

Notice of Determination

This notice of determination is being issued by Parks Canada under the *Impact Assessment Act*. Parks Canada has decided that the project is not likely to cause significant adverse environmental effects.

The invasive alien insect species Hemlock Woolly Adelgid (HWA) has been detected in Kejimikujik. This Detailed Impact Assessment uses the Resist-Accept-Direct (RAD) decision framework to examine the alternatives available to Parks Canada, in collaboration with the Mi'kmaq, to address the HWA infestation. Comparing the risks and benefits of the default Accept/Adapt (or do nothing) approach against the risks and benefits of active management using a combined Resist and Direct approach results in the following findings.

No intervention

Hemlock forests which are not actively managed are expected to undergo significant changes in structure and function as a direct result of the HWA infestation. Because of the large scale of hemlock forest, the limited availability of options to control HWA, the scale at which available active management interventions can be applied and the length of time it would take for management options to take effect, this is the likely outcome for most of the hemlock stands in Kejimikujik.

The “no intervention” alternative is anticipated to result in long-term, significant adverse residual effects on eastern hemlock, non-target invertebrates, forest birds that are associated with hemlock stands, and mycorrhizal networks characteristic of hemlock stands. Although tree planting and natural regeneration would help mitigate the expected loss of trees, it would not provide the same habitat or ecosystem services as those provided by hemlock. Species that are dependent on hemlocks for all or part of their life cycle may suffer population declines, and there could be a shift in the composition of floral and faunal communities away from rare or specialized species/communities, and in favour of more general species/communities.

Long-term residual impacts are expected on the health of the Mi'kmaq and visitor access and enjoyment in a “no intervention” alternative. The expected loss of hemlocks will make it increasingly difficult for the Mi'kmaq to find hemlock trees and associated plants to harvest and will change the aesthetics of the landscape known to visitors. Natural regeneration and planting using native tree species would help mitigate the expected loss of the tree canopy, however the ecosystem services provided would not be the same as those provided by hemlocks.

Chemical treatment

Resisting the effects of HWA infestation through the proposed application of chemical treatment in priority stands will allow hemlock to persist on some of the landscape and will help to maintain the characteristic structure and function of hemlock forest within treated stands. The maintenance of priority hemlock stands will serve as a mitigation against potential cascading effects on other species attributable to forest changes from HWA. No long term, significant adverse residual effects are expected under the chemical treatment alternative once mitigation measures are applied for eastern hemlock, non-target invertebrates, forest birds that are associated with hemlock stands, and mycorrhizal networks characteristic of hemlock stands. The intent of the proposed chemical treatments is to use

insecticides to lower HWA numbers to levels that enable the short-term survival of priority hemlock stands until the eventual establishment of a viable predator population through biocontrol. Treated stands are expected to maintain tree health in the short-term and continue to provide micro-climate conditions characteristic of a hemlock ecosystem, which in turn provides habitat for associated flora and fauna. Bees and other pollinators may be exposed to imidacloprid that is taken up into the pollen and nectar of flowering plants growing directly adjacent to treated hemlocks, however concentrations are below levels known to cause bee colony-level effects. The use of imidacloprid may result in a short-term negative effect on soil arthropod species richness and abundance, however, long term impacts are not expected.

No long term, significant adverse residual effects are expected on the health of the Mi'kmaq or visitor access and enjoyment. Hemlock trees in priority stands will be available for use by Mi'kmaq if they wish to harvest from treated stands. Clear identification and communication of which trees are treated will give Mi'kmaq choice as to whether they use those trees or not. Potential adverse effects to visitor experience will be mitigated through timing of activities to avoid peak visitor season and through public information and education. Parks Canada will educate the public about the HWA infestation and share information about its collaborative efforts with the Mi'kmaq to manage HWA infestations. Hemlock trees in priority stands will continue to contribute to the park's character and visitor enjoyment.

Biocontrol

The release of biocontrol agents is an alternative that also aims to direct change, but over a longer period of time- returning balance to the forest ecosystem where HWA and hemlock can coexist. Biocontrol agents have been released in northeast parts of the US over the last several years, resulting in 20-years of research and monitoring data being available to inform this project. At a local level, research led by the Canadian Forest Service is in the preliminary stages. The Hemlock Woolly Adelgid Management Plan for Canada identifies biological control as a critical tool for long term management of HWA in Nova Scotia.

No long term, significant adverse residual effects are expected from the release of biocontrol agents once mitigation measures are applied for eastern hemlock, non-target invertebrates, forest birds that are associated with hemlock stands, and mycorrhizal networks characteristic of hemlock stands. The proposed release of biocontrol agents is a long-term, landscape-scale active management strategy that is expected to contribute to the long-term persistence of flora and fauna associated with hemlock forests by controlling HWA to levels that support the continued persistence of hemlock trees within and beyond the borders of Kejimikujik. There is potential for non-native parasitoids to be inadvertently collected when bringing over *Leucotaraxis* silverflies from the West coast, however the application of mitigation measures minimizes this risk to negligible levels. Risk of hybridization with a native *Laricobius rubidus* species is negligible based on species distribution. The release of biocontrol agents is expected to reduce the dependence on insecticides by establishing a predator-prey relationship that keeps the HWA population at a level that is not detrimental to eastern hemlock.

There are no identified significant adverse residual effects of biocontrol on humans. This treatment alternative is expected to contribute to the health of the Mi'kmaq, and visitor access and enjoyment by controlling HWA to levels that support the continued persistence of hemlock at Kejimikujik.

The persistence of hemlock in the ecosystem will have a cascading, positive effect on native flora and fauna at Kejimikujik. The proposed release of biocontrol agents is a long-term, landscape-scale active management strategy that is expected to have positive impacts on hemlocks that will extend within and beyond the borders of Kejimikujik once biocontrol populations become established and self-sustaining.

Integrated Pest Management

The application of an integrated pest management strategy that incorporates both chemical treatment and the release of biocontrol agents is expected to have the most positive impact on the ecological and cultural valued components identified. Chemical control will help bridge the gap between the current level of the HWA infestation and the establishment of a viable biocontrol agent. Biocontrol will reduce the dependence on insecticides by establishing a predator-prey relationship that keeps the HWA population at a normal population level that does not result in widescale mortality of eastern hemlock.

Public and Indigenous Review

Comments on the draft DIA Amendment were received from the public and government departments. The feedback received was supportive of the project and included editorial comments, recommendations of studies to include in the analysis, and clarification of biocontrol protocols. This feedback has resulted in additional resources included in the DIA Amendment, with no changes made to the project itself.

The Mi'kmaq of Nova Scotia provided a letter to Parks Canada with their input and feedback on the draft DIA Amendment. Their recommendations included watercourse setbacks, considerations for pollinators and Species at Risk, and that soil drenching be avoided. Although there was some initial concern over the mixing of Xytect 2F and Starkle 20SG, the Mi'kmaq agreed to proceed with the proposed tank mixing following clarification and guidance provided by the Mi'kmaq Forest Advisory Council. The KMKNO recommendations have been incorporated into the DIA Amendment. Parks Canada will continue to collaborate and share information and decision making with the Mi'kmaq of Nova Scotia.

Considering implementation of mitigation measures outlined in the DIA Amendment, the project is not likely to cause significant adverse environmental effects to the valued components identified.

To request a copy of the Detailed Impact Assessment Amendment report, contact:

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