Defining management objectives:
lessons from fisheries

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Ecosystem Based Management
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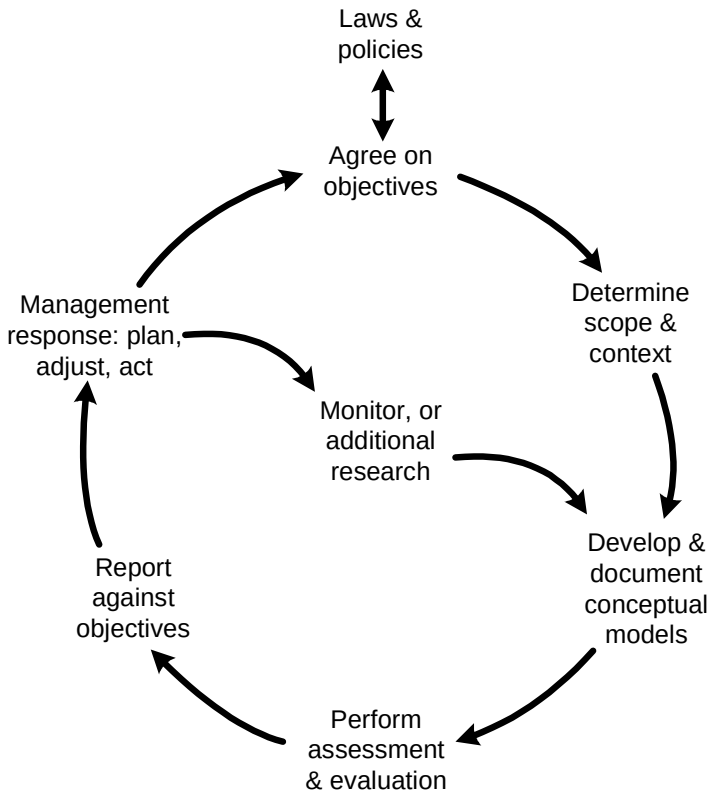
Context

- Common Assessment and Reporting Framework (CARF)
- Where objectives sit in the adaptive management cycle
- Related and important processes
  - Monitoring
  - Assessment
  - Management response

CARF agreed across fisheries and conservation agencies and departments and across States and Commonwealth

Endorsed by MACC



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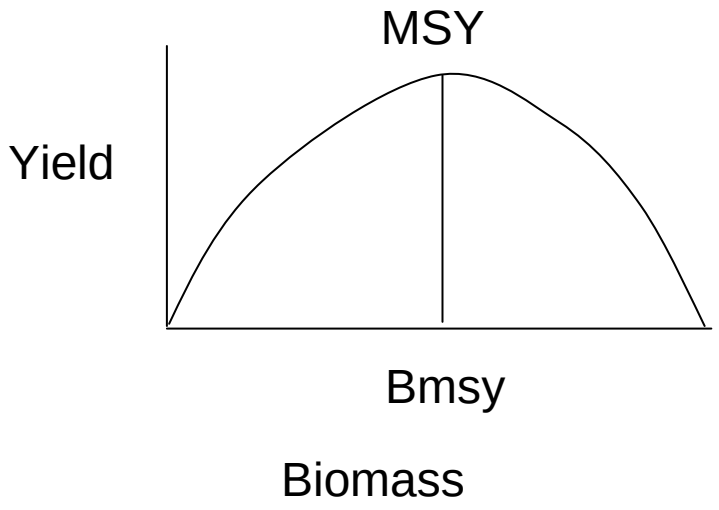
Objectives in fisheries management

- Objectives have evolved over time!
  - Stone tablets from present-day Iraq document fisheries regulations from 2000 BC (including spatial management!)
  - Concerns about effects of fishing from England in 15th century
  - French and English promoted fishing in 17th and 18th centuries for food (self sufficiency) and defence (trained sailors)
  - NSW government bought trawlers and established a commercial fishery in early 20th century
  - Maximum sustainable yield (MSY) – 1950s
  - Maximum economic yield (MEY) – 1960s
  - UNCLOS enshrined MSY in 1960s
  - ESD – 1990s – rediscovering the economic and social
  - Ecosystem based fisheries management – 2000s

Interplay between science and policy (1)

- Huxley 1890s “the great sea fisheries are inexhaustible”
- 1950s – models, surplus production, sustainable yield



Interplay between science and policy (2)

- Science → MSY → Policy uptake → Fishery specific assessments → operational management

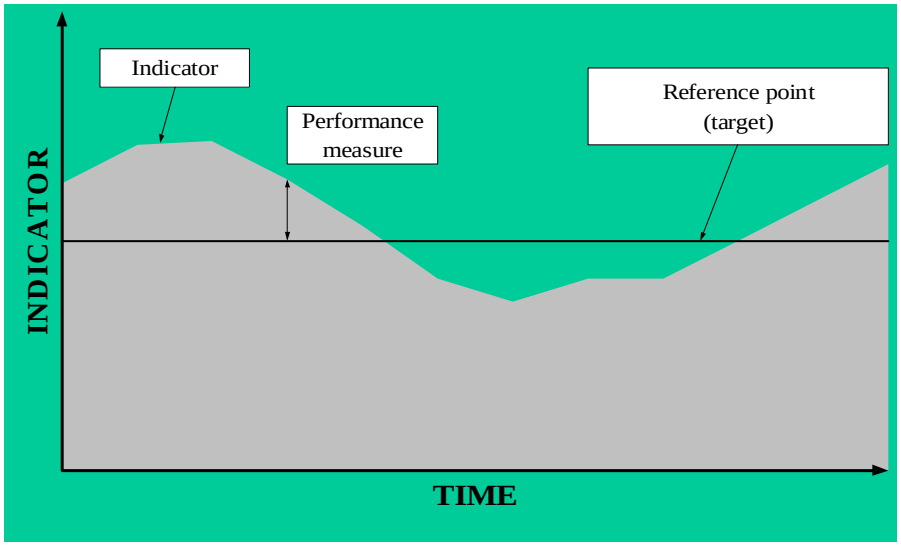
BUT

- Uncertainties in assessments + lack of precaution in decision making → overfishing, stock collapse etc
- Identify need for limit as well as target reference points
- Switch for MSY from target to limit (at least for exploitation rate)

- Analysis of lots of fisheries assessments → empirical information to define biomass limits (20% unfished levels)

Operational objectives

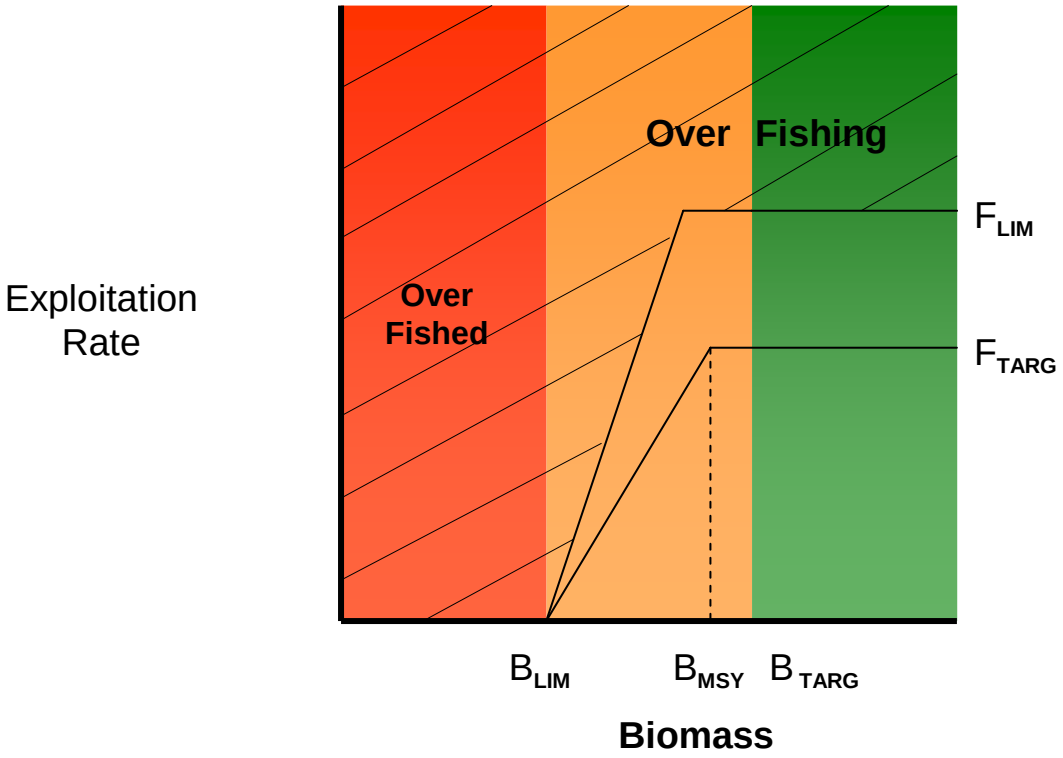
- Objectives, indicators, reference points and performance measures
  - E.g. biomass relative to B_{MSY}



Commonwealth Harvest Strategy Policy

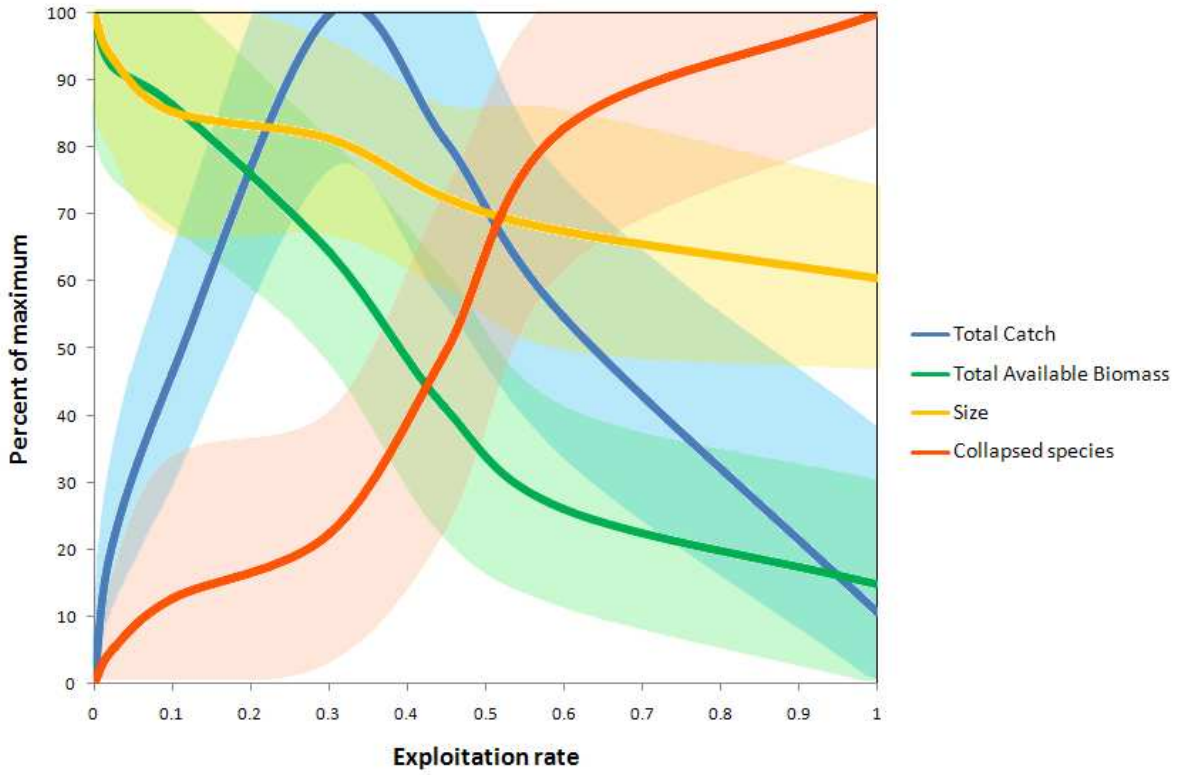
- Key elements
  - Target defined
    - MEY (maximum economic yield)
    - Default target biomass 1.2 X B_{MSY}
    - Default for B_{MSY} is 40% of unfished biomass
  - Limit defined
    - Biomass below which there will be no targeted fishing
    - Default half x B_{MSY} (or 20% of unfished biomass)
  - Acceptable risk defined
    - Less than 10% chance of the stock falling below the limit under application of the harvest strategy

SESSF harvest strategy



EBFM

- Much progress in past decade
  - ERA, whole of fishery management strategy analysis
  - Able to identify tradeoffs across multiple objectives, e.g.



Robust indicators (1)

- What we are really interested in is usually some “key variable” e.g. stock biomass
- What we can actually measure is usually some indicator e.g. catch rate
- Q. How well does the indicator track changes in the key variable?
- Q. How badly can we go wrong by using the wrong indicator?

Robust indicators (2)

Examples of non-robust indicators:

- CPUE for northern cod
- Mean length for eastern gemfish
- By-catch level for seabirds

See other presentations this workshop – e.g. Hayes

Cost effective indicators

- Experience with HSP implementation
  - Ideal is to have information on biomass
  - Usually don't have this (scientific surveys expensive)
  - Many data-poor fisheries but all Cwlth fisheries have to have a formal harvest strategy
  - Use of surrogate indicators
    - CPUE (commercial catch rates)
    - Size or age structure of catch (→ exploitation rate)
    - Risk assessment approaches
  - Fishing industry as scientific monitors – only way to achieve cost effective monitoring – but backed up by independent scientific monitoring (at lower level)
  - For broader ecological data: Neville Barrett et al.

Key messages

- Defining operational objectives key to effective management
  - Key component of CARF
  - Define using indicators and associated reference points
  - Even in absence of reference points, can start to identify tradeoffs
- Difficult process with lots of considerations
  - Link to legislation and policy
  - Multiple and (often) conflicting objectives
  - Integrating across space
  - Integrating across ecological components
- Need scientific input (but objectives not science-determined)
- Need to match operational objectives to likely data availability and (cost effective) monitoring strategies

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