

**Amendment of Environmental Assessment
of Multiklient Invest Newfoundland
Offshore Seismic Program, 2018–2023**

Prepared by



Prepared for

Multiklient Invest AS

and

TGS-NOPEC Geophysical Company ASA

**10 February 2020
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Amendment of Environmental Assessment of Multiklient Invest Newfoundland Offshore Seismic Program, 2018–2023

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1.0 Introduction

This document is an Amendment of the Environmental Assessment (EA) of Multiklient Invest Newfoundland Offshore Seismic Program, 2018–2023 (LGL 2018a), and the associated EA Addendum (LGL 2018b) and two EA Updates (LGL 2018c, 2019). The proposed change to the Project activities assessed in this Amendment relates to a mitigation measure intended to decrease the potential for MKI’s seismic surveys to interfere with the collaborative Fisheries and Oceans Canada (DFO) and Fish Food and Allied Workers (FFAW)/Unifor post-season snow crab survey.

2.0 Modification to Mitigation Measure

As indicated in Tables 5.1 (Section 5.5, Mitigation Measures) and 5.19 (Section 5.9, Mitigation Measures and Follow-up) of the Multiklient Invest (MKI) EA (LGL 2018a), MKI proposed a 7-day/30-km temporal/spatial avoidance mitigation for seismic operations in the vicinity of the snow crab survey stations associated with the collaborative DFO/FFAW\Unifor post-season snow crab survey. MKI qualified this mitigation with the following text:

“DFO does not indicate an official spatial and/or temporal buffer mitigation method for seismic operations in the vicinity of survey stations. MKI will work cooperatively with FFAW\Unifor and DFO in an effort to avoid survey stations prior to their sampling to the best extent possible.”

MKI proposes to remove the specific ‘7-day/30-km’ temporal/spatial buffer from the mitigation protocol. The rationale for the change is that the buffer is considered operationally impractical based on MKI’s recent experience in the Project Area. As a result, MKI instead commits to working cooperatively with FFAW\Unifor and DFO through communication channels to avoid snow crab survey stations prior to their sampling, to the best extent possible. MKI has consulted with the FFAW\Unifor (on 4 February 2020) on this proposed change to the temporal and spatial avoidance mitigation. The representative of the FFAW\Unifor acknowledged MKI’s description of the rationale behind the proposed modification to the mitigation measure.

3.0 Effects Assessment

Effects on the Fisheries Valued Environmental Component (VEC), specifically the post-season snow crab survey, have been reviewed based on the proposed Project amendment. It is essential that detailed temporal and spatial information regarding both MKI seismic surveys and the post-season snow crab survey be exchanged amongst the various parties. This will allow the establishment of a temporal and spatial separation plan, as has been successfully done with the FFAW\Unifor and DFO during MKI surveys in recent years. The critical aspect of the mitigation

measure is the ongoing communication between MKI and the snow crab survey collaborators, the FFAW\Unifor and DFO.

As indicated in the EA (LGL 2018a) and associated EA Updates (LGL 2018c, 2019), MKI proposed to conduct both 2D and 3D seismic surveys in the Newfoundland Offshore Project Area. The temporal and spatial avoidance mitigation included in these documents was relevant to the potential effects of two Project routine activities on the Fisheries VEC: (1) underwater sound; and (2) vessel/equipment presence (see Table 5.5 in Section 5.7.5 of EA [LGL 2018a]). Underwater sound could potentially affect the behaviour of snow crab, and vessel/equipment presence could potentially result in physical contact with the snow crab fishing gear. These effects could affect the snow crab survey results.

As indicated in Section 6.2 (Fish and Fish Habitat) of the 2019 MKI EA Update (LGL 2019), Morris et al. (2018) conducted a two-year (2015–2016) Before-After-Control-Impact (BACI) study examining the effects of 2D seismic exploration on catch rates of snow crab (*Chionoecetes opilio*) along the eastern continental slope of the Grand Banks of Newfoundland. The principal aim of the study was to provide useful information to help resolve resource conflicts between two marine industries, commercial fishing and seismic exploration. Both industries were consulted during the study design phase regarding a suitable study area and methodology. The study included efforts to make the experimental design as realistic as possible, from both harvester and seismic operational perspectives. Catch surveys were conducted by fishing industry harvesters using the same standard industry survey methods as those employed for the post-season snow crab survey. The airgun array used during both years of the study was operated from a commercial seismic exploration vessel. Overall, the findings of the study indicated that the sound from the commercial seismic survey did not significantly reduce snow crab catch rates in the short term (i.e., days) or longer term (i.e., weeks) in which the study took place. Both spatial and temporal controls were implemented, which bolsters the rigor of the study. While this field experimentation was unable to distinguish small changes in snow crab catch rates, the use of the BACI design allowed the potential effects to be placed in relative context of other sources of variation, spatial and temporal.

For this particular study, the researchers attribute the natural temporal and spatial variations in the marine environment as a greater influence on observed differences of catch rates of snow crab between control and experimental sites.

The potential effects of these two routine Project activities on the Fisheries VEC were assessed in Sections 5.7.5.1 (Sound) and 5.7.5.2 (Vessel/Equipment Presence) of the EA (LGL 2018a). Given the results of Morris et al. (2018) and other invertebrate studies (e.g., Carroll et al. 2016), and with the implementation of mitigation measures, residual effects on the Fisheries VEC associated with exposure to sound from the Project during 2D and 3D seismic surveys were predicted to range from *negligible to low* in magnitude for a duration of *<1 month to 1–12 months* over an area of *<1 to 1001–10,000 km²* (see Table 5.6 in Section 5.7.5.2 of EA [LGL 2018a]). Based on these criteria ratings, the *reversible* residual effects of underwater sound on the Fisheries VEC were

predicted to be *not significant*, and the level of confidence associated with this prediction was *low* to *medium* (see Table 5.7 in Section 5.7.5.2 of EA [LGL 2018a]) given the scientific data gaps.

With application of mitigation measures, the residual effects on the Fisheries VEC associated with vessel and equipment presence were predicted to have a *negligible* to *low* magnitude for a duration of *<1* to *1–12 months* over a geographic area of *<1* to *11–100 km²* (see Table 5.6 in Section 5.7.5.2 of EA [LGL 2018a]). Based on these criteria ratings, the *reversible* residual effects of vessel/equipment presence associated with MKI’s seismic program on the Fisheries VEC were predicted to be *not significant*, and the level of confidence associated with this prediction is *high* (see Table 5.7 in Section 5.7.5.2 of EA [LGL 2018a]).

In consideration of the proposed change to the temporal and spatial avoidance mitigation, all predictions of significance of the residual effects of underwater sound and vessel/equipment presence on the Fisheries VEC remain the same. All proposed mitigation procedures intended to minimize the potential effects of routine Project activities associated with MKI’s seismic surveys are discussed in detail in Sections 5.5 and 5.9 of the MKI EA (LGL 2018a).

4.0 Conclusion

As indicated above, scientific studies suggest that invertebrate commercial catches, including those for snow crab, are not affected by exposure to seismic airgun sound. The proposed removal of the specific ‘7-day/30-km’ buffer from the temporal/spatial avoidance mitigation for the post-season snow crab survey does not change any of the EA conclusions. The essential aspect of the temporal/spatial avoidance mitigation is ongoing communication between MKI and the snow crab survey collaborators, FFAW\Unifor and DFO. MKI is committed to ongoing communication. There will be *no significant* residual environmental effects resulting from this amendment.

5.0 Literature Cited

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