can be financially successful."*

- The original recommendation from ASEC to the Minister of Agriculture, Fisheries and Aquaculture did not specify a production level. However, DELG recommended that the site should be approved for only 200,000 fish.

- The aquaculture license specified an allowable production limit of 230,000. Note that this is more than recommended by the environmental regulator, but less than that seen as economically feasible by the applicant's accountant. DAFA and DELG representatives indicated that, while they agreed to this figure, ultimately it was simply a compromise.

129. We feel that a rationale for approved production levels chosen should be documented in producer files. This information would be useful both for subsequent review of the initial decision, and for reference purposes where subsequent increases in approved production levels are being requested.

Recommendations – new sites

130. We recommended that provincial aquaculture licenses should not be issued, nor should onsite activities be allowed, until

all necessary regulatory approvals have been obtained. Further, significant penalties should be in place and be applied where producers commence activities before a commercial aquaculture license has been issued.

131. We recommended the Province consider the option of setting up an integrated coastal zone management system in developing a provincial strategy for aquaculture.

132. We recommended that DAFA work with other federal and provincial regulators as necessary to try to improve the turnaround time for site applications.

133. We recommended that, as planned, DAFA require proof that an applicant has consulted with the local harbour authority to ensure access to adequate wharf facilities as part of the site approval process.

134. We recommended that a rationale for approved production levels chosen for new sites be documented in each approved applicant's file.

Departmental responses

135. *DAFA agrees with the* [first] *recommendation and supports the principle that all regulatory approvals be obtained before an aquaculture licence is issued; however, as with all policies, exceptional circumstances may arise.*

136. *DAFA agrees with this* [second] *recommendation in part, although not necessarily if "integrated coastal zone management system" implies a zoning approach. DAFA, DELG and DFO have initiated a marine resource users planning process to develop recommendations for enhancing integration of marine activities. This process may or may not recommend a zoning approach.*

137. *DELG recognizes the value of Integrated Coastal Zone Management (ICZM). The proposed strategy for sustainable aquaculture will complement the ongoing DELG efforts to move towards an ICZM model for New Brunswick.*

138. *DAFA agrees with the* [third] *recommendation. There is ongoing consultation with other regulators to streamline the site application review process.*

139. *DAFA agrees with the* [fourth] *recommendation. This procedure has been implemented since the summer of 2003.*

140. *DAFA agrees with the* [fifth] *recommendation. The approved production levels are based on guidelines and a formula that estimates site potential. DAFA is of the opinion that the methodology of approving production requires review.*

141. [DELG] *agrees with this* [fifth] *recommendation and will ensure that a rationale for production-related recommendations provided to DAFA are clearly documented in DELG files.*

142. [DNR supports the recommendations.] *Aquaculture licenses should not be issued or amended and no onsite activities should be allowed before the entire review process is complete and approvals are given, with no exceptions. We also agree that license conditions should be met at all times.*

Changes to commercial aquaculture licenses

143. There are three major changes to commercial aquaculture licenses that are typically requested by producers:

- an increase in the approved production limit for a site;
- a change in site boundaries; and/or
- a change to the species that may be stocked at a site.

144. DAFA, as issuer of commercial aquaculture licenses, reviews all change requests. Additionally, DELG reviews virtually all change requests and issues a new Certificate of Approval to Operate if necessary. Details of proposed changes may also be provided to DFO for their approval.

145. We selected a sample of license changes and examined supporting documentation to see if DAFA and DELG had conducted appropriate reviews. We also verified that federal approval for requested changes was sought if necessary.

146. In general, the process followed for changes we tested was as described in procedures guidance documents. However, we did identify two areas of concern.

- As a result of our testing, we became aware of two cases where DAFA approved increases in approved production limits for particular cage sites and allowed stocking to proceed before DELG had issued revised environmental Certificates of Approval to Operate. Given the potential impact of increasing an approved production limit on the environment, we feel it is imperative that

environmental approvals be in place before producers are allowed to increase cage site stocking levels.

- In 1993, New Brunswick issued guidelines for salmon cage site production levels in the Bay of Fundy. The maximum stocking density of 18 kg of salmon per cubic meter of cage space that was included in these guidelines remains the provincial standard. The approved production limit for each site is based upon this standard. No similar maximum stocking density standards have been set for other species of fish, even though the waste produced by those fish may be different than for salmon. Correspondence in departmental producer files indicated much the same concern on the part of certain regulators.

Recommendations – changes to commercial aquaculture licenses

147. We recommended that DAFA ensure that DELG has issued revised environmental Certificates of Approval to Operate for cage culture sites before allowing producers to increase stocking levels.

148. We recommended that maximum stocking density standards be developed for alternative species of finfish. Approved production limits for those alternate species should be based upon those standards.

Departmental responses

149. *DAFA agrees with the* [first] *recommendation. DAFA supports the general operating principle and has initiated an increased coordination effort with DELG. DAFA shares all requests for production increases with DELG and receives comments on production increases.*

150. *DAFA agrees with the* [second] *recommendation. DAFA acknowledges that stocking density standards requires further research. Current existing guidelines utilize monitoring performance.*

151. *DELG will work with DAFA to resolve this issue.*

Monitoring and enforcement of provincial standards

152. Governments typically manage risks associated with a particular industry by setting standards through legislation, licenses, or other legally enforceable means. They then monitor the industry to ensure that those standards are being complied with and take enforcement action where necessary.

153. Monitoring and enforcement are absolutely essential to ensure provincial standards are being complied with and therefore are contributing to the achievement of the desired regulatory results (i.e.

protection of the economy, the environment, and society). For example, a desired economic regulatory result would be providing all participants in a particular industry with access to a level playing field by ensuring that those who do not comply do not gain a competitive advantage.

154. Each New Brunswick salmon producer must comply with a number of regulated standards. Of particular note, for the purposes of this audit, are those established and enforced through:

- The *Aquaculture Act*
- The *Clean Water Act*
- The *Clean Environment Act*
- The *Pesticides Control Act*
- The *Fish and Wildlife Act*
- The *Endangered Species Act*
- The *Crown Lands and Forests Act*
- Terms included in their aquaculture lease
- Terms included in their commercial aquaculture license
- Terms included in their DELG Certificate of Approval to Operate
- Various pieces of federal legislation including the *Fisheries Act*, the *Navigable Waters Protection Act*, the *Canadian Environmental Protection Act*, and the *Species at Risk Act*.

155. Because of the importance of managing this risk area, we looked at current monitoring and enforcement practices associated with the aquaculture industry in some detail.

156. Note that our review included only legislation, lease, license, and environmental Certificate of Approval to Operate terms. We did not look in any detail at monitoring associated with policies such as the Bay of Fundy Marine Aquaculture Site Allocation Policy and the Proposed New Brunswick Policy for Fish Health.

DAFA monitoring and enforcement

157. Until very recently, DAFA did little monitoring of producers' compliance with provincial legislation, lease or license terms. However, we were pleased to note that the Department recently set up an Enforcement Unit in the Licensing and Enforcement Branch. Basic principles and approaches have been developed and selected monitoring activities have commenced. The section has also been involved in enforcement actions taken against five producers who failed to comply with ministerial orders to depopulate their cage sites due to the presence of ISA. Development of a comprehensive

monitoring plan and identification of monitoring techniques to be employed in specific areas are still to be completed.

Information for monitoring

158. The most effective and efficient way for DAFA to monitor compliance with terms of legislation, leases, and licenses at cage sites would be to have the industry regularly report information in relation to their onsite operations. Analysis and audit of this information would then serve as the basis for most monitoring activities supplemented by periodic unannounced site visits to inspect operations. In fact, this is the approach that DELG, a department with a long history of monitoring various industries, has taken in connection with the industry.

159. Prior to the establishment of the DAFA monitoring and inspection section, the need for specific information about ongoing operations outside of disease-related areas was limited. However, if future monitoring and enforcement activities are to be successful, access to such information in a usable form will be crucial. Specific concerns we have about information currently available to DAFA for monitoring and enforcement include:

- As discussed later in this section, certain provisions in the *Aquaculture Act* restrict DAFA access to information that would be of use in monitoring and enforcement activities.

- Requested information being provided by industry is often incomplete, or not in the format requested.

- In at least one case where information was not provided as requested, there were no enforcement activities sanctioned to compel the producer to provide that information. We have a concern that given the primary role of DAFA as a development department, there may be some hesitancy to take enforcement action unless it will aid in the development of the industry (e.g. depopulation orders to control ISA).

- Some information that would be of use in monitoring compliance with legislative, lease and license terms has never been requested by DAFA. We expect that it will be asked for in the future as monitoring and enforcement activities are expanded.

DAFA - monitoring of compliance with license terms

160. Salmon aquaculture licenses include a number of important terms, including those setting limits on:

- the species and strains of fish that may be stocked;

- the maximum holding unit capacity of cages on the site;
- the maximum stocking density permitted at the site; and
- the maximum number of fish to be stocked, also known as the approved production limit (APL) of the site.

161. DAFA is not currently monitoring producer compliance with the first three of these items. In order for the new monitoring and enforcement section to be effective, these items will have to be monitored and action will have to be taken to correct cases of non-compliance. The monitoring and enforcement section has commenced monitoring work on the fourth item, which is considered "the" key license restriction by both DAFA and DELG.

162. As previously noted, APLs for each site are based upon a maximum density standard of 18 kg per cubic meter of cage space. Limiting production levels on a site is intended to reduce the risk of negative impacts on the environment and to reduce the incidence of disease. Therefore, we feel it is particularly important for the Province to take appropriate monitoring and enforcement action to ensure that producers are not overstocking their cage sites.

163. During our work, we noted that DAFA allows producers to overstock sites by up to 12% to cover mortalities and other losses that occur during the production cycle. This overstocking percentage was set by DAFA many years ago, and has not been revisited. A DELG representative indicated that they are aware of this practice.

164. The DAFA monitoring and enforcement section commenced monitoring work on this area in 2003. They used the following information which was already being obtained annually from producers.

- the dates and number of fish introduced at cage sites;
- the hatchery from which the fish were shipped;
- the specific cage culture site to which the fish were shipped;
- the Department of Fisheries and Oceans transfer permit number; and
- a Site Plan containing a diagram of the site identifying all cages by type, size and depth of net.

165. In general this information is requested under terms of Regulation 91-158, Section 14 that states:

14(1) A licensee shall maintain accurate records relating to

(a) the transport, transfer and introduction of live aquacultural produce…

14(2) Upon the request of the Registrar or an inspector, a licensee shall provide

(a) the source, number and specific location of each stock and lot of aquacultural produce on the aquaculture site…

166. We note that there is additional information specified in Section 14 that may be requested in the future to aid the monitoring and enforcement section in verifying compliance with license terms.

167. We chose ten sites at random to see if producers had supplied the requested information. Of those ten sites, nine had responded. Only two of the producers provided all requested information in the desired format. The other seven responding producers failed to provide site plans showing the location and size of cages on their sites. There were also various other problems with the information provided. No follow-up was done by DAFA to have producers correct deficiencies in the information submitted. Further, in the case where information was not provided at all, there were no enforcement activities sanctioned to compel the producer to provide that information.

168. Representatives of both DAFA and DELG, along with several stakeholders, indicated that they felt that overstocking is common at Bay of Fundy salmon cage culture sites. Our testing confirms that belief. Among our ten test sites, we noted that the reported total number of fish introduced by three of the sites exceeded the approved production limits shown on their licenses by more than DAFA's allowable 12% overstocking rate. In one case, the producer had introduced enough fish to nearly double the APL shown on their license. It should also be considered that these overages are derived from numbers reported by producers. DAFA had not audited or otherwise verified these numbers at the time we looked at them.

169. The efforts of the DAFA monitoring and enforcement section have, to date, been focused on reconciling fish reported as shipped to cage sites and transport mortalities with APLs. They have visited producers and looked at operating records. A representative of the

section indicated that to date they have found *"that a number of sites stocked in 2003 were over their APL."*

170. We feel that the monitoring activity done to date is a good start. However, we do not feel it is a complete solution to the problem of overstocking. There are more steps that need to be taken in order for DAFA to be able to take enforcement action against producers when circumstances warrant it. Some additional steps we feel would be appropriate include:

- obtaining data on mortalities that occurred during the grow out period;
- obtaining information on fish escapes;
- obtaining data on deliveries/sales to processing plants;
- reconciling delivery/sales information, fish escapes, and mortalities during the grow-out period with beginning stock numbers (i.e. figures from work currently being done by DAFA monitoring and enforcement section); and
- where unexplained overages are encountered in sales/deliveries, looking at feed usage, pesticide usage, etc. to build a legally enforceable case against the producer.

171. We feel that the lack of access to financial information as currently mandated by the *Aquaculture Act* may preclude DAFA from being able to effectively complete some of these steps. That issue is addressed later in this section.

172. We do find it interesting that DAFA has sole responsibility for monitoring the APL standard that, in our opinion, impacts more significantly upon DELG's environmental protection mandate than it does on DAFA's development mandate. Restricting numbers of fish on site may have positive implications with respect to the prevalence of disease, although it also directly limits development.

173. We also note that APLs do not appear on environmental Certificates of Approval to Operate despite their importance to the ultimate achievement of DELG's environmental protection mandate. In the words of one DELG representative, *"...The level of production at each site has historically been difficult to ascertain, and continues to pose challenges for regulators. As the environmental regulator this uncertainty makes regulatory decision making extremely difficult."*

174. Because of the relative importance to the two departments of producer compliance with APLs, we feel that consideration should be given to transferring the APL from commercial aquaculture licenses to the DELG Certificate of Approval to Operate. This would necessitate transferring monitoring and enforcement of the APL to DELG as well.

DAFA - monitoring fish escapes

175. The Province currently does no monitoring of escapes, nor does it require site-holders to report escape incidents. DAFA takes the approach that producers will do what is needed to contain farmed fish because of the potential for economic losses. However, DNR has expressed a concern about the lack of monitoring of escapes and the potential effect on fish habitat. We would also note that farmed salmon have been found in New Brunswick rivers, so escapes have occurred in New Brunswick.

176. Under the *Aquaculture Act*, Section 11(1)

> *... the Registrar may ... make the licence subject to terms and conditions in relation to ...*
> *(d) measures to be taken to prevent the escape of aquacultural produce.*

177. There are no such requirements in existing New Brunswick salmon aquaculture licenses.

178. There is disagreement among scientists as to whether escaped farmed salmon have a negative impact on wild fish stocks or the environment. More research remains to be completed. Given the lack of definitive scientific knowledge in this area, we feel that DAFA should require the conservative practices that have been proposed and/or adopted in other jurisdictions to control fish escapes. These include:

- maintenance of adequate containment systems;
- maintenance of containment system records;
- tracking of inventory and losses;
- an identification system for all farmed fish;
- immediate reporting of the circumstances of an escape, the magnitude, and any fish subsequently re-caught; and
- active recovery efforts.

179. The previously mentioned North Atlantic Salmon Conservation Organization (NASCO) resolution, *"...To Minimise Impacts from Aquaculture, Introductions and Transfers, and*

Transgenics on the Wild Salmon Stocks" includes *"Guidelines on Containment of Farm Salmon."* Again, given Canada's status as a "contracting party" in NASCO we feel that these guidelines would appear to be applicable to New Brunswick salmon cage culture sites and could therefore serve as a model for the development of provincial standards in this area.

Recommendations – DAFA monitoring and enforcement

180. We recommended that DAFA follow up where there are deficiencies in information provided by producers.

181. We further recommended that enforcement activities be sanctioned by DAFA where producers fail to provide requested monitoring information.

182. We recommended the DAFA monitoring and enforcement section monitor compliance with license terms relating to:

- **the species and strains of fish that may be stocked;**
- **the maximum holding unit capacity of cages on a site; and**
- **the maximum stocking density permitted at the site.**

Appropriate action should be taken where cases of non-compliance with these license terms are encountered.

183. We recommended the DAFA monitoring and enforcement section extend compliance monitoring activities associated with site approved production limits to include the following steps:

- **obtaining data on mortalities that occurred during the grow out period;**
- **obtaining information on fish escapes;**
- **obtaining data on deliveries/sales to processing plants;**
- **reconciling delivery/sales data, fish escapes, and mortalities during the grow out period with beginning stock numbers (i.e. figures from work currently being done by DAFA monitoring and enforcement section); and**
- **where unexplained overages are encountered in sales/ deliveries, looking at feed usage, pesticide usage, etc. to build a legally enforceable case against the producer.**

184. We further recommended that consideration be given to transferring the approved production limit from commercial aquaculture licenses to the DELG Certificates of Approval to Operate. This would necessitate transferring responsibility for monitoring and enforcement of the approved production limit from DAFA to DELG as well.

185. We recommended that DAFA set license requirements including as a minimum:

- **a requirement that adequate containment systems be in place; and**
- **a requirement that the circumstances and magnitude of any fish escapes be reported immediately.**

Those requirements should be added to new licenses and to existing licenses upon renewal.

186. We further recommended that where a fish escape is reported, DAFA should ensure that appropriate action is taken to mitigate the effects of the escape and reduce the incidence of future escapes at that site.

Departmental response

187. *DAFA agrees with the* [first] *recommendation with respect to its own licensing process. An overall governance document is required that clearly defines regulatory matters and the proper competent authority. A review of current conditions and information that is required will be undertaken through the Site Access Harmonization process with other federal and provincial agencies. With respect to Approved Production Limits, DAFA believes that the current process has short-comings. DAFA would prefer to focus on performance indicators related to both fish health and environmental indicators.*

188. *DAFA agrees with the* [second] *recommendation.*

189. *DAFA agrees with the* [third] *recommendation and supports the principle; however, it is a question of jurisdiction and not duplicating the efforts of other regulatory agencies. Again, DAFA acknowledges that the approved production limit may not be the best tool for regulating the industry.*

190. *DAFA agrees with the* [fourth] *recommendation in principle, however given the current review of the approved production limit*

process there could be different informational requirements than those suggested in the recommendation. At the current time there is a requirement to keep detailed records and to make them available for audit purposes. Fish escape numbers could prove near impossible to quantify; however, the other described activities could be envisaged as part of an audit procedure to ensure compliance.

191. *DAFA does not support* [the fifth] *recommendation. DAFA is of the opinion that conditions for regulating the industry require a joint review with DELG in order that it can be determined what should be regulated and how. Further, if the rationale for the APL is to ensure that environmental standards are to be maintained, then perhaps no monitoring of fish numbers should take place at all. If for example, environmental monitoring indicates an oxic site (good environmental performance) then the site should be permitted an increase above its APL if there are no apparent problems. Establishing a method of counting fish or enforcing the APL has always been difficult, so utilizing environmental performance indicators may be a better way to make decisions than trying to determine fish numbers.*

192. *DAFA agrees with the* [sixth] *recommendation. At present, the issues of containment systems and fish escape prevention and management are addressed through the site application review process, with all new applications completing the federal environmental screening process. For existing sites that pre-date these federal requirements, codes of containment are being discussed with industry.*

193. *DAFA agrees with the* [seventh] *recommendation. This is addressed in the application review process and DAFA supports having a plan in place; however, regulatory approvals from other agencies are needed before mitigative efforts can be implemented. DAFA has no legislative authority to require that the plan is implemented.*

DELG monitoring and enforcement

194. As a result of salmon cage culture operations, residues (fish waste and potentially operational waste (e.g. marine debris), uneaten feed and other residues) end up on the sea bed under cages. Since 2002, DELG has had responsibility for monitoring the environmental conditions at cage culture sites and enforcing associated provincial environmental standards. Prior to that, DAFA was responsible for environmental monitoring and enforcement.

195. DELG representatives provided some examples of the negative consequences that could occur if poor practices at cage sites were not corrected through an active environmental monitoring and enforcement program. These included:

- a loss of habitat below the cage sites due to waste produced by cage culture operations; and

- large scale algal blooms and other effects associated with excess dissolved nutrients and a corresponding deficiency in oxygen in the water column. Impacts could include mortalities among both farmed fish and wild fish stocks in the area, and serious health effects among people and other organisms that consume shellfish that have absorbed algal toxins.

196. DELG monitors cage sites under the terms of the document, *Environmental Management Guidelines for the Marine Finfish Cage Aquaculture Industry in New Brunswick.* Underlying the procedures outlined in this document are terms of the *Clean Water Act*, the *Clean Environment Act*, and the *Pesticides Control Act*. DELG also monitors producer compliance with the terms of environmental Certificates of Approval to Operate.

Oxygen levels in sediment under cage sites

197. A key requirement of the *Environmental Management Guidelines* (EMG) is that all salmon cage culture sites should operate such that oxic conditions are achieved and maintained. Essentially this means that the oxygen content of the sediment beneath cage sites should meet provincial standards. Annually, as a result of test samples taken by the producer or their representative and audited on a test basis by DELG, the Department evaluates each site and assigns a rating. Sites found to have substandard levels of oxygen in their sediment are rated as hypoxic, or in the worst case anoxic. Anoxic sediments have extremely low oxygen content and support very few marine species. Anoxic sediments can also negatively affect the quality of the water column above and around the impacted area.

Table V – Sediment Conditions Beneath Cages				
DELG Environmental Rating (From Best to Worst)	**2002 Number of Sites with Rating**	**2002 Percentage of Sites with Rating**	**2003 Number of Sites with Rating**	**2003 Percentage of Sites with Rating**
Oxic 1	22	22.9	35	36.5
Oxic 2	41	42.7	26	27.1
Hypoxic	28	29.2	32	33.3
Anoxic	1	1.0	2	2.1
Not tested	4*	4.2	1**	1.0
Total	96	100.0	96	100.0

* *DELG Certificate of Approval to Operate not issued until after 2002 sampling carried out.*
** *Approval holder was not operating site and wished to have Certificate of Approval to Operate revoked.*

198. As can be seen from the table, 35% of all Bay of Fundy sites tested during the summer of 2003 were rated as either hypoxic or anoxic based upon the oxygen level in sediment beneath their cages. DELG considers any site with an anoxic rating to be in contravention of their Certificate of Approval to Operate (i.e. a contravention of the provincial *Clean Environment Act*).

199. Under the EMG, if a site deteriorates to hypoxic or anoxic status, then the producer must prepare and submit to DELG an environmental remediation plan. This may involve implementation of better management practices (e.g. reduced feeding or cage repositioning) or, where no other remedy is deemed sufficient, stocking reductions. By comparison, under Chilean environmental regulations, detection of anoxic conditions in sediment would result in a mandatory production reduction. A similar infraction in the succeeding year would result in the loss of the site holder's concession to practice aquaculture on the site. In Chile three to four percent of concessions are lost annually.

200. While appropriate policies and procedures documents appear to have been developed by DELG in relation to the environmental monitoring of the aquaculture industry, we do have some concerns about actual environmental monitoring and enforcement activity that has been carried out to date.

201. At the time of our audit, environmental remediation plans were well into the process of being developed for all sites rated as hypoxic or anoxic as a result of 2002 testing. The remediation plans related to 2003 test results were still being developed, as are DELG

plans for the form and extent of departmental monitoring of industry compliance with environmental remediation plans.

202. DELG indicated that delays were encountered because 2002 was their first year of testing under the EMG. For example, DELG decided to extend the industry deadline for submitting test results to 31 March 2003. Also, all environmental remediation plans had to be newly developed by producers as the industry had not been required to provide such plans in the past. Further, DELG had to review and approve those remediation plans to ensure they were in accordance with the EMG.

203. We appreciate that delays have been encountered because of the set-up time required to implement this system of environmental remediation plans. However, we would expect to see plans being prepared, implemented, and monitored on a more timely basis in the future.

Waste management plans

204. As previously noted, an environmental Certificate of Approval to Operate (Approval), as issued by DELG, is required for each operating cage culture site. One of the terms of each certificate is that a Waste Management Plan be submitted to DELG within three months of the date of the Approval being issued or as specified by the Department. We noted, however, that at the time of our audit some Waste Management Plans were still being reviewed by the Department but had not been approved, even though most Certificates of Approval to Operate were issued in 2002. Also, no monitoring of compliance with these plans had taken place by the time of our audit. The Department indicated that it plans to commence such monitoring during 2004.

Cleaning of aquaculture cages

205. Under the EMG, producers are responsible for ensuring that cage cleaning, including disinfection activities, is conducted in an environmentally responsible manner. For example, land-based cleaning of cages is considered preferable to ocean-based cleaning. Pursuant to that requirement, DELG has drafted the document, *"Guidance for Disinfection of Aquaculture Cages."* However, DAFA also has an interest in this area because cage cleaning can impact on fish health issues such as the transmission of ISA. Further, any such guidance must also be agreed to by DFO and Environment Canada. Because the involved departments have different goals for such guidance (e.g. DELG – no impact on environment, DAFA – no negative impacts on farm fish health) consensus has not yet been reached and the guidance document has not yet been issued to producers. Therefore, there is no clear standard in place against

which provincial departments can evaluate producer cage cleaning practices in monitoring operations.

Other DELG monitoring activities

206. DELG visits each site at least annually, and in response to complaints, to determine the level of compliance with the other aspects of the Environmental Management Guidelines and takes corrective action where necessary. Among those areas that are monitored and documented are:

- noise levels at cage sites;
- the adequacy of onsite chemical storage;
- the maintenance of records covering such areas as biomass and mass of feed on a monthly basis, chemicals administered to fish, nitrogen and phosphorous content of feed, and videos of the ocean floor under cage sites and field notes gathered during consultants' monitoring (such records are to be retained for at least five years); and
- any observed releases of contaminants or waste into the environment other than those already discussed.

207. A representative of DELG indicated that for the third item, they only ask producers if they maintain such records. They do not look at them. Since none of these records except consultants' videos and field notes are ever sent to DELG, we do not feel that this is a sufficient procedure. As a minimum, such records should be physically inspected on a test basis to ensure that they exist and are being maintained in an accessible form.

208. Health Canada is actively involved in ensuring that the environmental effects of pesticides used by the industry are known and acceptable. DELG does periodic monitoring of sites to ensure that pesticides are being used according to label instructions. However, DELG does not monitor the effects of pesticides used at cage sites on the environment, nor does it monitor the effects of cage culture operations on migrating fish or birds. The Department feels that such monitoring is beyond the scope of departmental responsibilities.

Recommendations - DELG monitoring and enforcement

209. We recommended that DELG ensure that environmental remediation plans required as a result of substandard oxygen content in the sediment beneath cage sites are prepared, implemented, and monitored on a timely basis.

210. We recommended that waste management plans be finalized for all cage culture sites for which environmental Certificates of Approval to Operate have been issued. Monitoring of compliance with those plans should commence as soon as possible.

211. We recommended that DELG work with DAFA to finalize guidance for the disinfection of aquaculture cages as soon as possible, and forward it to all producers. Monitoring of producer compliance with the finalized guidelines should commence as soon as possible thereafter.

212. We recommended that DELG monitoring procedures related to cage site visits include physically inspecting required operating records on a test basis to ensure that they exist, are in an accessible form and are being retained for the required five year period.

213. We recommended the Province, as part of developing a comprehensive strategy for the New Brunswick aquaculture industry, determine responsibility for monitoring the effects of pesticides used at cage sites on the environment and the effects of cage culture operations on migrating fish and birds.

214. We feel that most of the issues addressed in the recommendations for this section have arisen because DELG only assumed responsibility for environmental monitoring in 2002. Consequently, we expect that these recommendations will be addressed in due course as DELG finalizes its processes and activities in relation to salmon cage culture sites.

Departmental responses

215. [DELG] *agrees with the* [first] *recommendation, and will ensure that future remediation plans are processed and brought into force in accordance with the timelines outlined in the Environmental Management Guidelines (EMG). It should also be noted that the backlog noted during the audit has already been largely addressed.*

216. [DELG] *agrees with the* [second] *recommendation. Waste Management Plans for all sites will be brought into force before the end of 2004.*

217. [DELG] *agrees with* [the third] *recommendation and will continue in our efforts to complete this initiative along with the other aquaculture-related guidelines currently being developed by the Department.*

218. *DAFA agrees with the recommendation.*

219. [DELG] *agrees with the* [fourth] *recommendation and will immediately undertake to amend site inspection and audit practices and associated forms to provide for records inspection.*

220. *DAFA does not support* [the fifth] *recommendation. Health Canada and the Bureau of Veterinary Drugs monitor and approve therapeutants based, in part, upon research of effects on non-target organisms. Overall effects upon migrating fish and birds are considered in the site application process.*

221. [DELG] *recognizes the benefits of clarifying and formalizing these responsibilities in the sustainable aquaculture strategy.*

Monitoring of compliance with lease terms

222. Under Section 3(1) of the *Crown Lands and Forests Act*, the Minister of Natural Resources is responsible for the *"development, utilization, protection and integrated management of the resources of Crown lands"* including:

- access to and travel on Crown lands,
- habitat for the maintenance of fish and wildlife populations; and
- rehabilitation of Crown lands.

223. Pursuant to that responsibility, DNR has developed a draft Crown Land Management Strategy. Principles in that document include:

- Sustainable Development - Crown lands and resources will be utilized in a manner and to an extent that such use does not result in long term negative environmental, economic, or social impact.

- Protection - Crown lands will be protected against environmental degradation, improper or illegal use.

- Risk and Liability - Users of Crown lands do so at their own risk. Crown lands and assets will be managed with due consideration for public safety.

224. In keeping with the principles in the Crown Land Management Strategy, DNR feels that it is important that lease terms be monitored to ensure they are being complied with. They indicated that they strive to monitor all Crown land leases for which they are the lessor.

225. However, DNR does not monitor compliance with aquaculture leases for Bay of Fundy salmon aquaculture sites, as the involved lands are under the administration and control of DAFA. When a previously unoccupied site is identified as suitable for an aquaculture cage culture operation, the Minister of Natural Resources designates the Minister of Agriculture, Fisheries, and Aquaculture to act on his behalf in connection with that site. DAFA then leases the site to the licensed producer. As lessor of aquaculture sites, we feel that DAFA assumes direct responsibility for monitoring and enforcing lessee compliance with lease terms.

226. Key terms contained in aquaculture leases for cage culture sites include:

- the lessee shall maintain the premises in good repair;
- the lessee shall use the leased lands for agreed purposes only;
- the lessee shall not assign or sublet without the lessor's consent;
- the lessee shall provide public liability insurance;
- the lessee may install signs with the lessor's consent; and
- the adjacent shoreline must be kept free and clear of any equipment and/or debris associated with the operation to allow for public use, egress and regress at all times.

227. At present, DAFA does not monitor producers' compliance with Crown lease terms, nor do they receive any reporting from site-holders that could be used in establishing compliance.

228. This is of particular concern with relation to the requirement for at least $1,000,000 in public liability insurance included in all leases. A representative of DNR indicated that a failure by lessees to adequately insure in this area creates a risk of legal liability for the Province as owner of the Crown land. We would also note that, pursuant to legal advice received, DNR recently raised minimum public liability insurance required of Crown land lessees to $2,000,000 to better reflect the associated risk. DAFA has not adjusted the amount for aquaculture leases.

229. Regardless of which department acts as the lessor, we feel that DNR bears ultimate responsibility for ensuring that Crown land is managed appropriately. We further feel that when DNR designates control over Crown land to DAFA, it should assure itself that DAFA understands its responsibilities as administrator and controller of that land and subsequently carries them out.

230. There is currently a Memorandum of Understanding between DNR and DAFA, but it was intended to deal with transfers of land for agricultural purposes. It does not refer to aquaculture. We feel that a memorandum of understanding should be developed and signed by both departments that clearly defines the duties of each department in relation to Crown land transferred to DAFA and subsequently leased for aquacultural purposes. We feel this is an important step in ensuring that necessary regulatory activities in connection with Crown land are completed.

Recommendations – monitoring of compliance with lease terms

231. We recommended that DAFA monitor lessee compliance with the terms of aquaculture leases for which DAFA has been designated authority by DNR. In particular, DAFA should ensure that all lessees maintain at least $2,000,000 in public liability insurance, consistent with DNR administered Crown land leases.

232. We recommended that DNR and DAFA develop and sign a memorandum of understanding for aquaculture that clearly defines the duties of each department in relation to Crown land transferred to DAFA and subsequently leased for aquacultural purposes.

233. We recommended that DNR ensure that DAFA is monitoring compliance with aquaculture leases, pursuant to DNR's responsibilities under Section 3(1) of the *Crown Lands and Forests Act*.

Departmental responses

234. *DAFA is unable to support* [the first] *recommendation at this time. DAFA is currently undertaking a review of the public liability insurance requirement to determine which components are available commercially.*

235. *DAFA agrees with the* [second] *recommendation. There is support for the development of an M.O.U. to define the responsibilities of DNR and DAFA. DAFA and DNR do, in fact, hold frequent meetings to address issues of common concern.*

236. DNR supports this recommendation.

237. *DAFA agrees with the* [third] *recommendation. The newly created DAFA Compliance and Enforcement section is gradually increasing monitoring activities of aquaculture leases. The M.O.U. should indicate the conditions of the license.*

238. [DNR sees] *this as DAFA's responsibility and* [does] *not agree that one provincial Department should be responsible for ensuring that another provincial Department is fulfilling its responsibilities.*

DNR – fish and wildlife habitat monitoring

239. Under the *Crown Lands and Forests Act*, the Minister of Natural Resources is responsible for "habitat for the maintenance of fish and wildlife populations." As part of the approval process for new site applications, DNR considers the potential impact of a new aquacultural site on fish and wildlife habitat in the area. When they have major concerns, the application is rejected.

240. DNR representatives have indicated that the Department has some difficulty in appropriately discharging its responsibilities in this area. DNR does an initial site assessment to determine potential impacts of a proposed new aquacultural operation on fish and wildlife habitat. Once the initial site assessment has been completed, it has no further formal involvement in the process or the ongoing operations of the site. DNR does no monitoring of the cumulative impacts of aquacultural operations on fish and wildlife habitat. It also receives no reporting from the industry, DAFA or DELG with relation to actual impacts on fish and wildlife habitat near previously-approved sites. Consequently, DNR staff we talked to felt that subsequent DNR decisions whether to transfer Crown land to DAFA for aquacultural purposes may have to be made without adequate information, and therefore may not be optimal from the point of view of fish and wildlife habitat.

Recommendation – fish and wildlife habitat monitoring

241. We recommended that a requirement for reporting to DNR related to any potential impacts of aquaculture operations on fish and wildlife habitat be included as part of the previously recommended memorandum of understanding for aquaculture between DNR and DAFA, and that DNR take any necessary corrective action when presented with such information.

Departmental responses

242. *DAFA does not support this recommendation in whole. The site application process currently includes adequate opportunity for DNR to identify potential impacts of an aquaculture operation on fish and wildlife activities. Clarification of this review, however, will be included in the M.O.U. to be developed with DNR.*

243. DNR supports this recommendation.

Access to and reporting of information about onsite activities

244. From a provincial and public perspective, a key factor in appropriate decision making is access to information. Adequate information is needed by the Province in order to develop legislation and policies to regulate the industry, to conduct monitoring and enforcement activities, and to report upon the effectiveness of provincial programs in achieving their objectives. From a broader perspective, reporting of information must be adequate to allow legislators to make informed judgments about the industry and provincial involvement in it. A lack of adequate information means that inappropriate decisions may be made by provincial departments, and that inappropriate conclusions may be drawn by legislators or citizens.

245. Section 17(2) of the *Aquaculture Act* states the following:

> *A licensee shall forward to the Registrar the information, books, records, accounts and other documents required by or in accordance with the regulations, at the times and in the forms required by the regulations.*

246. However, Section 22(4) of the Act states:

> *An inspector may at any time require a licensee to produce for inspection, or for the purpose of obtaining copies or extracts, any records, books, accounts or other documents,* ***other than financial records, books, accounts or documents, relating to aquaculture or to the aquaculture site****.* (emphasis ours)

247. It goes on to say, in Section 29(1)

> *Subject to subsections (3) and (4), all information, books, records, accounts and documents obtained under section 5, 7, 9, 17, or 22* [i.e. basically all information] *are confidential.*
>
> Subsection (3) allows disclosure of this information:
>
> *(a) on a confidential basis to a person employed by the Government of Canada or by a province or territory of Canada,*

> *(b) in publications and programs in relation to aquaculture if the disclosure does not identify the person to whom the information, book, record, account, or document relates,*
>
> *(c) to any person when necessary to prevent or combat disease or to maintain genetic standards,*
>
> *(d) to members of* [certain] *advisory committees established by the Minister under Section 37,*
>
> *(e) to any person in the course of consultation, public or otherwise, undertaken in relation to any application under this Act, and*
>
> *(f) to any person in accordance with the regulations.*

248. DAFA has interpreted these sections to mean that:

- provincial departments may not access producers' financial information for any reason; and
- provincial departments may not disclose any information about individual sites to other departments or the public except on a confidential basis for the use of certain federal/provincial committees.

249. As a result:

- DAFA does not disclose certain information about individual sites to other provincial departments that might be useful to them in carrying out monitoring and enforcement activities (e.g. DELG is not provided access to commercial aquaculture licenses). We do not feel that this restriction is supported by the *Aquaculture Act* and believe that DAFA should seek a legal opinion to clarify the matter.
- A lack of access to financial information may make it more difficult or impossible for DAFA to build an enforceable case against producers who are suspected of overstocking their sites. In comparison, DELG does have the authority to obtain financial information pursuant to enforcement activities under the authority of the *Clean Environment Act*.
- Significant limits are placed on the amount of information disclosed publicly pursuant to applications for new aquaculture

sites. For example, the public is not provided with information on the proposed size of a farm nor the number of fish to be produced. This may make it difficult for the public and stakeholders to provide meaningful input. In the State of Maine, all such information must be made public. Restrictions such as this may well have a negative impact on public perception of the industry as previously discussed.

250. Additionally:

- DELG does not publicly report the environmental rating of individual aquaculture sites, nor any other specifics relating to findings from monitoring activities associated with those sites except upon receipt of a formal request under the provincial *Right to Information Act*. By comparison, in the Province of British Columbia all such monitoring findings are reported on the website of the provincial Ministry of Agriculture, Food and Fisheries in the "Annual Inspection Report on Marine Finfish Aquaculture Sites". Consistent with its approach for other industries, DELG treats this monitoring data as sensitive pursuant to the wishes of the industry.

251. It is reasonable for the industry to be concerned with the protection of proprietary information. However, salmon aquaculture is being conducted exclusively on Crown lands and waterways and there are significant public risks associated with those operations. Therefore, we feel that sufficient information should be made available to allow for adequate provincial monitoring, enforcement and reporting to take place, and to allow public policy decisions to be made in an environment of transparency. In our opinion, that is not the case at present. Changes to the *Aquaculture Act* and Regulation to remove restrictions on information could be made in conjunction with the review of that legislation currently being conducted by DAFA. Additionally, we feel that environmental monitoring data for individual cage culture sites should be provided to the public on a regular basis.

Recommendations - access to and reporting of information about onsite activities

252. We recommended that DAFA take appropriate steps to ensure that necessary information is accessible by provincial departments and publicly reportable, including seeking legal opinions where necessary. Where legal restrictions apply, DAFA should give consideration to proposing changes to the existing *Aquaculture Act* and Regulation to remove those restrictions in conjunction with the review of that legislation currently being conducted by the department.

253. We recommended that DELG publicly report environmental monitoring findings for individual cage culture sites on a regular basis.

Departmental responses

254. *DAFA agrees with the* [first] *recommendation. DAFA has undertaken to share "sensitive information" with other agencies. This issue of public accessibility to information will be examined during the legislative review of the* Aquaculture Act.

255. [DELG] *agrees with the* [second] *recommendation, and will ensure that site-specific monitoring results are made publicly available on a regular basis as soon as possible.*

Public effectiveness reporting

256. Significant amounts of public resources are being utilized to support and regulate the salmon cage culture industry in New Brunswick. Therefore, we would expect that performance information would be generated by provincial departments and reported publicly on a regular basis. This would allow legislators and New Brunswick citizens to evaluate the effectiveness of aquaculture programs in achieving stated goals. It would also provide departments with information which they could use in managing and improving the effectiveness of programs. However, such performance information is not generated and no reporting takes place.

257. Reporting in the 2002/2003 DAFA annual report was limited to a narrative description of activities undertaken and industry data obtained from Statistics Canada. There was no performance reporting in relation to goals stated in the Bay of Fundy Marine Aquaculture Site Allocation Policy or any other goals that may have been set for the DAFA aquaculture program.

258. Reporting in the 2002/2003 DELG annual report was limited to information on the number of aquaculture sites that had been granted approvals to operate by DELG. It did not include performance reporting relating to aquaculture stewardship activities undertaken by the Department or any summary of the results of environmental monitoring that had been conducted.

259. Aquaculture was not mentioned in the 2002/2003 DNR annual report.

260. Reporting of specific cases would be restricted by confidentiality protection afforded under the *Aquaculture Act* and

Regulation as discussed in the previous section of this report. However, reporting at a summary level would be permitted.

261. Ideally, performance measures should tie into strategic objectives developed as part of a provincial salmon aquaculture strategy. Performance measures could include:

- industry production levels;
- percentage of value added products;
- market diversification percentages by product line, destination, etc;
- fish health status;
- environmental ratings (i.e. numbers of sites oxic, hypoxic, or anoxic);
- level of compliance with waste management and remediation plans; and
- feedback from stakeholders on specific areas (e.g. by means of periodic surveys).

262. Specific targets should be set periodically, and actual performance should be reported in comparison with those targets. The provincial annual report policy indicates that departmental annual reports provide the best forum for reporting such performance information.

Recommendation - public effectiveness reporting

263. We recommended that each involved department establish procedures to measure and report on the effectiveness of provincial programs that impact on the salmon cage culture industry. Reporting should be clearly linked to the objectives of those programs and appear in departmental annual reports.

Departmental responses

264. *DAFA agrees with the recommendation. DAFA supports the development of a comprehensive strategy and establishing performance indicators as well as reporting results in the departmental annual reports.*

265. [DELG] *agrees with the recommendation, and will provide appropriate effectiveness reporting in future annual reports.*

266. DNR supports this recommendation.

Conclusion

267. As we mentioned in the Scope section of this report, the objective for this project was:

To determine whether Province of New Brunswick programs ensure that New Brunswick salmon cage culture operations are economically, environmentally, and socially sustainable.

268. Sustainability implies:

- a salmon cage culture industry that is financially viable and thereby contributes to a stronger economy in New Brunswick;
- a salmon cage culture industry that has no net negative effect on the eco-system of the Province; and
- a salmon cage culture industry that puts allocated Crown lands and waterways to their best use and does not unduly displace traditional users of those lands and waterways.

269. Based upon our findings, we would conclude that while current provincial programs do address some aspects of sustainability of New Brunswick salmon cage culture operations, there is much work still to do to ensure that the industry is truly economically, environmentally, and socially sustainable.

270. In particular:

1. A comprehensive provincial strategy for the development and management of finfish aquaculture in New Brunswick is needed. Such a strategy would:
   - ensure that all risks that are publicly significant are identified;
   - clearly identify responsibility for managing those risks and for ensuring that they are being adequately managed;
   - set goals and objectives that strike a balance between competing interests (i.e. economic, environmental, and social); and
   - provide a basis for provincial decision making in connection with the industry (e.g. in setting the form and content of legislation, leases, and licenses).
2. Additional environmental research is needed to reduce current gaps in knowledge about how the cage culture industry interacts with the eco-system in the Bay of Fundy area. Such knowledge would provide the basis for development of improved regulatory

standards in the future.

3. Improved monitoring and enforcement of compliance with existing provincial operating standards and certain environmental regulatory requirements is needed to ensure that producers are complying.

4. Access to and sharing of information about industry operations and findings from provincial regulatory activities needs to be improved to ensure that decision makers are able to make informed decisions that will promote the sustainability of the industry. For example, provincial departments (i.e. DAFA, DELG, and DNR) need sufficient information to serve as a basis for their own regulatory decision making and to properly coordinate their activities with federal departments. And legislators need adequate information to make informed judgements about the industry and provincial involvement in it, as do New Brunswick citizens.