

2022 SNP Radio Repeater Upgrades: Justification, planning and logistics

Prepared by Tess Espey and Brian Koonoo – updated October 2021

Purpose

This document provides an overview of Sirmilik National Park's (SNP) radio repeater network and highlights the need for upgrades to this infrastructure in the 2022 field season. Even though these upgrades are necessary and overdue, National Office is not able to fund this work as it has in past years. Because radio repeaters provide key communication support for operations on land as well as across much of the local marine environment, SNP seeks assistance from neighbouring Tallurutiup Imanga National Marine Conservation Area (TINMCA) to help cover project costs.

Background

As of 2021, SNP manages 5 repeater stations (Figure 1), which support regional VHF radio use by staff and local Search and Rescue. These repeaters pick up radio communications and retransmit them across a much wider area (dozens of kilometers) than would be possible with only radio-to-radio contact, which requires a direct line of sight and may only reach a few kilometers. Repeaters have been strategically located at high elevation points to allow maximum coverage in the park and adjacent areas.



Figure 1. Sirmilik National Park repeater locations.

Each repeater location supports a distinct radio frequency, and this network is routinely used in the course of park operations (Figure 2). Parks Canada holds licenses for individual repeaters (as land stations) and the frequencies that they support; these are renewed annually with Industry Canada. Coverage is particularly consistent across Eclipse Sound, the fjords adjacent to Pond Inlet, and the southern half of Bylot Island.

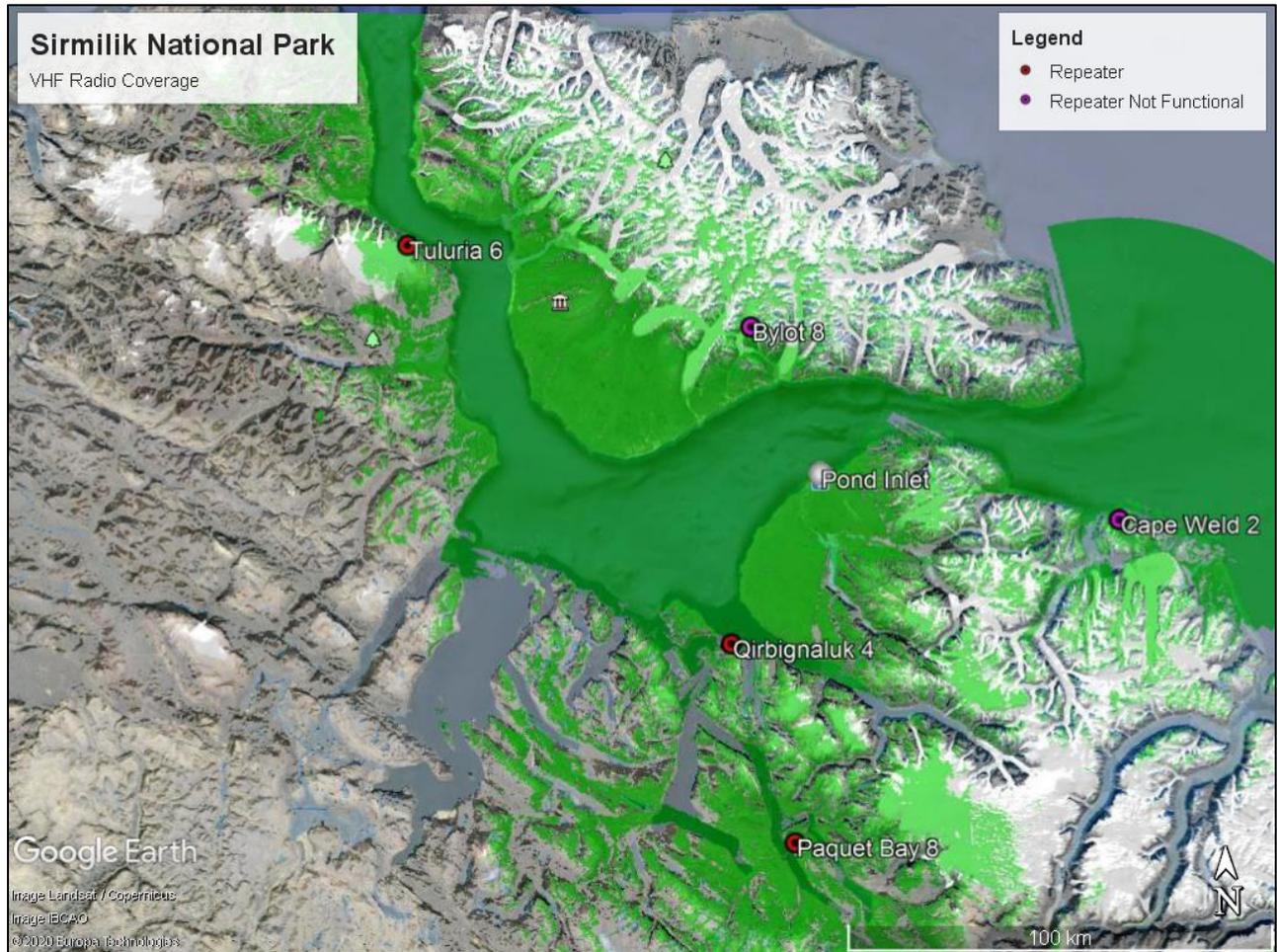


Figure 2. VHF radio network coverage for Parks Canada repeater network around Sirmilik National Park area. Note changes to be made in 2022: Mt Thule/Bylot 8 is down and needs to be serviced; equipment for Cape Weld 2 is at Mt. Morin (decommissioned; see Figure 1) and needs to be relocated and brought back online. (Total coverage shown is based on these changes being made.)

Mittimatalik HTO also operates five additional radio repeaters in the area; however, these are for year-round use and are open to the public.

VHF radio communication is an important means of relaying messages in the area. Parks Canada staff regularly use radio in the course of routine park operations, in order to maintain secure communications among staff and to correspond with the park office. And although Parks' frequencies are closed channels, they have also proven valuable in maintaining public safety through their use (with written permission) by Pond Inlet Search and Rescue (SAR). There have been several instances where groups

have contacted Pond Inlet SAR to request emergency assistance using their VHF radios, and this has been the primary means by which subsequent communications have been conveyed in the course of rescue or intervention.

In the future, Parks' repeaters could also help support TINMCA's operations – both for Parks Canada staff and Guardians undertaking work in the area.

Repeater sites and equipment

Each station has antennae, a battery array, solar panel, small wind turbine, repeater, weatherproof housing, and anchoring hardware (Figure 3). All are located on exposed mountaintops. Given the weight and volume of radio gear and the exposed, remote nature of the sites, helicopter access is the only viable, safe method to access repeaters to perform upgrades.

Parks Canada radio technicians, based in Calgary, originally established the repeater network and have routinely made summer visits to Pond Inlet to perform scheduled maintenance. It is anticipated that, after the 2021 upgrades, most repeater sites would require preventative maintenance and servicing at an interval of approximately once every 2 to 3 years.



Figure 3. Qorbignaluk repeater site (left); Tularia's battery array and transmitting equipment (right).

Need for upgrading

All repeaters need improved antennae to increase transmission distance for communications. And because current batteries quickly lose their charge in the winter months, when little to no new charge can be added via the solar panels, expanded battery arrays will aid in lengthening the season during which the repeaters can reliably function.

Equipment from the Mt. Morin repeater (currently decommissioned) also needs to be moved to Cape Weld to improve network coverage on the east side of Bylot Island. And the weatherproof box at Mt. Thule must be replaced. Some equipment there blew away one season after it was installed – the box was gone but the repeater was saved because the cables were connected to it. A new repeater box was purchased and is now sitting near the shore of Bylot Island at the park sign and red chairs there. This will

need to be moved up onto Mt. Thule during fieldwork in 2022. Bringing these two repeaters back online will help secure more consistent coverage to the east of Pond Inlet.

Minimal, if any, new equipment needs to be purchased for this project because all the equipment was acquired in 2018 and brought up by sealift that year. SNP staff will re-inventory equipment during autumn 2021 and order any additional parts needed to ensure the project can proceed smoothly in 2022.

Plans for 2022

All radio repeater sites must be visited in 2022. This work was originally scheduled to be completed in 2020 – when National Office had funding to cover all costs associated with the upgrades – but all field activities for the year were cancelled due to the COVID-19 pandemic.

Two radio technicians will travel to Pond Inlet in July 2021 to complete the upgrading work. Resource Conservation staff from SNP will be available to assist them, as needed.

To support these site visits, 20 hours of flying time has been requested from Polar Continental Shelf Project (PCSP). This work is tentatively scheduled to occur from July 12 to 14. Though distances to repeater sites from Pond Inlet are not necessarily great, the batteries and antenna infrastructure are heavy and bulky, necessitating more than one trip to each site to ferry gear – in a sling load – and also to deliver the field crew in a separate flight. Details on aircraft availability and scheduling should be confirmed in February or March 2022.

Although flying time is the main cost for this project work, the budget must also account for technicians’ travel to and stay in Pond Inlet. A rough breakdown of project costs is provided below.

Estimated cost	Description
\$30,000*	15 helicopter hours with PCSP aircraft [Bell 206LR]. (*Estimated conservatively at \$2000/hr. Note that in 2021, cost was \$1876/hr for the same aircraft.)
\$4,000*	Round-trip airfare from Calgary to Pond Inlet for a technician. (*Rates not currently searchable for whole route; estimate based on breaking the trip down into parts.)
\$400	Ottawa airport accommodation for technician (trip up and back must both be completed in two days, with an overnight stay).
\$1000	Per diems for one week (travel, fieldwork, and time in Pond Inlet; 5 days NU, 2 days in south in transit) for technician.
\$500	Excess baggage and other miscellaneous travel-related expenses (e.g. taxi to Calgary airport).
\$0	Accommodations in Pond Inlet – technician will stay in TU.
\$35,900	Estimated total project budget for summer 2022 (2022/23 FY)

Future possibilities

As the maps above indicate, the existing Parks Canada repeater network has good coverage around Pond Inlet and its adjacent marine and land areas. This coverage does not, however, extend much beyond the eastern edge of the Borden Peninsula or toward Arctic Bay (although that community has its own Hamlet-owned network for public use). Extending the network may be considered as TINMCA

operations among Parks Canada staff and Guardians scale up in the coming years. Additional repeaters would have to be added sequentially (i.e. so that signals can continue to relay from station to station without a gap), but strategic placement of new repeaters could help ensure broad coverage of coastal and marine areas in the region.