

HCR demo

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Overview

During ACLIM phase 2 (2019-2022), modelers evaluated a suite of Harvest Control Scenarios (1-5), in 2025 we added two addition HCRs to the set. Below is a list of those standardized harvest control rules and the equations used to derive the curves.

ABC+HCR 1: Status quo

ABC+HCR 2: Lagged recovery to estimate emergency relief financing needs

ABC+HCR 3: Long-term resilience (stronger reserve) F_{target}

ABC+HCR 4: CE informed sloping rate, e.g., MHW category alpha

ABC+HCR 5: climate sensitivity reserve (buffer shocks)

ABC+HCR 6: MHW slope + climate sensitivity reserve (buffer shocks)

ABC+HCR 6: Recruit per spawner biomass variability adjusted HCR based on analyses by Spencer et al. in prep

ABC+HCR 1: Status quo

This is the basic sloping harvest control rule for groundfish in the EBS. There is a B20% cut-off for SSL (Atka, pollock, P. cod). $F_{ABC_{max}}$ is the HCR adjusted F rate that corresponds to ABC. The Tier three approach is to set the slope of the sloping HCR to $\alpha = 0.05$ and $B_{lim} = 0$ and $B_{target} = B_{40\%}$ or $B_{target} = 0.4B_{100\%}$ (i.e., 40% of unfished biomass $B_{100\%}$, as an MSY proxy) for most species except $B_{lim} = B_{20\%}$ for pollock and Pacific cod.

Eq. 1

$$F_{ABC_{max}} = \begin{cases} F_{ABC} & \frac{B_y}{B_{target}} > 1 \\ F_{ABC}((\frac{B_y}{B_{target}} - \alpha)/(1 - \alpha)) & \frac{B_y}{B_{target}} < 1 \leq B_{lim} \\ 0 & \frac{B_y}{B_{target}} < B_{lim} \end{cases}$$

ABC+HCR 2: Lagged recovery to estimate emergency relief financing needs

This simulation set will help us estimate the approximate cost of emergency relief funds by artificially closing the fishery at $B_{25\%}$ (mimicking an economic driven closure). During recovery to mimic lagged fishery recovery from a closure shock, we further delay F rate by inducing a stronger alpha during the recovery period. Implementation of this would be to shorten the recovery period following a shock through a “rainy day” fund to supplement the fishery during climate shocks.