

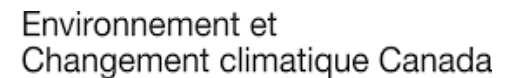
Davis Strait 2017 – 2018 genetic mark-recapture study results



This study report was completed as a collaboration between:

- Markus Dyck, Government of Nunavut
- Kylee Dunham, University of Alberta
- Aaron Dale, Torngat Wildlife, Plants & Fisheries Secretariat
- Andrew Derocher, University of Alberta
- David Hosmer, University of Massachusetts
- David Koons, Colorado State University
- John Pisapio, Government of Newfoundland & Labrador
- Eric Regehr, University of Washington
- Guillaume Szor, Gouvernement du Québec
- Jasmine Ware, Government of Nunavut

Thank you!



Introductions



Alyssa Bohart
Polar Bear Biologist
Department of Environment
Government of Nunavut



Transition

- Since 2021 there has been a transition at the Department of Environment in the Government of Nunavut
 - Tragic loss of our Polar Bear Biologist Markus Dyck in an accident
 - Two Polar Bear Biologists resigned last year
 - There are two new biologists continuing the program



Survey Process



1. Create a study design

Survey Process



2. Consult on study design and get feedback

Survey Process



3. Incorporate feedback into study design

Survey Process



4. Fly the survey

Survey Process



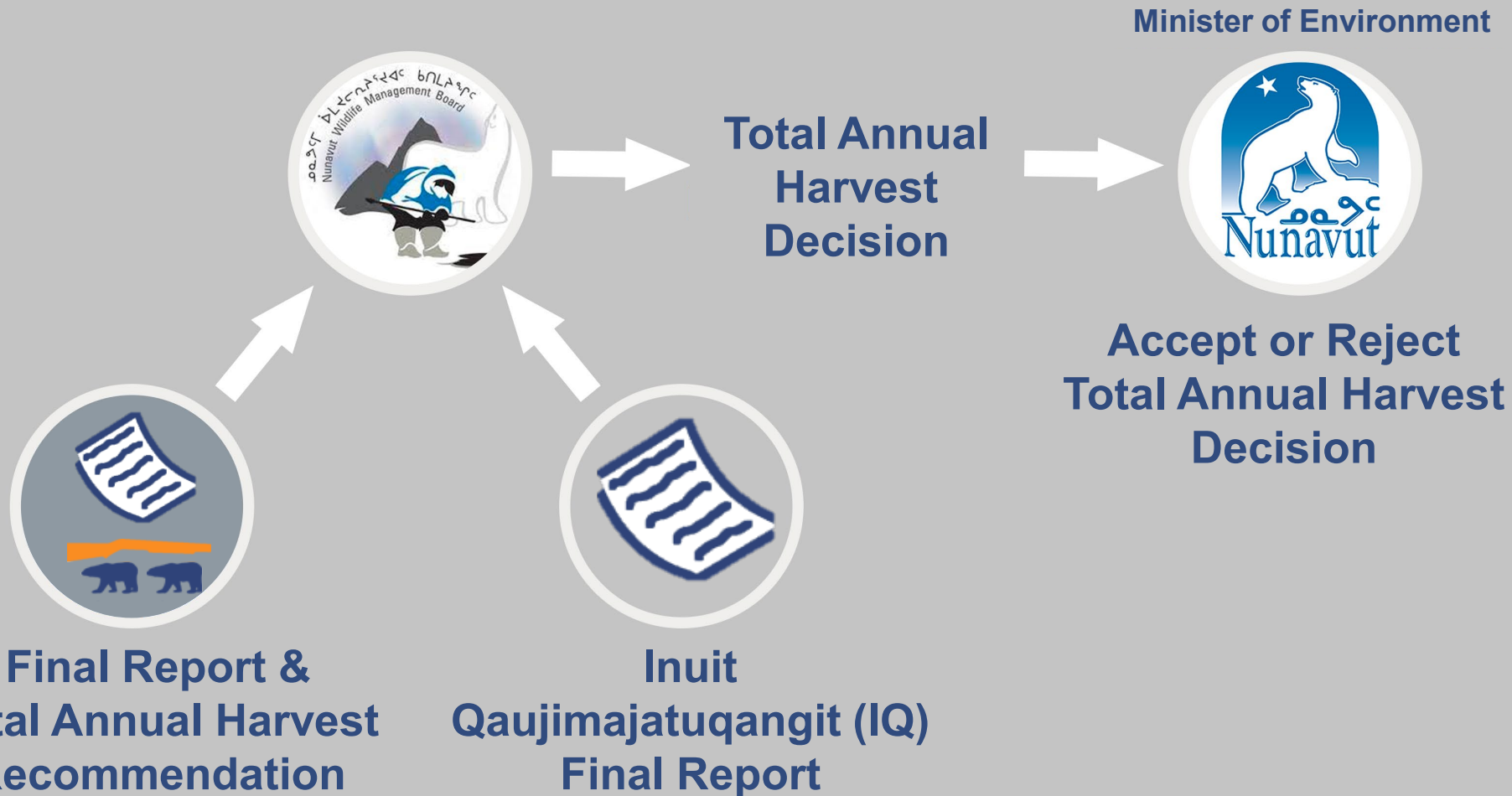
5. Analysis & Writing Final Report

Survey Process



6. Consulting on Final Report

Survey Process



7. Total Allowable Harvest Decision-Making

Survey Process

Minister of Environment

Regional Wildlife Boards



Accepts



Accept or Reject
Total Annual Harvest
Decision

Decide how many tags
each community gets



Send tags to
communities

7. Total Allowable Harvest Decision-Making

Survey Process



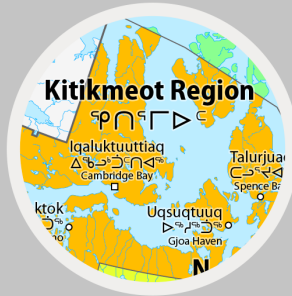
Minister of Environment

Regional Wildlife Boards

7.



Accepts



Purpose of this presentation



Provide summary of
the results from the
study

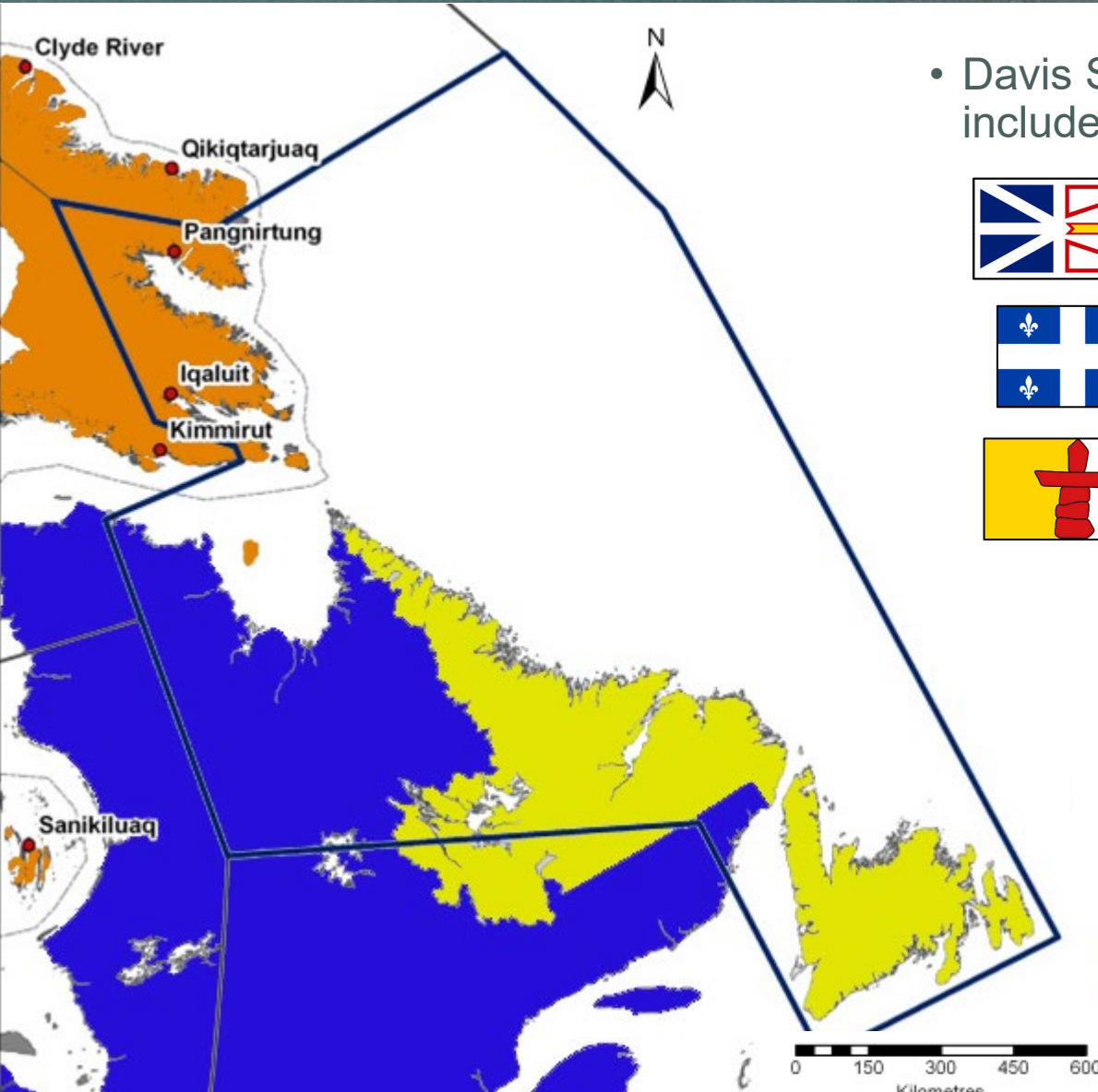


Obtain feedback from
your HTO



Next steps

Background



- Davis Strait polar bear subpopulation includes several jurisdictions



Newfoundland & Labrador

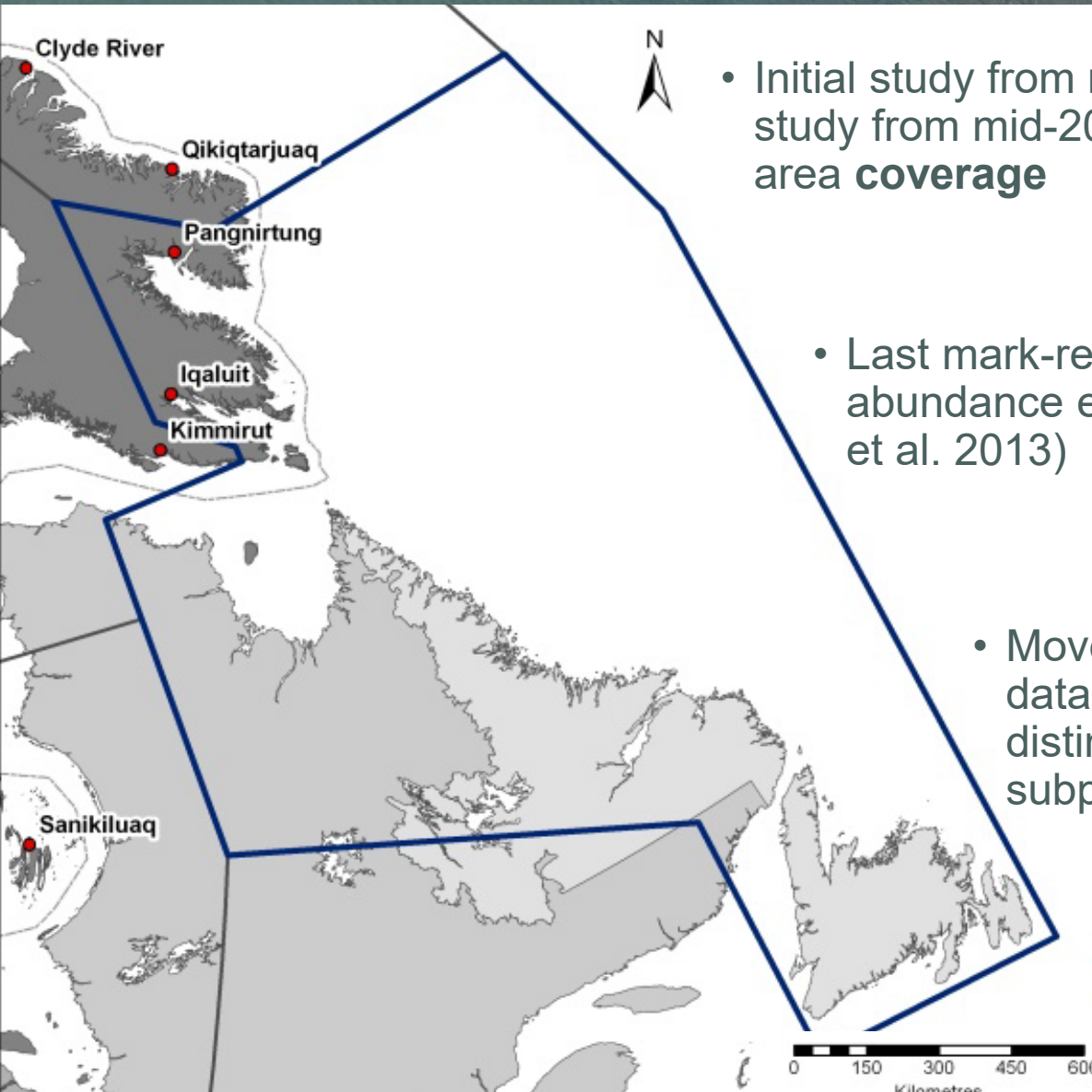


Québec



Nunavut

Background



- Initial study from mid-70s **cannot be compared** to study from mid-2000s because of **different study area coverage**

- Last mark-recapture study 2005 – 2007 with abundance estimate of **2,158 bears** (Peacock et al. 2013)

- Movement data and mark-recapture data indicate the subpopulation was distinct from surrounding subpopulations

Background



- Bear numbers **increased** significantly since mid 1970s
 - local knowledge
 - impacts on other species (birds, seals)
- **Higher density** than most populations
 - relatively low harvest
 - lots of harp seals
- Communities generally wanted to **decrease** abundance since 2005-07 study.

Objectives of study

1

Estimate current population size & compare with past estimates to evaluate population trend and status.

2

Estimate survival and reproduction parameters for the 2005-2018 period.

3

Provide updated information to all management authorities that share this subpopulation for management decisions.

Study Design

Davis Strait Polar Bear Study Timeline

Planning & Consultations

2015-16



- Study design
- Method choice
- Logistics planning
- Consultations with co-management partners

Field Work

2017-18



- NL, NU, Nunatsiavut, QC, Torngat Secretariat, and HTO/LNUK members
- August-October
- 2 years

Analyses, Report, & Consultations

2019-23



- Compile data
- Analyze data
- Prepare final report
- Community consultations

Study Design



Community Participation

2016

Survey design and method choice

**2017
2018**

Survey observers

2023

Review & evaluation of results

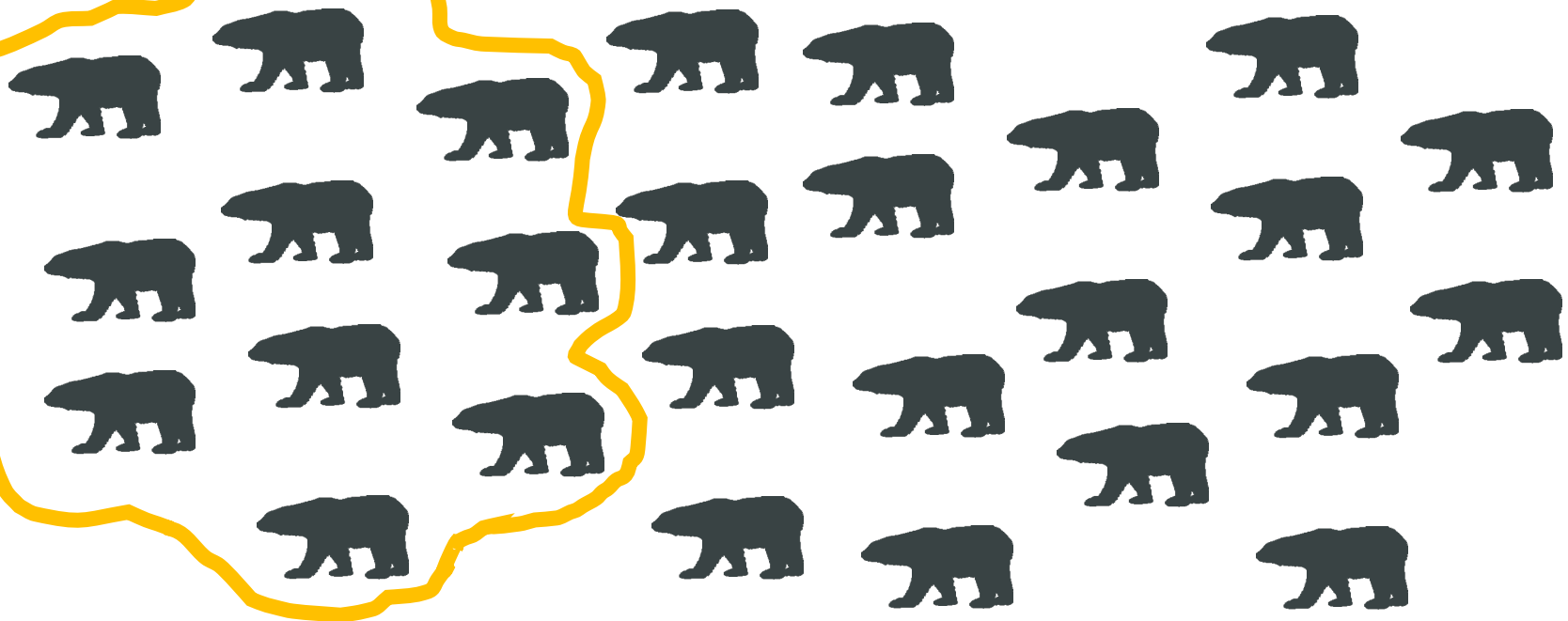


Planning & Consultations

- How do we estimate **how many bears** are in a population?
 - We can't count ALL bears
 - Instead, we **take a sample** and then **calculate** an approximate number → Mark-Recapture Method

Sample

Population





Planning & Consultations

Example of Mark-recapture method (calculating population abundance)

2021 – Mark Year

2022

2023 – Recapture Year

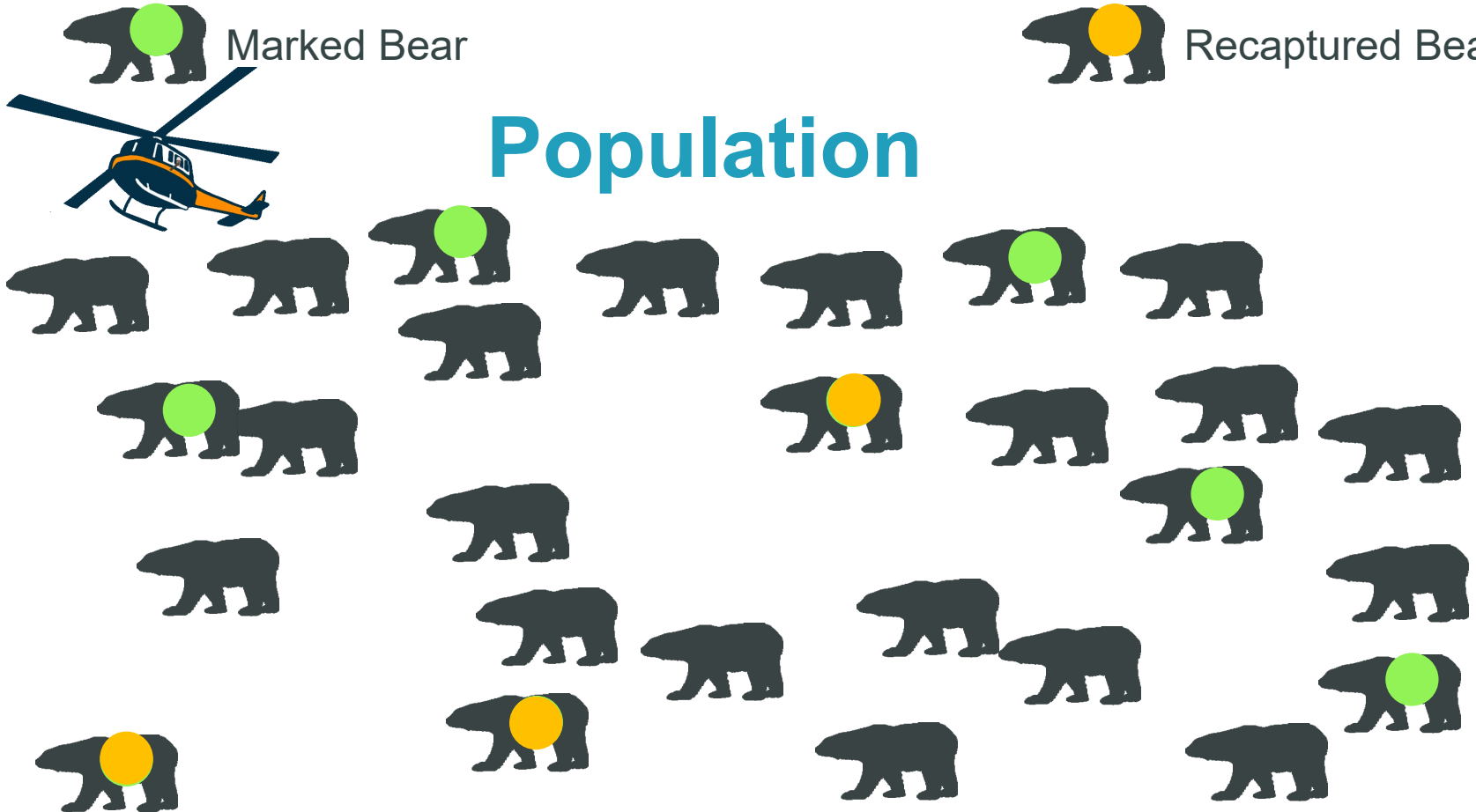


Marked Bear



Recaptured Bear

Population





Planning & Consultations

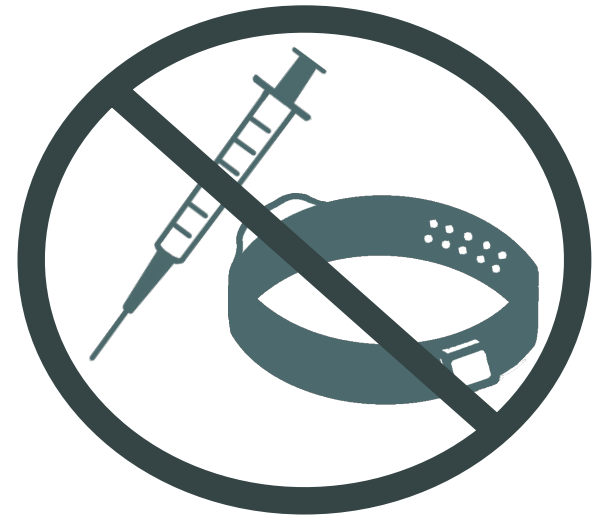
Mark-recapture method (calculating population abundance)

- How do we mark bears?
 - Tag and Collar
 - This was done in 2005-2007 DS study
 - Collect DNA
 - Biopsy darting
 - Harvest samples

Planning & Consultations



- Consultations in 2016
- Captured and collared bears in 2005-2007 study
- Co-management partners indicated concern about **drugging & handling** bears
 - Explore **alternative** population assessment methods
 - Better reflect **Inuit societal values**
- **Balance** with analysis needs to properly monitor population
 - Biopsy darting



Genetic Mark-Recapture = Biopsy Darting



Field Work



Genetic Mark-Recapture

- Biopsy sampling – bears **not physically handled** or **sedated**
- Project happened in August – October 2017 and 2018

Dart after collecting sample.
Immediately falls out.
No handling



Field Work



Genetic Mark-Recapture

- Looked for bears based on **Inuit Qaujimagatuqangit (IQ) and science**
 - **High-density:** up to 5km from coast
 - **Medium:** 5-10km inland
 - **Low:** 10-30km
- Also flew over **off-shore islands**
- Same technique applied in Baffin Bay study and **worked very well**



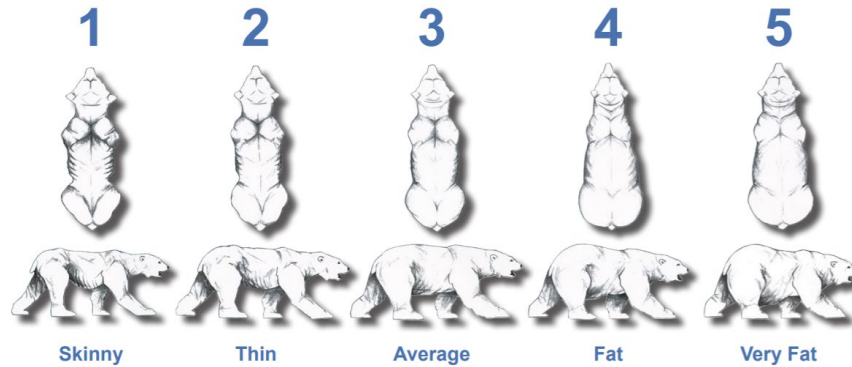
Field Work



Data Collected



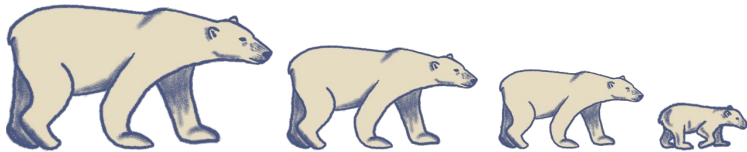
Biopsy/Genetics



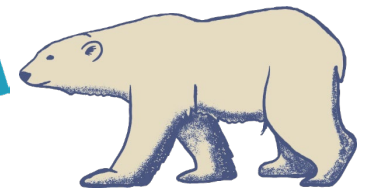
Body Condition



Location

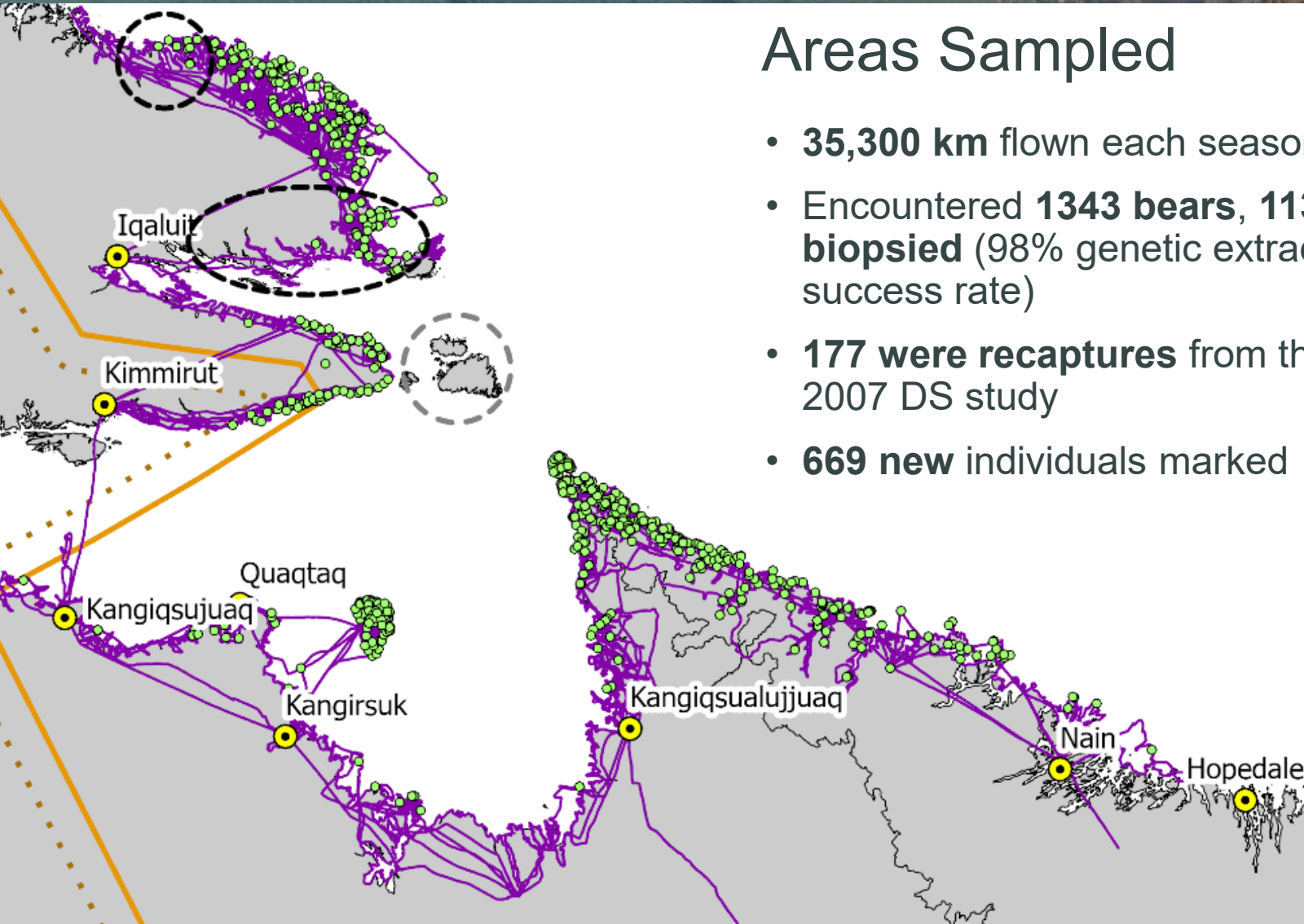


Age Class



Sex

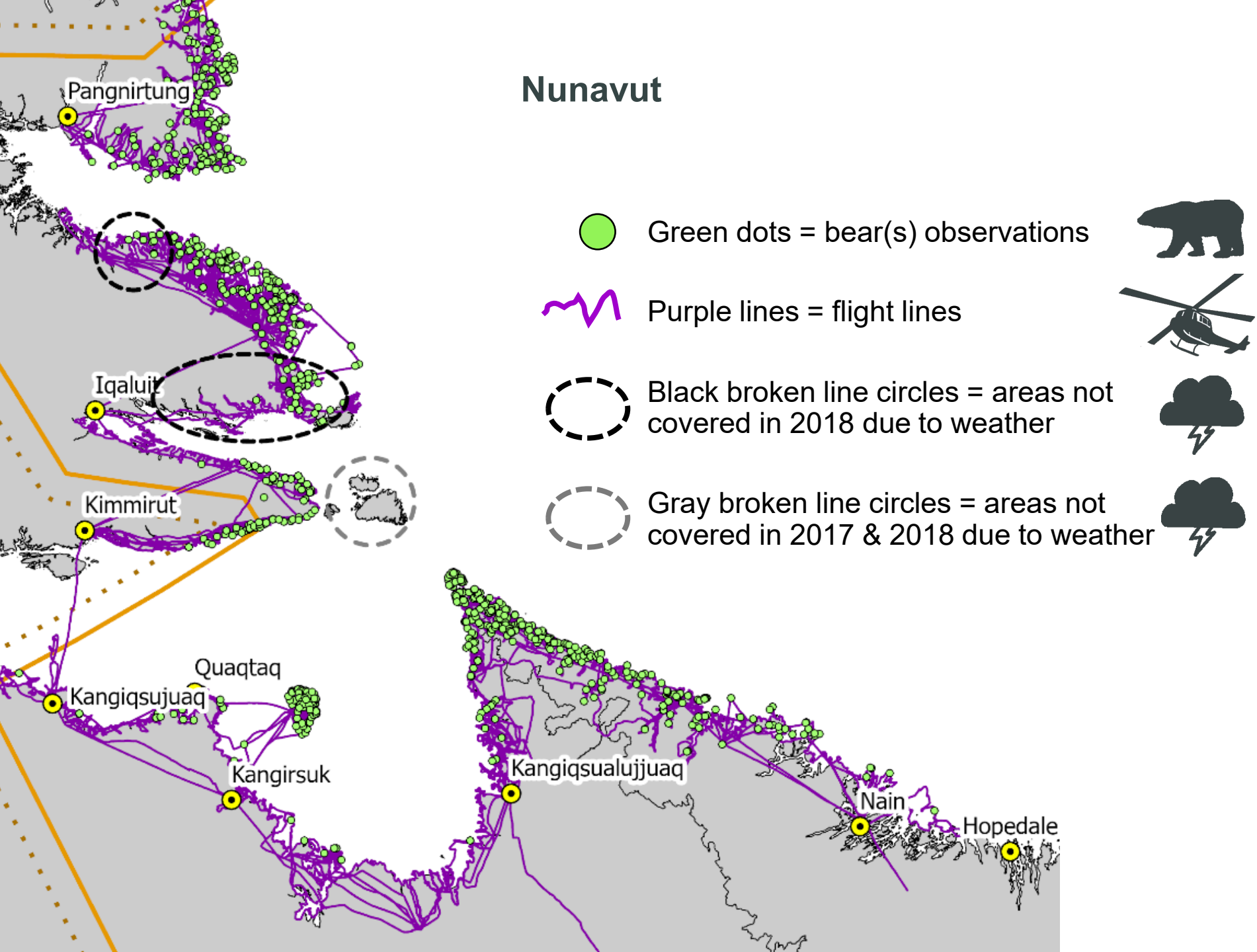
Field Work



Areas Sampled

- **35,300 km** flown each season
- Encountered **1343 bears**, **1139 were biopsied** (98% genetic extraction and ID success rate)
- **177 were recaptures** from the 2005 – 2007 DS study
- **669 new individuals** marked

Nunavut



Analyses



Dataset

- Included all available data for analysis:

Collars



+

Biopsies



=

Live-capture bears

- 2,513 live capture bears
- Collars 2005-2007
- Biopsies 2017-2018



Harvest Samples

- 1,623 harvest samples submitted
- 445 Baffin Bay, 460 Davis Strait, 718 Foxe Basin

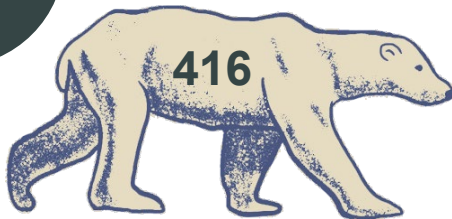
Analyses



Body Condition

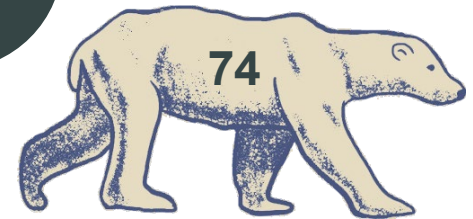
- Bears were assigned a Body Condition in both studies
 - Physical handling (2005 - 2007)
 - Aerial observation (2017 - 2018)
- Bears were in better body condition in 2017-2018

20% in poor condition



2005-2007

8% in poor condition



2017-2018

Analyses

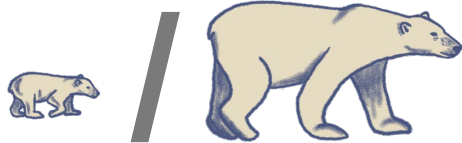


Reproduction – What do scientists look at?

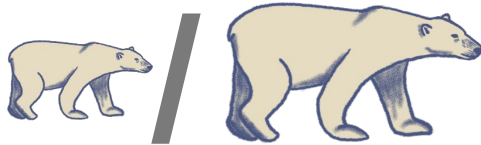
- **Number of offspring** compared to **all adult females**

2005-2007

- **0.30** COYs/adult female



- **0.33** yearlings/adult female



2017-2018

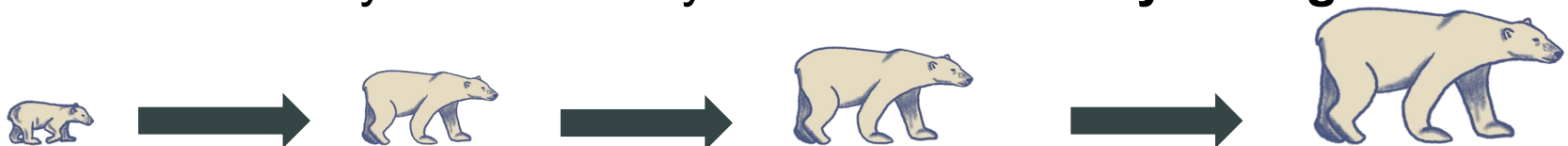
- **0.41** COYs/adult female



- **0.33** yearlings/adult female



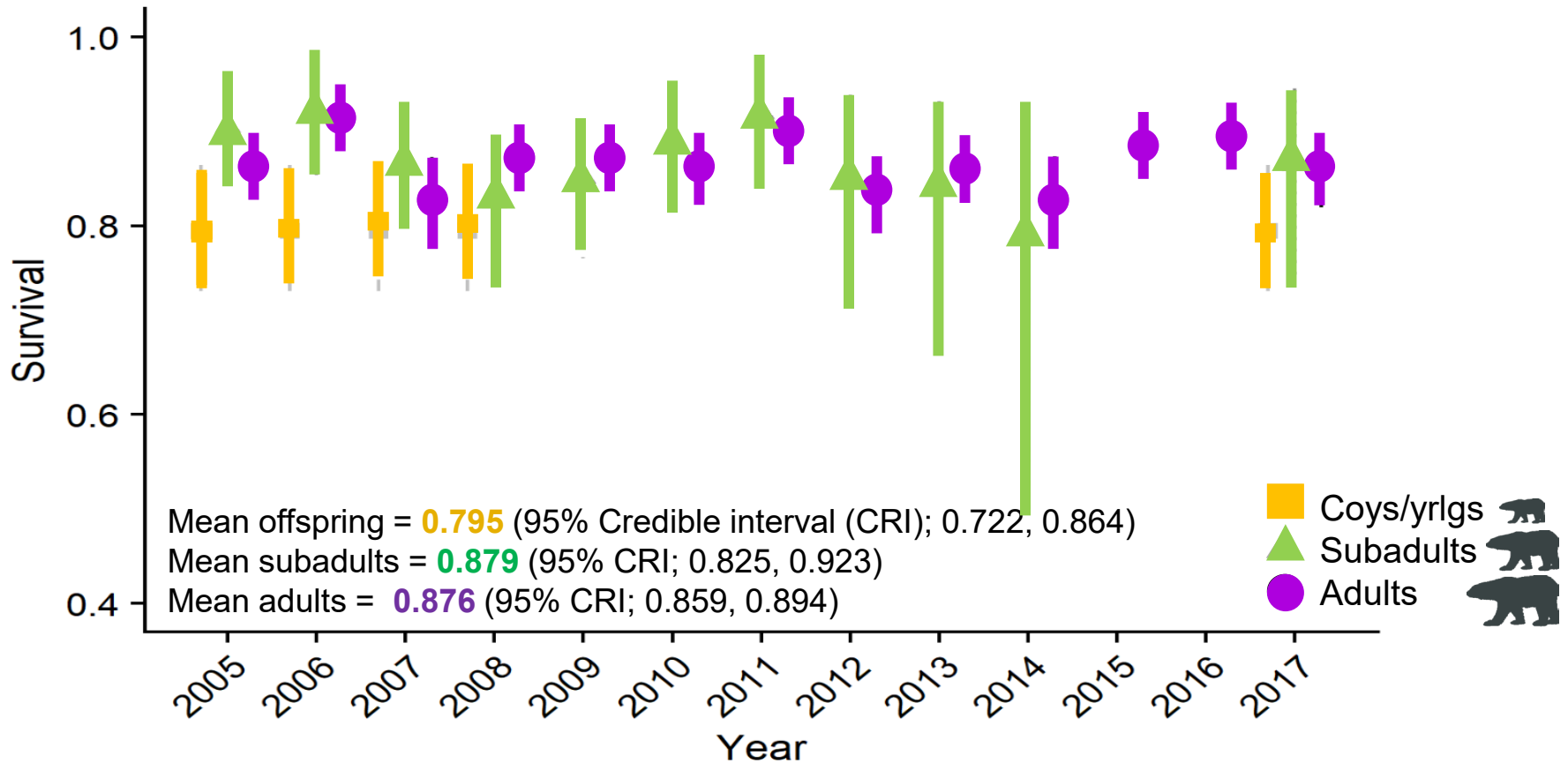
- Number of yearlings for each adult female is important because it shows how many cubs-of-the-year **survive to be yearlings**



Analyses



Survival

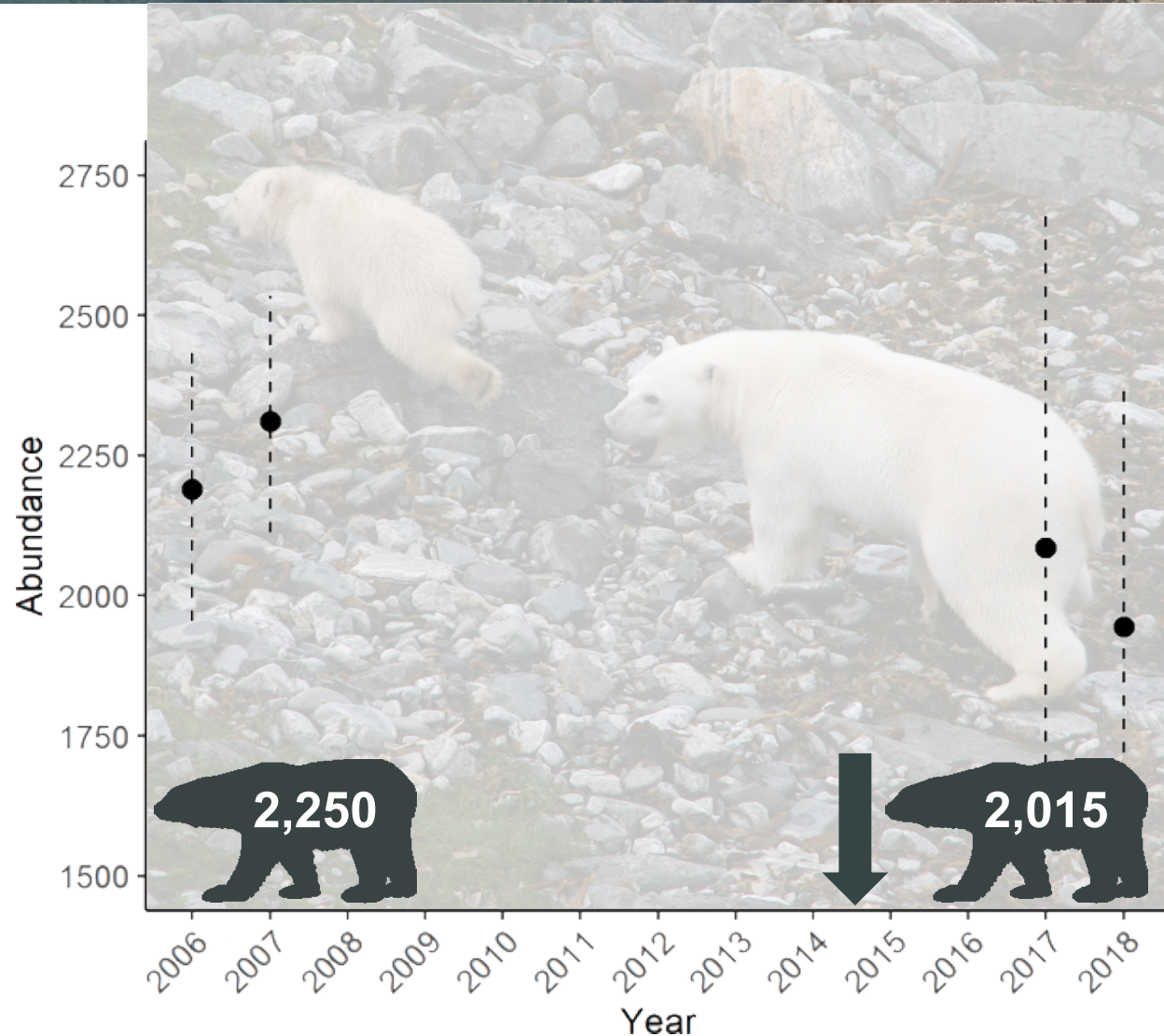


Analyses

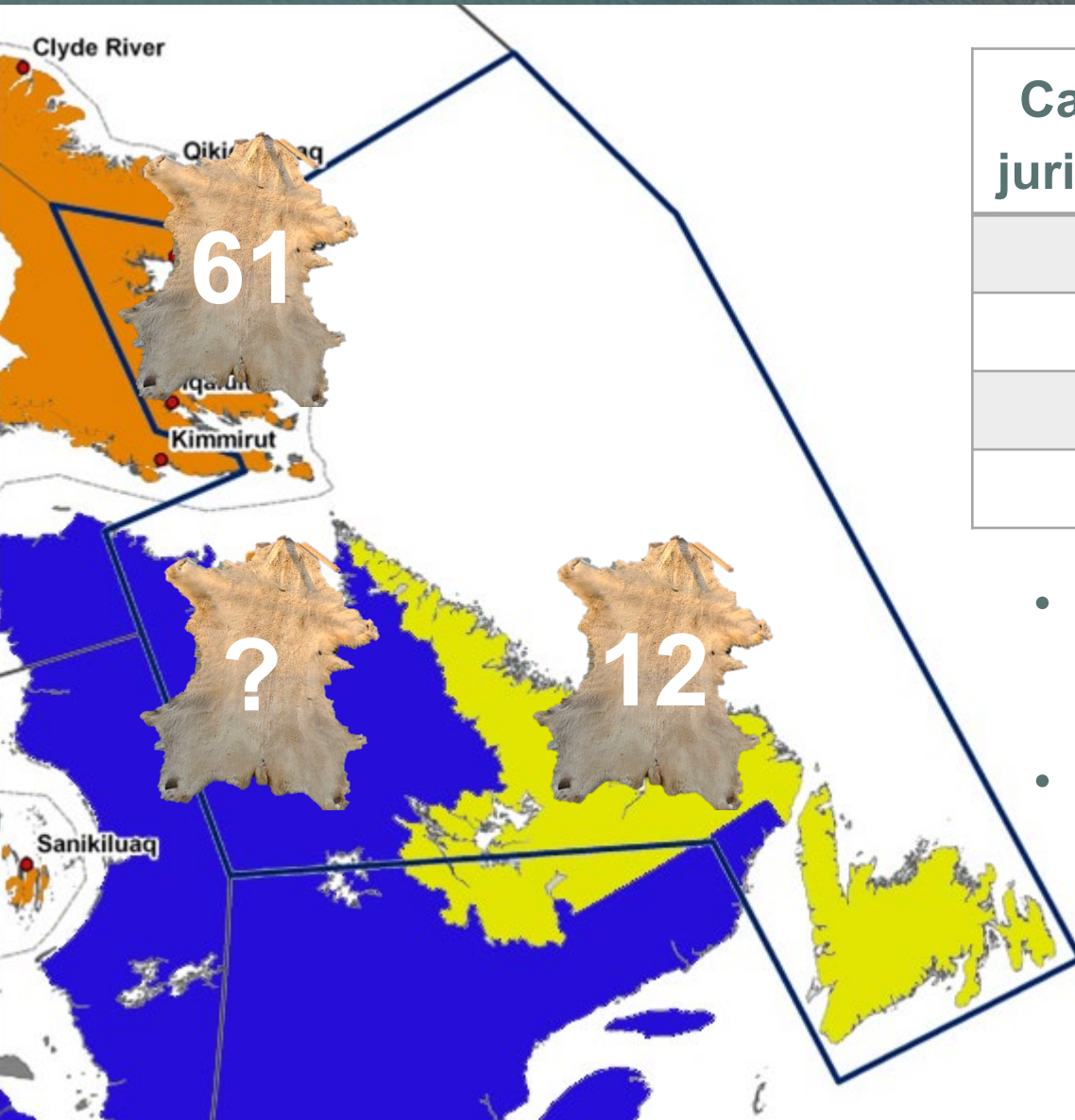


Abundance

- Less abundance in 2017-2018 than in 2005-2007
- Why?
 - Increased harvest
 - Nunavut community objective to slightly decrease population size



Davis Strait Harvest Overview



Canadian jurisdiction	Harvest quotas	
	2005-07	2017-18
NL	6	12
QC	No quota	No quota
NU	46	61

- Nunavut harvest averaged: **44 bears/year** since quota increase to 61.
- Overall DS harvest **increased**
 - 1998-2008 = 64.1
 - 2009-2019 = 86.8

Davis Strait Harvest Overview

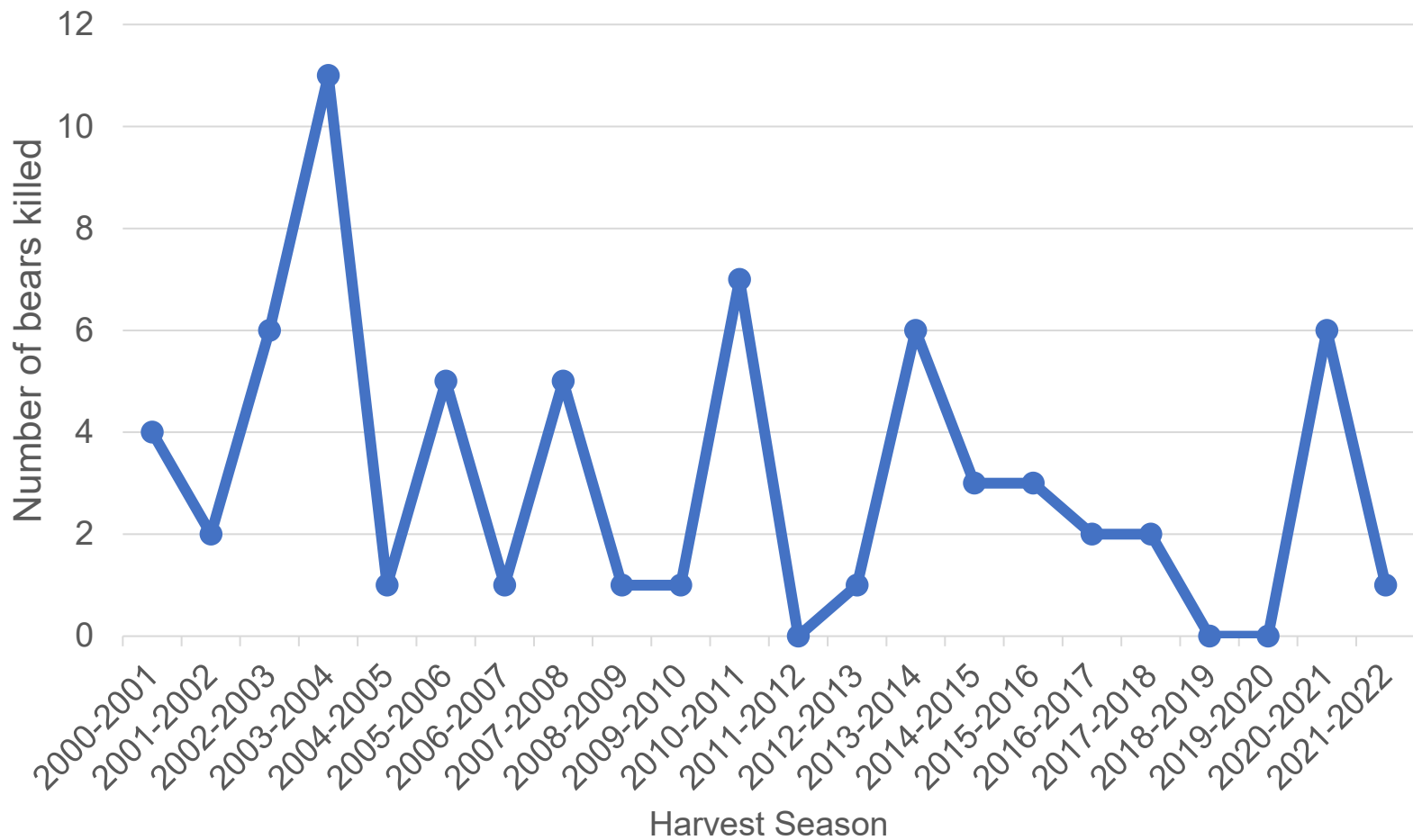
Harvest in Different Jurisdictions

Harvest Years	Jurisdiction				DS Mean	Proportion Female
	NU	Quebec	NL	GL		
1999-2008	39.4 ± 4.6	16.5 ± 8.4	5.9 ± 1.4	2.3 ± 2.0	64.1 ± 10.1	0.345
2009-2019	44.2 ± 10.1	30.2 ± 5.9	10.9 ± 3.5	1.5 ± 1.5	86.8 ± 23.6	0.350

- Nunavut **quota is 61**, but harvest has been about **44 bears a year** for last 10 years.
- 67 credits converted to tags in 2019/20 and 2020/21 and **none of those were used**.

Davis Strait Harvest Overview

Defence of Life and Property Kills (DLPK) in DS Nunavut



Nunavut Inuit Qaujimajatuqangit on the health of the Davis Strait polar bear population

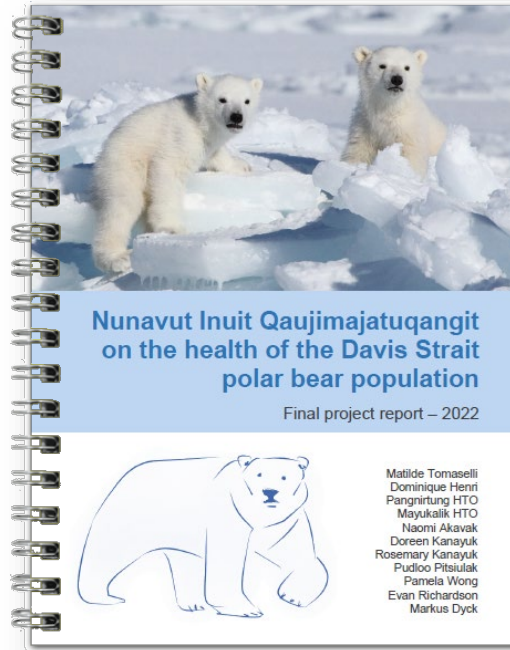
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Dominique Henri
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Environment and Climate Change Canada Environnement et Changement climatique Canada
 Polar Knowledge Canada Savoir polaire Canada



Next Steps – Harvest Management

	Western Science Study	Inuit Qaujimagatuqangit Study
Question	Result	Result
Body Condition	Better in 2017-2018	Good condition
Cubs	Relatively stable	Females with 2 cubs most often observed
Survival	Relatively stable	Stable
Polar bear abundance	Stable/slight decline	Increased
Health		Hair loss sometimes
Prey abundance		Ringed seals declined
Sea Ice		Changes in quality & quantity

Next Steps – Harvest Management

- Do you agree that the number of polar bears **stayed relatively the same** over time?
- Are there **enough** bears to harvest? Are there **too few**? **Too many**?
- What did you observe in the bears' **body condition** over time?
- Is there anything **special** that you observed and wanted to share with us?
- Where do you **agree/disagree** with our findings?

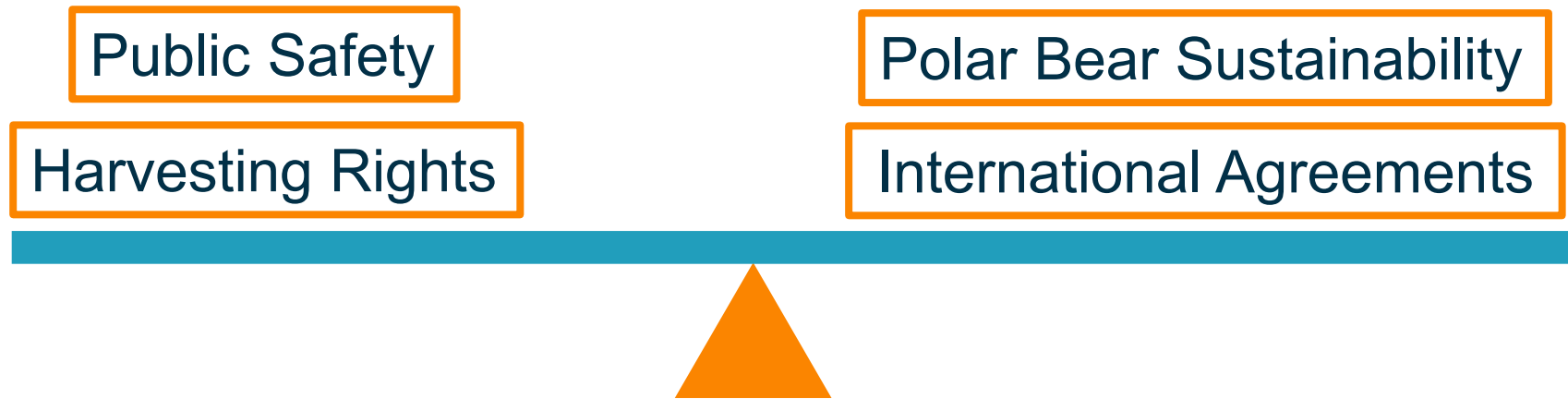
Next Steps – Harvest Management

- Think about **how your HTO would like to manage** the Davis Strait subpopulation?
- Davis Strait is a **shared subpopulation** between Canada and Greenland
 - Within Canada: Newfoundland and Labrador, Nunavut, and Québec
- Decisions on management will **likely be a multi-jurisdictional process** so Nunavut should have a clear position on the management goal for Davis Strait
 - We will keep you and other partners informed as this process develops

Next Steps – Harvest Management

Job of the Department of Environment

- Balancing act



Draft Total Allowable Harvest (TAH)

- The current TAH for Davis Strait in Nunavut is 61 bears per year.
- Department of Environment at this time is **not recommending a change** to the TAH
 - This is because of
 - Management objective of a **slight decrease** and **slight population decline**
 - **Overall DS stable** (body condition, reproduction, survival)

Dedicated to Markus
Dyck.

Thank you for all of your
hard work.



Thank you!



Questions?