Thresholds of unacceptable interactions

A few thoughts from Mark Tasker
Thresholds used in very many policy areas

Widespread use within nature conservation

Widespread use in fisheries management

Very useful in negotiating between various viewpoints on issues
### A. Population size reduction
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

<table>
<thead>
<tr>
<th></th>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>≥ 90%</td>
<td>≥ 70%</td>
<td>≥ 50%</td>
</tr>
<tr>
<td>A2, A3 &amp; A4</td>
<td>≥ 80%</td>
<td>≥ 50%</td>
<td>≥ 30%</td>
</tr>
</tbody>
</table>

- **A1** Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.
- **A2** Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.
- **A3** Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3].
- **A4** An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. Based on any of the following:
  - (a) direct observation [except A3]
  - (b) an index of abundance appropriate to the taxon
  - (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
  - (d) actual or potential levels of exploitation
  - (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

### B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

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<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1. Extent of occurrence (EOO)</td>
<td>&lt; 100 km²</td>
<td>&lt; 5,000 km²</td>
<td>&lt; 20,000 km²</td>
</tr>
<tr>
<td>B2. Area of occupancy (AOO)</td>
<td>&lt; 10 km²</td>
<td>&lt; 500 km²</td>
<td>&lt; 2,000 km²</td>
</tr>
</tbody>
</table>

AND at least 2 of the following 3 conditions:

- (a) Severely fragmented OR Number of locations = 1 ≤ 5 ≤ 10
- (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals
- (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals
Current ICES fisheries advice system

**Table 1.2.3** Symbols and text for status of stocks fished under management plans.

<table>
<thead>
<tr>
<th>Management plan reference points</th>
<th>Explanation</th>
<th>Sign</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing mortality ($F_{MP}$)</td>
<td>$F &lt; F_{mgt \ target/limit}$</td>
<td>✅</td>
<td>Below</td>
</tr>
<tr>
<td></td>
<td>$F$ within defined range</td>
<td>✅</td>
<td>At or Within range</td>
</tr>
<tr>
<td></td>
<td>$F &gt; F_{mgt \ target/limit}$</td>
<td>✗</td>
<td>Above</td>
</tr>
<tr>
<td>Biomass ($SSB_{MP}$)</td>
<td>$SSB &gt;$ target, limit or trigger biomass</td>
<td>✅</td>
<td>Above</td>
</tr>
<tr>
<td></td>
<td>$SSB$ within defined range</td>
<td>✅</td>
<td>At or Within range</td>
</tr>
<tr>
<td></td>
<td>$SSB &lt;$ target, limit or trigger biomass</td>
<td>✗</td>
<td>Below</td>
</tr>
</tbody>
</table>
Thresholds can be calculated scientifically, but nearly all need some form of societal choice.

“Societal” choice may be a bureaucratic or political decision, but in democracies usually involves some sort of consultation and negotiation process. There needs to be at least representation of diversity of views.

ICES fisheries examples derive from choices made under Convention on Biological Diversity.
Thresholds very often require detailed explanation in order to avoid misunderstandings and disagreements.

Thresholds make assessment and advice giving much more straight-forward.

Do not require assessments to be re-negotiated each time (beyond agreeing on data) and reduces greatly need for complex caveats.
Thresholds very often require detailed explanation in order to avoid misunderstandings and disagreements.

Often that means further adaptive (in the light of experience) modifications.
Needs for marine mammal bycatch thresholds

ASCOBANS requirement

MSFD indicator of GES in this area

Advice from ICES in relation to 812/2004 and to fisheries

In all cases, useful for prioritising further action, and in cost-benefit analyses
Need to review and maybe change?

ASCOBANS: total anthropogenic removal above 1.7 % of the best available estimate of abundance

Slight variance in 812/2004

Decision in relation to MSFD now urgent

ASCOBANS model was for harbour porpoise only
Issues

What does ‘in the long term’ mean? (as in 80% of carrying capacity in the long term)

Various examples exist
SCANS II and CODA used 200 years

IWC uses 100 years

IUCN uses 100 years or 3 generations
USA’s MMPA uses 100 years
What precision is required?

IWC aim for 72% carrying capacity on average (50% of the time);

Canada’s seal objective is 70% of maximum recorded abundance for 80% of the time;

MMPA aims for 50% of carrying capacity at least 95% of the time
Issues

What framework to adopt?

Current ASCOBANS model

Potential Biological Removal

Catch Limit Algorithm

Others that could be derived from fisheries modelling