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## Bzero workshop

La Jolla, December 18-20, 2006

### Proposed TOR for the workshop:

1. Evaluate the performance of the 40-10 harvest policy for stocks with different life history and stock-recruit patterns.
2. Evaluate alternative methods to estimate  $B_0$  and  $BMSY$  proxies and provide recommendations on their use.
3. Provide recommendations on the use of priors for key assessment parameters in stock assessment models. Parameter for which priors could potentially be useful include natural mortality, stock-recruit steepness, survey catchability, and recruitment variability.

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## Current Talks/Papers scheduled to be presented

- Melissa Haltuch, Andre Punt, Martin Dorn: *Simulation testing alternative estimators of unfished stock size*
  - Michael Schirripa: *Simulation testing estimators of sablefish biomass reference levels under decadal environmental variability*
  - Alec MacCall and John Field: *Comparison of dynamic and static estimates of  $B_{zero}$  and stock depletion*
  - Owen Hamel: *Advice on priors for natural mortality*
  - Martin Dorn: *Advice on priors for stock-recruit steepness*
  - Martin Dorn: *Review of methods of estimating biomass reference points used in harvest control rules employed by US Fisheries Management Councils*
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Melissa Haltuch, Andre Punt, Martin Dorn: *Simulation testing alternative estimators of unfished stock size*

Simulation/Estimation framework using a simple (ss2-lite) assessment model

Consider three examples: Canary (typical rockfish), Petrale (typical flatfish), Whiting (typical hake).

Scenario development: Number of years (25,50), SigmaR (low, mod, high), survey observation error (low, high), age comp error (low, high), (72 combinations for each species)

Two environmental scenarios: constant environment, fluctuating environment

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The methods of estimating  $B_{zero}$  being considered are the following:

1. Average mean recruitment  $\times$   $SPR@F=0$ .
  2.  $B_{zero}$  as determined by a stock-recruit relationship estimated intrinsically (with no priors).
  3. As in 2, but the model is forced to start at  $B_{zero}$ .
  4.  $B_{zero}$  as determined by a stock-recruit relationship estimated intrinsically (with priors on  $R_0$  and steepness).
  5. Alex MacCall's dynamic  $B_{zero}$ .
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Still lots of questions about how to model environmental forcing

- What functional form should the environmental forcing take (sine function, step function, or simulated PDO)?
  - What period should the function have (currently for the sine and step functions are 25 years)?
  - Where should the environmental function to start (at the peak, middle or trough of the function)
  - What proportion of the total  $\sigma_R$  should the function be (currently 1/2)
  - What about pure red noise/autocorrelation.
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Michael Schirripa: *Simulation testing estimators of sablefish biomass reference levels under decadal environmental variability*

Similar simulation/estimation approach but focused on sablefish

Simulation tool is FSIM, a population dynamics simulator developed by Phil Goodyear

Estimation model is SS2

*In setting my B0 simulations, I am thinking that I want simulate a population with an environmental effect on recruitment, then use SS2 to estimate the parameters  $MSY$ ,  $B_{msy}$ ,  $F_{msy}$ , and Depletion with stock-recruitment environmental parameter turned both on and off. The question being asked would be something like, "how are our estimates of these parameters effected when we omit the environmental effect on the S/R relation when in fact one exists".*

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An analyst to work on the evaluation of the 40-10 harvest policy has not yet been identified

The Puntalyzer has been modified (will be?) to do the required simulations relatively easily. Principle changes are to include autocorrelated implementation error and improved output.

Or drop this TOR for now?

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There is sufficient interest in pursuing publication of papers submitted to the workshop.

A special issue of Fisheries Research?

A potential problem is that the three objectives are diverse and don't fit particularly well together.

One idea is to consider joint publication of papers that deal with estimation of biomass reference levels (BMSY and Bzero), but to publish the other work independently.

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