

5.1: Yield per recruitment

- Recruitment overfishing vs. Growth overfishing
- Yield per recruitment

Uses of the Three Fishery Models

- **Surplus production model**
 - Conceptual model (theoretical model) to investigate the effect of fishing mortality
 - MSY, Proportional Quota, Constant Quota
- **Stock-recruitment model**
 - Predict recruitment level from stock/spawner abundance
 - If the relationship is found, it is useful in stock assessment.
- **Replacement Line (Spawning stock per recruitment)**
 - Find expected stock (spawner) abundance from recruitment level (if the recruitment remains the constant, what is the expected spawner abundance)
 - Together with stock recruitment model, we can determine the sustainability of fisheries
 - Together with data on recruitment, we can determine whether we are overfishing or not.

Recruitment Overfishing

- **Recruitment overfishing**
 - The abundance (density) of spawner is reduced to the point where the population cannot replace itself (i.e. not sustainable)
 - Catch is lower than the potential maximum (MSY)
- (1) Surplus production model, (2) stock-recruitment model, and (3) replacement line are primarily concerned about recruitment overfishing (**long-term sustainability**).