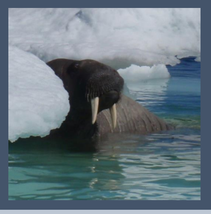

Dealing with limitations & biases when documenting Inuit Knowledge of Arctic species

An example of walrus in Nunavik (Quebec, Canada)

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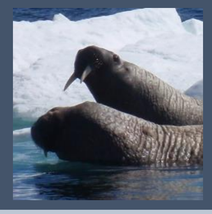


Introduction

- Inuit Knowledge (IK) provides valuable information about Arctic wildlife ecology
- But, limitations and biases in the methods used to gather, analyze and represent IK cannot only jeopardize the validity of the data, but potentially result in negative impacts for wildlife populations

Objectives

- Detect the limitations and biases in IK methods and provide solutions to deal with and reduce those
- Create more reliable datasets that better reflect hunters' knowledge and observations
- Increase trust and confidence in these datasets as a valuable source of knowledge for wildlife management

General methods

Interview & mapping with Charlie and Lizzie as interpreter (Quaqtaq, June 2013); Group validation workshop with Ali, Charlie, Mattiusi and Tivi (Ivujivik, July 2014)

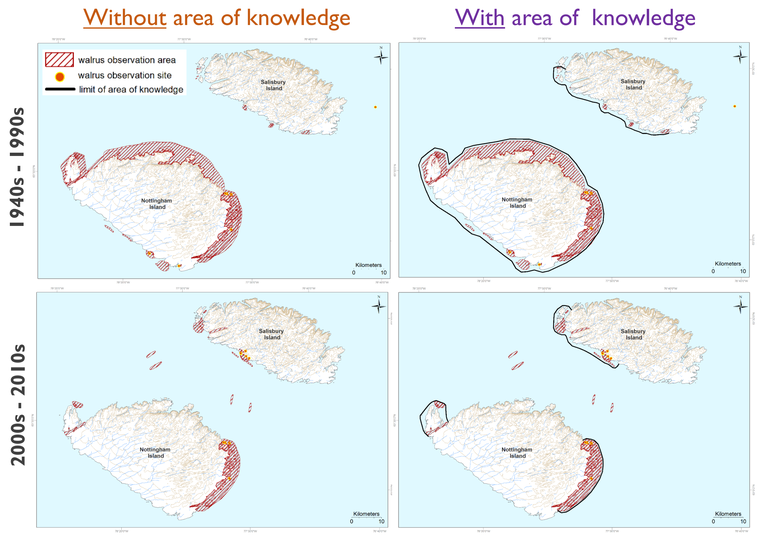
Knowledge from 33 expert walrus hunters and elders was collected in Quaqtaq, Ivujivik, Inukjuak and Kangiqsualujjuaq (Nunavik, Quebec)

- Semi-directive interviews with mapping process
- Interviews audio-recorded, transcribed and analysed in NVivo10
- Maps scanned, digitized and analysed in ArcGIS
- Results verified and validated during group workshops

Objective 1 - Define the limitations in space & time of the knowledge

METHODS **Established the geographic limits of participants' main area of knowledge** = area for which participants have knowledge, and with which they are familiar (per time period and season; during validation group workshop)

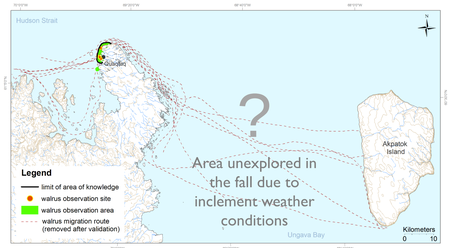
RESULTS **Case study 1**: IK & walrus (FALL, Ivujivik)



- Bias that walrus are absent from certain areas
- Bias towards the coast
- Potential biased interpretation that animal distribution changed across time

- Define areas that hunters typically visit and do not see walrus
- Define areas that hunters never visit
- Highlight temporal change in participants' area of knowledge

Case study 2: IK & walrus (FALL, Quaqtaq)



During interviews, participants explained that walrus use the same migration routes in the fall to return to overwintering grounds, but also that boating activities were rare after September.

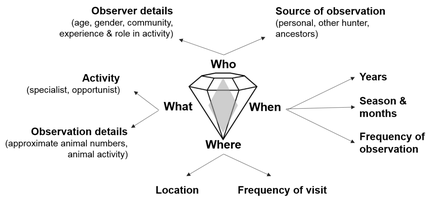
When adding participants' area of knowledge, it became clear that fall observations occur mostly around Quaqtaq

CONCLUSIONS

- It is essential to record participants' area of knowledge when mapping IK
- Validation workshops highlighted the desire of participants to include their area of knowledge on maps and in analyses
- Next step: Record each participant's personal area of knowledge during interviews

Objective 2 - Highlight the key mapping data to be collected

The data diamond
(Terry Tobias, modified version)



Example: Importance of collecting approximate animal numbers

OBJECTIVE

Test whether area sizes are proportional to the approximate number of walrus observed

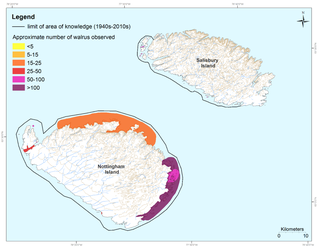
METHOD

- Measure the size of the walrus observation areas drawn (n=120)
- Compare these areas with the approximate number of walruses observed by participants (<5, 5-15, 15-100, >100)

RESULTS

Kruskal-Wallis chi-squared = 1.43, df = 3, $p = 0.67$

As expected, larger areas do not contain higher numbers of walrus



CONCLUSION

Documenting and presenting the **approximate number of animals observed *per unit area*** is critical for a better understanding of walrus habitat using IK

Objective 3 - Determine the variables influencing map information

SUB-OBJECTIVE Determine which variables - age, number of hunting trips, hunting period, community - explain the variability in the quantity of mapped data

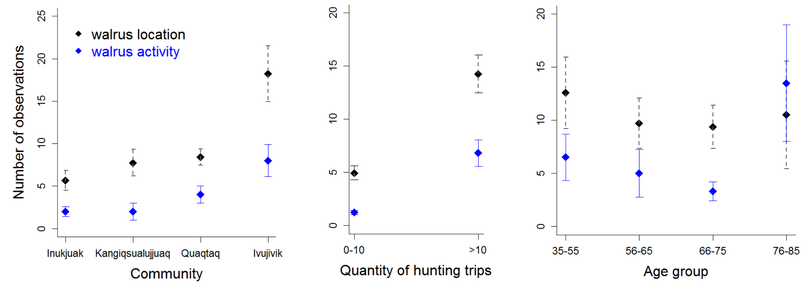
METHODS **Data collected per participant** (n=29 participants; men only)

- Number of walrus observations (walrus location)
- Number of walrus observations with detailed information (walrus activity [e.g. feeding, basking])

Statistical analyses (in R): Top down strategy of linear models

RESULTS

- Walrus location explained by: community + number of hunting trips
- Walrus activity explained by: community + number of hunting trips + age



CONCLUSIONS

- Number of hunting trips should be included in the criteria used to select participants
- While Elders do not provide higher quantity of map information, they provide greater diversity
- Next step: Try to quantify and understand the variability in the precision of the observations

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