



Marine Based Activities

À l'attention :

Ryan Harris
Parks Canada
1800 Walkley Road
Ottawa Ontario K1H 8K3
Canada
Téléphone : 613-993-2125, Télécopieur :

$\gamma_b \Delta^c \dot{\bar{N}}_0 \sigma^b \quad \Lambda_{\text{C-L}} \nabla^b \gamma_\sigma \nabla_{\text{L}} \nabla^a \bar{L}^a \sigma^b$

David Thompson -- Operations arctiques 2019 -- Sommaire non-technique -- À la fin septembre, les conditions de glace le permettant, le navire de recherche David Thompson de Parcs Canada transitera vers l'est à travers le détroit de Bellot et dans le bras de mer Prince Regent. Des opérations de prospection marine non-intrusives (c-à-d d'archéologie subaquatique, de bathymétrie, de l'échantillonnage sélectif d'eau marine, de cartographie d'habitat et de classification des fonds marins) auront cours à des endroits sélectionnés le long d'une route planifiée depuis le détroit de Bellot, à travers le bras de mer Prince Regent, ensuite dans le détroit de Lancaster et jusqu'à Pond Inlet, où une visite portuaire et un événement portes ouvertes pour la communauté sont planifiés, le 3 Octobre ou aux environs de cette date. De Pond Inlet, le NR David Thompson continuera son transit arctique le long de la côte de l'île de Baffin jusqu'à Pangnirtung où une autre visite portuaire et un événement portuaire sont planifiés aux alentours du 10 Octobre. Les visites portuaires fourniront une opportunité unique de montrer une sélection d'artefacts récemment récupérés des épaves du HMS Erebus et HMS Terror et d'informer les communautés sur le progrès des travaux archéologiques en cours sur ces sites. Dans le détroit de Cumberland, d'autres prospections marines non-intrusives sont planifiées aux alentours des îles Kekerten et Black Lead où des stations historiques de chasse à la baleine étaient opérationnelles au 19e siècle. Après le départ du détroit de Cumberland, le NR David Thompson se dirigera vers le sud vers le golfe du Saint-Laurent et ultimement vers son point d'hivernage à Prescott en Ontario. Les activités liées aux opérations dans l'est de l'Arctique du RV David Thompson sont marines, et impliqueront principalement des prospections au sonar latéral et à l'échosondeur multi-faisceaux. Tout élément archéologique submergé détecté par sonar, sera par la suite investigué par robot sous-marin téléguidé (ROV), par véhicule sous-marin auto-guide (AUV) et/ou par des plongeurs de Parcs Canada. En plus de localiser et de capturer des images des sites archéologiques submergés potentiels, le traitement des mêmes ensembles de données par différents programmes informatiques fournira aussi des données de bathymétrie, et de topographie et de classification des fonds marins (pour des objectifs de cartographie des habitats benthiques) Une prospection marine au large de l'île Bellot complètera une courte prospection terrestre de 1 ou 2 journées sur l'épave de Maud Bight (210-X3), pour chercher des restes de coque additionnels liés à ces restes d'épave visibles sur terre de ce que l'on croit être un baleinier qui fut jadis poussé sur terre.

[illegible]

Operations Phase: from 2019-09-19 to 2019-10-21

$$\Lambda \subset \mathbb{N} \triangleleft \mathbb{N} \xrightarrow{\sigma} \mathbb{N} \xrightarrow{\sigma^b} \mathbb{N}^c$$

ᐱᑦ	ᖃᓄᐱᑦᑐᒥᑦ ᐱᑦᑕᑎᐱᖃᑦᓂᐱᖃᑦ	ᑭᖅᐱᑦ ᓄᓇᑦᐱᑦᓂᑦ	ᑐᔨᐅᐤᓴᑦ ᓄᓇᐅᑦ ᖃᓄᖃᑦ ᐱᑐᐤᐅᑕᐅᖃᑦ ᑭᐤᓴᑎᐱᑦᓴᑦᓴᑦ	ᐱᑦᔨᑦᓂᑕᖃᑦᐱᐅᑕᑕᐅᖃᑦ ᐱᓄᖃᑦ ᓇᔨᖃᑕᐅᖃᑦᑕᑦᓂᐱᑦᓂᑦ ᑕᐱᑦᑭᐤᓂᑐᖃᐅᑦᖃᑐᖃᑦ	ᖃᓂᖃᓴᑦ ᓄᓇᑦᑭᓴᐅᔨᔨᖃᑦ ᐱᑦᐤᐤ ᔨᑐᑦᑭᖃᑦᑭᐱᐅᑕᓂᑦ ᑭᓇᓄᑦ
RV David Thompson route -- Cambridge Bay to Pangnirtung and Cumberland Sound	Marine Based Activities	Marine	Various. Marine	Potential of underwater archaeological sites. To be evaluated in the event.	Various. Vessel transit from Cambridge Bay to Pangnirtung/Cumberland Sound via Gjoa Haven and Pond Inlet.
RV David Thompson route -- Cambridge Bay to Pangnirtung and Cumberland Sound	Scientific/International Polar Year Research	Marine	Sonar operations: hull-mounted multi-beam echosounder survey may be undertaken 24 hours/day throughout the transit to amass bathymetric and seafloor topographic data. Vessel towed side-scan sonar and Autonomous Underwater Vehicle (AUV) deployed side-scan sonar would be undertaken more selectively in areas of identified archaeological and/or ecological interest, for periods of up to 24 hours per day, but typically for 1-5 days at a time.	Deployments of Remotely Operated Vehicles(ROVs) will be site specific, to gain more specific (photo/video/laser scan) data on identified archaeological and/or ecological features of interest. ROV would be deployed from vessel at anchor.	Various. Vessel transit from Cambridge Bay to Pangnirtung/Cumberland Sound via Gjoa Haven and Pond Inlet.
RV David Thompson route -- Cambridge Bay to Pangnirtung and Cumberland Sound	Sampling sites	Marine	Periodic water sampling for micro-plastic pollution and environmental DNA (eDNA)analysis. Samples would be collected up to 6 times per day, approx. every four hours, using both surface water collection bottles and Niskin bottles at select depths of interest.	N/A	Various. Vessel transit from Cambridge Bay to Pangnirtung/Cumberland Sound via Gjoa Haven and Pond Inlet.

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		Thompson	
<ᐅᓂᑦᑐᑦᐅ	N/A	Community visit / open house on RV David Thompson	2019-10-10
<ᐅᓂᑦᑐᑦᐅ	Simeonee Keenainak	Hunters and Trappers Association - Mittamatilik	2019-03-25
<ᐅᓂᑦᑐᑦᐅ	Mosesee Qappik	Hamlet of Pangnirtung	2018-03-29
Γᑦ∩LCᑦᐅ	Members	Hunters and Trappers Association - Mittamatilik	2019-02-25
Cᐅᑦᐱᑦᐅ	Members	Hunters and Trappers Association - Mittamatilik	2019-02-12
ᐅᑦᐱᑦᑐᑦᐅ	N/A	Community visit / open house on RV David Thompson	2019-08-18

Λ⁵δ^c 4⁵Γ²ξ^b 4⁵ξ^bCDσD⁴Λ⁵ξ^b Δ^cξ^bPDΠ^cΓ^c Δ^jξ^cΔ^c, Γ^c→4P⁰ξ^b, ξ^bξ^cLC^jξ^b, 3⁵ξ^bPD^c 4⁵Γ⁵Γ^c→

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$\Delta L^{\epsilon_b} \triangleleft \triangleright^{\epsilon_b} C \triangleright \triangleleft \dot{L}^{\epsilon_b} \triangleright^{\epsilon_b}$

$\Delta^c \rightarrow C \dot{I}^{fb} \rightarrow J^{fb} C D \sigma - d^{fb} J^{fb}$	$^{fb} \omega^{fb} \Delta \Gamma^{fb} C^{fb} C^c \sigma - d^{fb} <^c$	$a P^c \Delta \Gamma^{fb} C^{fb} C^c \sigma - d^{fb} <^c$
0	No fresh water retrieval. Two on board water makers (reverse osmosis) with a 22,000 L fresh water holding tank.	Aboard RV David Thompson

$\triangleleft^b C d^c$
$$\Delta^b C d \leq \rho \sigma \Delta^a \sigma^a$$

Aᑦᓕᓚᐃᓇᔭᐅᒻᐱᐣᑐ^c AᑦᓕᓚᐃᓇᔭᐅᏍᐄᖂᖂᖁ	ᖃᓪᓴᐃᑦᑐᖂ ᐊᖃᐋᐈᖂᖁ	ᖃᓪᓴᐎᓯ ᐊᖃᐋᐈᖂᖁ ᙳᖂᓶᐃᏍᐄᖂᑐᓇᔭᐅᗞᑐᑦ	ᖃᓪᓴᖂ ᐊᖃᑦᖂᐋᐈᏍᐄᖂᑉ	ᙳᐣᓀᓀᖂ ᙳᐅᐆᖃᖃᓪᓴᓸᏍᐅᏍᐄᖂᑐᑦ
Marine Based Activities	ᐊᖃᐋᐈᖂᖁ Δᐃᐊᓬᐋᔭᐊᓰᓲᓇᖂᑐᑦ	N/A	All garbage will be compacted and at the end of the project, brought to approved shore disposal facilities in Pond Inlet.	N/A
Marine Based Activities	Δᓀᓀᑐᑦ ᐊᑐᖂᐋᐈᔭᓵᖂᓿᓀᓀᑐᑦ	1540 L/day	All accommodation will be on the ship which is equipped with a Transport Canada approved sewage treatment plant meeting the IMO MEPC 227(64) and Annex IV of MARPOL regulatory standards.	N/A
Marine Based Activities	ᖃᐈᖂᐋᐈᓸᓼᓹᓢᓤᖁ	1540 L/day	All accommodation will be on the ship which is equipped with a Transport Canada approved sewage treatment plant meeting the IMO MEPC 227(64) and Annex IV of MARPOL regulatory standards.	N/A

$\Delta^{\circ} \text{G}_{\text{f}}^{\circ}(\text{C}_6\text{H}_6) = -123.4 \text{ kJ mol}^{-1}$, $\Delta^{\circ} \text{G}_{\text{f}}^{\circ}(\text{C}_6\text{H}_6\text{L}) = -107.9 \text{ kJ mol}^{-1}$

No negative impacts. Positive impacts include will the collection of multibeam echosounder data for bathymetry, seabed classification and habitat mapping purposes. Vessel will also collect water samples for pollution monitoring. Non-disturbance identification and evaluation of potential underwater archaeological sites will also be a positive impact.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

See sections on Material Use, Water Use, and Waste. See non-technical summary. RV David Thompson (228 tonnes, 29 m, max 14 persons on board) -- ABS Classed as Govt. Survey vessel. 5.90 m RHIB and 5.30 m Zodiac (research support craft -- deployed by the ship). Ship equipped with DVZ Biomaster Plus SKA 20 sewage treatment plant (capacity for grey and black water waste from 20 ppl). Vessel is non-ice classed and will not operate in or near ice. Fuelling: When in Arctic waters, the RV David Thompson will refuel directly from Canadian Coast Guard ships (approx. 40,000 L per year), under MOU with the Coast Guard. There is no plan to take fuel in communities. Ship-to-ship refuelling operations are overseen by Coast Guard. Fuelling of the onboard 130 L fuel tank of the 5.90 m RHIB will be done only when the boat is on deck of the RV David Thompson. All re-fuelling operations are overseen by the Chief Engineer. Spill mitigation: The RV David Thompson has an Enviro-pack 65 gallon (246 L) spill kit on deck, complete with 65 gallon overpack drum, absorbent socks, pads, scupper plugs, etc. The Coast Guard ships all have fuel spill containment booms readily available in the event of a spill.

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

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Miscellaneous Project Information

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Large Marine Mammals. In the event that large marine mammals such as Bowhead whales, Beluga whales, and/or Narwhales are encountered during survey operations and/or vessel transit, said operations will be suspended or re-located, until such a time that the animals have moved a safe distance away from the vessel activity (minimum 500 m) on their own accord. Bridge Watch personnel and boat operators will be advised to look out for large marine mammals and report observations to the Master and Project Director. Sightings of Species at Risk within the waters of the Bylot Island Migratory Bird Sanctuary will be reported to the Canadian Wildlife Service, and in the waters of Tallurutiup Imanga National Marine Conservation Area, to Parks Canada's Nunavut Field Unit.

Cumulative Effects

Impacts

[illegible][illegible]

1 polyline RV David Thompson route -- Cambridge Bay to Pangnirtung and Cumberland Sound

