MyDas

MSY for DAta-limited Stocks

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Tasks

Develop and test a range of assessment models and methods to establish *MSY* or proxy reference points across the spectrum of data-limited stocks

- **Case Studies** based on Economic value; Importance; Sensitivity to the impacts of fishing; Available data.

- A number of data-limited methods already exist, therefore implement a **Common Framework** to compare performance.

- Evaluate **Sensitivity** to assumptions

- **Management Strategy Evaluation** to ensure robustness to uncertainty

MSY

An objective of the Common Fisheries Programme is to achieve *MSY* for **all harvested species**

Fast approaching 2020 deadline for achieving Good Environmental Status

Data Poor Advice
Data Poor Advice

Simple catch rules have been developed to stabilise data limited stocks at current levels

The *"2 over 3"* catch rule adjusts catches based on changes in an index of abundance (I)
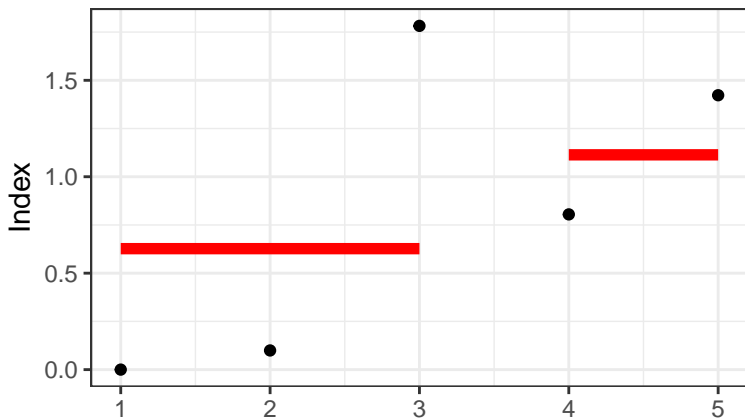
Management Strategy Evaluation

Management Strategy Evaluation

Construct an **Operating Model** to simulate stocks with different life and exploitation histories

Generate different types of datasets using an **Observation Error Model**
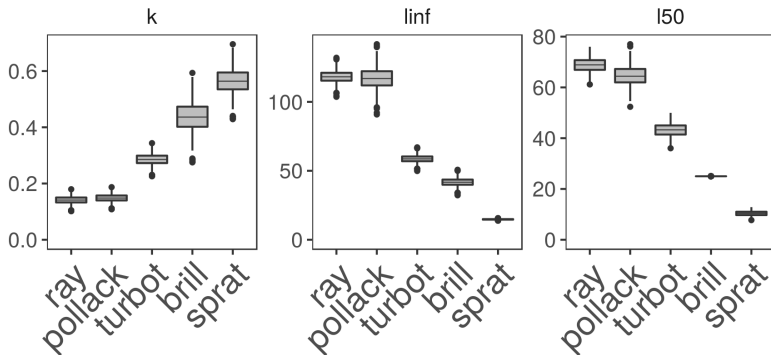
Test Alternative **Management Procedures**

- ▶ Assessment Methods
- ▶ Reference Points and
- ▶ Advice Rules

Operating Model
Case Studies

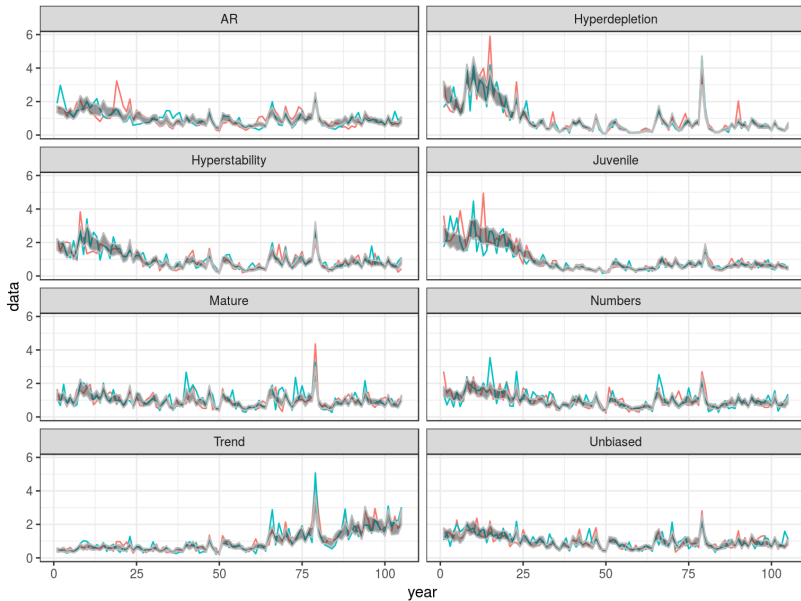Turbot, Brill, Pollack, Ray, Sprat, Lobster, Razors

Life History Relationships

Natural Mortality

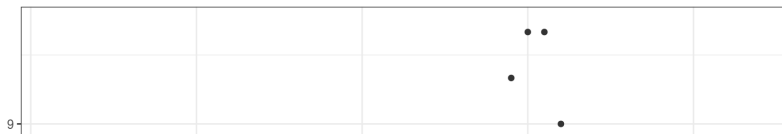# Observation Error Model
Indices of Abundance

Methods
Length Based Methods

F_{MSY} Proxies

Based on Beverton and Holt $L_F = \frac{L\infty + \frac{F+M}{K}L_c}{1+\frac{F+M}{K}}$
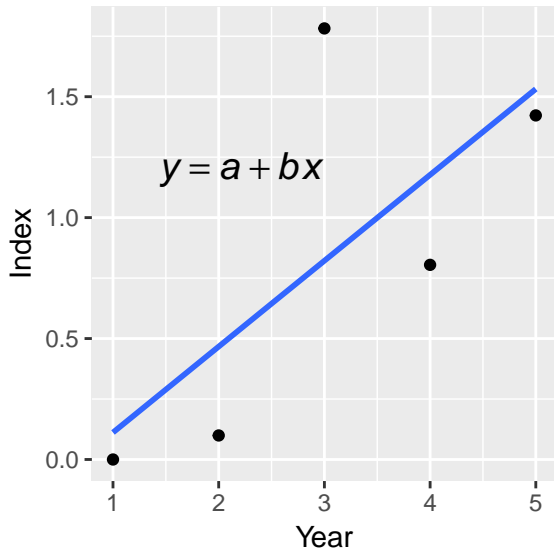
- $L_{current}/L_{F=M}$
- $M/(Z_{current} - M)$
- $F_{0.1}/(Z_{current} - M)$
- *LBSPR* Length-based spawning potential ratio (Hordyk et al. 2015)
- *Lime* (Rudd and Thorson, 2018) mixed effects non-equilibrium
- . . .

F from LBSPR

Empirical HCR

$$y = a + bx$$

if slope $(b) < 1$

Next Steps

Case studies

- ▶ Summarise current infomation
- ▶ Propose future data collection options

Evaluate individual rules based on Proxy reference points

- ▶ Length
- ▶ Abundance Indices
- ▶ Catch

Evaluate combined rules of the form $C_{t+1} = C_{t-1}rfb$

Compare to category 1 rules to evelute benefits of improved data

- ▶ e.g. Biomass dynamic assessment that uses Index and Catch

Value of infomation

Models are cheap, but data is expensive

Management Procedures

Consider the data along with the assumptions, estimator and management and feedback between the various elements

Diagnostics

Compare across species, stocks, fisheries and advice rules

Risk

An uncertainty that matters, what matters are management objectives

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