ASCOBANS Conservation Objectives

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Background information on conservation objectives and management targets for cetaceans

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Population reference levels 1:

Maximum Sustainable Yield Level (MSYL)

= Maximum Net Productivity Level (MNPL)

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

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

$0.5K < MNPL < 0.6K$ (K = mean carrying capacity)

Specified as target in several international conventions

- International Convention for Regulation of Whaling (ICRW) 1946
- UNCLOS Law of the Sea 1982
  (but allows more conservative targets for marine mammals)
- US Marine Mammal Protection Act MMPA 1972
  "Optimum Sustainable Production" (MNPL and above)
- Target in CFP since 2002

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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

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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

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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 Rmax (MSYR)
- uncertainty in population identity (e.g. one large vs many small pops)
- variability in environment and demography
- etc etc

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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 catches is not possible
  - feedback mechanisms play little to no role for first 30 years

  - Need (approx.) estimates of cetacean abundance, otherwise zero catch

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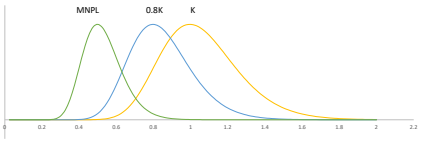
ASCOBANS conservation targets

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 size relative to mean K

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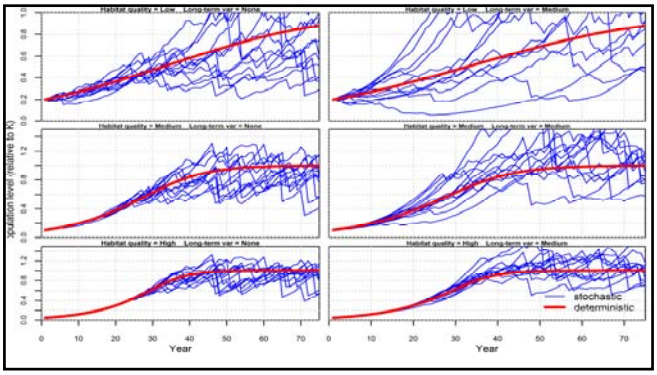

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Population reference levels 1:

- 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

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ASCOBANS conservation objectives - continued

Advisory Committee (AC6, 1999)

- advised that 2% rule will not ensure that population target is met

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

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- Threshold of 1.7% based on deterministic calculation of take that stabilizes population at 0.8 K assuming all parameter values correct, with no error or uncertainty, and assuming MNPL = 0.6*K*
- Very sensitive to assumptions, e.g. if MNPL = 0.5*K*, then the threshold is 0.8%
- Cannot be regarded as having a relevant scientific basis

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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_R = 0.5
  - percentage can vary through choice of R_{max}, F_R
- RLA
  - percentage varies dynamically with past bycatch history

Note: N_{min} = $N_{0.20}$ ~ N_{best} (1 - 0.84 CV)

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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. OSPAR MMEG) can determine a thresholds that meet them:
    - sensible definitions of *K* 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

- **RLAs** (Removal Limit Algorithms)

An RLA is a rule for setting a removal (e.g. bycatch) limit for given input data.
Where RLAs are developed, these should:

- be subject to the same tests as the mPBR 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

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Objective: $P > 0.8\,K$ with 95% probability

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