



NZ sea lion Threat Management Plan

Quantitative risk assessment Methodology and timeline

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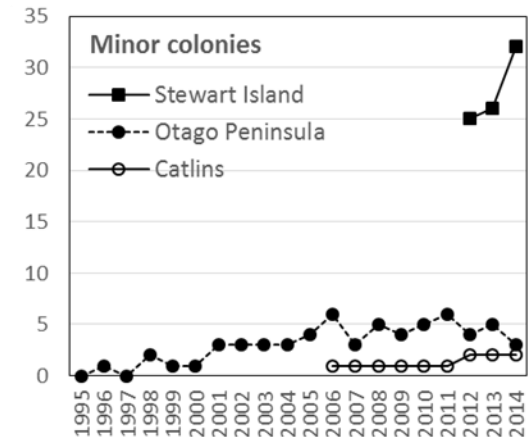
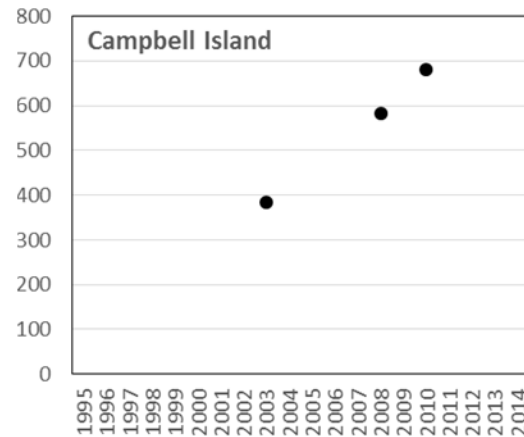
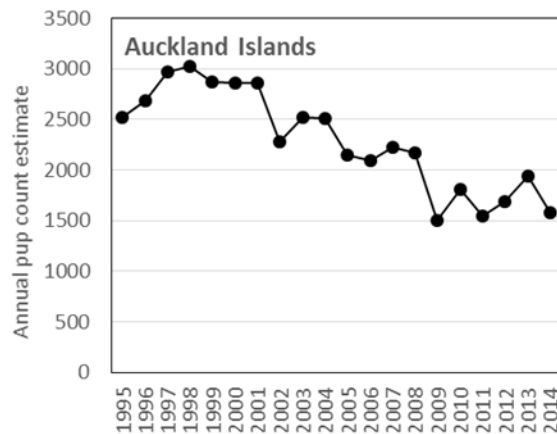
DOC, November 2014

In this presentation

- NZ sea lion TMP
- Quantitative risk assessment methodology
- Timeline
- Science/data requirements



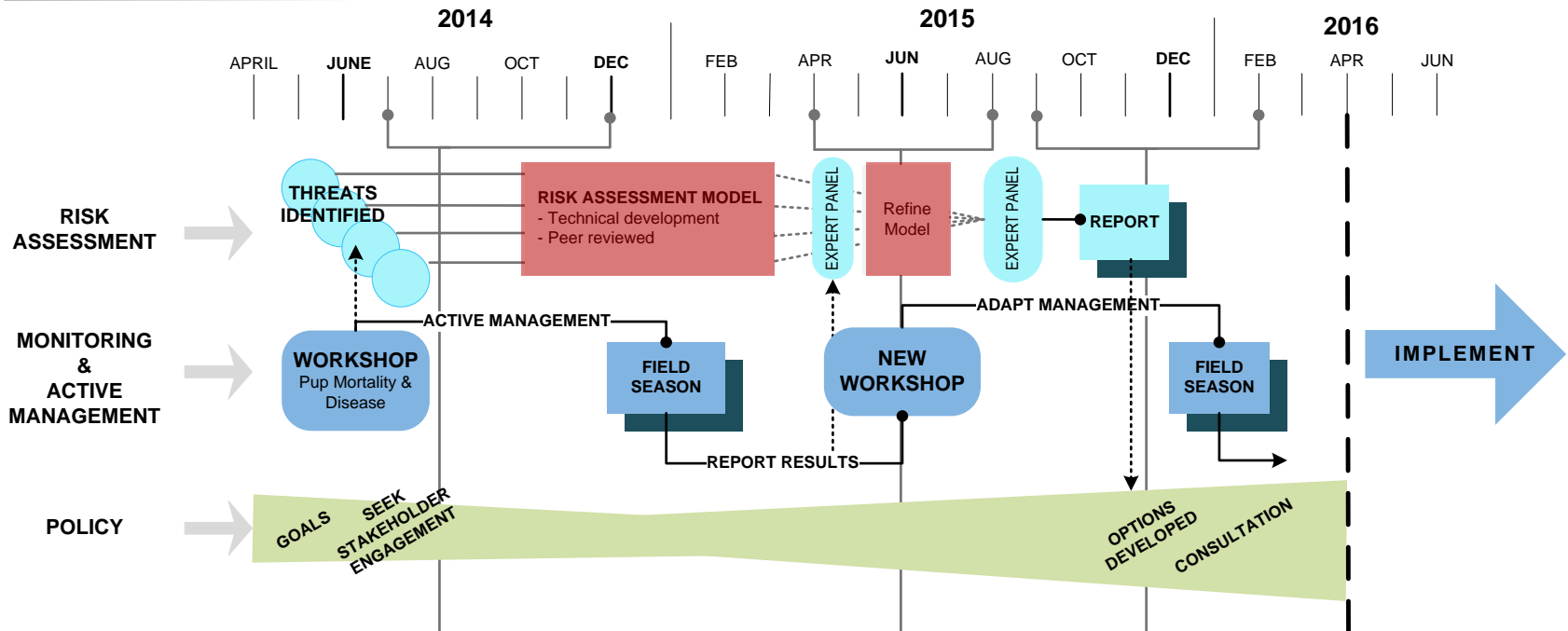
NZ sea lion TMP



- Population decline at the Auckland Islands & population change elsewhere - potentially multiple causes
- TMP management objectives relating to population status (e.g. population growth rate or mature female n)
- TMP will review and assess potential threats to NZ sea lions
- Identify management actions that will attain management objectives

TMP process & timeline

DEVELOPMENT PROCESS FOR THE THREAT MANAGEMENT PLAN (TMP)



ENGAGEMENT and FEEDBACK OPPORTUNITIES

JUNE – DECEMBER

Stakeholders will have opportunities to engage in the development and review of research which will inform the TMP, as well as provide feedback on the TMP goals and high level objectives.

Engagement throughout the TMP will occur through the following groups:

- **Technical Working Groups (CSP/AEWG)**
- **National Environmental Engagement Forum (EEF)**

APRIL - JULY

Stakeholders will have opportunities to engage in the review of the demographic work and risk assessment outputs

JUNE

Stakeholders will have opportunities to review results from the 2014 Auckland Island field season.

AUGUST

Experts will be invited to participate in the expert panel risk assessment

SEPTEMBER - FEBRUARY

Stakeholder will have opportunities to review results from the expert panel qualitative risk assessment

Public consultation will occur on proposed options for TMP

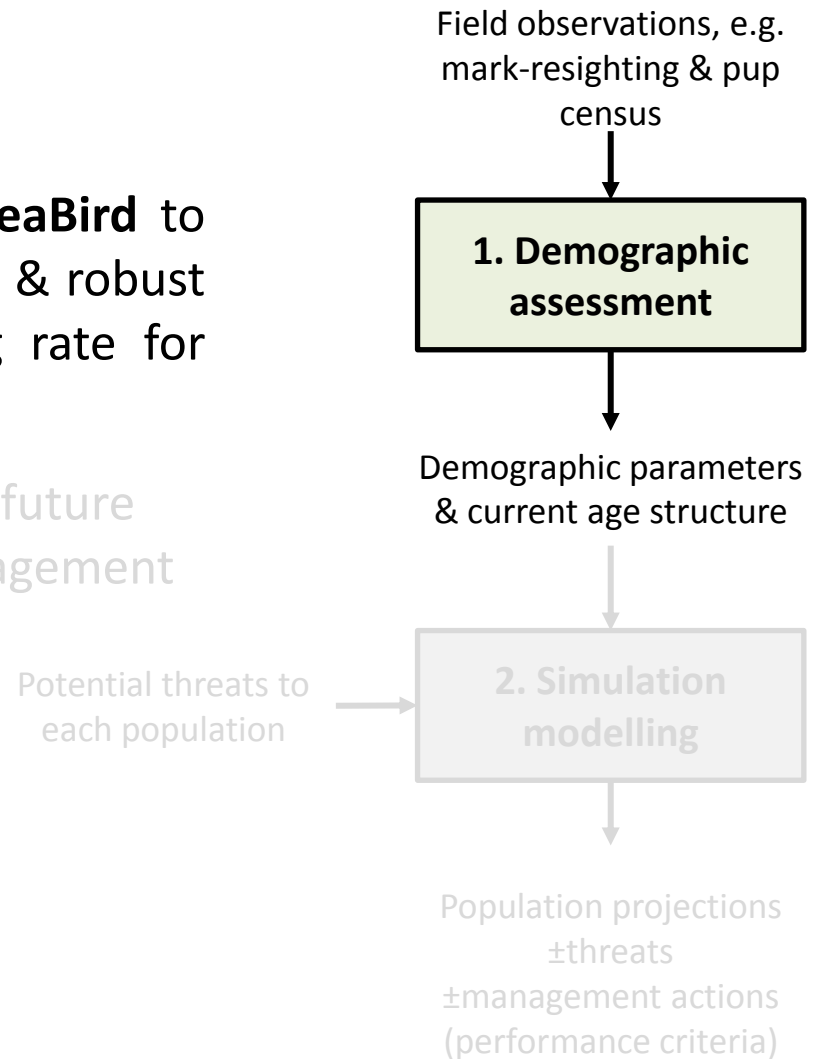
TMP risk assessment process

1. Identification of threats
2. Develop models for quantitative risk assessment
3. 1st Expert panel meeting (~April 2015)
 - Review threats
 - Review candidate management actions
 - Relationship between threats and management actions
 - Review models
 - Other
4. Conduct quantitative risk assessment
5. 2nd Expert panel meeting (~August 2015)
 - Review outputs of quantitative risk assessment
6. Reporting (~November 2015)

TMP quantitative risk assessment

Two research components:

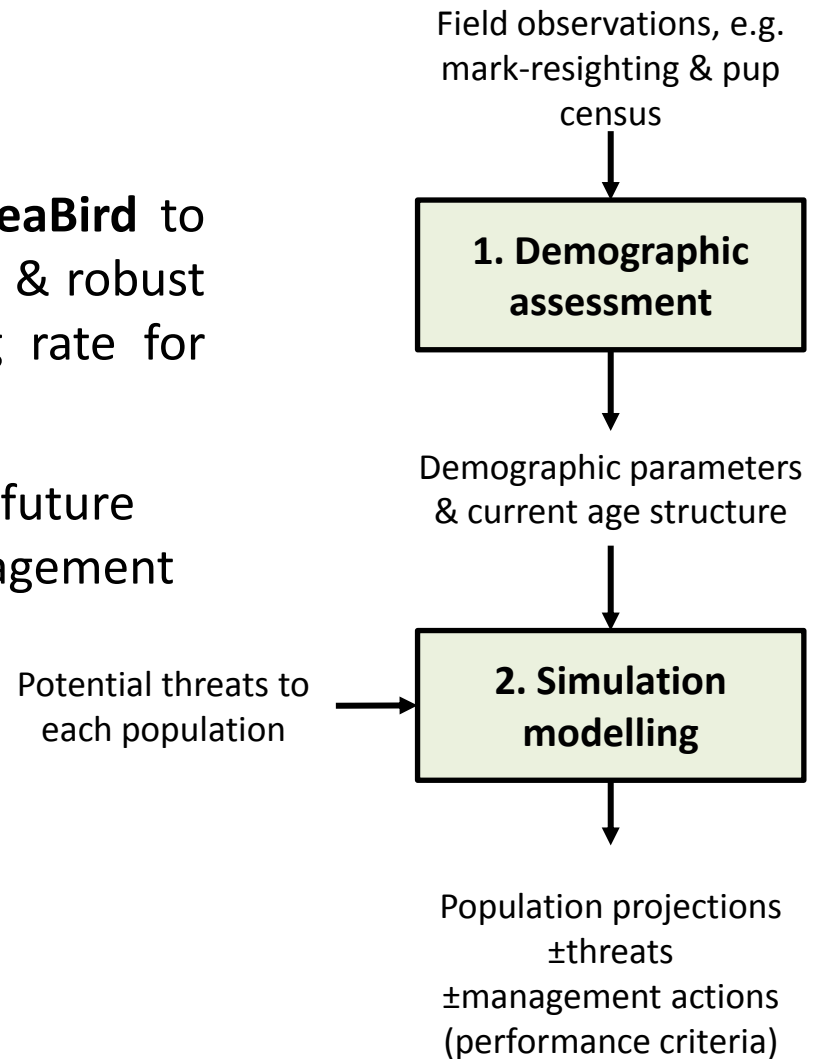
- 1. Demographic assessment in SeaBird** to generate initial age distribution & robust estimates of survival, pupping rate for relevant population
- 2. Simulation modelling** to assess future performance of candidate management actions



TMP quantitative risk assessment

Two research components:

- 1. Demographic assessment in SeaBird** to generate initial age distribution & robust estimates of survival, pupping rate for relevant population
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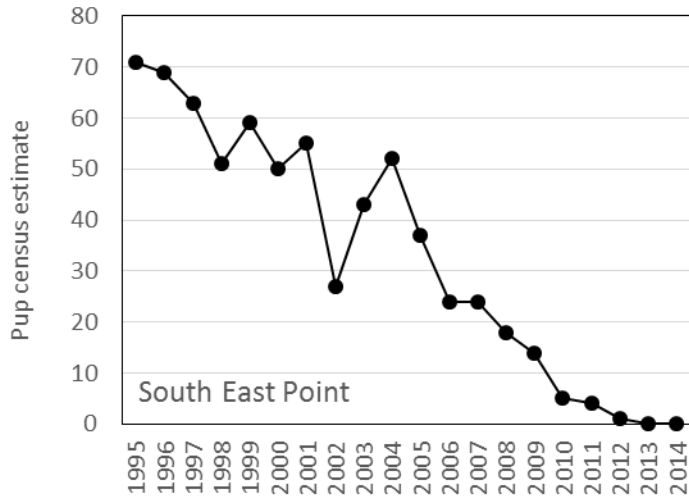
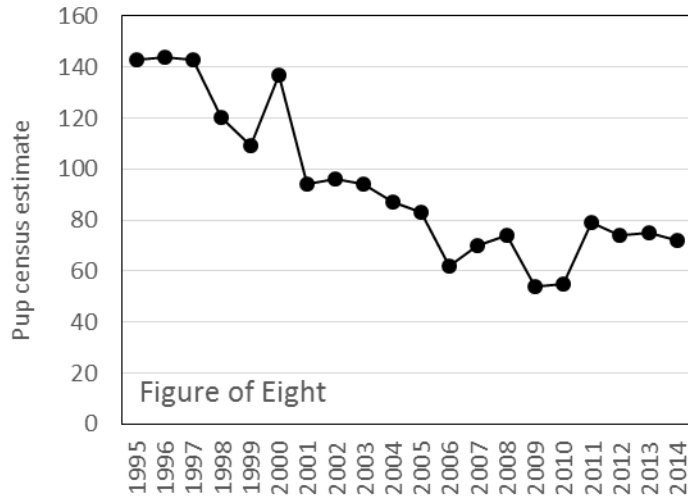
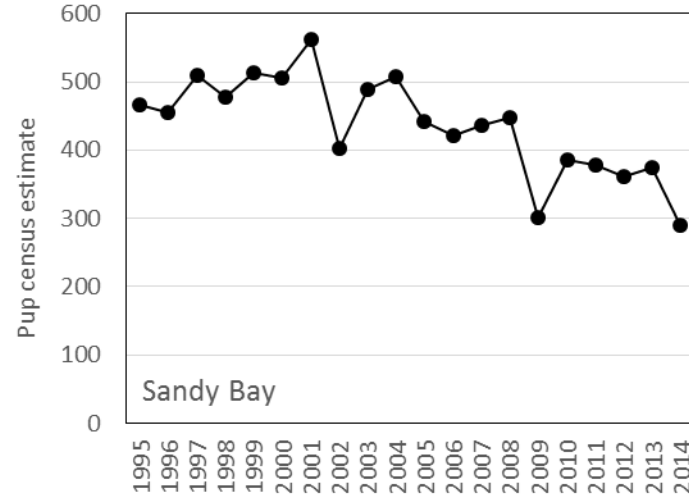
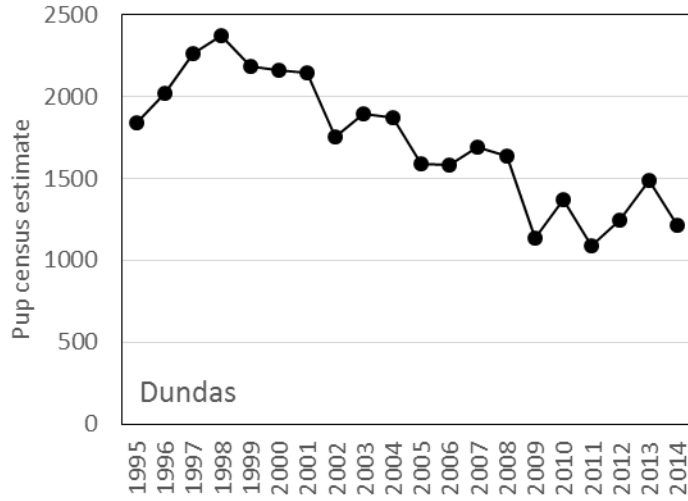


Demographic assessment
(generate inputs for simulation modelling)

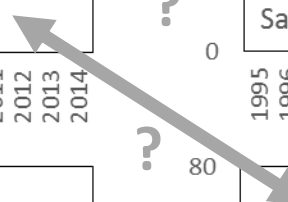
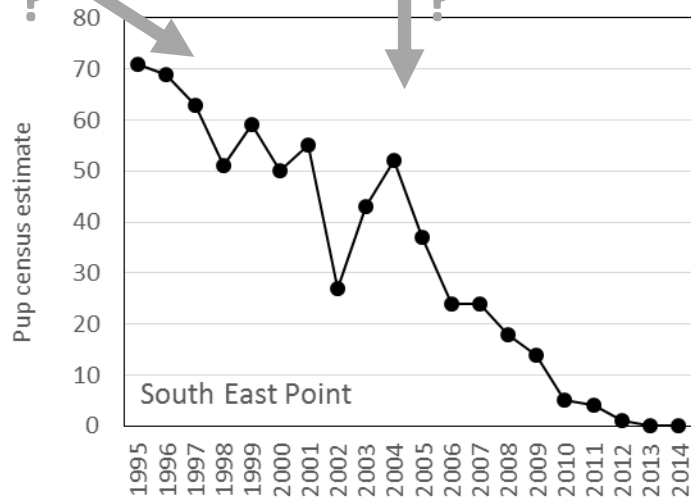
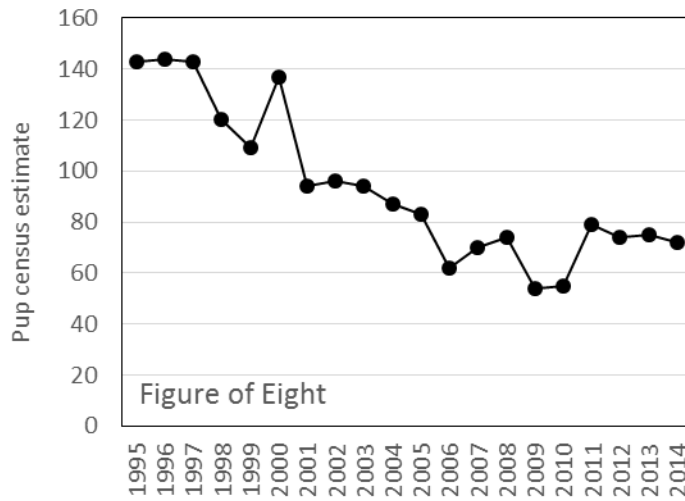
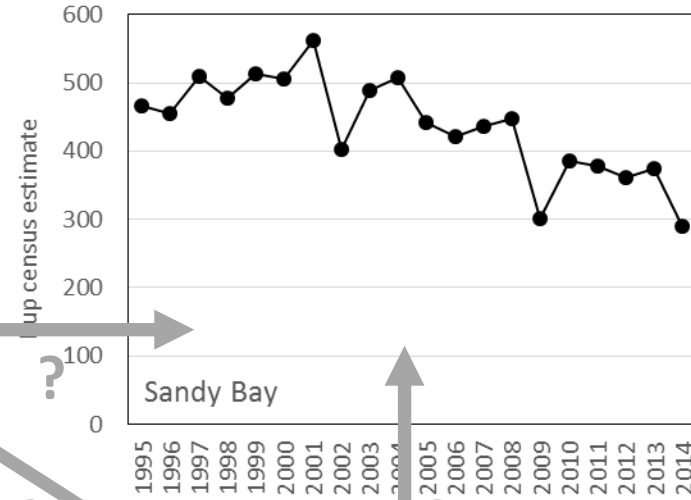
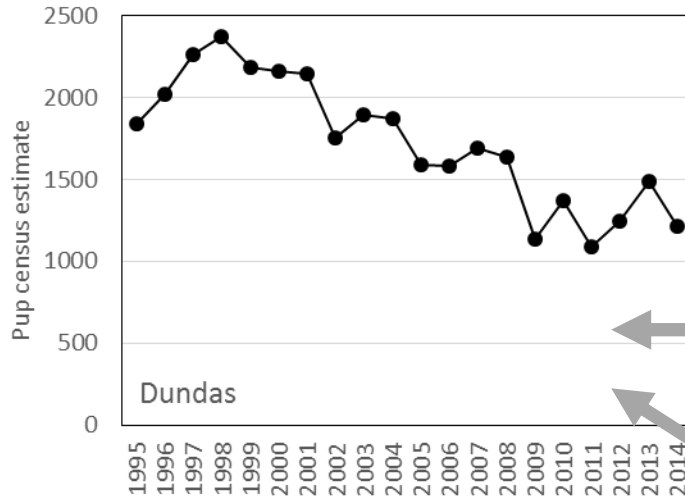
Demographic assessment (inputs for simulation modelling)

- Objectives:
 - Estimate recent demographic rates and current age distribution (focussing on females)
 - Calculate *intrinsic* demographic parameter distributions
- Which populations?
 - Auckland Islands initially
 - Photo-ID resighting at Otago Peninsula
- Development of demographic assessment using SeaBird software (DOC POP2012-02)
 - Robust estimates of survival and tag loss rate
 - Account for potential breeding site relocations

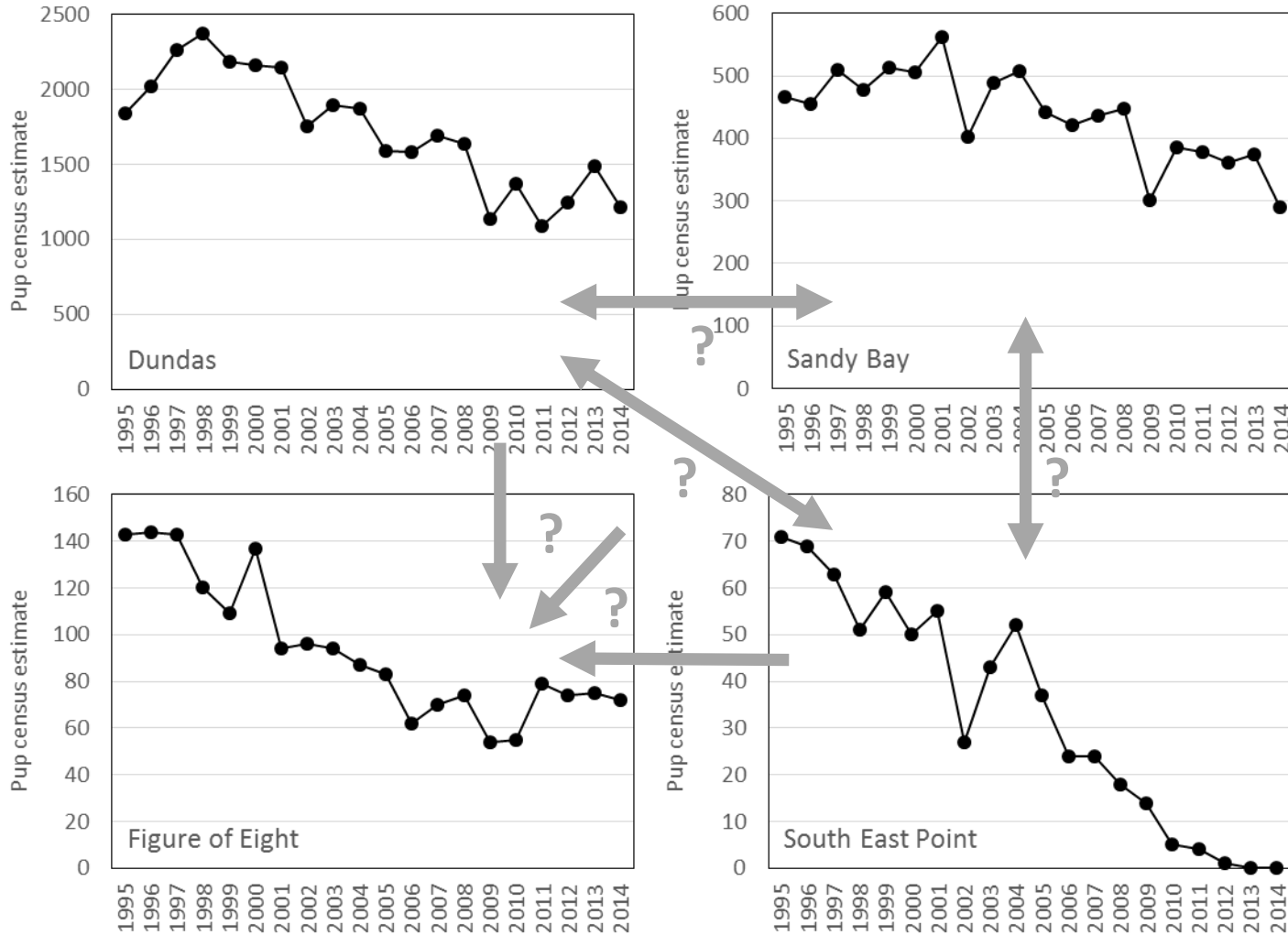
Demographic assessment



Demographic assessment



Demographic assessment



New data requirements

Demographic assessment

- Auckland Islands
 - Three additional years' observations at Auckland Islands (2012/13-2014/15)
 - Resighting effort at all Auckland Islands breeding rookeries
- Otago Peninsula
 - Photo-ID mark-resighting observations by individual (~10 years resighting observations)
- Campbell & Stewart Island
 - Can assume demographic rates for simulation model runs

Simulation modelling
Performance of management actions

Simulation modelling

Performance of management actions

- Objectives:
 - assess future population consequences of various threats (e.g. reduced pup survival)
 - assess future performance of management actions (e.g. increase pup survival by X%)
 - focus on Auckland Islands, then other colonies
- Account for uncertainty
 - demographic rates
 - nature/magnitude of threats
 - future carrying capacity & degree/mechanism of density dependence
- Operating model for population projections
 - **without** density dependence
 - **with** density dependence

Projections *without* density dependence

- Objectives
 - Assess effects of potential threats on future population size/growth ***over short time period (e.g. 5 or 10 years)***
 - Assess performance of candidate management actions
 - No population density effect on growth rate, though there will be age distribution effects
- Methodology
 - Develop operating model to conduct population projections
 - Use estimates of current age distribution
 - Sample from demographic parameter distributions
 - Assess population effects of threats & performance of management actions

Projections *with* density dependence

- Objectives
 - Assess population effects of threats & performance of candidate management actions *over longer time periods*
 - Population growth rate also affected by population density relative to carrying capacity (K)
- Methodology
 - Use same operating model and current age distribution
 - Assume mechanism of density dependence and scenario for K
 - Sample from *intrinsic* demographic parameter distributions
 - Assess population effects of threats & performance of management actions

Requirements

Projections with density dependence

- Carrying capacity
 - Probable range of values
 - Constant or dynamic
 - Genetics, temporal teeth isotopes, oceanography, BFG model, expert panel meeting
- Demographic mechanism of density dependence
 - Survival, pupping rate, age at first pupping, relocation?
 - Shape of density dependence relationship
 - Literature on NZ SLs and other pinniped sp., expert panel meeting

End of presentation

