Combining close-kin- and self-mark-recapture to improve walrus abundance monitoring

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Abstract

Abstract, should normally be not longer than 200 words.

walrus ,CKMR ,mark-recapture -557

# 1 Introduction

* Walrus have been in a bad way, and climate is changing, and they need to be monitored for [MMPA etc].
* Aerial surveys NBG, so monitoring entails expensive shipboard surveys using biopsy mark-recapture.
* Biopsies also contian info about close-kin in the samples, which can substantially augment the inofrmation content of a given amount of sampling effort.
* We investigate how CKMR+IMR can be used to substantially *reduce* the overall amount of survey effort required for adequeate monitoring.

Also:

* lethal samples as well as non-lethal
* DNAge

# 2 BCB Walrus

## 2.1 Walrus biology & history

## 2.2 Existing IMR sampling and modeling

# 3 CKMR for walrus

(slightly) simplified model for Design purps. Concentrating on ...

## 3.1 MOPs

## 3.2 XmHSPs

### 3.2.1 The breeding cycle

## 3.3 SelfPs: IMR in a CKMR setting

## 3.4 Simulations and model checking

... estimodel vs sims

# 4 Design calculations for CKMR+IMR

great wodge of theory— NB 2 MB what about HS..?

“flowchart” for what you *actually* need

# 5 Results

obvs the checks passed (eventually...). Not much more to say! (I suspect it’s not worth reporting the checks— where do you stop with that? but perhaps they should be avilable online, eg obs & exp kin-totals? mebbe report the deriv checks for bias, dunno)

Present some scenarios and results together (do NOT put “scenarios” into separate ealier section, it just confuses the hell out of readers).

## 5.1 Sample sizes and duration

Sample size investigations (main thing). Really, the story we want is that adding CKMR lets you get better CVs with less sampling, than if you were just doing IMR. (It’s true, but might be embarrassingly good!)

## 5.2 Sensitivity analyses

* pop-dyn stable/inc/dec (presumably, minimal diff from a Design PoV, ITO how much CKIMR adds rel to IMR— which is the key Design Q)
* turning off CKMR (or IMR)
* value of Lethal

# 6 Discussion

We didn’t bother doing X coz IJAD[[1]](#footnote-34). For real data analysis, we might do Y instead.

Ways to extend the model... impact of DNAge

Future utility of lethal samples (although my guess is: there won’t be enough. Glass-half-full, or glass-half-empty, if you’re a walrus?)

1. It’s Just A Design [↑](#footnote-ref-34)