

# African Penguins and the Blue Economy

## African Penguin Health: Building a Foundation to Prevent Extinction

MW Webinar

27 January 2021



On behalf of



Federal Ministry  
for Economic Cooperation  
and Development



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA



# Background: why bother?

## African Penguins:

- Endemic to South Africa and Namibia
- Endangered (IUCN, 2009) – 97%↓ in last 100 years
- Extinct < 30 – 80 years?
- Essential ecosystem providers and sentinels
- Economic benefit (tourism)



# Background: why bother?

## African Penguin Health:

- Effect on population sustainability?
- Avian Influenza outbreaks: 2017 - 2018

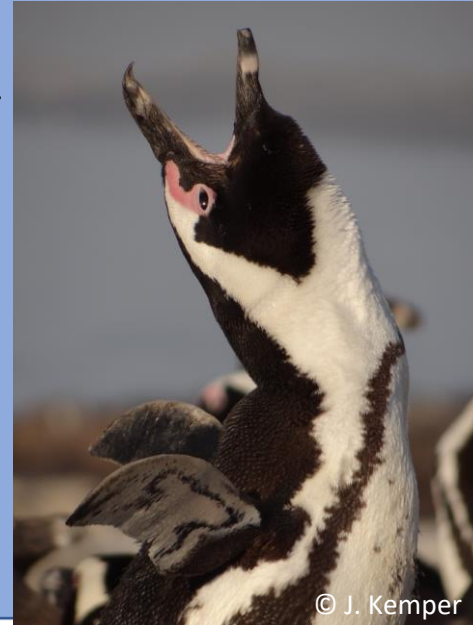


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# Actions

- Workshops identified needs & strategies – 2018/19
- Key projects identified:
  - HPAI (and health) survey & contingency
  - Toxic chemical survey (pilot)
  - Surveillance tools (App & Drones)
  - Computer modelling
  - Stakeholder analysis/engagement
- Sourced funding

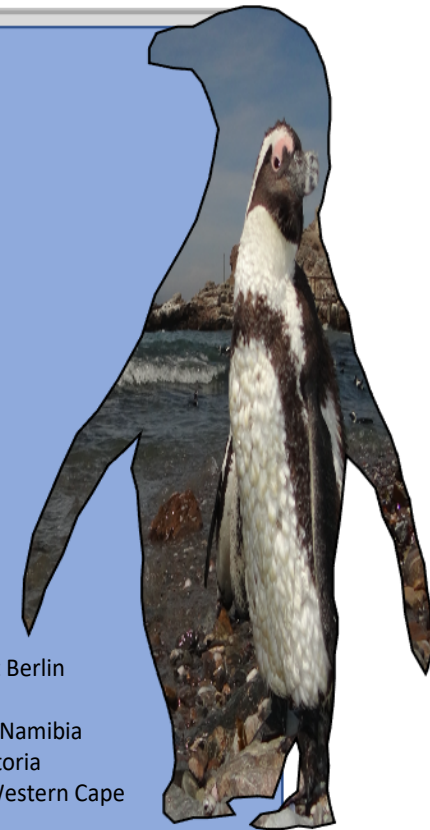
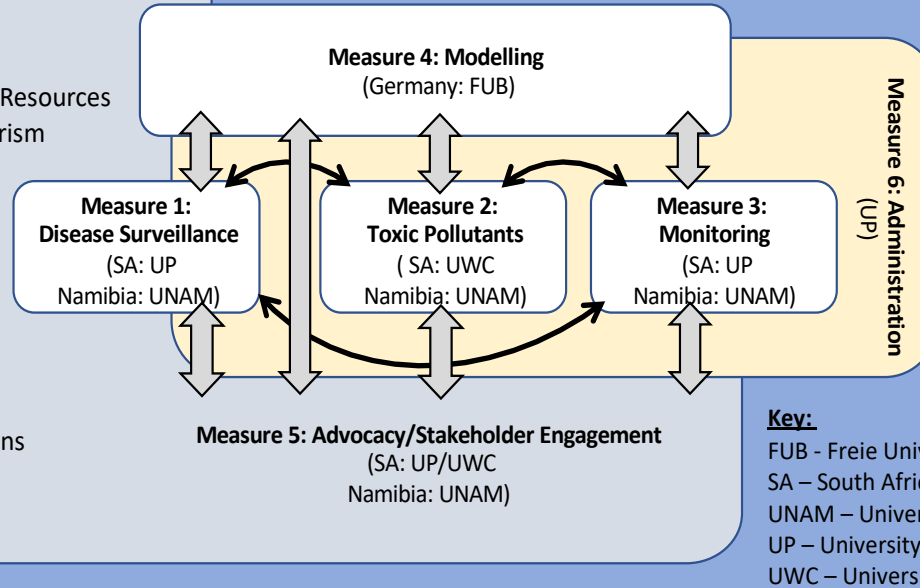


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## Stakeholders

1. National Government: SA
  - Department of Environment, Forestry & Fisheries
  - South African National Parks
2. National Government: Namibia
  - Ministry of Fisheries & Marine Resources
  - Ministry of Environment & Tourism
3. Provincial/Local Government
  - Eastern Cape Government
  - Western Cape Government
  - City of Cape Town
  - CapeNature
  - Robben Island Museum
4. Non-Governmental Organisations
  - SANCCOB
  - Birdlife SA



**Figure 1: Structure and relationship of Measures and Stakeholders**

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# Measure 1: Health survey (1) – Dr Laura Roberts

## Objectives:

- (i) determine the presence, prevalence and risk factors for avian influenza;
- (ii) assess the prevalence and characterize haemoparasites of penguins;
- (iii) collect samples for biobanking

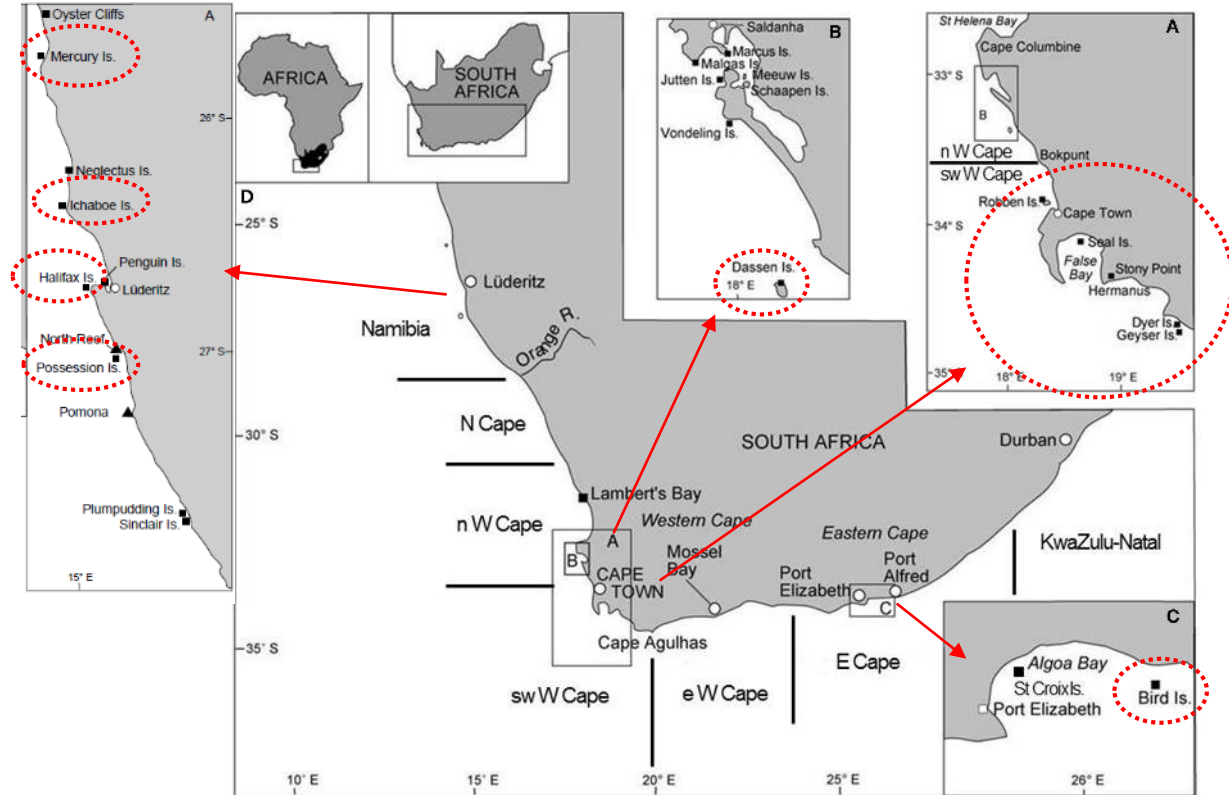
- Newcastle disease virus
- avian encephalomyelitis virus
- avian infectious bronchitis virus
- avian reovirus
- infectious bursal disease virus
- *Mycoplasma gallisepticum* & *M. synoviae*
- Avian cholera (*Pasteurella multocida*)
- Endoparasites & faecal biome
- Ectoparasites



# Measure 1: African Penguin Health survey (2)

## Methods:

- Sample size: max to estimate disease prevalence:
  - SA: 381
  - Namibia: 377
- Samples:
  - Blood
    - Serum (antibodies)
    - Smears (haemoparasites)
    - FTA card (DNA & RNA)
    - PCV & TSP
  - Swabs (viruses)
  - Feathers (stable isotopes)
  - Faeces & Ectoparasites



“Map of South Africa showing several of the important seabird breeding localities” (Crawford et al 2015) and Namibian islands (Crawford et al, 2011)

# Measure 1: African Penguin Health survey (3)

## Progress (1)

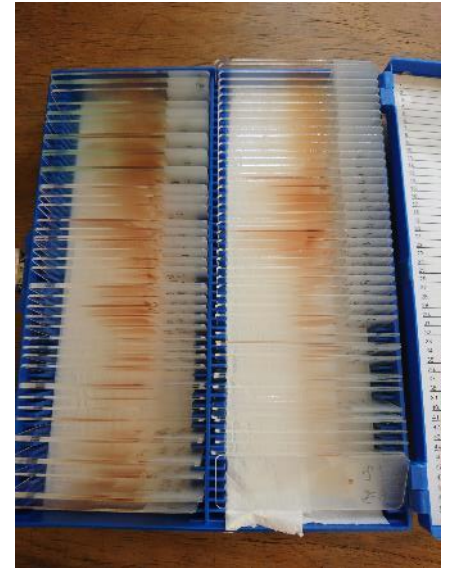


Dassen Island 18-21 January 2021: 43 penguins down...



# Measure 1: African Penguin Health survey (4)

## Progress (2)



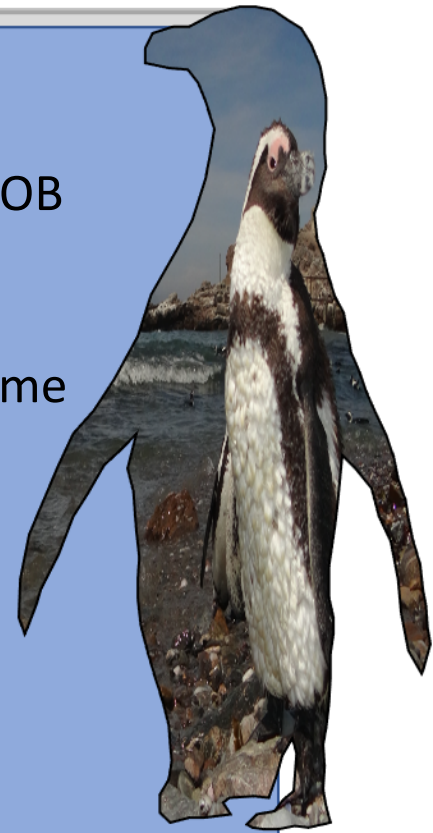
## Measure 2: Prof Leslie Petrik

- Assess the presence and potential impact of toxic chemicals arising from human activities on the African Penguin *Spheniscus demersus*
- Assess the chemical impact of proximity to major human settlements
- Assist in optimizing conservation policies by helping to identify factors that are responsible for population decline



# Work Underway

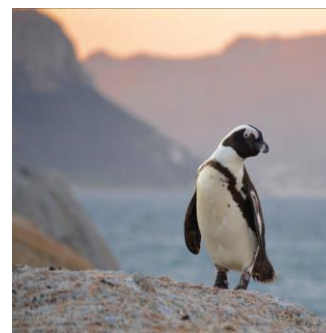
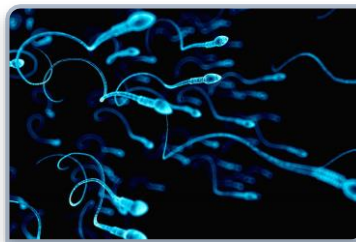
- Site visit to Two Ocean's Aquarium (once a week) and SANCCOB for sample collection trials and dissection of carcasses.
- Most lab orders delivered.
- Permit applications have been submitted and awaiting outcome (TOPS; CAPENATURE; Section 20).
- Awaiting the outcome of second ethics application (Animal Research Ethics Committee – AREC)
- Awaiting delivery of chemical calibration standards.



# Student Progress

- Research Proposals have been compiled
- Research project and Thesis Title has been submitted and registered, and the MOU completed
- Research SITE visits to Two Oceans and SANCCOB
- Practice runs/trials of sample and tissue collection/dissection at SANCCOB
- Training for semen sample collection
- Training in sample preparation and chromatography





## UWC team



Prof Leslie Petrik (PI)



Prof Liana Maree



Stephanie Dreyer (PhD)



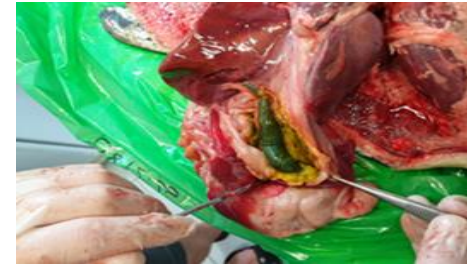
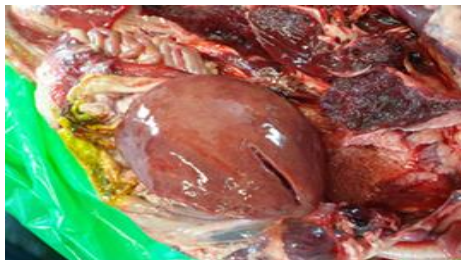
Suzanne Grove (PhD)



Justin Moser (PhD)



Farren Hardneck (PhD)

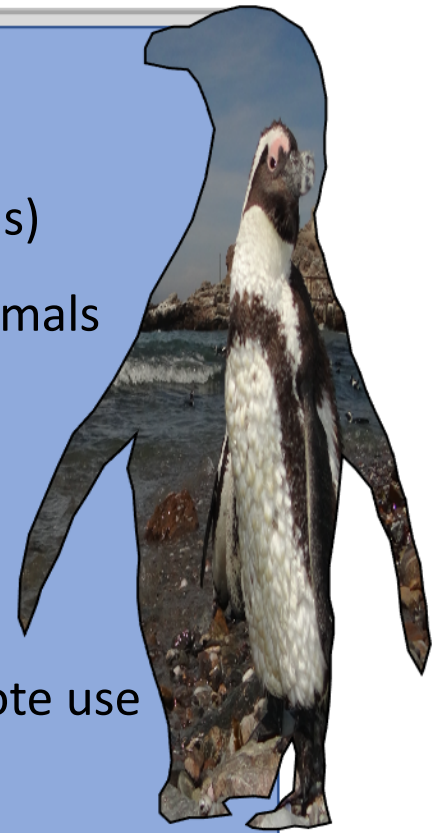


# Measure 3: Surveillance Tools



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- **App to report beached birds** (and animals)
  - Report no, sick, injured and dead animals
  - Reported in real time
- **Unmanned aerial vehicles** (drone)
  - Review of regulations and legislation
  - Proof of concept – feasibility of remote use



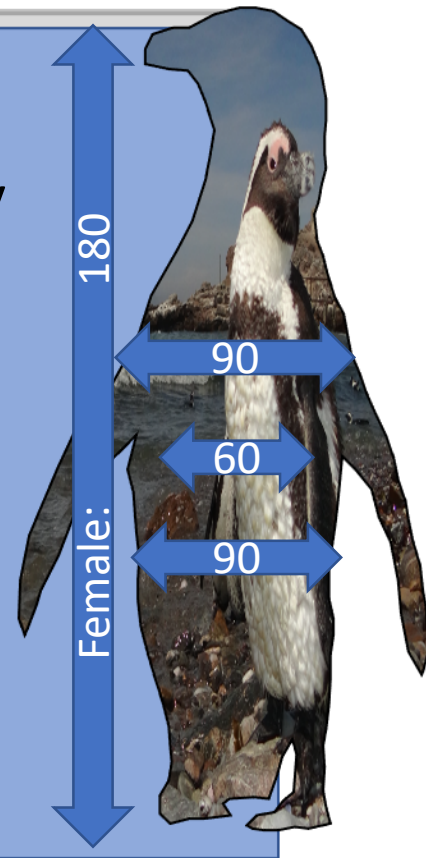
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## Measure 4 – Modelling: Prof Marcus Doherr

Models are a simplified (virtual) description of reality

Most models are wrong but some are useful

- Immediate (re)action in outbreaks
  - Lack of data, simple, rapid emergency decision support
- Long term predictions
  - More data needed/used, complex structure
  - Population management scenarios
  - Stakeholder involvement



# Measure 4 – Modelling (2)

Stakeholders

- Needs
- Actions
- Questions
- Data
- Limits



Modelling experts

- Predictions
- Scenarios
- Uncertainty
- Data gaps
- Limitations

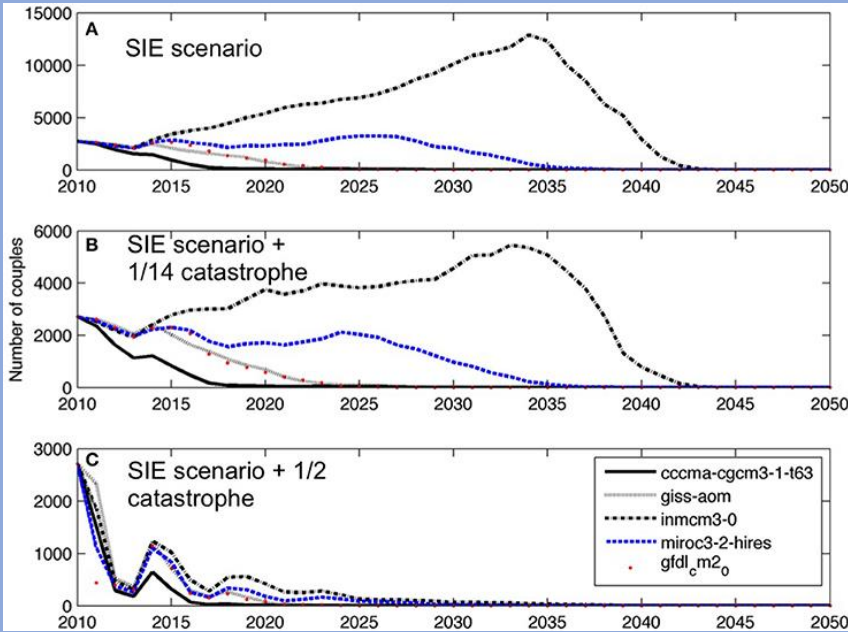
Results



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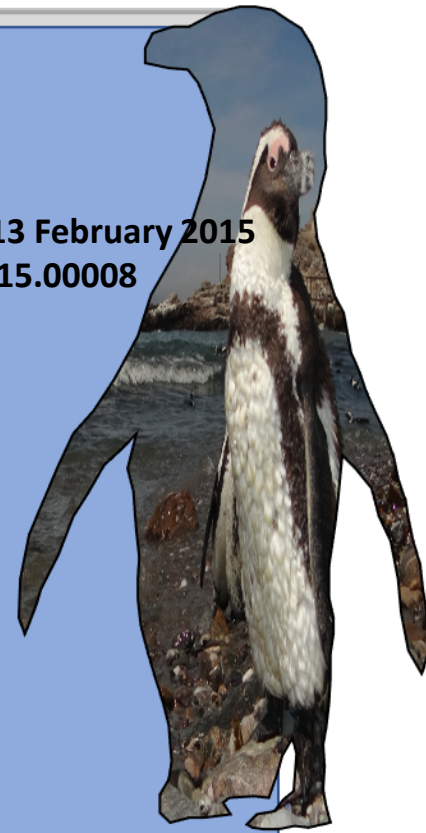


# Measure 4 – Modelling (3) – an example



Ballerini et al. *Front. Ecol. Evol.*, 13 February 2015  
<https://doi.org/10.3389/fevo.2015.00008>

Figure 7. Projections of the Adélie penguin population at Edmonson Point based on stochastic sea ice extent anomalies forecasts from five Atmosphere-Ocean General Circulation Models (AOGCMs) (A), considering a catastrophic weather event at breeding with a frequency of 1 over 14 years (B), and considering a catastrophic weather event every other year (C). For each AOGCM, the median population trajectory from 200 stochastic simulations is shown.



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## Measure 4 – Modelling (4) – the plan

Extract stakeholder (information) needs

- Expert consultation workshops

Select / adopt suitable population (disease) models

Identify data needs and available data

Run scenarios and communicate results

- Explain strength and limitations to stakeholders



## Measure 4 – Modelling (5)

Stakeholder involvement is an important component in all modelling activities

- Which questions should be answered vs. which questions can be answered
- Which data are needed vs. which data can be provided / must be collected
- What should be communicated (average or extreme scenarios / results) and by whom



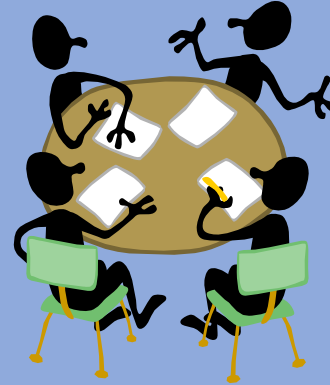
# Measure 4 – Modelling (6)



??



??



# Measure 5(a): Assessment of Stakeholder Views – Ms Takdeera Lewis

- The African Penguin population is endemic to South Africa and Namibia where 77% of the population resides within SA
- Currently listed as Endangered by the IUCN
- Biodiversity Management plan for the African Penguin – 2<sup>nd</sup> Draft of BMP



# Biodiversity Management Plan – 2<sup>nd</sup> draft

- Biodiversity Management plan for the African Penguin – 2<sup>nd</sup> Draft of BMP
- Highlights a need for co-ordinated research action
- Survey research is an important tool in conservation

## Aim of study

- To gather knowledge and perceptions of different stakeholders to fill the research gaps set out by BMP and guide policy and management decisions.



# Different Stakeholders

Stakeholder – any group or individual who can affect or is affected by any of the actions of the Biodiversity Management Plan

- We have identified 2 stakeholder groups
- Specialist stakeholder groups (researchers, NGOs etc)
- Local stakeholders (public)



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# People and Penguins

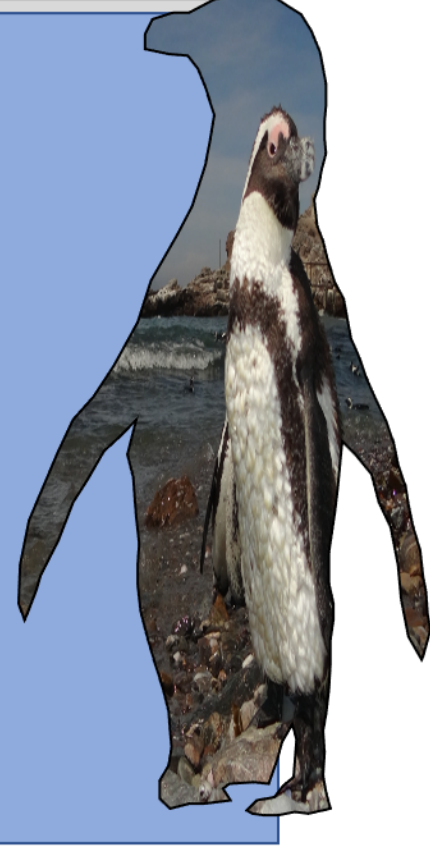
- Human wildlife conflict between penguins and residents of mainland colonies
- Benefits through tourism and job creation
- Marine Protected Area management and challenges to fisherman



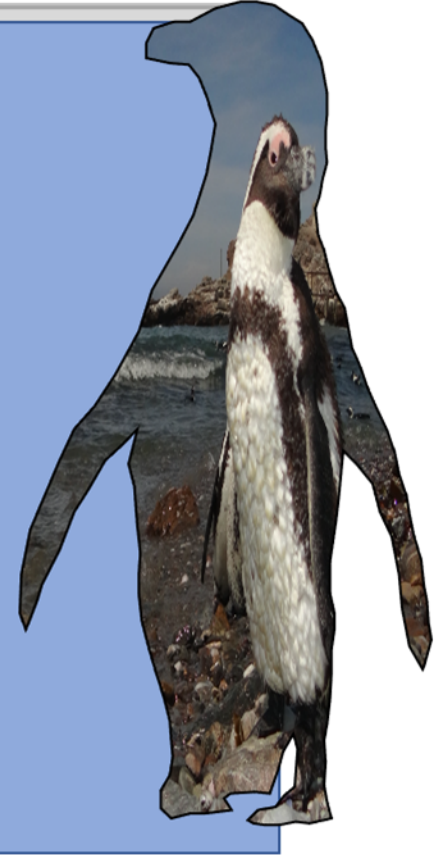


# What does the survey intend to find out

- Experts – opinion on current conservation strategies and challenges faced to achieve BMP outcomes
- Fisherman – general attitudes towards fishing policies and attitudes towards penguins and other wild populations
- Local people – attitudes towards living in proximity to colonies and general attitudes and knowledge towards penguins and conservation



**Human dimensions to conservation takes on an ecosystem approach, breaching the gaps in the research. Man needs to be recognized for the role played in the ecosystem and thus needs to be included in the management making processes that follow.**



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## Concluding Remarks

### Future:

- Beat COVID!!
- Complete projects < 2 years
- Collaborate with NaMares?
- Funding for biobanked samples
- Save the penguin (or do our bit!)



Thank You

