

Review
Environmental Impact Assessment
Proposed aquaculture site #1370 West Shoal Bay

Overview

This assessment document is deficient in many respects. Not only does it not meet provincial and federal standards for marine fish aquaculture but much of the data used in support of the project are inappropriate and meaningless as applied here. Also much of the ancillary information supplied is irrelevant and seemly added to lend the document a tone of authority and completeness.

Furthermore it can hardly be considered an at-arms-length environmental assessment as large portions of the document are dedicated to justifying the fish aquaculture industry. One can't help but wonder how objective Sweeny International Management Corporation is in producing this report.

Specific Items

(1) *Page i: "SIS will also work with various stakeholders to identify and develop natural exclusion zones on the eastern shore to support and enhance both the traditional fishery sector and the wild Atlantic salmon migration routes."*

Nowhere in the document is this explained how this would be accomplished. If anything this will be a detriment to traditional fisheries. There is overwhelming evidence that fish feedlots are harmful to wild salmon. It has been argued by the aquaculture industry that evidence for this is largely circumstantial; however, recent work has shown that smolts protected against sea lice (a serious problem in fish farms) have twice the rate of returns to the native river than those not protected (Gargan et al 2010).

(2) *Page iii: "30 to 50 full time positions on local farming sites/service locations and an additional 30 to 50 positions will be supported through a regional processing partner that will supported by a regional processing partner....."*

Nowhere in the document is there given any indication of how many persons would be needed and what the jobs would be. The numbers are undoubtedly overestimated and probably includes those that were hired for the Owls Head site which has been inoperative for a year. Even when in operation, positions on a full time basis were few and mostly minimum wage. Employment at fish farms has been always low and as production from these enterprises increases, employment has actually dropped as more and more automated systems are brought into use. From a peak of about 450 jobs in the 1990s, total employment as of 2010 has fallen to slightly less than 200. Over this same period, production has risen from about 1.5 million kg to 5.5 million kg (Fuller and Grant 2012).

(3) Page ii: *“This low level stocking will improve not only the health of the surrounding environment but also the welfare of the stock by providing the fish room to school while reducing stress, disease risk..... ”*

Much is made of low stocking densities yet mortalities are estimated to be 10 to 15% (see page 77). The fact that this many (50 to 75 thousand) salmon die, even though they are protected from predation and have unlimited food, is an indictment of the husbandry methods and undoubtedly largely due to stress brought on by overstocking.

(4) The proponent believes that through the *“...close cooperation of the local communities, fishermen, government authorities and other stakeholders in the region, the eastern shore can become a model of salmon farming sustainability and a net gain for the region as a whole.”* It is clear that the only parties supporting this proposal are government. Affected communities and local fishermen are almost unanimous in their condemnation of the idea of these fish farms. Furthermore, recent analysis of the aquaculture industry by the Ecology Action Centre clearly indicates that benefits to local communities are minimal (see #2).

(5) Pages 3 to 5 (Figs. 1 & 2)

The site for the proposed farm is poorly chosen; positioned in the narrowest part of the channel leading into Shoal Bay, it is a hazard to boat traffic. Fishing boats regularly use this channel as well as sail boats to which it is a particular obstacle due to their limited maneuverability. This area is part of an inshore protected route between Owls Head and Spry Harbour often used by smaller craft. For small craft proceeding from Owls Head to Shoal Bay, a recommended route charted in a local sailing guide (Cox 1997) is between Little Island and the western shore of Charles (Borgles) Island. The proposed site of the fish farm at the eastern end of this passage would block a normal eastward turn and require a long detour to the north to avoid the farm before eventually turning east to traverse the narrow channel between the proposed site of the farm and Shag Ledges. These ledges extend westward underwater a considerable extent beyond the above water portion and the distance between the 2m depth contour associated with the Ledges and the proposed site boundary is, by this reviewer’s measurement, 208m, considerably less than the 371m appearing in the proponents assessment document.

(6) Page 6; Fig. 3

A report outlining criteria for aquaculture development (Stantec 2009) was prepared for the provincial government. In it are listed a number of *“.... characteristics that make aquaculture impossible or very risky.”* The first two of these are

Y Critical exposure (i.e., areas with waves over 2m);

Y Shallow areas (i.e., depths less than 20m except in sounds/straits with strong currents)

Shoal Bay is exposed to the east and experiences waves of this height from time to time. Although not common in the past, the frequency of these events has increased substantially in recent years. (see also #12)

The depth at the site is only 12m and the mitigating current speeds do not exist here. Average velocity measured in the course of this assessment were a mere 0.05m/sec (0.1 knot). Current speeds for Shoal Bay as measured by DFO oceanographers were much less; they report a maximum current speed of 0.04m/sec and a mean of 0.02m/sec). The bottom of the proposed pens will be 4m above bottom; with a settling rate of 7cm/sec, uneaten food particles would take about a minute to reach the bottom. However, even at the higher current speeds reported in this document the food would have drifted a mere 3m laterally; hardly enough to ensure wide dissipation and dilution of waste. Hargrave (2002) devised a decision support system to aid in quantifying site suitability. Nine criteria are assigned values to determine acceptability. One of these, depth under the pen is pre-emptive, that is it supercedes all others and must be satisfied for even considering the other factors. Hargrave considers 5 m to be the minimum distance between the sea bottom and the pen bottom to be acceptable. This site obviously would not pass.

(7) The proponent proposes to carry 500,000 fish in the operation which when fully grown at 5kg that would be 2,500 tonnes. In studies investigating the benthic impacts of organic enrichment from marine aquaculture the DFO has calculated carrying capacity of small embayments along Nova Scotia's Atlantic coast. Two estimates are given for Shoal Bay, they are 1566 & 1739 tonnes; the proposed production number is 50% over this. Even at maximum fish weight of only 4kg, the proposed is 25% greater than the limit. The estimates of capacity for Owls Head, the site of the other farm (lease # 772) mentioned, are a mere 384 & 459 tonnes which is a mere one fifth of the proposed production level.

(8) *Page 8, Fig. 5*

It is said on page 3 that Snow Island Salmon (SIS) owns lease #833 located on a map of the area (Fig 5). This is no longer a farm, the site having been abandoned a few years ago apparently because of too much exposure to the weather. It is worth noting that the site's location is much the same as that presently proposed; that is, on the northeast shore of adjacent islands.

(9) *Figures 6 to 12.*

These figures appear on pages 12 to 18 and are not referenced anywhere in the text What is their significance?

(10) *Page 12, Fig. 6*

The figure indicates an existing aquaculture site off Nichol (Wolfes) Island. This does not exist (see #8). The key to the figure also has an icon for "Potential seal haul out" but none are shown on the map. There is a substantial haul out on a ledge in Deep Cove on the west coast of Charles (Borgles) Island just over a kilometer from the proposed site.

(11) *Page 19: Wind*

First it must be recognized that the data taken from the MacLaren Plansearch report is over 20 years old. Up-to-date data are needed here, since it seems probable that the frequency of extreme weather events has increased in recent years and winds of 30 knots are now relatively common. Secondly, winds off the south shore can hardly be presented as representative of the

eastern shore. The fact that the Eastern Shore and South Shore have different marine weather forecasts attests to that. Additionally, Shoal Bay is subject to the phenomenon of coastal convergence which is “*a convergence of land and sea winds which creates a stronger band of wind near the shore. The severity of coastal convergence depends on such factors as the shape of the coastline and the angle between the wind and the coast.*” (Environment Canada 1992). A particular case of this convergence is ‘corner effect’ which can lead to small scale local but very severe conditions. “*Windy conditions off prominent headlands are a common example of a corner effect.*” (Environment Canada 1992). The proposed site for this fish farm is right below Borgles Bluff, the headland for which the island has recently been named (formerly Charles Island). Other effects on wind velocity due to local land configuration and which probably can be expected in Shoal Bay are channeling (the tendency of the wind to blow along the axis of a channel or to be deflected by land) which can affect the direction of the wind, and funneling, where wind is forced through a narrow opening between two land masses, greatly increasing wind velocity.

(12) *Page 19: Waves*

The criticisms of the wind section apply here also. Using data from LaHave Bank is bad enough, but to use wave data from the Northeast Channel off Georges Bank leaves one incredulous. Again wave data from offshore are irrelevant. As offshore waves approach shore and shoal water, friction with the bottom causes the wave to slow and the amplitude increase. No attempt has been made to even estimate how much bigger waves would be after encountering water of 20m depth at the mouth of Shoal Bay and then steadily decreasing to 12 m at the proposed site. “*Large seas sometimes occur between islands in the approaches to Necum Teuch Bay, Spry Bay and Shoal Bay;...*” are reported by Environment Canada (1992).

The wind and wave data presented here are completely inadequate and the situation demands local measurements be taken and recorded before any consideration of advancing this project.

(13) *Page 24: Temperature*

Figure 17 states that the data are collected in Shoal Bay, but the text states that they are from near Shoal Bay. Again, the data must be recorded at the proposed site to have any credence for support of this application. The data provided in Figures 18 and 19 are for offshore and of little applicability here. For instance, inshore surface temperature routinely reach 20 °C. in late summer-early autumn; the maximums given in the document are slightly over 16 °C.

The following statement appears in the last paragraph.

“The presence of a successful aquaculture farm located at Cable Island would indicate that the temperatures in the area of Shoal Bay will be tolerable for Atlantic salmon.”

This is not true.

The first farm (#772) sited here about 20 years ago was unsuccessful. The lease was taken over a couple of years ago and once again stocked with salmon. In early March 2011 the farm experienced a mass fish kill. Local residents were led to believe that the mortalities were a result of very low water temperature. Considering this is the time of year for coldest water

temperature, this is credible. However, there were probably other contributing factors. Those aboard a seiner contracted to pump the dead fish out of the pens reported that the fish appeared to be suffering from some kind of disease or infection as their bodies had many sores and lesions.

(14) *Page 27: Salinity*

Once again, the data are inappropriate. It is almost certain that at times salinity is much lower than is indicated here. Two rivers empty into adjacent Ship Harbour. The largest, Ship Harbour river, drains a very large watershed and considerable volumes of fresh water traverse inner Ship Harbour to enter the outer harbour and contiguous Shoal Harbour. At some times of year, a fresh water layer a foot deep can overlay the salt water in Ship Harbour. It is probable that there are wild swings in salinity at the proposed Shoal Bay site as patches of fresh water pass by.

(15) *Page 30: Currents*

Average current speeds measured for this proposal (5.3 cm/sec) are more than twice as high as those (2.0 cm/sec) measured by the DFO (Gregory et al 1993). It is possible velocities along Charles Island may be higher than most of the bay, but such a large discrepancy needs to be verified. In any case the speeds given in this assessment are still too low to satisfy the Stantec (2009) report proviso of strong current in situations where pens could be sited in depths of less than 20m (see #6). The fact that the bottom at the proposed site is mud attests to the fact that bottom currents must be very low.

(16) *Pages 31-48*

These pages give details of species at risk and mitigation procedures. Much of this has little or no relevance to the proposed site. Many of the itemized species are terrestrial and would not be impacted unless the operation were to erect structures on shore, which appears not to be the case. Listing species like boreal felt lichen and ghost antler lichen seem pointless. Likewise marine species such as the blue whale are very rare in Nova Scotian waters and even if not this large animal could not reach the proposed site because it is larger than the water is deep and wouldn't physically be able to enter the bay.

(17) *Page 39*

With respect to Atlantic sturgeon we see that *"-Have been captured in Nova Scotia from the following rivers: Cheticamp, Aspey Bay, Canso Strait and Halifax..."*

An example of the carelessness with which this report was put together.

(18) *Page 54: Pelagics*

In the first paragraph it is stated that *"The most common commercial species of pelagic fish off the shore of Nova Scotia include: herring.....with herring being the most valuable pelagic.."* and then in the second paragraph *"In the Shoal Bay area there may be some commercial bait fisheries for mackerel and /or herring."* However, the possibility of herring spawning grounds in the vicinity is not addressed. Herring are a demersal spawner and their eggs are particularly susceptible to high mortality from fish farm waste. This part of the Eastern Shore was identified by fishermen as a herring spawning area (Sameoto 1971). Most jurisdictions have

strict regulations regarding the siting of fish farms with respect to herring spawning beds and it is imperative that this issue be addressed with respect to this proposed site.

(19) *Page 59: Shellfish and Other Invertebrates*

It is recognised that lobster fishing occurs in Shoal Bay but there appears to have been no attempt to contact local fishermen to determine fishing areas in the bay. This makes the earlier statement “*SIS will also work with various stakeholders to identify and develop natural exclusion zones...*” a rather empty promise.

(20) *Page 63: Seaweeds*

It is stated that “*...rockweed harvesting can coexist with aquaculture and no conflict is anticipated between the industries...*”

This is not always true. Eutrophication stemming from excessive fish farm waste has encouraged the growth of slimy algal mats which have choked the growth of larger, commercially salable macrophytes and rendered them unfit for harvest if not actually eliminating them. (Milewski 2012).

(21) *Page 63: Recreational fisheries*

As well as mackerel, there is salmon and sea trout fishing in Ship Harbour and Ship Harbour river.

(22) *Page 63: Seals*

There is a haul-out near the proposed site (see #10)

(23) *Page 65: Lobsters*

Lobster fishermen in the area need to be consulted.

(24) *Page 69: Harmful Algal Blooms*

It is worth noting that if anything, eutrophication caused by fish farms would facilitate the advent of an algal bloom. Experiments to test the efficacy of biological controls (mussels, kelp) to mitigate the nutrient loading resulting from fish farms are ineffective (Milewski 2102).

(25) *Page 70: Superchill*

Superchill is a distinct concern in this area and has apparently caused mass mortality of salmon in an adjacent farm (see # 13).

(26) *Page 75: Management of Mortalities*

It appears there will be no effort to determine cause of mortality as all dead fish will be transported directly to a composting facility.

(27) *Page 77: Introduction of Fish*

I question the claim of low stocking density with anticipated 10 to 15% mortality (see also # 3).

(28) *Page 79: Mortalities*
Repetition of section 7.6.

(29) *Page 79: Fish Feed and Faeces*
There is no discussion of faecal waste despite the title of the section.

(30) *Page 79: Harvest Wastes*
Repetition of section 8.4.3.

(31) *Page 81: Public Consultation*
Despite the title of this section, little or no public consultation took place. The persons listed in Table 10 are nearly all government representatives. There appears to have been no local input to the planning of this project. Very late in the process, a public meeting was held at which the major complaint was lack of consultation. Also the fact that equipment had already been moved to the area in anticipation of establishing the fish farm did nothing to endear the proponent to the community..

(32) *Pages 88 and 89: Tables 15 and 16*
There is nothing explicit in these tables on the fishing industry on which projects of this sort have the greatest impact.

(33) *Page 89*
One of the justifications for fish farms continually touted by proponents is employment. However, jobs are few as is made clear in a recent report by Fuller and Grant (2012) who state
“If the desired outcome of economic generation in Nova Scotia is jobs - then it is clear that open net pen aquaculture in both Nova Scotia and Newfoundland create an order of magnitude fewer jobs per million dollars in economic revenues, than other coastal industries including shellfish aquaculture, recreational fishing, commercial fishing for lobster and tourism.....traditional industries that rely on good environmental quality are clearly a better investment should government funds be available, than industrial scale open net pen salmon farming.”

Nevertheless the proponents of this proposed fish farm state *“Marine aquaculture has the potential to be a sustainable, reliable and environmentally sustainable industry in Atlantic Canada and to provide needed jobs to Atlantic Canadians.”*

As far as being more environmentally friendly, the potential is there, but for decades this industry has done little or nothing to achieve this goal and there is no reason to believe this operation will be any different. One obvious solution is closed containment which would preclude many of present shortcomings. Waste fouling of the bottom, fish lice, spread of disease to wild fish, predators and escapes would all be preventable with closed pens. This does not have to be shore-based as there are now large, floatable tanks available for aquaculture.

“As traditional fisheries of the world diminish or, as in some cases, collapse, aquaculture is posed to help supply global appetites for healthy sources of fish protein.”

This is a particularly galling statement when there is ample evidence that fish farming has caused the collapse of wild salmon stocks (west coast of Scotland, Norway) and southern stocks of sardine and anchovy are being decimated to provide food for penned salmon in the northern hemisphere.

(34) *Page 90: Significance of Proposed Farm to Other Ocean Users*

The significance is that the fishing industry, tourism and recreational users of coastal waters are almost universally against fish farms.

References

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