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Aquaculture Administrator
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Re: Submission to NSDFA on the renewal application of Kelly Cove Salmon Ltd's aquaculture licence and lease for site 0602 in Shelburne County

The Ecology Action Centre submits these comments re the above application by Kelly Cove Salmon Ltd. ('the proponent') for the renewal of a site number 0602 in Shelburne Harbour.

The Ecology Action Centre is Nova Scotia's largest and oldest non-government environmental organization. We are a membership based organization and with over 4000 members we represent thousands of Nova Scotians. We have been involved in policy and advocacy work at the local, national, and international level for almost 20 years to promote sustainable fishing and aquaculture and support vibrant, coastal communities that are the backbone of our economy.

The Ecology Action Centre is connected to this matter as an official stakeholder in the development of aquaculture in this province. We have been been an official stakeholder in federal and provincial aquaculture regulatory round tables, NASAPI and the Doelle-Lahey Panel Advisory Committee Roundtable and Science Advisory Committee. We currently hold a seat on Nova Scotia's Aquaculture Regulatory Advisory Committee We have been actively involved as a stakeholder in the Shelburne Harbour aquaculture development for 6 years. We have policy and science staff with expertise in the aquaculture industry and we are very familiar with the research, assessments, and community discussions surrounding this particular site. We represent our official membership base, which includes citizens with specific concerns about aquaculture.

The Ecology Action Centre objects to the renewal of Kelly Cove Salmon Ltd's aquaculture licence and lease for site 0602 in Shelburne County.

The new 0602 site is 40 metres away from the proponent's old 0602 site, which had high biomass accumulation, resulting in sulphide levels above the regulatory allowance for years of its operation. It was eventually put out of production, leaving an anoxic dead zone at the site. Independent research and DFO data clearly showed the decline of macrofauna abundance and biodiversity in the site area and harbour throughout the life of the proponent's previous ventures. Independent research carried out after the closure in 2011 of old site 0602 showed fallowing of more than two years did not remediate the site. The proponent company has operated outside the licenced boundaries of other sites and been investigated for numerous infractions over the years.

There is no performance review attached to the consultation or justification given to demonstrate that the environmental performance and proponent mitigation would be different with this new site 0602. We have detailed our analysis below and our position that the new 0602 site under this consultation does not justifiably meet the regulatory guidelines.

Out of respect for the new process set up by the government of Nova Scotia to increase transparency and social acceptability of aquaculture, we request a response to our concerns below with the reasons for the eventual rejection or renewal of the lease.

Lack of information for consultation

From the outset of our submission we would like to note that insufficient information is provided to stakeholders about this new 0602 farm site. Without access to the full information about the planned farm—including anticipated stocking, production practices, waste mitigation, type of cages, type of anti-fouling—stakeholders cannot properly assess the benefit, impact, and costs of the proposed farm. There is also no EIA presented in the consultation documents for this site.

Without full information we can only make our scientific assessment of the appropriateness of the site based on the nearby existing site 0602 and the scant information of the site location in the consultation document.

Justification that this site should fall under a renewal process

We urge the NSFAD to consider this a new site application that goes through the proper process of an independent board panel review recently put in place to ensure robust aquaculture regulation and social acceptability.

This cannot be argued to be a renewal of an existing lease. The site is clearly a distinct site:

- The boundaries do not overlap in any way with site 0602.
- This site is significantly larger than the existing 0602 site, allowing for increased stocking.
- There is indication on the application that another species could be farmed under the new lease and no information on the intended species to be farmed.
- The site is closer to the shoreline than the old 0602 and runs along 240 metres more coastline that the old 0602 site, decreasing the flow of water between the cages and the shoreline, and increasing the impact on the coastline as well as adjacent properties.

As per Subsection 72 (c) of the *Aquaculture License and Lease Regulations*, a performance review of the site is to be undertaken for renewal of leases. Has a performance review been completed for this lease? The public should have access to these performance reviews in order to make an informed decision on consultation submissions. Just as capture fisheries have management plans and annual reviews that are open to stakeholders with production, mitigation, and harvesting plans analysed, aquaculture production in our public areas and its performance should also be open to scrutiny.

It is likely, however, that there is no performance review since this is technically a new site where there have yet to be fish grown out. What is the justification for this being considered only a renewal rather than a new site?

The acceptance in 2011 that this site was merely an amendment to the original site 0602 of the proponent was widely disputed. There was never an explanation given for the Ministerial approval of this site as an amendment to 0602.

This is not adhering to the spirit of the Doelle-Lahey report that formed the basis for the new aquaculture regulations and licensing process in Nova Scotia. The Report stated, "the pervasive discretion built into the current regulatory framework must be limited in a new regulatory framework if the new framework is to enjoy the trust and confidence it needs to be successful." pg. ix

The Report also recommended that, "the public will have multiple opportunities, including a mandatory hearing on every application for a licence, to contribute to decision making in the licensing process." pg. viii

Subsequently promised changes were made to aquaculture regulation in Nova Scotia and new leases are to be reviewed by an independent panel to ensure 1) compatibility with the ecosystem of the area, 2) other users, 3) responsiveness to cumulative impacts of aquaculture in an area, and 4) contribution to the community.

In good faith, the government should consider this site a new site and ensure the proper panel hearing and public consultation is followed. If the site meets all the new requirements and criteria and the proponents have a clean history of operation that give net benefit to the community, there should be no worry about carrying out a transparent process to gain the social license.

The Ecology Action Centre objects to the 'renewal' of this lease, not only due to the above, but based on the following:

- The site location is ecologically unsuitable due to the oceanographic and biophysical characteristics of the area.
- The new 0602 site is only 40 metres away from the old 0602 site and there is no evidence presented for consultation on any new practices or mitigation by the proponent that would alleviate the unacceptable problems experienced at the old site.
- The previous 0602 site showed unmitigated levels of sulphides that created a dead zone and there is no evidence that the new site will perform better.
- The previous 0602 site had an ISA outbreak and the close proximity of a number of other sites in the same harbour increases the risk, as well as pushes the carrying capacity of the area.
- The proponent has been out of compliance on a number of issues in their operations, including setting infrastructure out of their approved boundaries
- There is no information presented on the mitigation and protection measures in place for protected and endangered species habitat as required by the *Species at Risk Act* (SARA).
- The proponent has not yet rehabilitated the old 0602 site.
- The proponent did not fulfill its promised job numbers and business opportunities for the area that was part of its social license with the community, never opening a promised processing plant despite keeping $9 million of the forgivable loan and owing $16 million now to the government for this.

The oceanographic and biophysical characteristics of the public waters surrounding the proposed aquaculture operation

The new 0602 site is ecologically unsuitable due to the oceanographic and biophysical characteristics of the area.

Depth of site and cage

The new site has an unacceptable depth under the regulations. According to the MFADSS (p20), *"a site is unacceptable if the clearance between the sea floor and the bottom of the predator cage is less than 5 metres more than 50% of the time."* With a water depth of only 10 metres, dipping to 6 metres at the edge of the site, the bottom ring of the cage will only be 4 metres away from the seabed, even at high tide.

The location and depth of the site pose significant concerns for the creation of anoxic dead zones, as the clearance area below the cages would be approximately 4 metres. There is an unacceptable amount of space for waste to be carried away by any current movement before reaching the sea floor.

How will the administrator justify the lease when the site does not meet the minimum depth requirements in the regulations?

Current speed

No official current data for this site have been presented. The original EIZ for the old 0602 site did not have current measurements and relied on data from the Hartz Point sites across the harbour. It is unacceptable to not have basic data available for the new site, especially after years of operation of the old site 40 metres away.

We can only rely on unofficial measurements to analyze the acceptability of the current and flushing rate. Unofficial readings show a 5cm/s flow and readings of the site across the harbour show 10 cm/s flow at times. At these low current rates, the build up of waste will be substantial and lead to higher than acceptable sulphide levels. There is significant concern for the movement and deposition of anything entering the water including fecal matter and organic waste, chemicals from disinfectants (ex. Wescodyne, Germ Kill , Ovadine, Virkon), antiobiotics (ex. Slice, Terramycin, Aquaflor), and hazardous materials (engine oils, diesel fuel, gasoline, and other agents) all of which are outlined in the original 2009 EIA.

How will the administrator justify this level of current against the regulations?

Proximity to shore

The shallow depth is due to the proximity to shore. This location will exacerbate the unacceptable rate of flushing creating a choke with the already very slow current movement in the area being hindered by the operation. This will result in increased build up of waste under the cage, increased sulphide levels, and funneling the movement of waste, debris and pollutants towards shore. There are significant concerns for the biophysical processes of the area with the site location.

The intertidal zone and shoreline provide habitat for protected coastal birds and other animals. The service boats will add to shore erosion, and availability of food may attract predatory birds, both of which pose risks to the protected Piping Plover.

The close proximity to the shore will also severely impact other users of the coast.

Proximity to other farm sites

The new 0602 site will operate in a harbour that research has shown already has experienced a decline in biodiversity and an increase in sulphide readings from the aquaculture production. Regulations call for 3 km separation between fin fish farms. There is only 1-2 km between site 0602 and 0983 & 1192.

This site would be in violation of distance between farms in the provincial regulations. This proximity between sites increases the risk for disease outbreaks. This was already demonstrated in the 2012 outbreak of ISA in this very harbour. One million fish were slaughtered and wasted, and taxpayer money went to a federal compensation pay out of $13 million. In this case the ISA spread to the old 0602 site from another farm in the harbour.

ISA results in severe anemia in the fish caused by a binding of the virus to red blood cells. Once infected, there is no treatment and the fish will die. ISA is easily transmitted by blood, feces or possibly passive transmission from seawater (Nylund et al. 1994). It has been suggested that sea lice are likely the most prevalent cause of ISA transmission between fish. The virus can also be passed from salmonid parent to offspring through vertical transmission (Vike et al. 2008).

Though the ISA virus is endemic to the Atlantic, transmission and prevalence of this disease is greatly increased on salmon farms due to the high density at which the fish are kept, resulting in mass mortalities, a significant loss of profit and dumping of infected individuals into the wild.

The new 0602 site is at the same, if not higher, risk of the previous site, as the new site is closer to other sites and is larger, meaning more fish in the system and a potentially larger outbreak.

What are the mitigations in place to prevent the spread of this devastating disease to other farms in the harbour?

Impact on other marine species

There has not been a full environmental assessment offered for consultation discussions. There is no excuse for lack of information or a review of the production impact over the last number of years of active aquaculture on the marine ecosystem in the area. It should be a minimum requirement for aquaculture as it is for other economic activities in our waters, such as capture fisheries, which are required to have assessments and impact mitigation plans.

Aquaculture is well documented to affect marine biodiversity at localized scales (less than tens of kms) and farther-reaching impacts are possible. Major localized effects threaten wild bottom-dwelling organisms and their habitat by deposition of the organic waste and chemical inputs from the antibiotics, anti-foulants, pesticides, etc., used at a finfish operation.

Shelburne Harbour, the area of the new site 0602, hosts juvenile lobsters and other marine fish. There are risks to these animals from fin fish aquaculture and, given the lack of farm plan to review, it is not clear how these risks will be mitigated.

The feed given to farmed Atlantic Salmon contains a number of trace metals, including copper, zinc and cadmium, and concentrations of these metals in the sediments below sea cages show high levels of contamination by these metals in a study on Scottish salmon farms (Dean et al. 2007). These levels exceeded those deemed acceptable by the Scottish Environmental Protection Agency suggesting that the abundance

of these metals would likely have adverse effects. Similar feed and farm practices are used here in Nova Scotia.

Copper, used in anti-fouling on the sea cages, has been found to have significant effects of the physiology of spiny lobsters, causing alterations to the muscle, gills and heart, as well as having impacts at a cellular level by creating chromosomal aberrations (Maharajan et al. 2011; Maharajan et al. 2012).

These effects could seriously impact the survival of American Lobster in the proximity of salmon farms. Both zinc and copper have toxic effects on some marine copepods and could also affect recruitment of lobsters by decreasing the survival of larvae (Bielmyer et al. 2006; Lauer & Bianchini 2010; Wong & Pak 2004).

In Nova Scotia, the use of SLICE, which is the most common treatment for sea lice through coating food pellets, is the main concern due to its potential impacts on the American Lobster (*Homarus americanus*), which is an incredibly important commercial species to the area. Research shows the lethality of emamectin benzoate to American lobster at standard industry concentrations is quite low (Burridge et al. 2004). However, there is significant evidence of other harmful but non-lethal effects. Waddy et al. (2002) found that 44% of female lobsters exposed to small doses of emamectin benzoate moulted prematurely, and those which were carrying eggs aborted their brood. This would seriously affect the reproductive ability of wild lobsters near salmon farms and could have a profound effect on Nova Scotia's lobster fishery.

Several other studies have assessed the effect of deposition of the above including Rooney and Podemski (2009), which shows this waste deposition reduces species richness and leads to an increase of sulphides in the surrounding waters, with a worst case of anoxic conditions on the sea floor and almost entire loss of life.

With such high concentrations of farmed fish in the harbour, with larger new sites, significant amounts of waste will accumulate on the bottom under the cage. Given that the old 0602 site led to an anoxic environment under the cage, we can only assume the new site will also create the same, if not worse, impact on the marine species on the bottom.

Both porpoises and whales are identified in the original EIA for Shelburne Harbor in 2009 as falling within a 5km radius of the fin fish farms. It has been demonstrated globally that aquaculture operations pose a significant risk to marine mammals. By depositing ropes and lines into their habitat, there is a significant risk of entanglement likely resulting in death or injury leading to death. While there are no documented instances of entanglement at the Shelburne operations, the risk to species reach much farther than the immediate vicinity of the operation as debris or lost equipment may be carried large distances by storm surges.

Specifically there should be mitigation measures in place for Atlantic Right Whale and Leatherback Sea Turtle, both endangered species and protected under Canada's *Species at Risk Act*.

Does the farm proponent have the required permit to harm for any activities that take place in these species' critical habitat?

Evidence from old 0602 that new 0602 is unacceptable

As stated above, given the lack of information on the new 0602 site and the proponent's new farm plan, we can only base our full analysis on the performance and impact of the existing 0602 and assume increased impact due to the larger size, new boundary locations, and potential stocking of more fish.

Given the lack of information for the new 0602, it is unacceptable that the performance review for the old 0602 is not public and part of these consultations for transparent understanding of the testing and assurance that the site was meeting the minimum standards.

Lacking that, we can only assume the levels to be similar to those that resulted in an anoxic dead zone by 2008 in the old 0602. The sulphide levels in the old 0602 site climbed year after year as shown in the 2009 EIA Nova Scotia Government data presented. The average sulphide level at the old site was 637 µm based on three measurements taken on October 27, 2004. Ten months later, on August 25, 2005, three new sulphide measurements averaged 1509 µm. A year later three Sandy Point sulphide readings taken on August 2, 2006 averaged 2305 µm. In August, 2005, the average sulphide reading of 2305 µm meant that the loss of macrofauna at this Shelburne Harbor site had, on average, increased from about 55% to about 68% in just one year.

On July 11, 2007 three more sulphide readings were taken at Sandy Point with an average value of 6211 µm. This very high average sulphide reading not only went beyond the upper boundary of the Hypoxic A and Hypoxic B classifications, it represented a macrofauna loss exceeding 90%. Operations at Sandy Point continued for another entire year, through mid-2008 when there were two sulphide readings that exceeded 8000 µm at which point the site was fallowed.

The old site 0602 was finally closed in 2011, however, has shown that the site failed to remediate through fallowing. After two years with no production, sulphide levels were still hypoxic, toxins such as copper and zinc were still above regulatory levels, diversity of species on the bottom was still lower, and visible mats of bacteria still remained (pers comm. with Researcher Inka Milewski).

With the new 0602 site presented in this consultation, only 40 metres away from the old site we can safely assume that a similar trend in rapid formation of anoxic conditions will result in this site also. The area is clearly vulnerable to biomass overloading.

Local residents have documented other environmental degradation of the seabed and boulders during the years in operation of old site 0602, continuing after its closure. The once pebbly seabed was covered in places by a dense green fibrous mat and harbour boulders also blackened. This is clear indication that fecal matter and other fish wastes are transported beyond the boundaries of the cages also indicated by elevated sulphide levels measured at reference stations outside the cages during previous operations.

There has also been documentation that the proponent's aquaculture sites in Shelburne Harbor have released surface oil slicks into the harbor and debris, equipment and morts washed ashore from the operation.

No farm plan has been presented that would lead us to believe the new 0602 site would stay above the minimum levels required. There is also no evidence provided that the proponent has rehabilitated the old site 0602 area. Instead, the proponent seems to be merely moving away from the polluted and unproductive site having used up its carrying capacity and is continuing with exactly the same production model in an entirely new site.

In fact, the new 0602 is substantially bigger than the old 0602 allowing for more fish to be stocked in the farm and more area to be impacted. The new site will potentially produce several times the amount of biomass as well as more infrastructure and equipment needed. All of this will exacerbate the above problems experienced at the old 0602.

Does the administrator have evidence to believe that the above environmental impacts will be any more mitigated at the new 0602 site?

Other users of the public waters surrounding the proposed aquaculture operation

The new site 0602 operation application is for 20.5 hectares. This is significantly larger than the old 0602. As noted above, the current operation application is located much closer to the residential shoreline and, because of its greater length paralleling the shoreline and potential greater number of caged fish, the effects on other users will be increased.

The close proximity to the coast and residential properties is a substantive concern as during the operation of the previous 0602 site residents had already observed environmental degradation, and pollution from hazardous materials, including photographed oil slicks and debris, equipment, and morts washing ashore from the operation. There is no reason to think that these issues would not occur with the new 0602 site as they did with the old site, which was only 40 metres away and had a biomass much smaller than the potential biomass for this new 0602 site.

Users of the coast also will need to contend with the noise and smell of production, which can have significant impacts on enjoyment of the area and on property values.

Contribution of the proposed operation to community and Provincial economic development

Upon reviewing approvals given in 2016 and 2015 for lease renewals by NSFAD we note the economic contribution is taken into account for lease renewal approvals. Again, we argue that this is a new site and should be treated as such with an independent review panel. This is especially needed as the economic climate has changed and the proponent's promised contribution to the economy has gone unfulfilled. We can only assume the renewal will rely on economic data from the old 0602 site.

One of the most egregious aspects of this application for this new site by the proponent is their failure to follow through on the promised economic boon to the community. Much of the social acceptance received by the proponent during the initial consultations on salmon farming in Shelburne Harbour was based on a promised processing plant in a community in need of local jobs.

The proponent received a $25 million loan from the government to subsidize this planned processing plant. This never materialized and now the proponent is paying back $16 million. Shockingly, a full $9 million of taxpayer money was forgivable. Despite failing in their business plan, they have not been penalized.

The fish continues to be shipped to New Brunswick to be processed, where the bulk on the economic impact is realized.

Cost of Approving new site 0602

It is clear from the above analysis of the proposed site and the past performance of the proponent that the cost of allowing Kelly Cove Salmon to profit from the public waters of Nova Scotia is too high.

The old site 0602 is abandoned, leaving behind a dead zone, decreased diversity of macrofauna, and a plume of impact. The question remains: why is the proponent not continuing to use the old site?

Is the site no longer suitable? If not, why?

If the site is no longer suitable due to the waste build up and the anoxic environment, the proponent is not being held to account. Instead, they are moving on to a new unpolluted area that could be productive and profitable for another few years before it too becomes too polluted to sustain fish. This is the same concept as slash and burn agriculture.

Instead, it is the greater society and ecosystem that are bearing the costs.

On top of these externalized costs, while the company continues to make profit, the promised economic boon of jobs to the community has not been realized. In fact, they have left taxpayers with a $9 million unpaid loan. It seems folly to reward such proponents with a new site.

This site has not been assessed independently and the assessment and review information informing the administrator's decision can only be from the old 0602 site—the original assessment dates back to 2009 and any review of impacts since then have not been made available.

In closing, we ask that this site be considered by the government as a new site that must undergo an independent panel review to ensure proper and transparent examination of the ecosystem impacts, the cumulative impacts of continuing aquaculture in the harbour with expanded sites, and the economic costs and benefits projected and accrued by the proponent. It would be a concerning precedent to allow a site that is in a physically different location from the old site to be considered a renewal.

We look forward to your response to our comments and the queries in our letter.

Sincerely,

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References:

Bielmyer, G. K., Grosell, M., & Brixti, K. V. (January 01, 2006). Toxicity of silver, zinc, copper, and nickel to the copepod Acartia tonsa exposed via a phytoplankton diet. Environmental Science & Technology, 40, 6, 2063-8.

Burridge, L. E., Hamilton, N., Waddy, S. L., Haya, K., Mercer, S. M., Greenhalgh, R., Tauber, R., ... Endris, R. G. (2004). Acute toxicity of emamectin benzoate (SLICE®) in fish feed to American lobster, Homarus americanus. Aquaculture Research, 35, 8, 713-722.

Dean, R. J., Shimmield, T. M., & Black, K. D. (2007). Copper, zinc and cadmium in marine cage fish farm sediments: An extensive survey. Environmental Pollution, 145, 1, 84-95.

Lauer, M. M., & Bianchini, A. (2010). Chronic copper toxicity in the estuarine copepod Acartia tonsa at different salinities. Environmental Toxicology and Chemistry, 29, 10, 2297-2303.

Maharajan, A., Kumarasamy, P., Vaseeharan, B., Rajalakshmi, S., Vijayakumaran, M., & Chen, J. C. (2011). Effect of copper on morphology, weight, and chromosomal aberrations in the spiny lobster, Panulirus homarus (Linnaeus, 1758). Biological Trace Element Research, 144, 769-780.

Maharajan, A., Rajalakshmi, S., Vijayakumaran, M., & Kumarasamy, P. (2012). Sublethal effect of copper toxicity against histopathological changes in the spiny lobster, Panulirus homarus (Linnaeus, 1758). Biological Trace Element Research, 145, 2, 201-210.

Nylund, A., Hovland, T., Hodneland, K., & Nilsen, F. (1994). Mechanisms for transmission of infectious salmon anaemia (ISA). Diseases of Aquatic Organisms, 19, 2, 95.

Rooney, R. C., & Podemski, C. L. (2009). Effects of an experimental rainbow trout (Oncorhynchus mykiss) farm on invertebrate community composition. Canadian Journal of Fisheries and Aquatic Sciences, 66, 11, 1949-1964.

Vike, S., Nylund, S., & Nylund, A. (2009). ISA virus in Chile: evidence of vertical transmission. Archives of Virology, 154, 1, 1-8.

Waddy, S. L., Burridge, L. E., Hamilton, M. N., Mercer, S. M., Aiken, D. E., & Haya, K. (2002). Emamectin benzoate induces molting in American lobster, Homarus americanus. Canadian Journal of Fisheries and Aquatic Sciences, 59, 1096-1099.

Wiirsig, Bernd, and G. A. Gailey. (2002). Marine mammals and aquaculture: conflicts and potential resolutions. Responsible Marine Aquaculture. CAP International Press*, New York*. 45-59.

Wong, C. K., & Pak, A. P. (2004). Acute and subchronic toxicity of the heavy metals copper, chromium, nickel, and zinc, individually and in mixture, to the freshwater copepod Mesocyclops pehpeiensis. Bulletin of Environmental Contamination and Toxicology, 73, 1, 190-196.