ASCOBANS Conservation Objectives
Bonn 16-17 May 2023

Background information on conservation objectives and management targets for cetaceans
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Population reference levels:

- Maximum Sustainable Yield Level (MSYL)
- Maximum Net Productivity Level (MNPL)

Population level at which average net reproduction (excess of births over natural mortality) is maximized.

For realistic models (with variability, multiple demographic parameters):

\[ 0.5K < \text{MNPL} < 0.6K \]

\( K \) = mean carrying capacity

Specified as targets in several international conventions:

- International Convention for Regulation of Whaling (ICRW) 1946
- UNCLOS Law of the Sea 1982
- International Conventional on the Conservation of Marine Mammals 1994
- US Marine Mammal Protection Act MMPA 1972
- Target is 0.45 (K)

First attempt at management procedure to achieve MSYL/MNPL:

International Whaling Commission "New Management Procedure"

- effective 1976-1985
- rule for setting catch limits based on population level relative to MSYL
- no fixed method for determining population level relative to MSYL, so not really a workable management procedure
- could not be evaluated or tested

IWC Revised Management Procedure (RMP)

- Developed 1987-92 by IWC Scientific
- "accepted" by IWC 1994
- Not implemented by IWC, but implemented in some form by some countries (Norway, Iceland, Japan)

No fixed conservation objective, but general idea was:

- population should not be reduced "much" below MNPL
- depleted populations not inhibited from recovering to MNPL
- Complete rule for setting catch limits from data

Testing complete management rules by simulation:

- Hypothetical populations from which hypothetical data generated.
- "We" know the true population status
- rule being tested knows only the data.

Simulations studies for RMP covered a range of scenarios:

- imprecision and bias in abundance estimates
- uncertainty in Rm (MSYR)
- uncertainty in population identity (e.g. one large vs many small pops)
- variability in environment and demography
- etc etc

Conclusions from simulation studies on RMP:

- Adaptive / feedback management does not work well
  (because populations severely depleted before this is recognized)
- Precautionary / preventive management works robustly
  - catches set to a small % of abundance
  - rapid depletion due to catch is not possible
  - feedback mechanisms play little to no role for first 30 years
- Need (approx.) estimates of cetacean abundance, otherwise zero catch
ASCOBANS conservation targets

2nd MOP (1997) Resolution adopted interim targets
- maintaining populations at 80% of carrying capacity or above
- limit bycatches to 2% of estimated population size

Population reference levels 1:
- Carrying capacity (K): average level around which a natural population fluctuates in absence of takes
  - "Takes" include:
    - bycatch
    - hunting
    - ship strikes
    - other direct kills
- Potential carrying capacity absent all anthropogenic influences

3rd MOP (2000) Resolution 3.3
- maintaining populations at 80% of carrying capacity or above
- limit bycatches to 1% of estimated population size as precautionary measure
- bycatches > 1.7% are "unacceptable"

8th MOP (2016) Resolution 8.5 (rev MOP9)
- same as above except unacceptable limit may be lower for species other than harbour porpoise

Bycatch thresholds
- Simple percentage of (best estimate of) population size
  e.g. ASCOBANS "precautionary" threshold of 1%
  - PBR or mPBR
    - e.g. 1% of $N_{min}$ for $R_{max} = 0.04, F = 0.5$
    - percentage can vary through choice of $R_{max}$, $F$
  - RLA
    - percentage varies dynamically with past bycatch history

Note: $N_{min} = N_{0.20} - N_{best} (1 - 0.84 \times CV)$
Way forward?
- Not possible at this meeting to propose alternative generic thresholds to the ASCOBANS 1% “precautionary” threshold and the 1.7% “limit” threshold, but the latter is almost certainly too high.
- Quantify the ASCOBANS conservation objectives, so that simulation studies (e.g. OSARN MMEG) can determine thresholds that meet them.
  - Viable definitions of $A$ and probabilities
  - Time horizon long enough not to be dominated by initial state, but not absurdly long.
- Thresholds can be expressed either:
  - as direct % of population size (e.g. $N_{min}$); or
  - as PBR Recovery Factors
- RLA (Removal Limit Algorithms)
  - A rule for setting a removal (e.g. bycatch) limit for given input data.
  - RLAs should be:
    - subject to the same tests as the PBR or threshold percentages (to compare like with like)
    - include realistic scenarios as to how removal limits are implemented
    - complexity of rules should be justified by performance gains

Objective: $P > 0.8$ with 95% probability