Part I: Moving towards a sustainable fisheries framework for BC herring: data, models & alternative assumptions.
Part II: Stock assessment and management advice for BC Herring stocks (2011/2012)

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Moving towards the sustainable fisheries framework.

Overview

- Review of the HCAM model in June 17-18, 2010.
  - Model parameterization of q.
  - Parametrization of q, M, and selectivity is confounded.
- Development of a new integrated Statistical Catch Age Model (^{i}SCA$_M$).
- Data, assumptions and Analytical methods.
- Outstanding issues.

Introduction

- Current harvest control rule for BC herring:
  - Cuttoffs set at 0.25 B_0
  - 20% exploitation rate
  - Estimates of B_0 were last updated in 1996.
- HCAM model assumed $q = 1$ for the dive survey data.
- Natural mortality is modelled as a random-walk.
- Gill net selectivity is a function of weight-at-age.

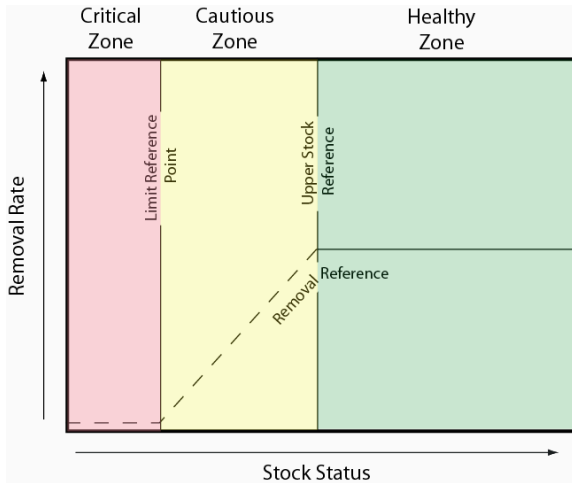# Harvest Strategy Compliant with Precautionary Approach

Figure: Fisheries management framework consistent with a precautionary approach.

Key elements for the new framework

Reference points

- ▶ Limit Reference Point (LRP) & Upper Stock Reference (USR) requires knowledge of stock productivity and population scale.
- ▶ Removal Rate requires knowledge of stock productivity.
- ▶ MSY-based reference points require *a priori* allocation to different gears.

Risk & Decision making

- ▶ Onus on being able to reliably determine stock status (informative data).

Herring Stock Assessment Model Review

Summary of Panel Recommendations

- ▶ Panel concluded that $q_2 = 1$ was inappropriate.
- ▶ CUTOFFS can be fixed or annually estimated (should be updated if management objective is 25% B_0)
- ▶ A model based approach to estimating B_0 and B_{MSY} is appropriate.
- ▶ Recruitment variation should be estimated within the model rather than fixing it at a pre-specified level.
- ▶ Issues regarding estimating selectivity vs. availability should be explored (data is limited to estimate availability).
- ▶ Science advice should be risk neutral.
- ▶ MSE should explore elements of the Sustainable Fisheries Framework (i.e., ensure that $B_t > 0.4 B_{MSY}$ with 95% certainty over two generations.)
- ▶ ...

Input data

The input data for $^iSCA_M$ is the same as HCAM:

- Catch by gear,
- Spawn survey index,
- Age-composition data for all gears,
- Empirical weight-at-age data.