Summary of inventories of the biophysical environment carried out by CIMA+ between 2022 and 2025

Inventory Type	Campaign	Date	Inventory Area	Type of statement	Objectives of the inventory	References[1]
Physical environment						
Water environment	2022	October 24 to 27, 2022	Laniel (Kipawa River)	Drone survey of the river at flows of 10 m^3/s and 15 m^3/s.	Obtained orthomosaics of the river. To allow the characterization of the river by photointerpretation.	
	2022	July 11 to 15, 2022 and May 15 to 26, 2023	Laniel and South Onimiki (Gordon Creek)	Active search for watercourses in the inventory area, planned according to the available databases. Biophysical characterization of watercourses by homogeneous segment. Delimitation of the shoreline by the MELCCFP biophysical method (2022).	Watercourses characterization: segmentation of watercourses according to flow facies and substrate composition. Delimitation of the shoreline for all the watercourses.	Aide-memoire form for the identification and delimitation of water environments (MELCC, 2022a) Aide-memoire methods for delimitation of shorelines (MELCC, 2022b) Aide-mémoire on methods for determining the shoreline (MELCC, 2022c) Explanatory note on the shoreline line: The expert botanical method (MELCC, 2022d)
	2024	August 14 to 21, 2024 September 10 to 16, 2024	Onimiki North	Active research for watercourses in the inventory area, planned according to the available databases. Biophysical characterization of watercourses by homogeneous segment and in some cases with the help of cross-sections. Delimitation of the shoreline by the MELCCFP biophysical method (2022).	Watercourses characterization: segmentation of watercourses according to flow facies and substrate composition. Delimitation of the shoreline for all of the watercourses. The information was collected to plan and design the culverts end bridge that will be needed on the road to all the facilities (dikes, dam, water intake and canals to be excavated).	
	2024	October 21 to 25, 2024	Laniel (Kipawa River)	Drone survey in 4 sectors (2 rapids, river, Great Falls) at flows of 15 m^3/s, 25 m^3/s and 50 m^3/s	Produce orthomosaics photos and videos of the4 targeted sectors. Provide visual support during project presentations at different flow rates. To allow the characterization of the river by photointerpretation.	

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Inventory Type	Campaign	Date	Inventory Area	Type of statement	Objectives of the inventory	References[1]
	2025	July 15 to 18: Characterization of the biophysical environment September 23 to 25: characterization of the biophysical environment and electrofishing	North Onimiki (two streams in the lower reaches of Lake Thiriot: one that is unnamed and Lost Creek)	Drone survey and characterization of watercourses by homogeneous segment. Additional data for characterizing the biological environment. Including, but not limited to: • Aquatic grass beds • Riverside wetlands • Potential spawning or breeding ground • Insurmountable obstacles for fish • Electrofishing	Characterize the two watercourses whose flow rates will be affected by the construction of the Onimiki North power plant. These watercourses flow through Opemican National Park. It is therefore necessary to ensure that ecological flow rates are maintained and that the biodiversity of the natural environments in the park is preserved.	
Water quality	2022	October 13 to 22: *In situ physical chemistry*	Laniel and South Onimiki sector (Kipawa Lake, Mill Lake, Tee Lake, Jadot Lake, Pike Lake, Ottawa River)	10 stations: *in situ* physical chemistry	Physicochemical and biological evaluation of the water. Document the current condition of water bodies and watercourses that may be affected by the proposed work.	Sampling Guide for Environmental Analyses, Book 1: General (MELCCFP, 2023) Sampling Guide for Environmental Analyses, Book 2: Sampling of Liquid Discharges (MELCCFP, 2009) Monitoring the Quality of Rivers and Small Streams (Hébert and Légaré, 2000) Conservation Methods for Surface Water Sampling – DR-09-10 (CEAEQ, 2012) Quality criteria for the prevention of contamination of water or aquatic organisms (MELCCFP, 2024c)
	2024	June 16 to 18: *In situ* physicochemistry August 14 to 20: *In situ* physicochemistry and physicochemical analyses September 10 to 15: *In situ* physicochemistry and physicochemical analyses (suspended sem only) and bioindicators	Onimiki North and Onimiki South (Pike Lake)	12 stations (lakes and rivers) (10 stations - Onimiki North and 2 stations - Onimiki South)		
	2025	August 17 to 22: *in situ* physicochemistry and physicochemical analyses October 6 to 9: *in situ* physicochemistry, physicochemical analyses, and bioindicators	North Ominiki (Lake Kipawa, MacAdam and Dorval bays as well as a site southwest of l'île aux Fraises, canal intake channel downstream from Lake Thiriot)	4 stations: *in situ* physicochemistry and physicochemical analyses 3 stations (Lake Kipawa): bioindicators	Establish the ecological status of Lake Kipawa in these areas Analyze water quality based on the following indicators: total phosphorus, chlorophyll a, and suspended solids. For the canal's intake channel only, also analyze mercury and dissolved organic carbon.	

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Sediment quality	2024	September 10 to 15: physicochemical analyses	Onimiki North and Onimiki South	14 stations (10 stations - Onimiki Nord et 4 station - Onimiki Sud)	Determine the level of contamination for the sediments in place if they are excavated as part of the work (soil management). Assess the impact on water quality and fish habitat quality if sediment is disturbed by the work.	
Soundscape	2025	October 6 to 9	Onimiki South	Installation of 3 sound level meters	Data collection to establish the existing soundscape. This data will be needed when modeling noise levels for the construction and operation phases, among others.	
Biological environment						
Identification, delimitation and characterization of wetlands and terrestrial environments	2024	August 14 to 21, 2024 September 10 to 16, 2024	Onimiki North and Onimiki South	The study area was characterized using the method proposed in the guide Identification and delimitation of wetlands in southern Quebec (Lachance et al., 2021). Thus, 252 plots of vegetation were distributed in the inventory sectors. Transects spaced 50 m apart were used to walk through areas where the study area was wider in order to walk the entire site.	Characterization, identification and delimitation of the wetlands and uplands. Identify the presence or absence of SPR and IASS.	Identification and delimitation of wetlands in southern Quebec (Lachance et al., 2021)
Inventories of Plant Species at Risk (SPRs)	2024	August 14 to 21, 2024 September 10 to 16, 2024	Onimiki North and Onimiki South	Was carried out simultaneously with the wetland and terrestrial characterization survey.		Inventory of Plant Species at Risk in Quebec (MELCCFP, 2022)
Inventories of invasive alien plant species (IASS)						

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Ichtyofaune						
Fish fauna (fisheries)	2022 to 2023	October 11 to 21, 2022 and May 15 to 26, 2023	Laniel and Onimiki South	24 experimental nets, 1 fyke net, 4 trap nets, electrofishing in Gordon Creek and some small tributaries	Identify fish communities.	
	2023	August 13 to 22	Onimiki North	10 experimental fillets, 17 bait traps and 3 fyke nets	Identify fish communities.	
	2025	September 25: Characterization of the biophysical environment and electrofishing	North Onimiki (two streams in the lower reaches of Lake Thiriot: one that is unnamed and Lost Creek)	The information of this inventory can be found in the “Physical Environment” inventory type. Several types of surveys were planned during these inventory campaigns.		
Walleye spawning ground	2023	May 29 to June 9	Laniel and Onimiki South	8 egg and larvae capture stations in running water (plankton net and troubled net)	Potential walleye spawning ground validation	
	2024	May 14 and 16	Onimiki North	33 egg and larval capture stations in lake environments (cloudy net)	Potential walleye spawning ground validation	
Fish habitat	2022 to 2023	July 11 to 15, 2022 and May 15 to 26, 2023	Laniel and Onimiki South	Assessment of fish habitat in lakes with 28 transects. Characterization of fish habitat by homogeneous segment with flow surface analysis.	Fish habitat assessment inside the project area potentially impacted	
	2024	August 14 to 21 and September 10 to 16	Onimiki North	Assessment of fish habitat in lakes with 50 transects. Characterization of fish habitat by homogeneous segment with flow surface analysis.	Fish habitat assessment inside the project area potentially impacted	
	2025	July 15 to 18: Characterization of the biophysical environment September 23 to 25: characterization of the biophysical environment and electrofishing	North Onimiki (two streams in the lower reaches of Lake Thiriot: one that is unnamed and Lost Creek)	The information of this inventory can be found in the “Physical Environment” inventory type. Several types of surveys were planned during these inventory campaigns.		

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Inventory Type	Campaign	Date	Inventory Area	Type of statement	Objectives of the inventory	References[1]
Fish habitat	2025	August 18 to 29	Laniel (Kipawa River)	Complete characterization of two areas in the Kipawa River (directly downstream from the Laniel Dam and in a river bend) In these sectors, inventories included, but were not limited to: • Fishing using multiple methods (gill nets, electrofishing, fyke nets • The delimitation of the coastal boundary • Characterization of fish habitat in shallow and deep-water areas • Characterization of tributaries • Taking *in situ* physicochemical measurements (temperature, dissolved oxygen, pH)	Gather as much information as possible on sections with diverse flow patterns in order to obtain a better reference framework for the Kipawa River.	
	2025	November 2 to 7	North Onimiki (Lake Thiriot and Lake Kipawa in the Île aux Fraises sector)	Assessment of fish habitat in lakes using approximately twenty transects. Video recording and bathymetric survey along the lakes' shores.	Thiriot Lake Complete the inventory of biophysical parameters for bodies of water (Lake Thiriot) that will change from a lentic ecosystem to a lotic ecosystem. Thiriot and Kipawa Lakes (area of the lake located near the mouth of Lake Thiriot)) Document changes to the ecology of these ecosystems and determine the anticipated effects on shoreline dynamics. Kipawa Lake Validation of information received from the public regarding sites of potential interest for fish fauna, including potential spawning or breeding grounds.	

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Inventory Type	Campaign	Date	Inventory Area	Type of statement	Objectives of the inventory	References[1]
Herpetofauna						
Anurans (frogs, tree frogs and toads)	2022	May 18 and 21	Laniel and Onimiki South	4 listening stations (2 stations - Laniel and 2 stations - Onimiki Sud)	Use of the sector during the breeding season.	Quebec Anuran Inventory Protocol (MFFP, 2019)
	2024	May 18, June 18 and June 20	Onimiki North	5 listening stations	Use of the sector during the breeding season.	
Urodeles (salamanders, newts and mudpuppies)	2023	May 13 to 24	Laniel and Onimiki South	21 transects: active excavation in some small tributaries. The transects were walked twice.	Use of the sector during the breeding season.	Standardized Protocol for Stream Salamander Inventories in Quebec (MELCCFP, 2024b)
	2024	May 13 to 18	Onimiki North	6 transects: active search in the 2 streams of the downstream reach of Lake Thiriot. The transects were walked twice.	Use of the sector during the breeding season.	
Snakes	2023	May 19 to June 23	Onimiki South	5 stations (visited 8 times)	Validate the presence of snakes in critical areas.	Standardized protocol for snake inventories and hibernacula research in Quebec (MELCCFP, 2024a)
	2024	May 31 to July 5	Onimiki North	40 stations (visited 6 times)	Validate the presence of snakes in critical areas.	
Turtles	2022	May 24 to June 1	Laniel and Onimiki South	17 sectors: drone survey (8 sectors - Laniel and 9 sectors - Onimiki Nord)	Validate the presence of turtles and identify potential nesting sites.	Standardized Wood Turtle Inventory Protocol in Quebec (MELCCFP, 2023a) Environmental DNA: Bureau Veritas protocol provided in 2023
	2022	July 4 to 8 and July 11 to 15	Laniel and Onimiki South	Validation of 6 potential egg-laying sites	Validate the use of potential egg-laying sites.	
	2024	16-June	Onimiki North	Validation of 5 potential egg-laying sites	Validate the use of potential egg-laying sites.	

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	2023	May 13 to 24	Laniel and Onimiki South	21 transects: active search in some small tributaries Transects were conducted twice Water samples were taken from 12 tributaries from the Kipawa River to analyze environmental DNA to detect the presence of wood turtles	Validate the presence of wood turtles (a status species) as well as all species of turtles, salamanders, snakes and other wildlife observations of interest such as the water snake or the marsh frog.	
	2024	May 13 to 18	Onimiki North	2 transects: active search in the 2 streams of the downstream reach of Lake Thiriot. The transects were walked 3 times.	Validate the presence of wood turtles (a status species) as well as all species of turtles, salamanders, snakes and other wildlife observations of interest such as the water snake or the marsh frog.	
Avifauna						
Waterfowls	2022 to 2023	May and June	Laniel and Onimiki South	Incidental observations	Use of the area by migrating waterfowl.	
	2024	May 15 to 17 and September 14 to 16	Onimiki North	10 observation stations	Use of the area by migrating waterfowl.	
Nightjar	2023	21-June	Laniel	4 listening stations	Use of the sector during the breeding season.	Canadian Nighthawk Survey Protocol (Knight 2018)
Songbirds	2022 to 2023	July 6, 7 and 12, 2022, June 20 to 23, 2023	Laniel and Onimiki South	19 listening stations	Use of the sector during the breeding season.	There is no specific protocol for insectivorous birds, the inventories are carried out using the technique of active listening to all songbirds (Hamel et al., 1996; Ralph, 1995).
	2024	June 17 to 20	Onimiki North	12 listening stations	Use of the sector during the breeding season.	
Mammal						
Bats	2022	September 21 to October 5	Laniel and Onimiki South	11 fixed stations (acoustic recording with ultrasound sensors)	Use of the area by bats during the migration period.	Standardized protocol for acoustic inventories of

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	2023	June 14 to July 1	Laniel and Onimiki South	11 fixed stations (acoustic recording with ultrasound sensors)	Use of the area by bats during the breeding season. Use of the area by bats during the migration period.	bats in Quebec (MELCCFP, 2023b)
	2024	June 10 to July 4 August 21 to September 14	Onimiki North	5 fixed stations (acoustic recording equipped with ultrasound detectors)	Use of the area by bats during the breeding season. Use of the area by bats during the migration period.	

[1] The main references have been given in the table for information purposes. The references and complete protocols will be available when the environmental impact study is submitted to the MELCCFP. The protocols and the inventory effort by sector were submitted to the MELCCFP before each inventory campaign.

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