

Harvest Strategies

TRL RAG Meeting
31 March 2016



Australian Government

Australian Fisheries Management Authority



Harvest Strategy - Background

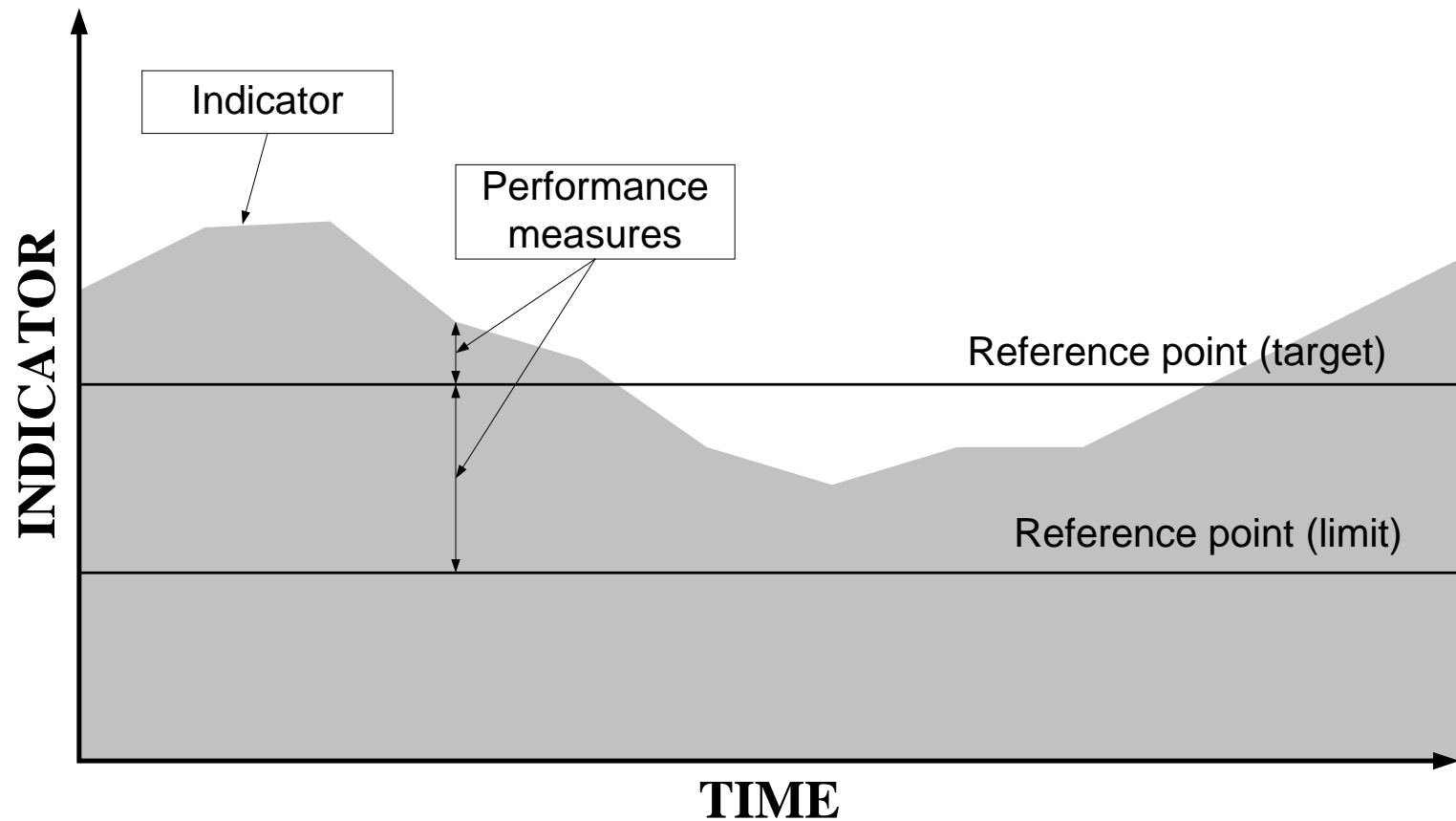
- A Harvest Strategy is required by:
 - Strategic Assessments under EPBC Act
 - Commonwealth Fisheries Harvest Strategy Policy
- A harvest strategy should:
 - Be easy to understand
 - Be unambiguous
 - Make sense
 - Be precautionary

Harvest Strategy - Background

Six Key Elements

1. Objective(s) – what you are trying to achieve
2. Reference Points – benchmarks
3. Indicator(s) – what you measure
4. Performance measure(s) – how you are tracking
5. Control Rules – how you will react
6. Meta Rules (Exceptional Circumstances) – for when the unusual happens

Harvest Strategy - Definitions



Example - fishery

1. Objective: Keep fishery sustainable and profitable
2. Reference Point: Fishing mortality \leq a target
3. Indicator: Current level of fishing mortality
4. Performance measure: How close to target
5. Decision Rule: Increase/decrease catch
6. Meta Rule; e.g. If bad signs in other indicators then further reduce the catch

Defining some terms - defaults

- *Exploitation rate* is the fraction of the available stock that is caught ($=C/B$)
- *Fishing mortality rate* (F) is a particular form of an exploitation rate
- *Biomass* (B) is the total weight of fish (usually of spawners but has to be defined)
- *Limit reference point* (F_{LIM} or B_{LIM}) is an exploitation rate or biomass to be avoided
- *Target reference point* (F_{TARG} or B_{TARG}) is an exploitation rate or biomass to be aimed for

Defining some terms - defaults

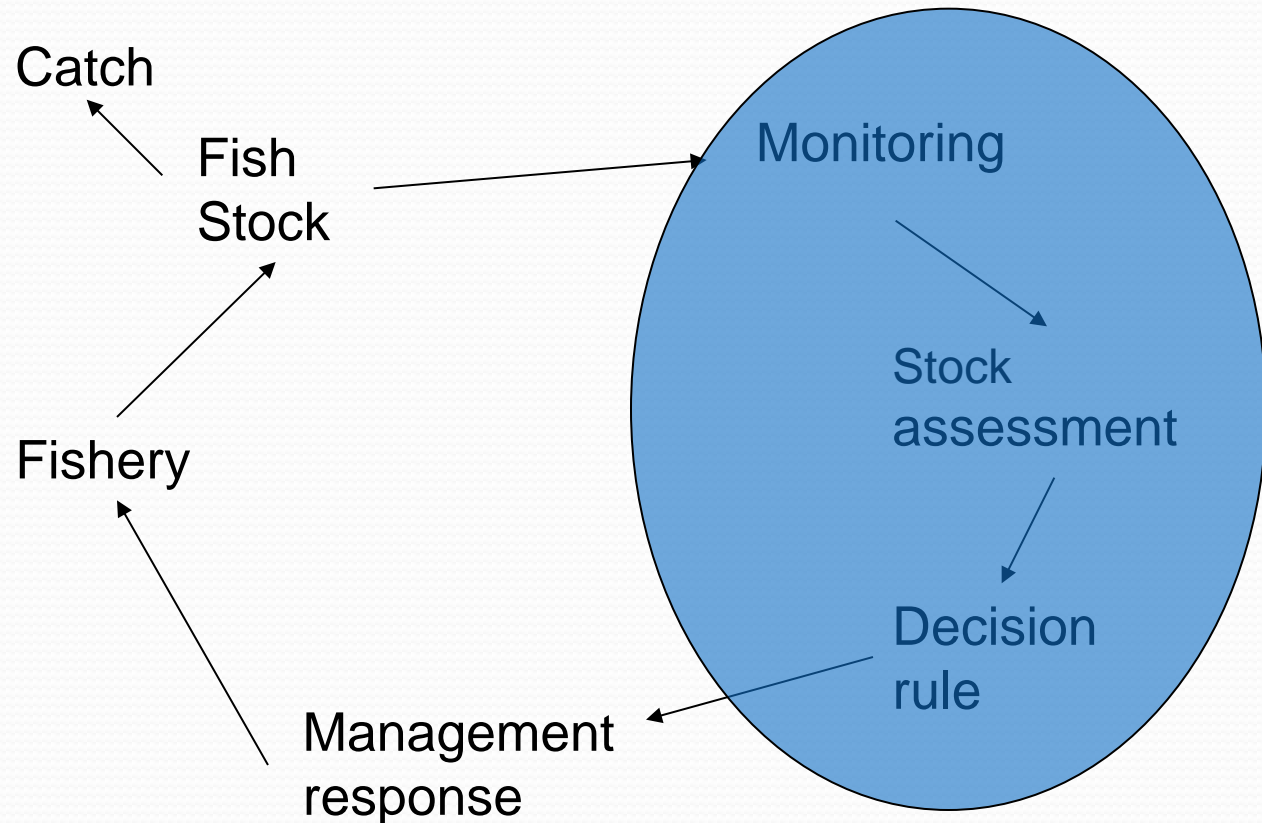
- Limit reference point
 - To be avoided
 - $B_{LIM} = 20\%$ original biomass
 - May be higher for important food chain spp
 - $F_{LIM} =$ High effort level that will reduce biomass beyond 20% original biomass
- Target Reference Point
 - $B_{TARG} = 48\%$ original biomass is an F_{TARG} exploitation rate or biomass to be aimed for

Defining some terms - defaults

- Target Reference Point
 - Biomass above B_{MSY} (Default $B_{MSY} = 40\%$)
 - $B_{TARG} = 48\%$ original biomass ($1.2 \times B_{MSY}$)
 - F_{TARG} exploitation rate that reduces biomass to 48% original biomass
 - Only have biomass estimates from Tier 1 or 2 assessments
 - Proxies need to be developed for species without formal assessments.

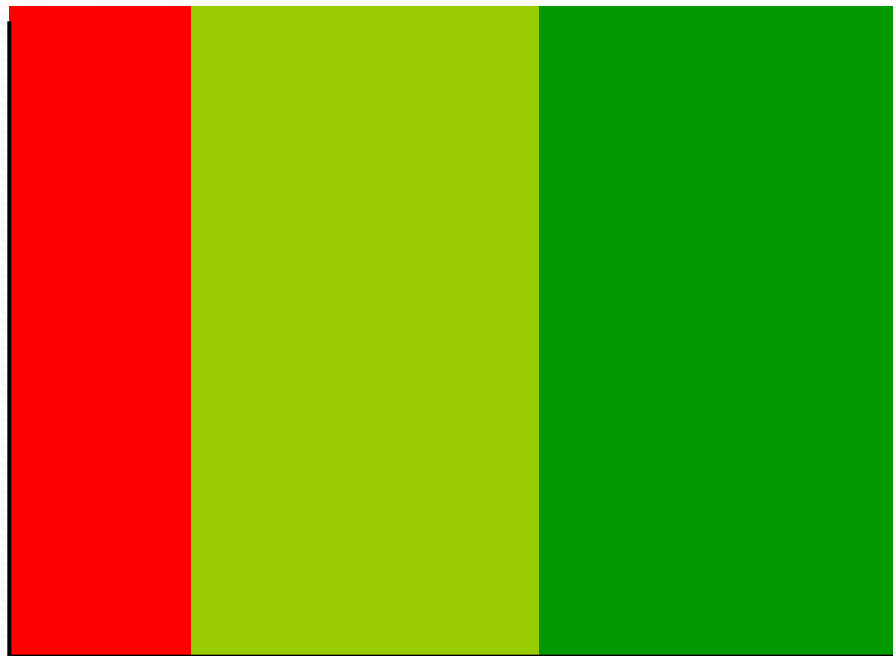
Harvest strategy - components

Fisheries adaptive management cycle



Harvest strategy - components

- Monitoring + Assessment + Decision rule
- Monitoring ✓
- Assessment ✓
- Decision Rule ✗
 - Critical from a policy perspective
 - Explicit formula for recommending a management response



B_{lim}

B_{targ}

Biomass

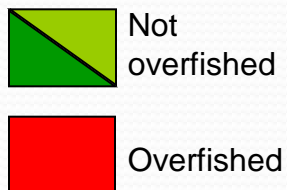
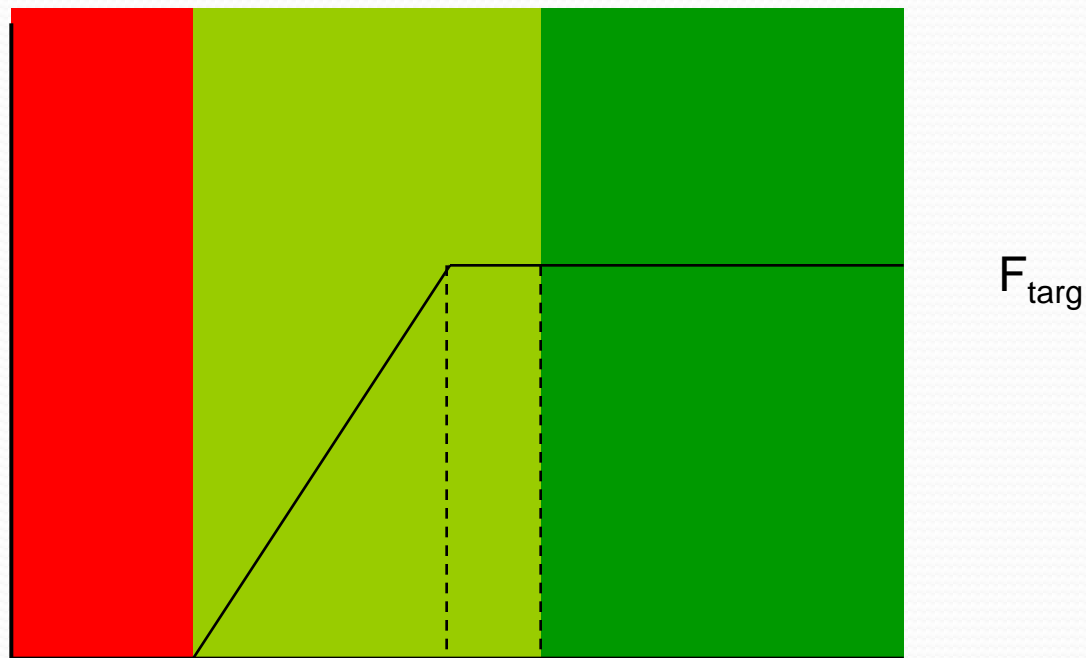


Not overfished



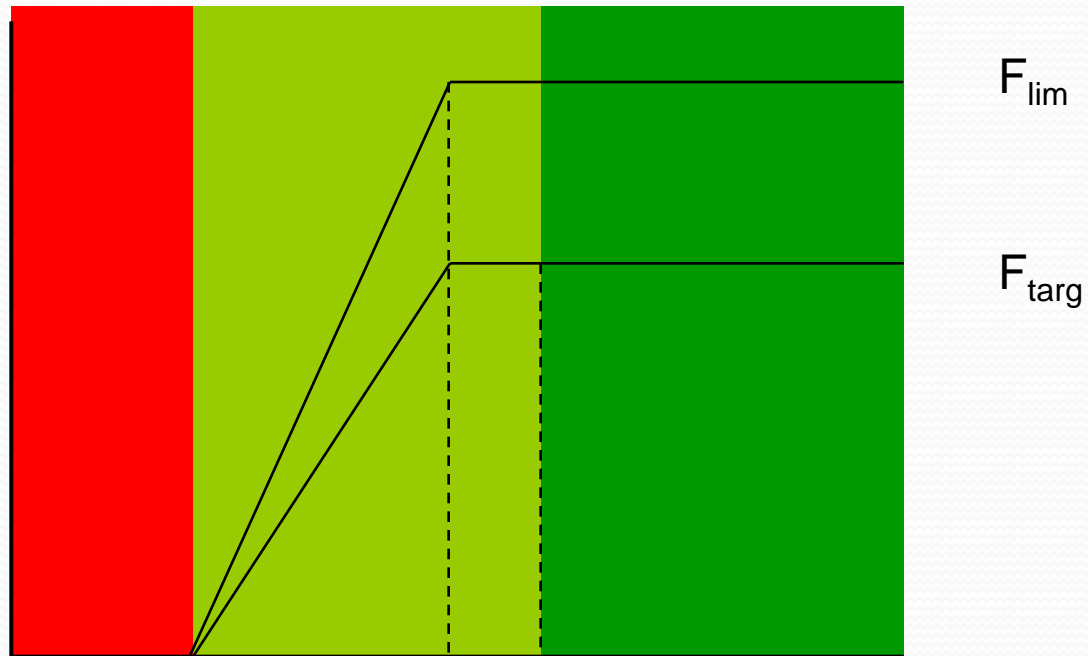
Overfished

Fishing
mortality



Biomass

Fishing mortality



B_{lim}

B_{msy}

B_{targ}

Biomass

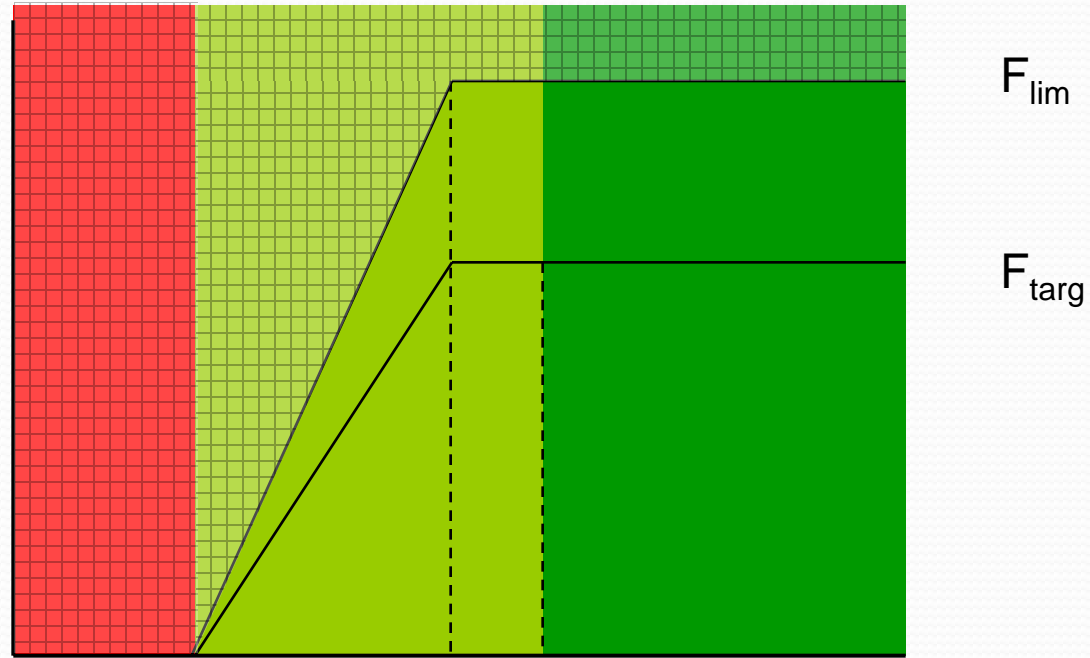
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 Overfished

Tiers 1 and 2

 Overfishing

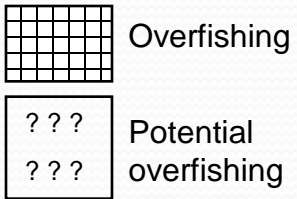
Fishing mortality



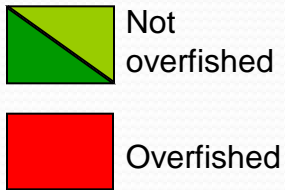
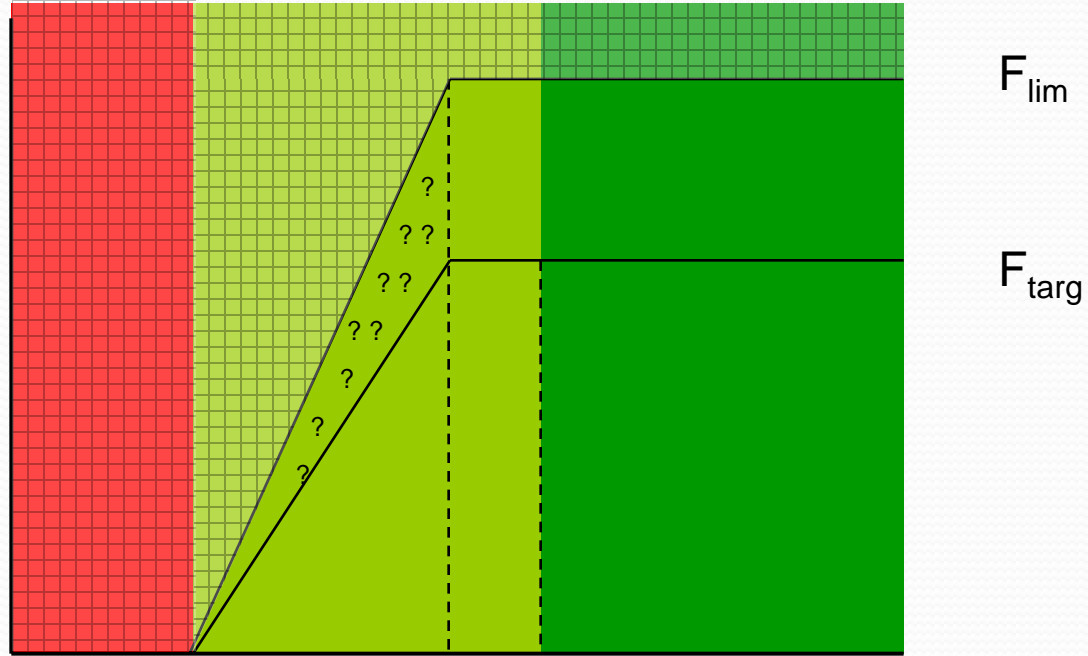
 Not overfished

 Overfished

Biomass



Fishing mortality



B_{lim}

B_{msy}

B_{targ}

Biomass