

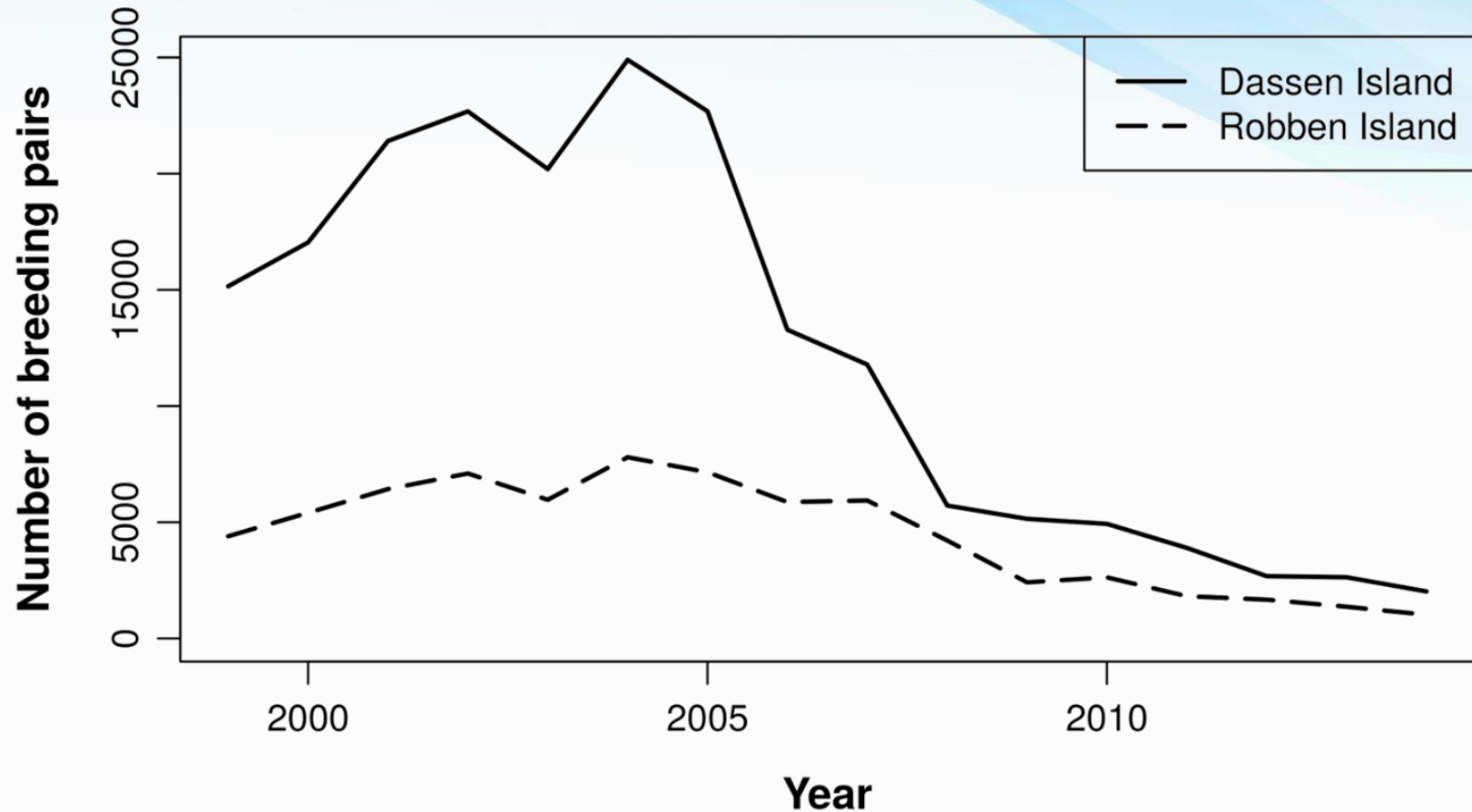
Impact of fishing on the African Penguin Population

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Management Group
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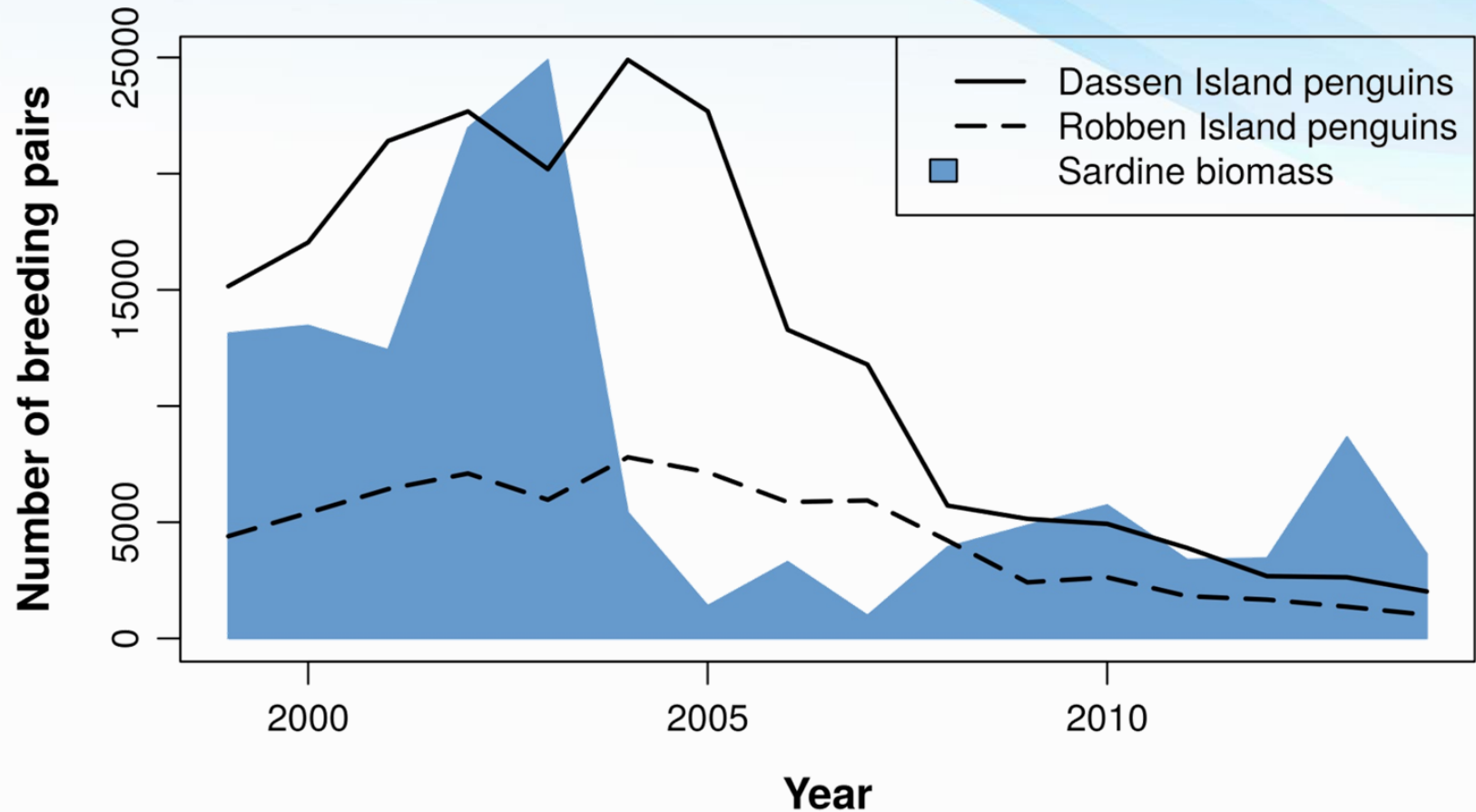


The decline of the penguins



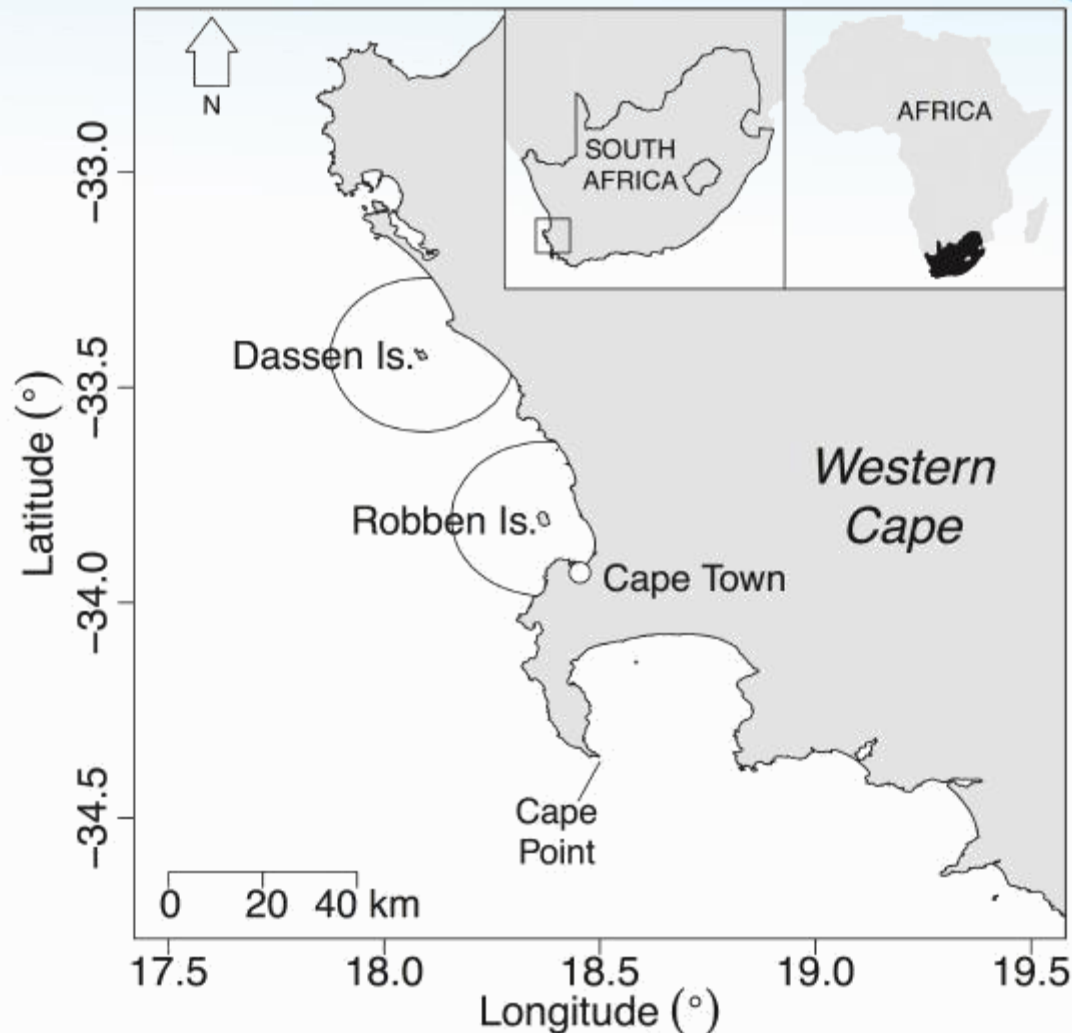
DEA unpublished data

The decline of the penguins



DEA unpublished data

The Island Closure Experiment



Data Collected

- Fledging success
- Chick growth
- Chick condition
- Foraging path length
- Foraging path duration
- Active nest proportion

Random Effects Model

(lmer, lme4 package)

Fishing effect


$$\ln(F_{y,i,s}) = K + \alpha_y + \gamma_s + \underbrace{\left(\lambda\right)}_{\text{Fishing effect}} \frac{C_{y,i}}{\bar{C}_i} + \underbrace{\left(\delta_i\right)}_{\text{Closure effect}} X_{y,i} + \epsilon_{y,i,s}$$

Results

Not uniformly conclusive...

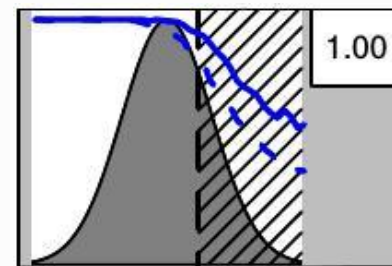
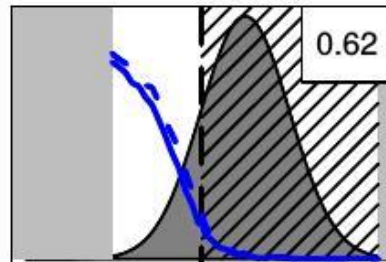
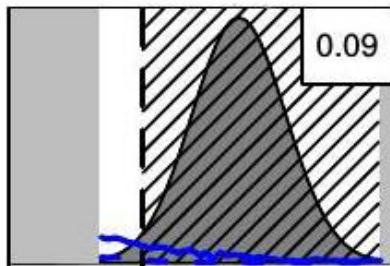
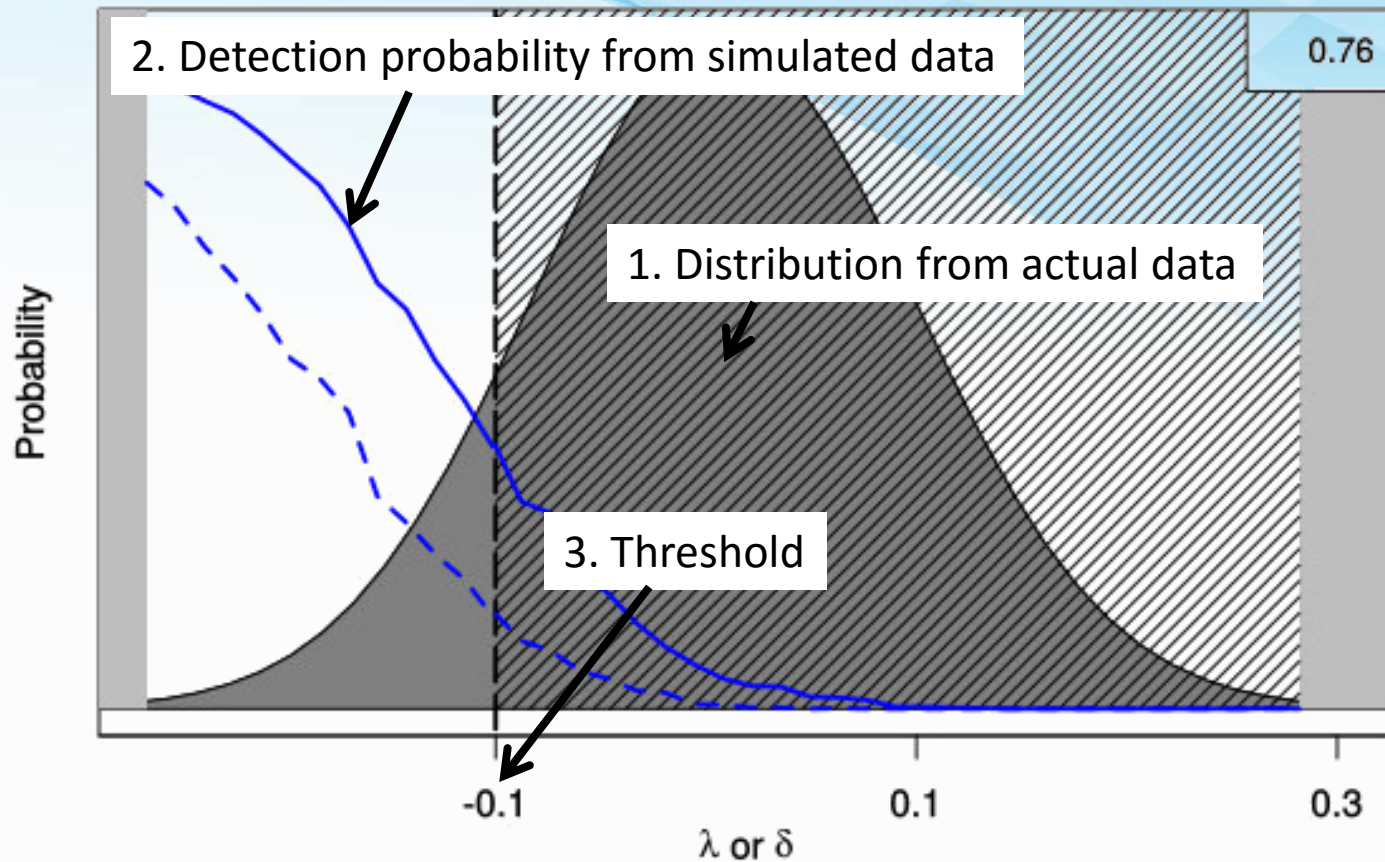


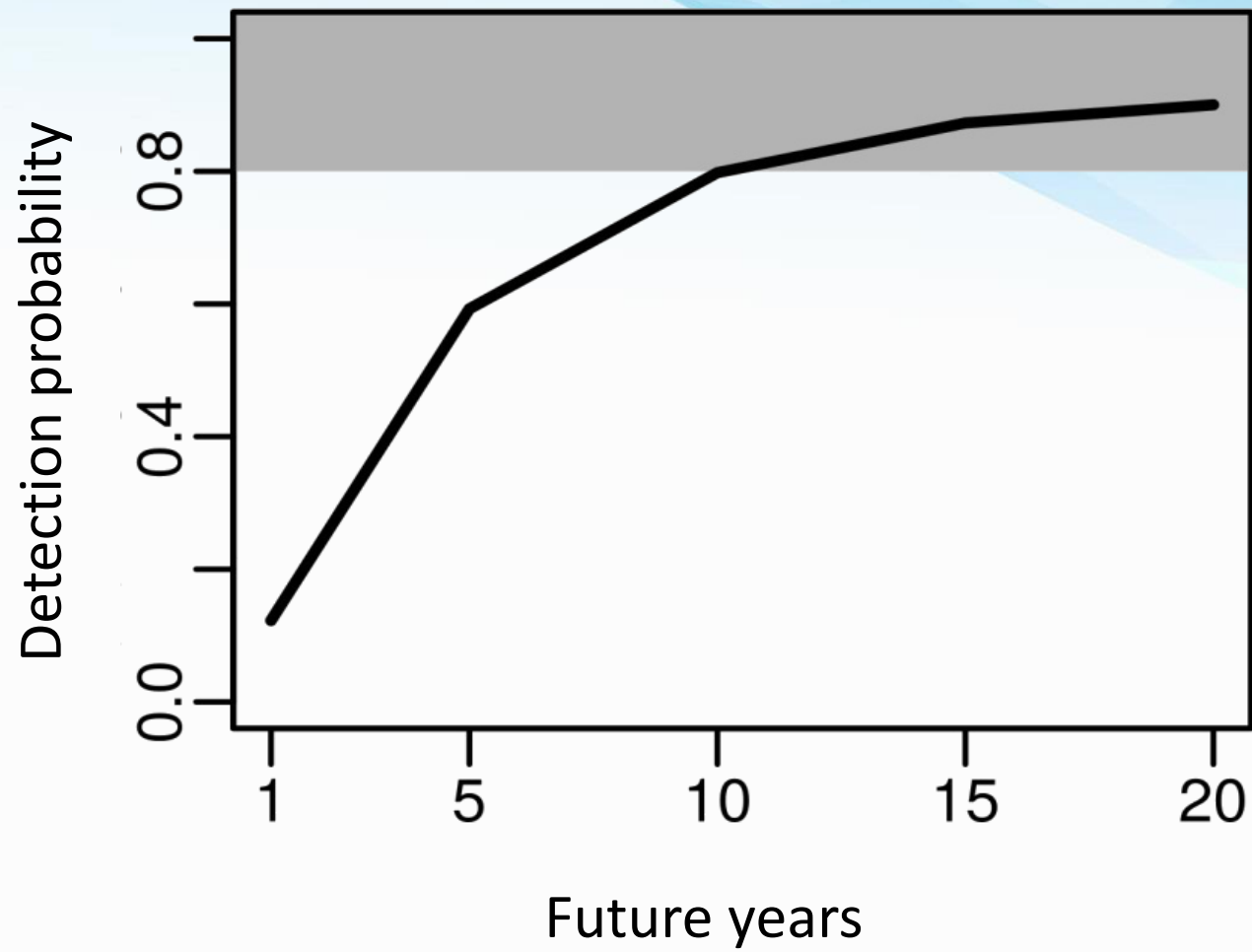
Should the closure experiment
continue?

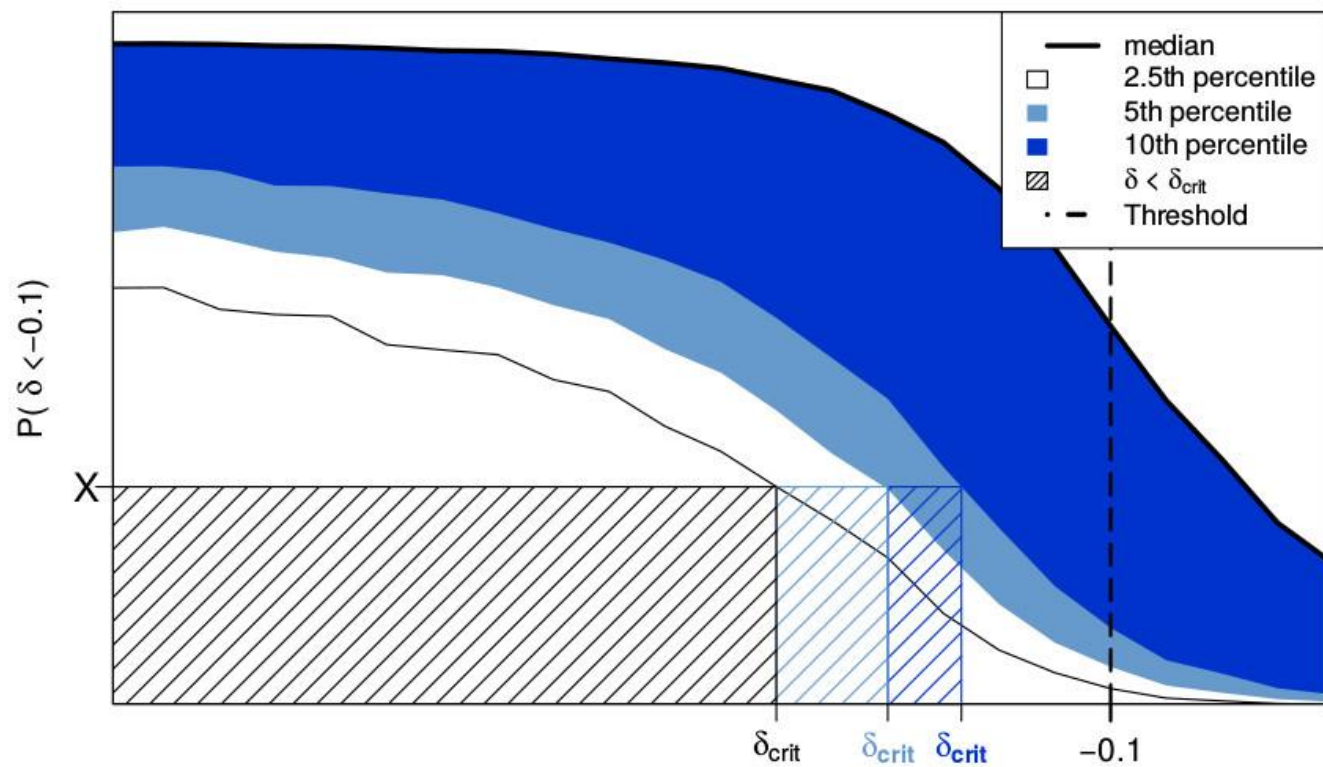
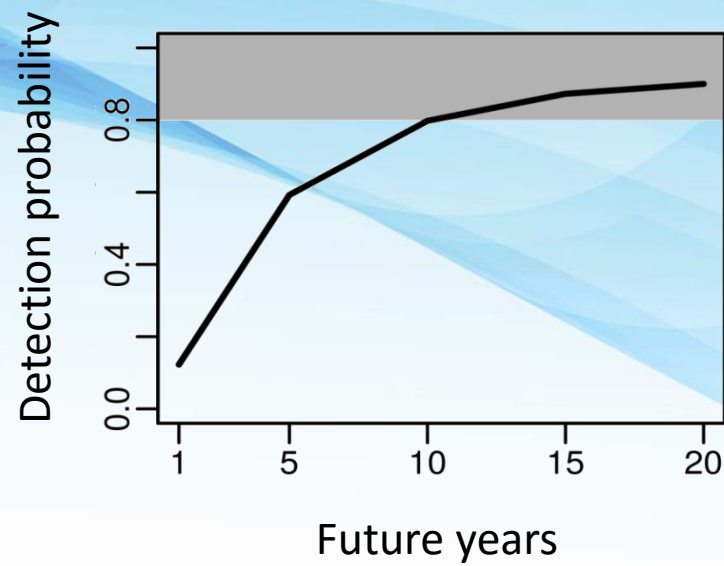


**Assuming there is a biologically meaningful impact
of the fishery on the penguin population,
how long would the island closure experiment
need to continue for
before we are likely to detect this impact?**

Power analysis







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