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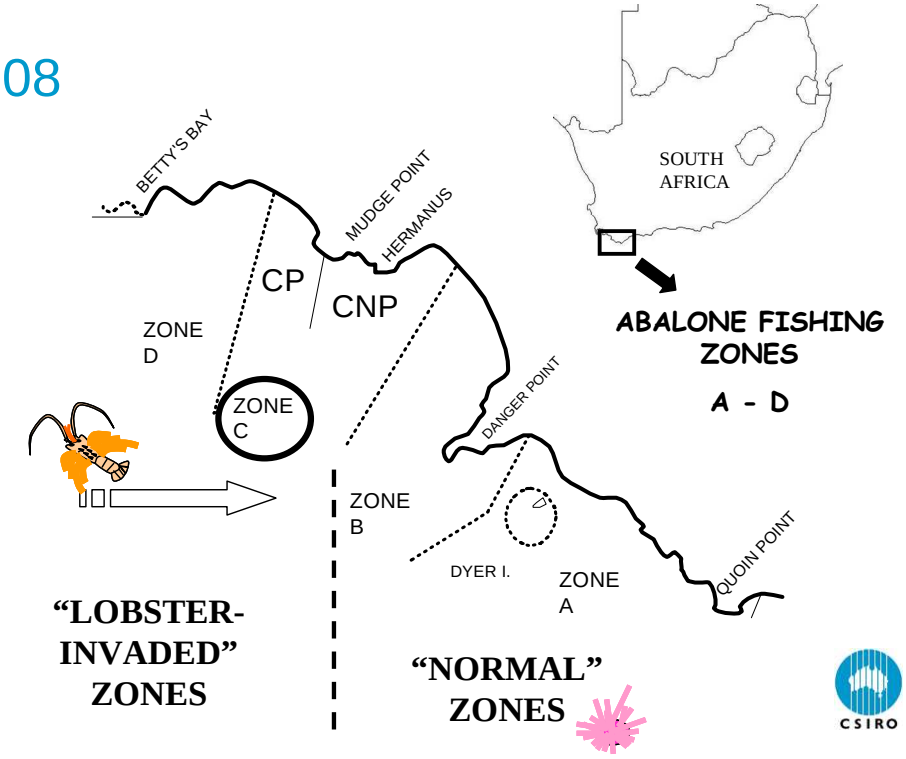
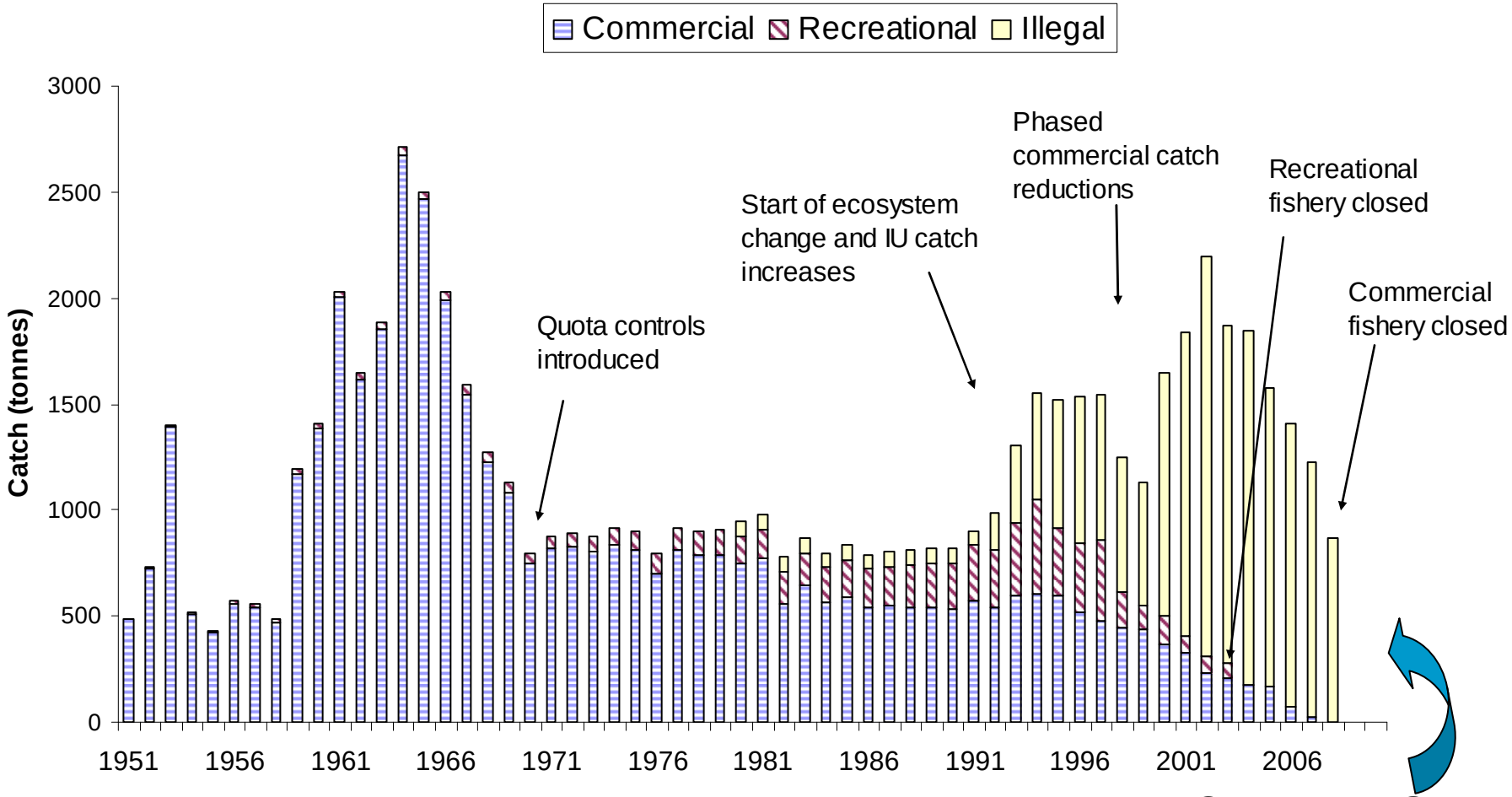
International review of the assessment of the South African abalone *Haliotis midae* fishery

Overview of Abalone Fishery

- Seven management zones (A to G)
- Illegal catch problem since mid 1990s
- Illegal catches initially highest in Zones C and D and then spread to other zones
- Ecosystem change (lobsters) primarily impacting Zones C and D
- Fishery closed in October 2008



Abalone catch history



MODEL ILLEGAL CATCH ESTIMATES!

Focus of the review

- Comments on the assessment
  - Is the Fishery Independent Abalone Survey (FIAS) reliable?
  - Are the estimates of illegal catch reliable?
  - Are the estimates of depletion by zone reliable?
  - Is there an “Allee effect” influencing the stocks?
  - How reliable is the model to predict the effects of future levels of illegal and legal catch?
- Comments on management arrangements outside the main fishing zones
- Provide advice on international best practice regarding recovery targets and depletion thresholds for closure of fisheries

General findings of the review

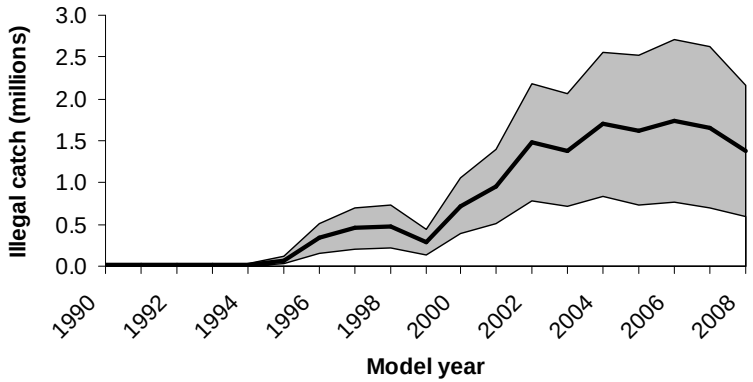
- The FIAS is an appropriate method to monitor trends in abundance in abalone stocks
  - The method is standard
  - The current survey focuses mainly on shallow waters
  - There would be benefits in extending the offshore components of the survey

- Estimating illegal catch is difficult and rarely attempted. However the data and methods used to estimate the illegal catch of SA abalone appear to be appropriate, though the confidence intervals are (inevitably) fairly wide

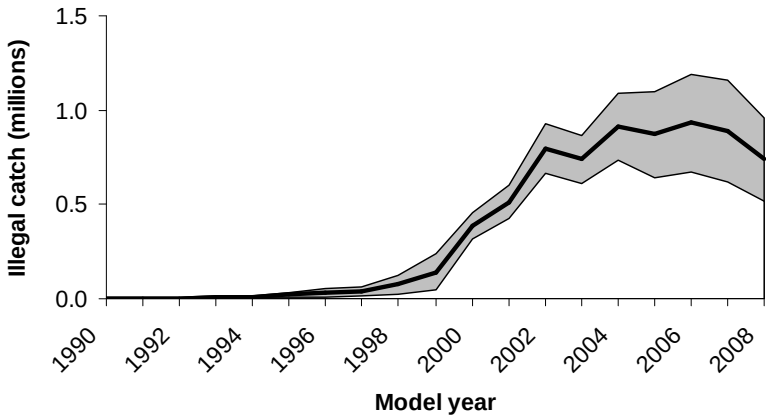
Model-estimated Illegal Catches:

NUMBERS

a) Zone A



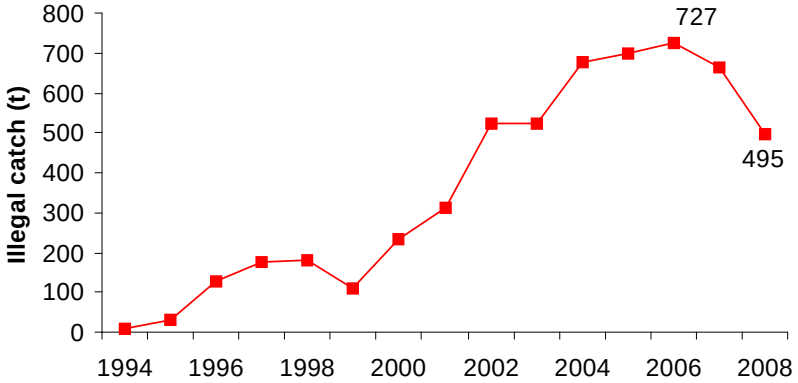
b) Zone B



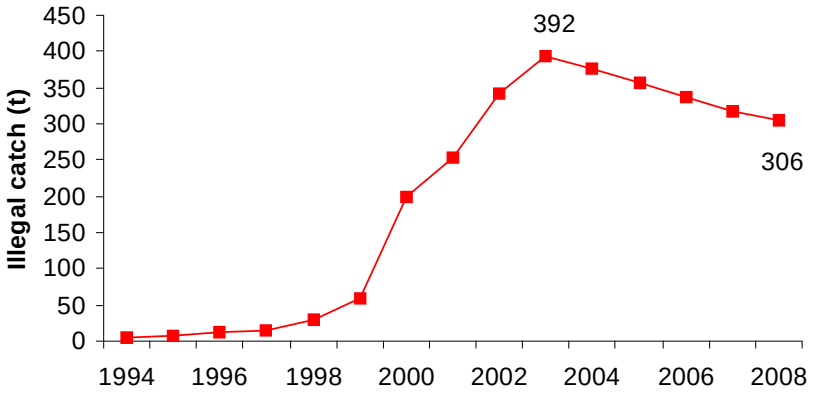
Shaded area = Hessian-based 90% C.I.

BIOMASS

Zone A

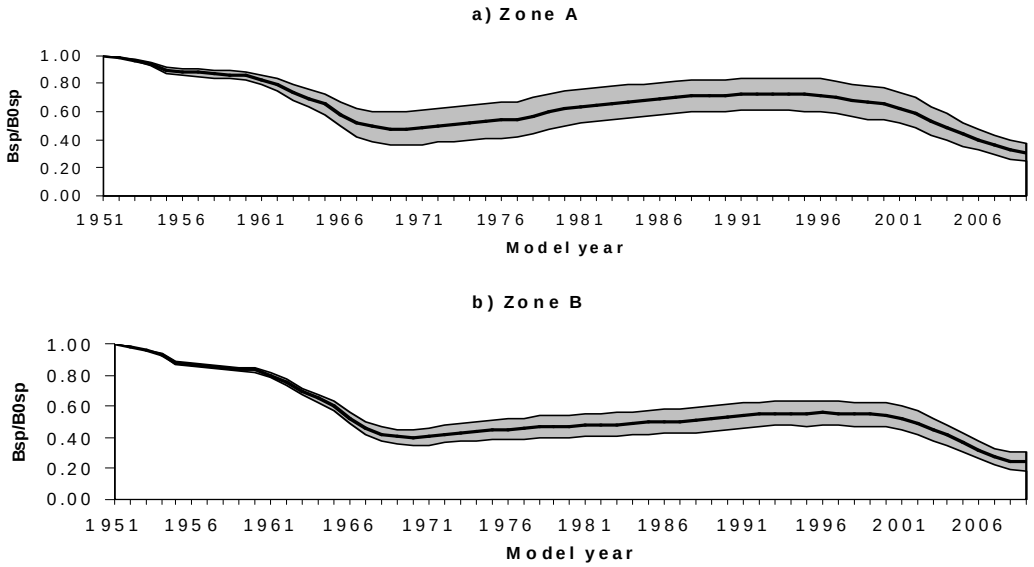


Zone B



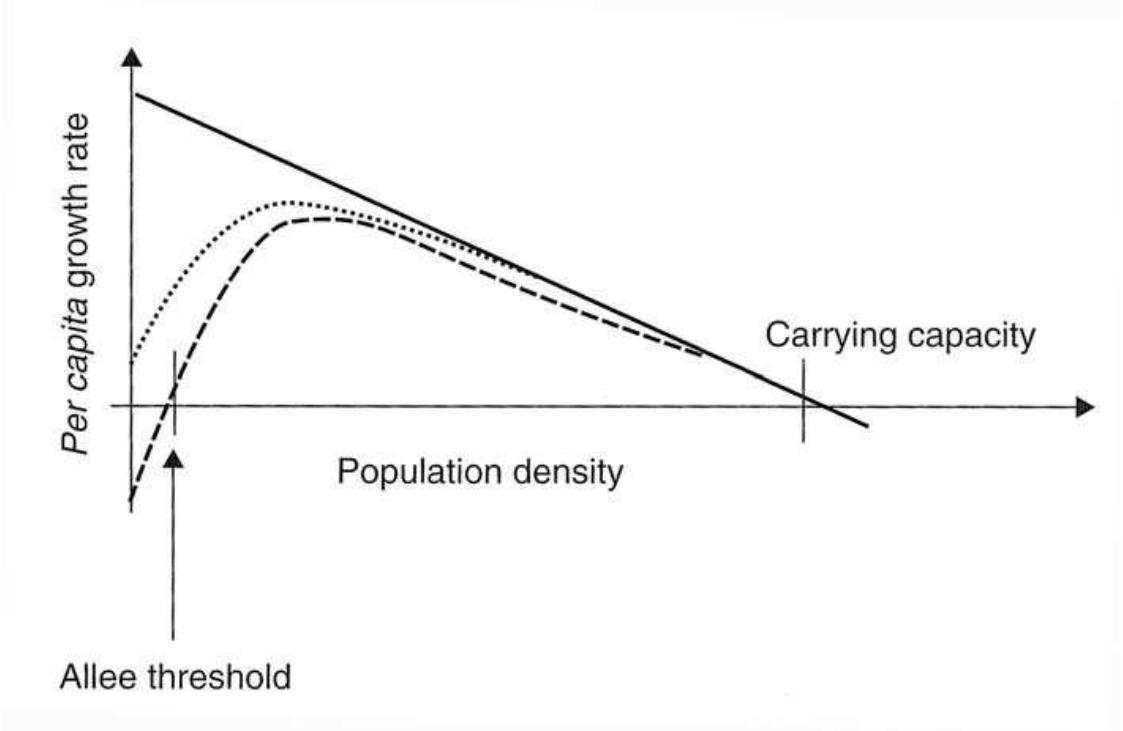
General findings of the review

- The model fits the data quite well and depletion seems to be well estimated
  - Because there is more information for the shallow water (FIAS), the estimates of depletion for the that area are more soundly based, but trends in both commercial CPUE and in size structure of the catch support the overall depletion estimates



General findings of the review

- The Allee effect and critical depensation



General findings of the review – Allee effect

- It is plausible that some form of depensation could occur with abalone
- There is some evidence for critical depensation in a South Australian abalone population
- The density at which this occurred is below the current density estimates in Zones A and B, but may be above those in Zones C and D
- The Panel has suggested that this effect be included in the model and forecasts as a sensitivity test

General findings of the review - forecasts

- Reliability of forecasts on the effects of future levels of legal and illegal catch
  - The Panel agreed that the assessment model provided a reasonable basis for predicting such responses, noting the considerable levels of uncertainty involved
  - Development of a recruitment index would improve the predictive power of the model
    - E.g. similar to 2002 joint industry-MCM extractive survey
  - Expanding the deep water FIAS and including the data in the assessment would also improve the assessment

General findings – Zones E, F and G

- There was insufficient information and time to allow a technical review of this approach

General findings – overview of abalone

- The assessment provides a reasonable basis for making management decisions concerning the fishery
- The top priority should remain bringing the illegal catch under control

General findings – international norms

- Emerging international agreement on exploitation limits
  - Default values available for most reference points
    - E.g. Typical biomass limit at 20% unfished levels
    - Justified case specific values can over ride the default values

Overall comments from the Panel

- Trade offs in approach to coding stock assessment models
  - Models tailored to South African conditions versus packages that have been tested extensively
- Data management issues
  - Problem everywhere
  - Need a data strategy
    - Scientific data manager
    - Adequate resources to implement strategy

Questions