

The ABCs of Fisheries Management

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Presentation Outline

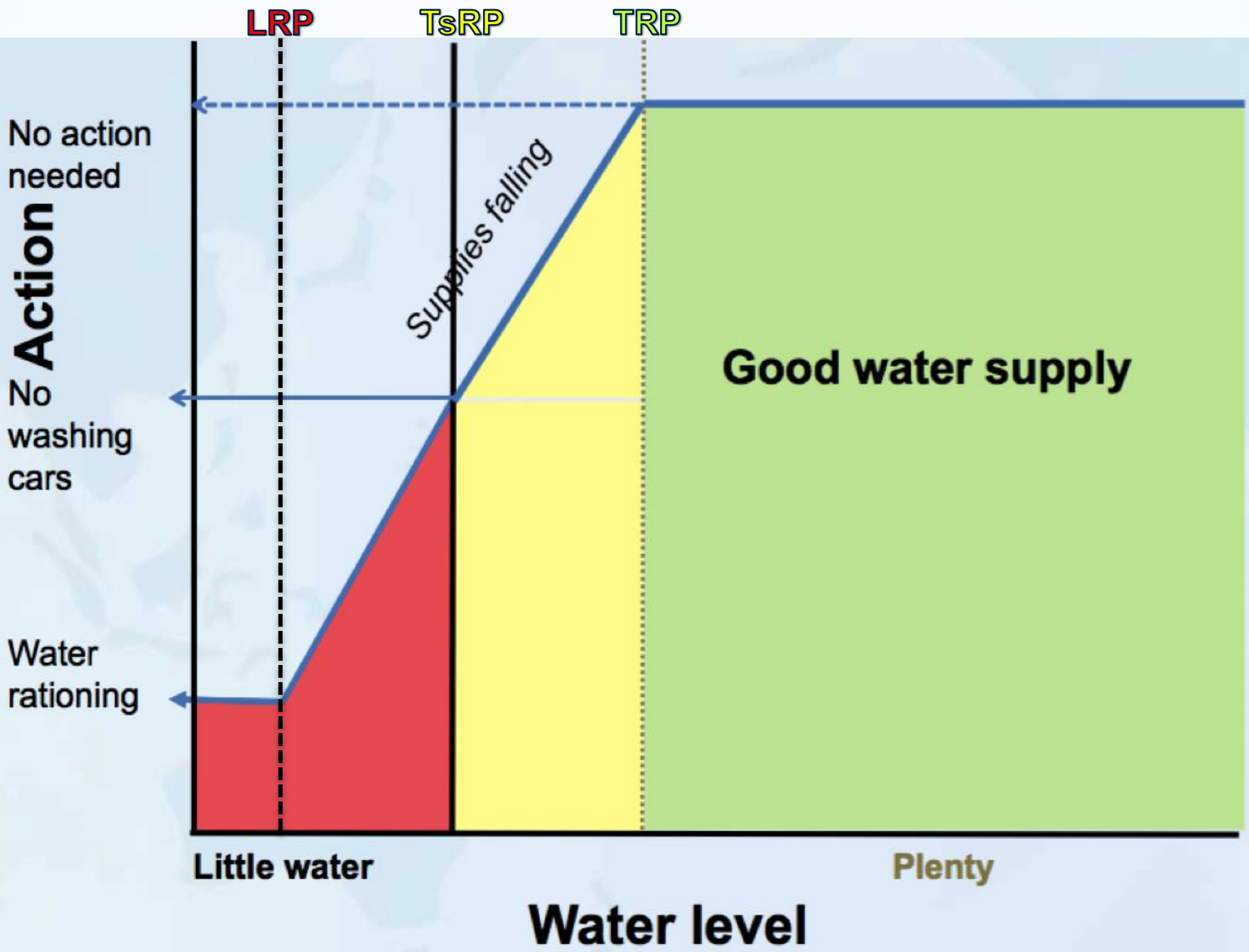
- **Harvest Control Rules (HCR)**
- **Management Reference Points**
- **Management Objectives**
- **Management Strategy Evaluations (MSE)**
- **Current and Future Considerations**

Harvest Control Rules (HCRs)

- **Pre-agreed management actions** taken in response to stock status indicators
- Increase the **efficiency and transparency** of management.
- Helps **avoid** costly and difficult **political negotiations**.
- Incorporating Target, Threshold and Limit Reference Points into HCRs result in more robust management frameworks.
Target \neq Threshold \neq Limit

EXAMPLE – WATER USAGE



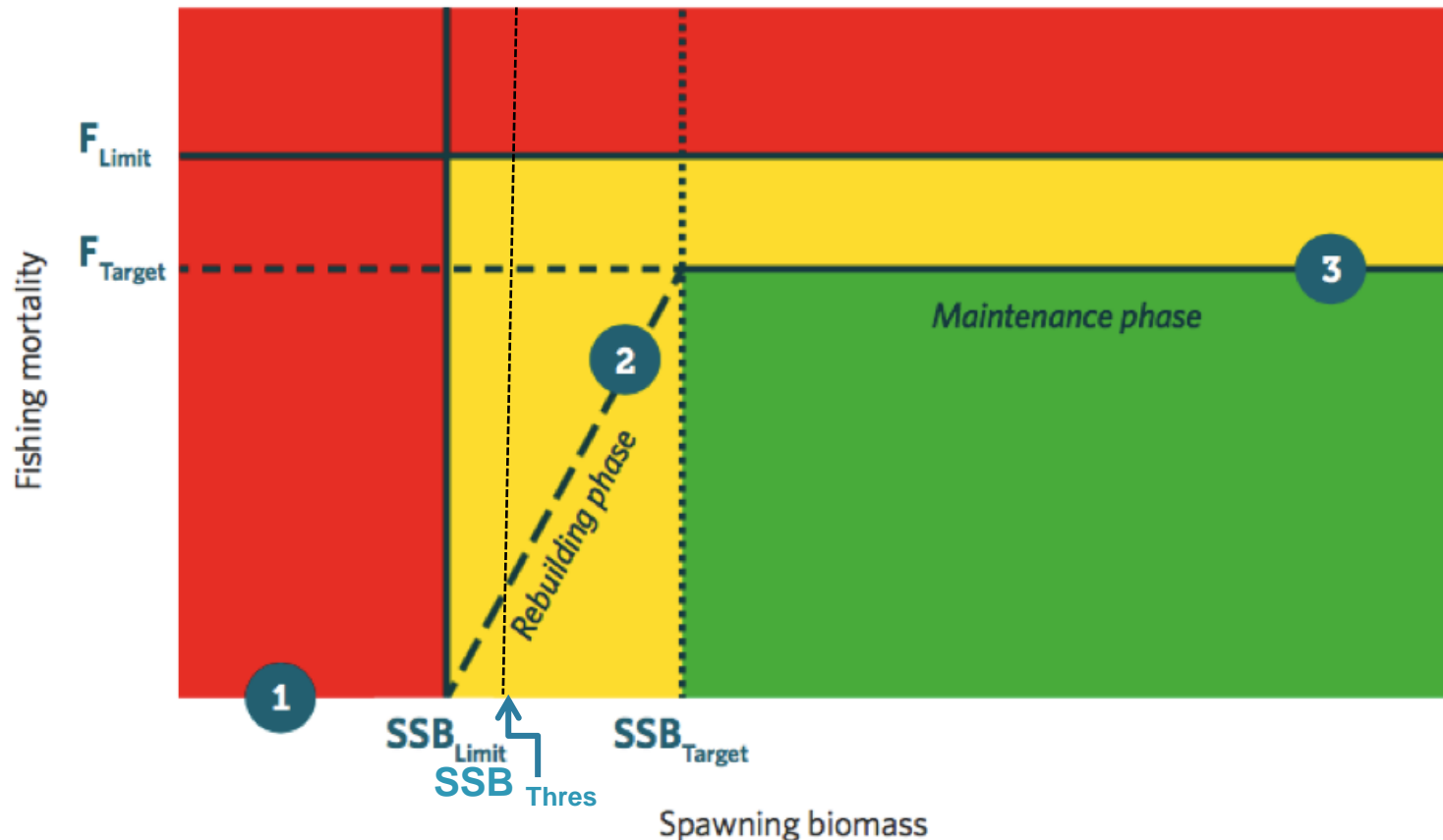


Main Types of Harvest Control Rules

HCR type	Description	What it looks like
Constant	<p>Allows for a constant level of fishing based on one value, regardless of stock status.</p> <p>The single value could be mortality (F), total allowable catch, days at sea, etc.</p>	
Threshold	<p>Fishing is allowed at a single target level until a limit is reached, at which point fishing is stopped.</p>	
Step	<p>Incorporates steps so higher fishing levels are permitted as the stock's status improves.</p>	
Sliding (simple linear)	<p>A sliding rule allows for a continuous adjustment in fishing controls. Higher fishing levels are permitted with improved stock status.</p>	

How Harvest Control Rules Work

- 1 If SSB is below SSB_{Limit} , suspend the fishery and institute a scientific monitoring quota until the limit is reached or exceeded.
- 2 If SSB is between the limit (SSB_{Limit}) and the target (SSB_{Target}), reduce fishing mortality in accordance with the rebuilding phase of the HCR.
- 3 If SSB is greater than or equal to the target (SSB_{Target}), fish at the target mortality rate (F_{Target}).



Management Reference Points

- Are a **management tool** used to achieve **biological and socio-economic management objectives**.
- Are **pre-determined** levels of a given **indicator (generally biological)** that correspond to a particular **state of the stock** that management either **seeks to achieve (target) or avoid (limit)**.
- **Threshold reference points** identify **intermediary (precautionary) actions**; their incorporation into HCR result in more **robust management frameworks**.

Management Reference Points

- Management Reference Points: are benchmarks for gauging the status of a stock.
- Target reference points: where managers want to be or are shooting for.
- Limit reference points: the maximum degree of safe exploitation. Line that's not really safe to cross...

Stock
Biomass



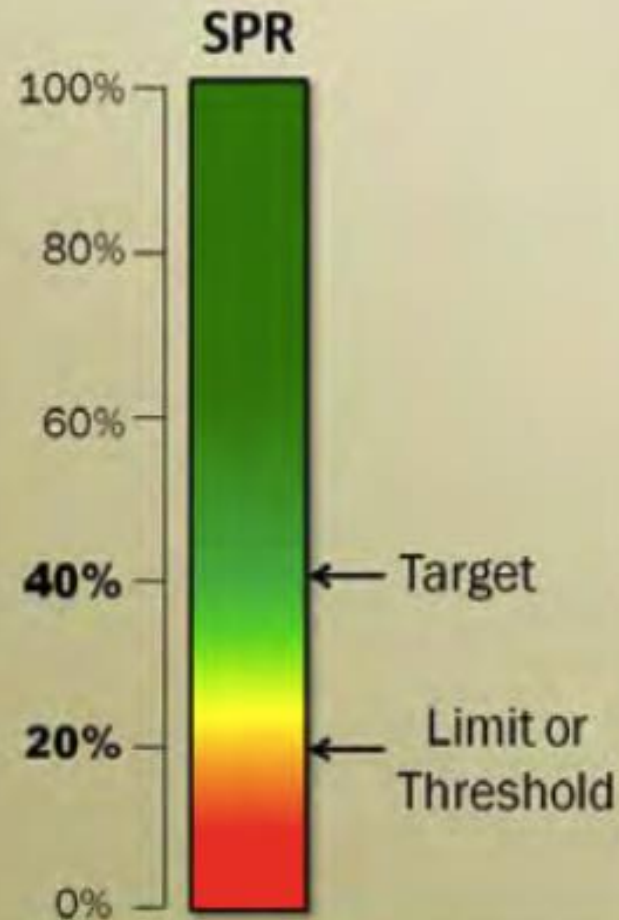
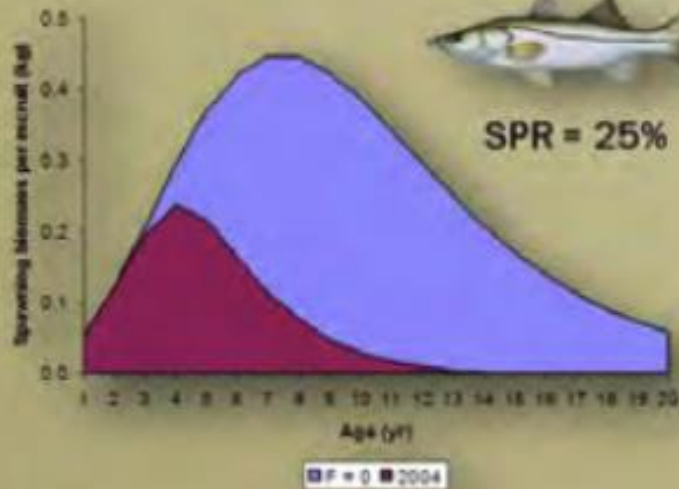
← Target

← Limit or
Threshold

Management Reference Points

Spawning Potential Ratio (SPR)

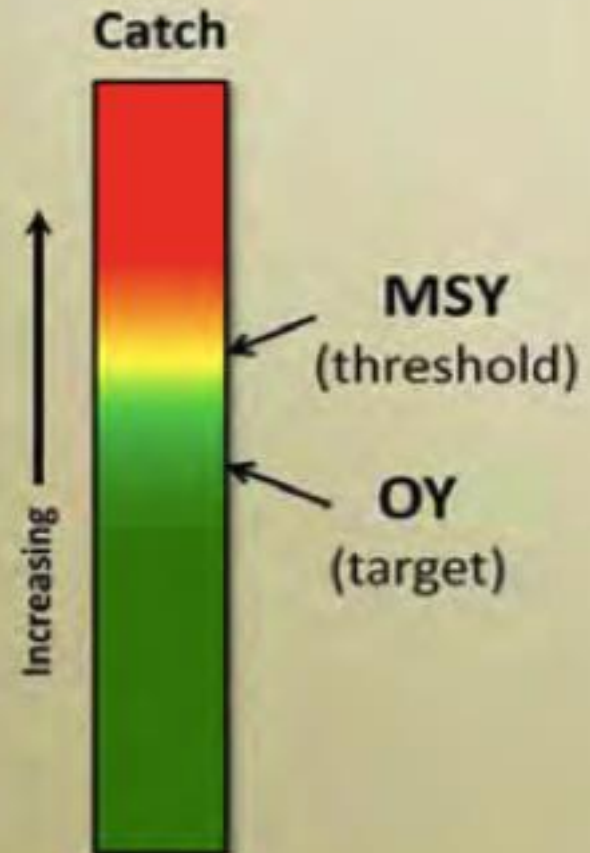
$$\text{SPR} = \frac{\text{Spawning Biomass Fished}}{\text{Spawning Biomass Unfished}}$$



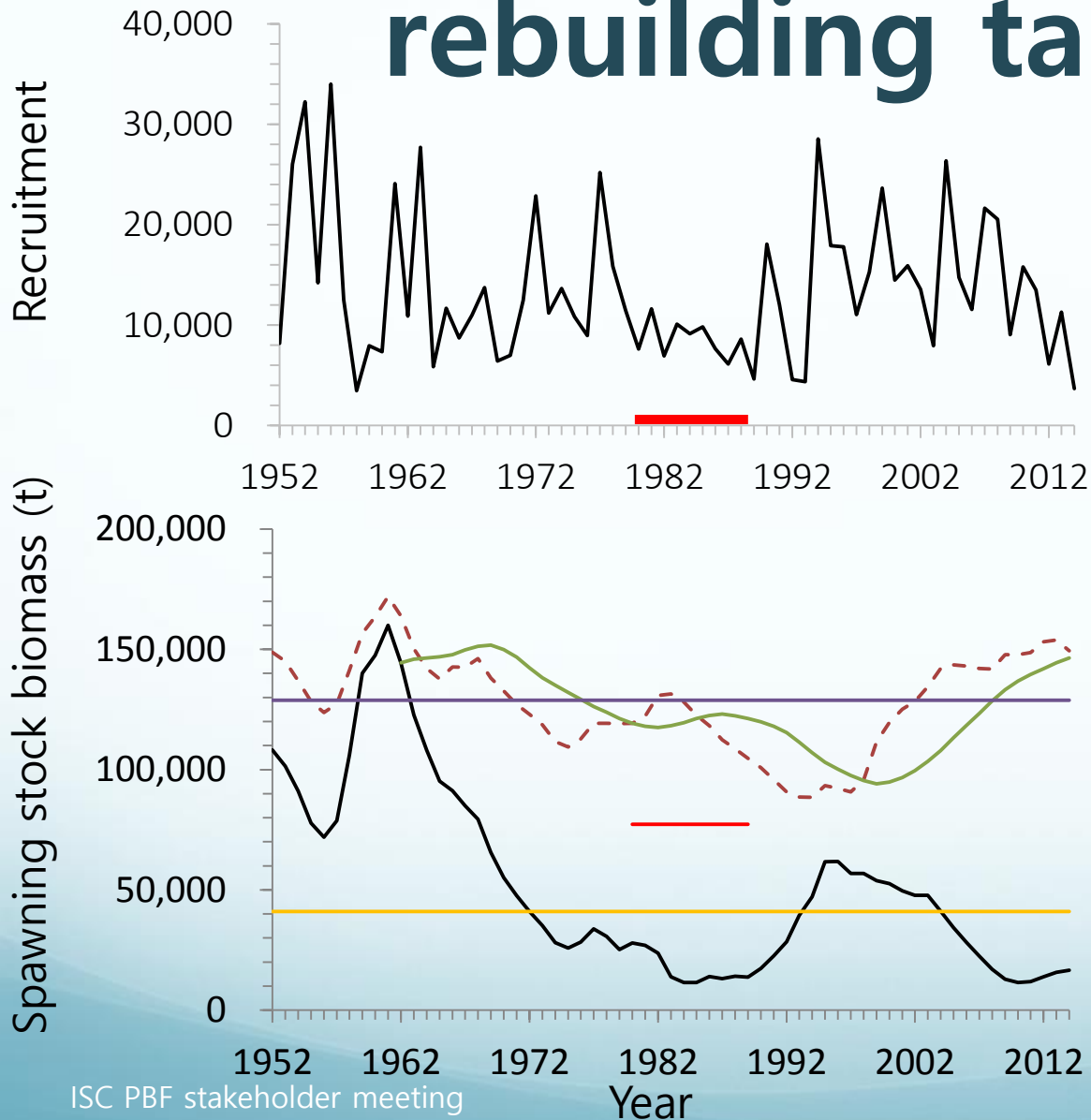
Management Reference Points

Other Reference Points

- Maximum Sustainable Yield (MSY): the largest long-term average catch or yield that can be taken from a stock.
- Optimum Yield (OY): a reduction from MSY to account for economic, ecological, and social factors.



What are the candidate rebuilding targets?



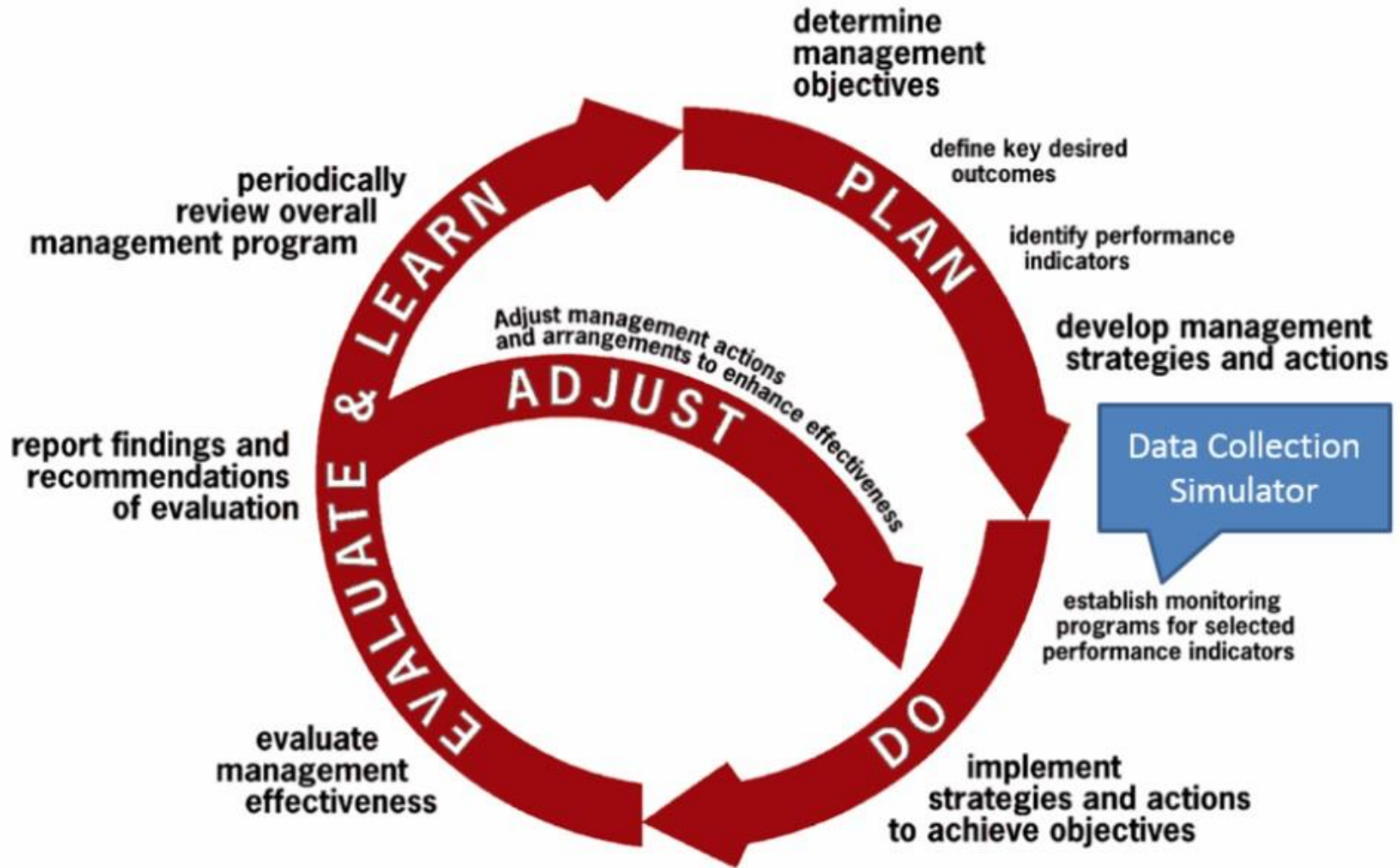
Management Objectives

- **Types of Objectives**
 - **Status**: To **maximize** the probability of maintaining the **stock above** the biomass **target reference point**.
 - **Safety**: To **minimize** the **probability** that the stock will fall **below** the biomass **limit reference point**.
 - **Yield**: To **maximize catch (or effort)** across regions and/or fishing gears.
 - **Abundance**: To **maximize catch rates** to enhance fishery profitability.
 - **Stability**: To **maximize stability in catches** to reduce commercial uncertainty by minimizing variability in catch from year to year.
- **Performance Measures – Generally risk-based**
- **Accountability Measures (monitoring)**

Management Strategy Evaluation (MSE)

- MSE process can be used to **determine** which approaches would best meet the **pre-defined objectives** for a fishery.
- MSE test the **performance over a range of uncertainties**, increasing the likelihood that it will achieve its intended goals in the face of the inevitable unknowns in fisheries.
- MSE is a **circular process** where each activity informs each other (**feed-back loop**)
- **Input from stakeholders and managers is critical!**

Management Strategy Evaluation (MSE)



THANKS