

Cumberland Sound Turbot Quota Request

Briefing Note for the NWMB with Climate Analysis and Strategic Considerations for an Open Water Pilot Project Test Fishery

Prepared for: Nunavut Wildlife Management Board

Subject: Request for 10t open-water turbot quota for Cumberland Sound — fall 2026 pilot

Submitted on behalf of: Pangnirtung Hunters and Trappers Organization

1. The core argument — last four seasons under consistent management, effort and market conditions with varying outcomes due to weather patterns:

The last four consecutive fishing seasons (2023–2026) have had consistent management, effort, fleet, and operational approach during the January–April fishing window. This four-year period removes confounding variables that affect longer-term comparisons (changes in management, effort, market conditions, or regulatory framework) and isolates the environmental signal and variable ice conditions as the most likely factor resulting in significantly variable outcomes from the fishery.

Fishing Year (Jan–Apr)	Winter	ENSO Conditions	Catch (t)	% of TAC	Outcome
2023	2022–23	Weak La Niña	550.17	110%	Full Jan–Apr season; exceeded TAC via carryover
2024	2023–24	Strong El Niño	290.00	58%	Stopped by ice — short season
2025	2024–25	Cool-neutral (post-El Niño)	219.00	44%	Stopped by ice — short season
2026	2025–26	Weak La Niña	574.50	115%	Full Jan–Apr season; record catch

Four-year average: 408.4 t / 81.7% of TAC

Key observations

- Effort, fleet, and management held constant across all four years.
- Catches ranged from 219 t to 574.5 t — a swing of **355 tonnes (64%)**.
- Both strong years occurred under La Niña / cool conditions with reliable ice across the full Jan–Apr window.
- Both weak years occurred during or immediately after the Strong 2023–24 El Niño, when ice conditions prevented a full operating season — both early-season ice formation in

November–December and late-season ice deterioration in March–April affect the harvest.

- The variation is attributable to ice formation, not to capacity, market, or operational factors.

2. The mechanism — why El Niño disrupts Cumberland Sound ice

In the eastern Canadian Arctic, El Niño and La Niña pull the winter weather system in opposite directions with very different consequences for sea ice. **During El Niño**, the Pacific jet stream strengthens and reorganizes, routing more low-pressure storms up the US. East Coast and into Atlantic Canada, Davis Strait, and Baffin Island, while warm, moist air is pushed further north than usual. For Cumberland Sound this means a delayed and disrupted freeze-up in November and December, more frequent winter storms, and — most importantly — heavier early-season snowfall on top of thin new ice. Because snow is roughly seven times more thermally insulating than sea ice, a thick early snowpack effectively stops the ice from thickening, leaving fishers without a safe, stable platform for the January–April turbot season. **The same pattern also shortens the season at the other end:** warm air intrusions and earlier spring melt under El Niño conditions can cause unsafe ice to develop weeks earlier in March and April than in normal years, cutting the operating window from both sides. **During La Niña**, the opposite occurs: the storm track shifts south and weakens, the warm tongue along the Labrador coast and Davis Strait fails to set up, and cold Arctic air settles more reliably over Baffin Island. Ice forms earlier in the autumn, thickens steadily through December and January, and persists safely through March and April — producing the full four-month operating window the fishery depends on.

In short: El Niño brings warm air, storms, and insulating snow that prevent the ice from thickening and accelerate spring breakup; La Niña brings clear, cold, stable conditions that let the ice grow into a working platform and hold it through April.

The senior meteorologist with the Canadian Ice Service has confirmed this pattern publicly for our exact geography, noting that under strong El Niño conditions the warm setup along the Labrador coast and Davis Strait fails to develop normally, disrupting expected ice patterns off Baffin Island.

3. Forecast for the 2026–27 winter — a strong El Niño is now likely

Multiple international climate authorities, as of April–May 2026, are aligned on a strong El Niño developing through summer–fall 2026 and intensifying into the 2026–27 winter:

- **NOAA Climate Prediction Center (April 9, 2026 update):** ENSO Alert System status is “*Final La Niña Advisory / El Niño Watch*.” ENSO-neutral conditions are favoured through April–June 2026 (80% chance), but in May–July 2026 **El Niño is likely to emerge (61% chance) and persist through at least the end of 2026.**
- **NOAA / OpenSnow analysis:** Latest forecast indicates an **80% chance of El Niño conditions developing this summer**, with high confidence in the transition, “eventually strengthening into a ‘strong’ El Niño phase” — defined as Niño 3.4 sea-surface temperature anomalies of +1.5°C or greater.

- **NOAA strength probability (April 2026):** Approximately **50% chance** the developing El Niño reaches “strong” intensity ($\geq +1.5^{\circ}\text{C}$), and a **25% chance** it reaches “very strong” / “Super El Niño” intensity ($\geq +2.0^{\circ}\text{C}$) — the highest such probability in years.
- **World Meteorological Organization (May 2026):** Climate models are now strongly aligned, with high confidence in El Niño onset and further intensification. WMO’s Chief of Climate Prediction stated: “*Models indicate that this may be a strong event.*”
- **ECMWF (Europe), BOM (Australia), and NOAA CFSv2 forecast plumes** all agree on a strong event for 2026–27, with successive monthly forecasts showing **increasing intensity** — the current 2026 trajectory is outpacing the development curves of the 1997–98 and 2015–16 Super El Niño events at the same point in the calendar.

Operational implication for Cumberland Sound: Following the timing pattern observed in 2009→2010, 2015→2016, and 2023→2024, an El Niño developing in summer–fall 2026 and peaking in winter 2026–27 would disrupt ice formation in November–January 2026–27 and impair the January–April 2027 fishing season at both ends — through delayed freeze-up and heavy early snow loading on the front end, and through accelerated spring breakup on the back end. Based on the three precedents in the dataset, a moderate-or-stronger El Niño produces an average catch of **229.9 t (46% of TAC)** — roughly half of normal harvest. If the 2026–27 event reaches the “strong” or “super” intensity that current forecasts suggest, the impact could be at least as severe as 2024.

This is not a prediction that the 2027 ice fishery will fail. It is a documented, multi-source forecast that **the risk of failure is substantially elevated**, and the request for a 10t open-water pilot quota is calibrated to that risk.

4. Local ice-thickness verification — SmartICE

The SmartICE program has been actively monitoring ice and snow thickness in Cumberland Sound from Pangnirtung since early 2020, with named local Community Operators (Patrick Kilabuk and Mosesie Akulujuk) deploying SmartBUOY thermistor sensors and SmartQAMUTIK trail-towed sensors. The system measures both snow depth and ice thickness simultaneously along community travel routes, with data published weekly via SIKU.org. Five winters of Cumberland Sound–specific data are available, including the Strong El Niño winter of 2023–24 and the cool-neutral winter of 2025–26.

If the NWMB would like to review it, the SmartICE record for Cumberland Sound trails, by week, for winters 2020–2026, could be requested from:

- **Tyler Spurrell**, Technical Operations Manager — tspurrell@smartice.org

This data — Inuit-operated, locally measured, season-by-season — would most likely directly demonstrate the snow-on-ice mechanism described in Section 2 using community-based monitoring rather than outside science.

5. The full 18-year fishing and catch record (for reference and supporting context)

The eighteen-year average (2009–2026, 2022 included as 0t — COVID closure) catch is **325.2t/ year or 65.0% of TAC.**

This conservative long-term average (with 2022 included as zero rather than excluded) avoids any appearance of cherry-picking and supports the claim that the fishery routinely operates well below TAC due to environmental constraints as illustrate by the table below which shows the fishery performs poorly in neutral or moderate/stronger El Nino years.

Catch by ENSO phase (18-year record):

ENSO Phase	Years	Avg Catch (t)	% of TAC
Moderate-or-stronger El Niño	3	229.9	46.0%
Neutral	3	301.7	60.3%
La Niña (any strength)	9	341.0	68.2%
Weak El Niño	3	396.8	79.4%

The Moderate+ El Niño group (2010, 2016, 2024) is the clear outlier — a 154-tonne / 22-percentage-point gap below La Niña years.

6. The request

The Pangnirtung HTO is requesting a **10-tonne open-water turbot quota** for Cumberland Sound, to be fished in **fall 2026** as a pilot season ahead of the forecast 2026–27 El Niño winter.

Key features of the request

- 10t represents **2% of the 500t TAC** — a small fraction of total stock allocation.
- 10t is **well within historical precedent** — open-water catches of 32.55t (2010), 27.70t (2009), and 19.45t (2021) have all been recorded in past years.
- The request is for **pilot-scale operational readiness** — testing gear, methods, and bycatch profile before the community needs to rely on open-water fishing as a backup. See Section 7 for detail.
- The 2025 fishery left **281 tonnes of TAC uncaught** due to ice limitations — this fish remains in the water, and a 10t open-water harvest is a small fraction of what the ice fishery couldn't reach in 2025.

7. Why fall 2026 specifically — the 10t is a pilot, not an emergency response.

The 10-tonne open-water quota is requested for fall 2026 as a controlled pilot season, not as an emergency response to a winter that has already failed. This timing is deliberate and important.

Open-water turbot fishing from small boats in Cumberland Sound has not been operationally tested at scale by the current fleet and management. Several practical questions need to be answered before the community has to rely on this method as a backup:

- **Greenland shark bycatch risk.** Greenland sharks are present in Cumberland Sound and are a known bycatch concern in open-water turbot longlining elsewhere in the eastern Arctic. The fall 2026 pilot would let the HTO quantify the actual bycatch rate

under local conditions, develop mitigation practices, and determine whether the fishery requires gear modifications, time-of-day restrictions, or specific area avoidance — *before* committing to it as a primary harvest method in a bad ice year.

- **Operational readiness.** Gear configuration, set times, depths, soak durations, weather windows, and small-boat logistics in Cumberland Sound’s specific conditions all need to be worked out through real fishing, not theory.
- **Catch-per-unit-effort baseline.** Establishing a baseline for what a small boat can realistically harvest in a day, a week, and a season provides the data the HTO need to size any future open-water quota appropriately including the purchase of vessels and gear.

The strategic logic: if NOAA’s forecast of a strong-to-very-strong El Niño in winter 2026–27 plays out as expected, the January–April 2027 ice fishery will likely be impaired, as it was in 2010, 2016, and 2024. **If the community waits until that point to start figuring out how to fish open water, an entire year of the remaining harvest is lost** — first to the ice failure itself, and then to the learning curve of trying open-water fishing under pressure with no prior experience and no bycatch data. The lost catch is when significant amounts of quota are left in the water is a large economic loss to the community through lost revenue to fish harvesters and plant workers but also to the fish plant operations that has to manage shipping costs on a smaller output as a direct example. By piloting in fall 2026 under no pressure, the community arrives at the 2027 ice season with a tested method, known bycatch profile, and an operational fleet ready to deploy if needed if the winter ice fishery is limited in success.

8. Caveats to be aware of:

- ENSO is a Pacific-equatorial signal; the link to Cumberland Sound ice is teleconnected (via jet-stream and Arctic Oscillation effects), not direct. The foregoing assessment shows and data supports a clear correlation observed in the local catch record, but not causation.
- The strongest statistical signal is at the **threshold** — Moderate-or-stronger El Niño events. Weak El Niño years do not show the same impact in the catch record. The trends may not illustrate the same indication across all ENSO states.
- Three Moderate+ El Niño data points (2010, 2016, 2024) is a clear pattern but not a large sample. The pattern is a risk indication if 2027 is a moderate+ El Niño year but not a deterministic prediction.

Sources

- Cumberland Sound Turbot Management Area annual catch data (HTA records, 2009–2026).
- NOAA Climate Prediction Center, Oceanic Niño Index (ONI v5), DJF values, via Golden Gate Weather Services.
- NOAA CPC ENSO Diagnostic Discussion, April 9, 2026 (next update May 14, 2026).
- World Meteorological Organization, El Niño / La Niña Update, May 2026.

- Canadian Ice Service public commentary (April 2026).
- SmartICE Monitoring & Information Inc., smartice.org.
- Peer-reviewed literature on snow thermal conductivity and sea-ice growth (MOSAIC expedition findings; Sturm and Massom, 2017).

Cumberland Sound Turbot Management Area — Annual Catch & ENSO Record

TAC: 500 t/year • 15% (75 t) carryover permitted from prior-year unused quota • Fishing season: January–April

Fishing Year (Jan–Apr)	Winter	Total Catch (t)	TAC (t)	% of TAC	DJF ONI	ENSO State
2009	2008–09	183.95	500	36.8%	-0.85	Weak La Niña
2010	2009–10	65.43	500	13.1%	+1.50	Moderate El Niño
2011	2010–11	53.96	500	10.8%	-1.31	Strong La Niña
2012	2011–12	287.00	500	57.4%	-0.72	Moderate La Niña
2013	2012–13	315.66	500	63.1%	-0.29	Neutral
2014	2013–14	370.55	500	74.1%	-0.28	Neutral
2015	2014–15	295.03	500	59.0%	+0.69	Weak El Niño
2016	2015–16	334.26	500	66.9%	+2.63	Very Strong El Niño
2017	2016–17	459.02	500	91.8%	-0.19	Weak La Niña
2018	2017–18	503.73	500	100.7%	-0.77	Weak La Niña
2019	2018–19	390.60	500	78.1%	+0.89	Weak El Niño
2020	2019–20	504.63	500	100.9%	+0.64	Weak El Niño
2021	2020–21	456.25	500	91.3%	-0.91	Moderate La Niña
2022	2021–22	0.00	500	0.0%	-0.82	Moderate La Niña (closed — COVID-19 ¹)
2023	2022–23	550.17	500	110.0%	-0.54	Weak La Niña
2024	2023–24	290.00	500	58.0%	+1.92	Strong El Niño
2025	2024–25	219.00	500	43.8%	-0.45	Neutral (cool)
2026	2025–26	574.50	500	114.9%	-0.55	Weak La Niña / cool ²

Summary Statistics (2022 included as 0 — COVID closure¹)

18-yr Avg Annual Catch (t)	325.2
Avg TAC Utilization	65.0%

Maximum Annual Catch (t) — record	574.50
Minimum Annual Catch (t)	0.00
Years Reaching ≥90% of TAC	6
Years Below 50% of TAC	5

Average Catch by ENSO Phase (2022 included as 0)				
ENSO Phase	Years	Count	Avg Catch (t)	Avg % of TAC
Moderate-or-stronger El Niño	2010, 2016, 2024	3	271.5	54.3%
Weak El Niño	2015, 2019, 2020	3	396.8	79.4%
Neutral	2013, 2014, 2025	3	301.7	60.3%
La Niña (any strength)	2009, 2011, 2012, 2017, 2018, 2021, 2022, 2023, 2026	9	341.0	68.2%

¹ The Cumberland Sound turbot fishery did not operate in 2022 due to a COVID-19-related closure. The catch is recorded as 0 t and included in averages — this conservative treatment lowers the long-term average and avoids overstating the fishery's typical performance.

² 2025–26 winter ONI: NOAA reports SON +0.5°C, OND -0.55°C, indicating an ENSO-neutral / cool-neutral state transitioning toward weak La Niña conditions during the freeze-up and fishing window. Confirmed weak La Niña / cool-neutral.

Carryover note: Catches exceeding 500 t (2018, 2020, 2023, 2026) reflect the 15% (75 t) carryover provision: when prior-year catch falls short of TAC, up to 75 t of unused quota carries forward. Each over-100% year follows a year that left substantial quota uncaught — and 2026 follows 2025's 219 t catch (281 t left uncaught). authorizing the maximum 75 t

ENSO data source: NOAA Climate Prediction Center, Oceanic Niño Index (ONI v5), DJF (Dec–Jan–Feb) values, via Golden Gate Weather Services compilation.

Color key: Strong/Very Strong El Niño = dark orange • Weak/Mod El Niño = peach • Neutral = grey • Weak/Mod La Niña = light blue • Strong La Niña = darker blue • Closed year = yellow • New record = green.