

### ***General Comments***

If the report is intended to be a publicly available, scientific based document, it should be revised taking into account an adequate review of the literature as well as a more balanced approach to both literature and viewpoint. For instance, the Executive Summary contains an opinion on effects citing one particular expert. It should be noted that there are other (published) expert opinions, which do not concur with this opinion. Furthermore, it is not typical to express the selective viewpoint of any one expert in a conclusion-type statement. Therefore, available literature should be reviewed more carefully, particularly with respect to providing the background for an evidence-based opinion in the Executive Summary.

The report should also provide a better appreciation of the literature in relation to the potential effects of oil spills. It appears only a few outdated references were provided, which are not sufficient from a scientific perspective.

Throughout early discussions, the FFAW provided advice on the timing of seismic programs to aid in conflict avoidance for all parties. The FFAW had meetings and conversations with leaders in the various fishing fleets in the area to compromise on the “most ideal” timing for this Program. The timing agreed upon was in the fall season, due to concerns of sensitive spawning and migration patterns of various species, and presence of fishing gear in the area. Timing of such a program is paramount, especially on the West Coast, where there is such a diverse fishery. However, fish harvesters were given the understanding that is seismic program would be brief, “12 days”, to be precise. The EA portrays a 20-30 day program, with the potential to be up to 75 days. This change in temporal boundaries of the project was not communicated to the FFAW, or the fish harvesters. This expansion of overall length of the program causes concern for fish activity and sensitive areas and periods for various species.

In 2007, NWest Energy representatives met with the FFAW to discuss plans for the 2008 season. The FFAW continued communications with these representatives and provided advice on the best possible timing of seismic activity in the West Coast region. It was agreed upon for the proponents to host dedicated fisheries consultations in several of the communities on the West Coast. These meetings were recommended to occur as the program approached it's start date so the proponents could provide more specific details.

A useful tool to enable effective operations for the seismic vessel would be the use of an escort vessel. Escort vessels will provide a unique vantage point for the seismic operations; with support in communicating with fishing boats and locating and identifying fixed gear.

Section 5.1 of the Scoping Document states that “*The EA will consider the potential effects of the proposed seismic program activities within spatial and temporal boundaries that encompass the periods and areas during and within which the project may potentially interact with, and have an effect on, one or more VEC.*” Table 6.7 (page 185) in Section 6.7.7 of the EA states that “*the Project will not interact with lobster nursery areas due to the considerable distance of survey areas. It is unlikely that the 3D surveys*

*will take place in June and July when larvae are in the water column due to the amount of fishing activity in the offshore.”* This is an inaccurate statement given the fact that the lobster nursery area falls within the Project Area (10 km buffer), as identified on Figure 4.1 on page 31. Also, the temporal scope of the project (Section 4.4.2, page 32 of the EA) is from 2008-2015 from May to December of each year. The timing of activities could interact with, and have an effect on, lobster during both the larvae stage and the moulting stage which occurs from mid July to early September during this eight-year period. This should be addressed.

### *Specific Comments*

**Page 13, Section 2.34 and Page 14, Section 2.35** – What is the timing of wellsite and VSP surveys. The timing was provided for 3-D and 2-D Seismic Surveys.

**Page 31, Figure 4.1** - According to this figure, the project area with the 10 km buffer required for line change, will result in the vessel entering nearshore shallow areas where the inshore lobster fishery occurs. It will also overlap the North Head Lobster nursery area (page 96), which is presently closed to fishing for conservation purposes. Given the closeness of this survey to the North Head area, it is likely that timing restrictions may be placed on the survey. The Western SEA highlights the North Head Lobster Area and Trout River.

Mitigations, to avoid this area during sensitive time periods (June-July when larvae are most abundant in the water column or during moulting) and to ensure that the seismic sound source is minimized when transiting this area, are strongly recommended.

**Page 33, Table 4.3; Page 60, Section 5.2 - Valued Environmental Component** - As per the *Canadian Environmental Assessment Act (CEAA)*, the term "Valued *Ecosystem* Component" is used for the acronym VEC.

**Page 42, Section 5.1.5 Meteorology and Climate** - The report relies on the SEA 2005 for their description of winds, waves, and visibility. They used wind and wave hindcast data from a grid pt off the Port aux Port Peninsula, as the SEA had done, although their area of interest is further to the NE. Since the SEA was prepared the MSC50 hindcast data set has become available (contact Atlantic Climate Centre). The MSC50 has wind and wave hindcast information at a higher resolution of 0.1 degree or about 11 km. It would probably be advisable to look at that.

It would have been preferable to see presentation of some coastal station data for winds, and mention that the AES40 winds are considered representative of one-hour averages at 10 m (standard observations are 10 minute means or less, and include a gust). No mention of local effects near the coast.

Section 5.1.5.3 on Visibility and Fog omits mention of the low visibility in winter due to snow streamers, and says best shipping and flying weather is between Dec through June. This is contrary to the information presented in the SEA Fig 2.16.

**Page 53, Section 5.1.6.2 Waves** - This section states that storms most often occur between late-August and October. Perhaps they are referring to tropical cyclones although that was not stated. In fact winter storms produce high winds and waves more often than tropical cyclones. The word southeast in the last sentence of the first paragraph in 5.1.6.2 should have been southwest, and as in the SEA, the sentence should indicate that SW to NE is referred to in a clockwise sense, for the directions from which swell would come.

**Page 54, Section 5.1.6.5** – It is stated that future geophysical survey activity after 2008 could take place anytime, depending on the situation at hand. It was previously stated that seismic surveys would occur between May to December. Please clarify the scope.

**Page 55, Figure 5.12** – Current Meters are included in the legend but not identified on the figure.

**Page 68, Section 5.2.2 Marine and Migratory Birds - Coastal Waterfowl**. It should be noted that the Harlequin Duck is listed as a species of special concern, not a species of concern.

**Page 72, Para. 5** - “*In 2002, a new zone was established in 4R to protect the spawning stock.*” A figure showing the location of this zone in relation to the project area should be provided for comparison purposes.

**Page 73, Para. 4** - A reference should be provided for the information on white hake.

**Page 83, Para. 6** - The reference made by fishers, during consultations, to the North Head lobster nursery area (LFA 13B) reinforces the need to apply mitigations to avoid this area during sensitive times and ensure that the seismic sound source is minimized when transiting this area.

**Page 90, Section 5.2.7 Species at Risk** - In the section on Ivory Gull, its status is, as a species of special concern on Schedule 1 of the *Species at Risk Act* should be noted. It should also be noted that the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has listed the Ivory Gull as endangered.

**Page 124, Para. 1** - There was also a moratorium during the years 1994 to 1996.

**Page 124, Para. 1** - To clarify, the cod fishery in this area is nearshore, not offshore (gillnets and longlines). The stratified random surveys (DFO-R/V survey, sentinel survey) cover all depths deeper than 40 m (sentinel) and 100 m (DFO-R/V) in the Gulf.

**Page 124, Figure 5.43** - The data source is missing and should be provided.

**Page 124, Sentinel Surveys** - These are not surveys *per se*; sampling is carried out while undertaking commercial fishing. Also, the figure number referenced in this section (Figure 5.45) is incorrect; it should be Figure 5.44.

**Page 125, Research Vessel Surveys** - This section is confusing as it discusses a mixture of DFO groundfish research surveys, fixed gear sentinel surveys, and mobile gear sentinel surveys. These should be separated. For clarity, DFO suggests placing the fixed gear sentinel text in section 5.3.2.1 Sentinel Surveys and renaming it: Fixed Gear Sentinel.

**Page 125, Research Vessel Surveys** - The DFO Groundfish Research Survey (referenced in the first two sentences of the paragraph) is completely independent of commercial activities and should not appear in the section 5.3.2 Commercial Fishery Surveys. The information provided does not outline the purpose of this specific survey (i.e., where it is carried out, the species being studied, etc.). In fact, the information provided is insufficient to adequately evaluate the actual impacts of the project on DFO groundfish research surveys.

**Page 125, Research Vessel Surveys** - Please note that there is also a Fisheries Science Collaborative Program (FSCP) crab survey in 4R, which is conducted jointly with industry and DFO. These are fixed-gear crab pot locations and the gear is generally set for a 24 hour period. Each management area is usually completed within 4 days. Although the survey time is variable, it generally takes place within the period Sept. 1 – Oct. 15 for any given year. Maps showing the set locations are attached for your information.

**Page 126, Figure 5.45** - There may be a problem with manipulation/conversion of fishing tow data, possibly during conversion from minutes to fraction of degrees, as they appear as five separate horizontal bands in 4R. It should reflect a continuous sampling area.

**Page 127, Snow Crab Survey** - It would be beneficial to plot fishing positions of the snow crab survey similar to the previous map (Figure 5.45).

**Page 127, Halibut Tagging** - The size of juvenile fish (less than 81 cm) being tagged should be provided as well as the minimum legal size of capture. In addition, since 2007, there has also been a tagging program for commercial size halibut.

**Page 127, Halibut Tagging** - It would be beneficial to plot tagging position sites as well as the number of fishermen involved in the project and the number of halibut tagged at each site. The time of year when tagging activities were undertaken and the scientific rationale for the tagging program, etc., should also be provided.

**Page 127, Halibut Tagging** - The meaning/intent of the last sentence is uncertain. This section should be revisited and updated accordingly.

**Page 127, Cod Reproductive Survey** - The first sentence should be re-worded to read, “*Two otter trawlers must perform fishing tows to conduct...*”

**Page 127, Aquaculture** - According to Figure 5.46, there are *two* blue mussel sites: one at Goose Arm in the Bay of Islands *and another at Piccadilly Head on the northern side of the Port au Port Peninsula*. This should be revisited and revised.

**Page 127, Aquaculture** – The blue mussel farm identified in Goose Arm and the three Atlantic cod sites identified in Bonne Bay are not currently active. The Atlantic salmon farm identified in Daniel’s Harbour is a land-based salmon hatchery.

**Page 127, Marine Traffic** – It is important to note that vessels may move outside these shipping lanes when ice is present. There are also a lot of local vessels that do not travel towards the Great Lakes in the Gulf. It is worth mentioning that many small fishing boats do not have Vessel Monitoring Systems (VMS). This section should be revisited and updated accordingly.

**Page 132, Section 6.1 Marine Birds and Migratory Birds** - In this section, it could be noted that the ramping up procedures used for marine mammals will also likely aid in reducing any effects on marine birds near the vessel during the survey.

**Page 133, Section 6.1.2 Potential Interactions and Issues** - In this section, it is noted that coastal and marine birds could be affected by a spill due to an accident involving the survey vessel. CWS is also concerned about the potential for dielectric oil to be released from the streamer, and this should be added to this section. Every effort should be taken to ensure that no oil leaks occur and that a contingency plan in case of oil leaks is prepared. If dielectric oil is dispersible, then supplies of dispersants with application machinery should be available and an approved dispersant application plan should be put into place prior to any seismic activities.

**Page 138, Section 6.1.6 Monitoring and Follow-up** - It is stated that the proponent will have an Environmental Observer on board to monitor marine birds. This section indicates that the protocol followed is a version from 2005. Appendix C contains the most recent version of the protocols from 2006. The wording in Section 6.1.6 should be changed to reflect this. These protocols are a work in progress and we would appreciate feedback from the observers using them in the field. A guide sheet to the pelagic seabirds of Atlantic Canada is available through CWS in Mount Pearl. A report of the seabird monitoring program, together with any recommended changes, is to be submitted to CWS on a yearly basis.

**Page 140, Para. 1** - For future surveys (between May-December until 2015), in addition to consultations with fishers, the proponent should also contact DFO in order to establish an appropriate seismic survey window to minimize conflicts with commercial fisheries and DFO sentinel and research vessel surveys.

**Page 141, Physical Effects** – To follow are a couple of examples, which reinforce the problem of apparent selective interpretation of literature and viewpoint. On Page 150, it states that in a preliminary study carried out by Christian *et al.* (2003) on the effects of seismic on snow crab eggs, a 1.6% mortality was noted. This seems somewhat trivial; however, mortality was not the important point in this instance. The omission was the concept of major differences in egg development rate, demonstrating that it could be an important endpoint to consider in a more comprehensive study. It was noted (page 146) in a study by Payne *et al.* (2007), in which some sub-lethal effects were noted in lobster, that the animals were exposed at a few meters. This may seem somewhat irrelevant for the non-expert, since in the real world, distances are known to be much greater. The

important omission in this instance was not including the measured pressure levels where some sub-lethal effects were observed at levels that were relatively low but could, depending on gun size, reach hundreds of meters in the water column.

**Page 146** – It is mentioned that tank exposures have constraints. Other references, which were not included, have noted that the tank approach is the only economical and practical way of obtaining an understanding of dose-exposure relationships. Perhaps unknown to the authors is the importance of tank experiments, which at a very low cost have demonstrated little effect on snow crab; the species expected to be in high abundance within the area to be surveyed. If any significant effects had been observed in the tank experiments, policy recommendations could have been markedly different.

**Page 154** - Regarding monitoring for effects on fish and shellfish, a strong case cannot be made at this time for monitoring effects on snow crab or other non-commercial species, which may be present in the area. An important consideration in this regard is the relatively deep water in the area. However, this could change if new information on effects become available or the surveys are extended into shallow lobster habitat. Therefore, DFO requests that the program be reviewed on an annual basis throughout the expected timeframe of the seismic program.

*References:*

Christian, J.R., Mathieu, A., Thompson, D.H., White, D., and Buchanan, R. 2003. Effect of seismic energy on snow crab (*Chionoecetes opilio*). Environmental Research Funds Project No.144. Calgary. 106p.

Payne, J.F., Andrews, C.A., Fancey, L.L. Cook, A.L., and Christian, J.R. 2007. Pilot study on the effect of seismic air gun noise on lobster (*Homarus americanus*). Can. Tech. Rep. Fish. Aquat. Sci. 2712: v + 46.

**Page 152, Para. 1 and Page 177, Para. 3** - The statement that accidental spills will not occur because solid streamers will be used is not entirely consistent with the statement on page 22, that a vessel using solid streamer technology is *preferred*. Please revisit and clarify.

**Page 159, Bullet 4** - Reference is made to using a qualified Marine Mammal Observer; however, the last paragraph indicates that a trained Environmental Observer will watch for marine mammals. Such monitoring should be conducted using a set of consensual guidelines with the object of providing the best possible data, disseminated to the most researchers (e.g., DFO, CWS, MUN). Results of this monitoring should be made available in digital format, preferably.

**Page 159, Bullet 8** - During line changes, reduction to a single energy source is preferred over complete shut down, especially as ramp up/soft start will not be required, as stated. This is a common mitigation for marine mammals, sea turtles and fish and should be employed during this program.

**Page 160, Para 1** - DFO agrees with the mitigation measure proposed during line changes that the seismic array be powered down to a single air source to warn marine mammals of the presence of the seismic vessel.

**Page 176, Para. 5; Page 177, Para. 6; Page 178, Para. 4; Page 180 Table 6.6** - See previous comment regarding use of dedicated Marine Mammal Observers vs. Environmental Observers.

**Page 177, Para. 6** - “*If a concentration of marine mammals is observed in a particular area, the survey can shift to another part of the survey area until the concentration has moved away.*” Is this mitigation an actual commitment by the operator? If this is the case, the wording should be changed to “*will shift,*” otherwise the statement has no merit and should be removed from the text.

**Page 178, Para. 1** - Although the probability of vessel collisions with endangered species is considered low, the potential for ship strikes by the seismic source, guard, or any support vessels will certainly exist. Please note there are several cases of large whale ship strikes with the ferries between Cape Breton and Port aux Basques, so not all marine mammals avoid vessels successfully. The *endangered* blue whale is sighted regularly in the proposed operations area so ship strikes remain a concern and necessitate extreme vigilance by the operators. This cannot be overstated.

**Page 178, Para. 4** - The last two sentences of this paragraph should be edited to include observations of sea turtles *or marine mammals*.

**Page 180, Table 6.6** - DFO requests that it be notified if dead or distressed marine mammals or sea turtles are spotted and particularly in the event that sea turtles or mammals are injured or killed by project activities.

**Page 183, Para.2** - The North Head lobster nursery area is *not* well beyond the influence of physical harm to lobster larvae from the Project, as stated. The proponent should make every effort to avoid this area (which may overlap during line changes) during the most sensitive time periods for this life stage.

**Page 188, Para.2; Page 190, Para. 3; Page 192, Table 6.8; Page 198, Table 9.2** - Previous coordination between offshore oil and gas operators and DFO has proved to successfully mitigate the potential for overlap between offshore oil and gas activities and DFO/Industry research surveys. To prevent gear conflicts and minimize disruption of natural fish behavior and/or distribution prior to and during research surveys, DFO-NL Region has requested that seismic operators maintain a buffer of 30-40 km around research survey set locations for 7-10 days prior to arrival of DFO research vessels. It is requested that the Department be notified of survey locations and project timing as soon as they are known.