

# A proposal for future penguin island closures

SWG-PEL Meeting  
26<sup>th</sup> October 2020

Carryn de Moor



Marine Resource Assessment and Management Group (MARAM)  
Department of Mathematics and Applied Mathematics  
University of Cape Town

# A proposal for future penguin island closures

- Island-specific proposals based on the Island Closure Experiment conducted since 2008
- Proposals primarily based on the summary of both sets of GLMM analyses available to the SWG-PEL
- Focus/limit further work
- Analyses based on data up to 2018 – before MPAs
- Robinson *et al.* 2015

Island	Penguin performance parameter	Butterworth and Ross-Gillespie	Sherley
Robben	Chick growth	Experiment can't inform	
	Chick condition	Yes	Yes
	Fledging success	Yes	
	Path length	Experiment can't inform	
	Trip duration	Experiment can't inform	
	Max. distance	Experiment can't inform	Experiment can't inform
	Chick survival	No <sup>A*</sup>	Yes
Dassen	Chick growth	Is fishing benefiting penguins?	
	Chick condition	Experiment can't inform	Experiment can't inform
	Fledging success	Experiment can't inform	
	Path length	Is fishing benefiting penguins?	
	Trip duration	Is fishing benefiting penguins?	
	Max. distance	Experiment can't inform	Experiment can't inform
	Chick survival	Yes	Yes
St. Croix	Chick condition		Experiment can't inform
	Path length	Yes <sup>#</sup>	Yes
	Trip duration	Not yes. Need power analysis to advise if experiment could inform or not	
	Max. distance	Yes	Yes
Bird	Chick condition		Experiment can't inform
	Path length	Possibly no. Need power analysis to advise if experiment could inform or not	Experiment can't inform
	Trip duration	Yes <sup>#</sup>	
	Max. distance	Possibly no. Need power analysis to advise if experiment could inform or not	Experiment can't inform

Table 1 of  
FISHERIES/2020/SEP/SWG-PEL/95rev

# Robben Island

- As both sets of analyses currently show that the closure of Robben Island to purse-seine fishing benefits penguins, Robben Island should be closed for an “extended period” from 2021.
- $\pm 1/3$  of area closed since 1 Aug 2019 as part of MPA.
- “Extended period” ~10 years, after which the closure should be reviewed to determine whether the expected benefit for penguins is being achieved (“benefit” may be a slower decline rather than an increase in numbers).
- Data should continue to be collected during this period and re-analysed once ~8 years more data are available to ensure that results are available before ~10 years.
- The collection of chick condition, fledging success and chick survival should be prioritised.

# St. Croix

- As both sets of analyses currently show that the closure of St. Croix Island to purse-seine fishing benefits penguins, St. Croix Island should be closed for an “extended period” from 2021.
- $\pm 1/4$  of area closed since 1 Aug 2019 as part of MPA.
- “Extended period” ~10 years, after which the closure should be reviewed to determine whether the expected benefit for penguins is being achieved (“benefit” may be a slower decline rather than an increase in numbers).
- Data should continue to be collected during this period and re-analysed once ~8 years more data are available to ensure that results are available before ~10 years.
- The collection of max distance, path length and trip duration should be prioritised (+ new time series?).

# St. Croix

- Useful for SWG-PEL to gain a better understanding of link between foraging data and penguin reproductive success (also for Dassen Island), noting initial comments provided by Sherley
- Review of “extended period” could always be brought forward if ‘better understanding’ suggests such a need

# Dassen Island

- Both sets of analyses currently show that the closure of Dassen Island to purse-seine fishing benefits penguin chick survival.
- Some results from B&R-G suggest the closure of Dassen Island to fishing may be detrimental to chick growth, path length and trip duration?
- Continue 3-year open/closed experiment for short term [1-year] to gain better understanding of these 'counter-intuitive' results.
- (No MPA-complications)
- All time series of data should continue to be collected during this period.
- NOT the opposite of Robben Island results

Robben – benefit (+ experiment can't inform)-> action not better precision

Dassen – conflict -> continuation of experiment

# Bird Island

- Sherley: experiment could not inform on the impact of fishing to penguins on Bird Island
- B & R-G: extending the experiment at this Island may produce more informative results, although there is already a weak indication that closure may decrease trip duration of penguins from Bird Island.
- $\pm 1/2$  of area closed since 1 Aug 2019 as part of MPA.
- In most years (excluding 2006-2010) very little sardine and no anchovy catch has been taken within 20km of Bird Island.
- The lack of contrast (high v low fishing in open v closed years) likely contributes to the ability for this experiment to inform on the impact of near-island fishing to penguins on Bird Island.

# Bird Island

- I see three possible ways forward:
  - (i) Design a new experiment with longer periods for opening/closing?, noting that the MPA would likely constrain analysis of data to the new experimental years to maintain consistency, and results will thus only be available a number of years from now).
  - (ii) Opening the area to purse-seine fishing for an “extended period”.
  - (iii) Closing the area to purse-seine fishing for an “extended period”.
- Given the lack of historical catches around this island (and thus lack of contrast in the data).



# Bird Island

- I see three possible ways forward:
  - (i) Design a new experiment (longer periods for opening/closing?, noting that the MPA would likely mean analysis of data would be constrained to the new experimental years to maintain consistency, and results will thus only be available a number of years from now).
  - (ii) Opening the area to purse-seine fishing for an “extended period”.
  - (iii) Closing the area to purse-seine fishing for an “extended period”.
    - $\pm 1/2$  of area already closed with new MPA
    - Future catches within 20km of the island to continue to be of the same order as the recent past
    - Catches substantially exceeding that could bring review of “extended period” forward. (e.g. OMP ECs re distribution of catches, selectivity, bycatch etc.)

# A proposal for future penguin island closures

Thank you!