

Harvest Control Rules and the Groundfish Tier System

A structured approach to considering uncertainty and risk

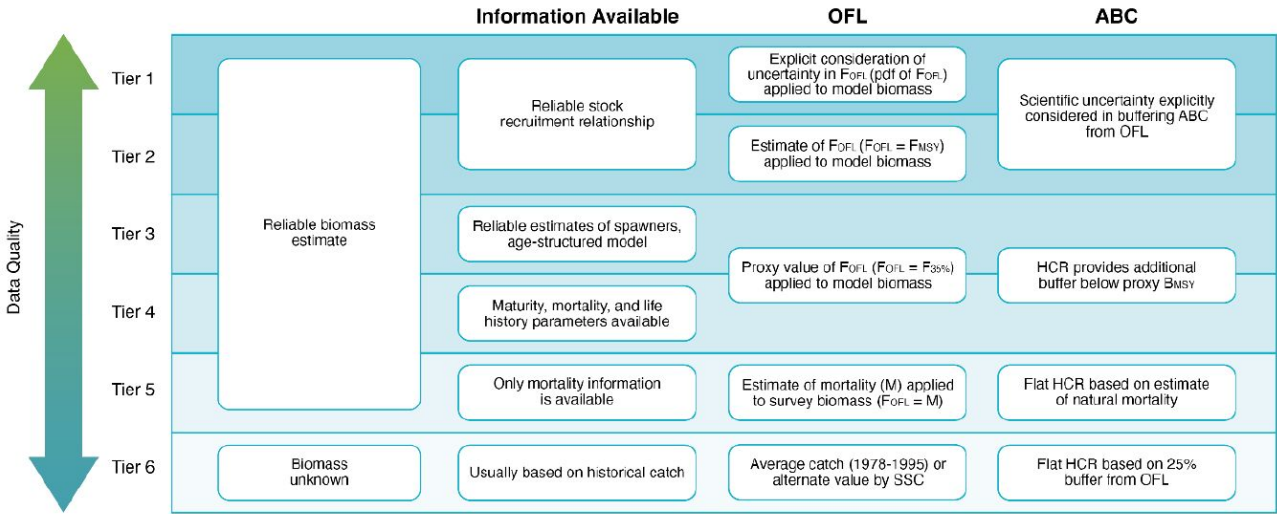
Harvest Control Rules (HCRs) are guidelines, established in the Groundfish Fishery Management Plans, that specify how much fishing can take place based on the biological status of a stock. These guidelines are applied to each stock to generate recommendations for the Overfishing Limit (OFL) and Acceptable Biological Catch (ABC) recommendations. **The use of HCRs helps provide structured, consistent guidance for how the Council and SSC consider risk and uncertainty in making catch level recommendations.** HCRs also provide transparency to the public in how scientific information from stock assessments translates into management recommendations.

HCRs are not a “one size fits all” approach. For each stock or stock complex, the specific HCR applied depends on information availability and stock status. Groundfish stocks are categorized into one of six tiers based on how much data and information are available to assess stock biomass, abundance and productivity. Higher tiers (1–3, meaning there is more information on the stock) use age-structured assessment models and spawner-per-recruit analyses; lower tiers (4-6; less information) rely on survey biomass estimates and more precautionary default reference points to accommodate the increased uncertainty. Many of the major assessed groundfish stocks including BSAI and GOA pollock and Pacific cod are categorized as Tier 3.

Reference points: Where are we, relative to where we want to be?

The concept of reference points is important for understanding how a harvest control rule is structured and applied. The concepts of targets, limits and decreasing fishing mortality below a biomass threshold are all included in HCRs. Reference points are based on the concept of Maximum Sustainable Yield (MSY), or the highest average catch that can be removed continuously from a population without depleting it.

The tier level and status of each groundfish stock or complex determines which harvest control rule is applied. Stock status is determined relative to **reference points**, which are criteria used to identify sustainable levels of fishing mortality and stock biomass. Reference points serve as “guardrails” that managers rely on to prevent overfishing or cause a stock to be overfished, and to correct course if needed. Reference points are expressed as **targets** and **limits** for biomass and fishing mortality rates. A biomass target is a level of abundance a stock should be at or above, and a target fishing mortality rate is a rate of removal to stay at or below.

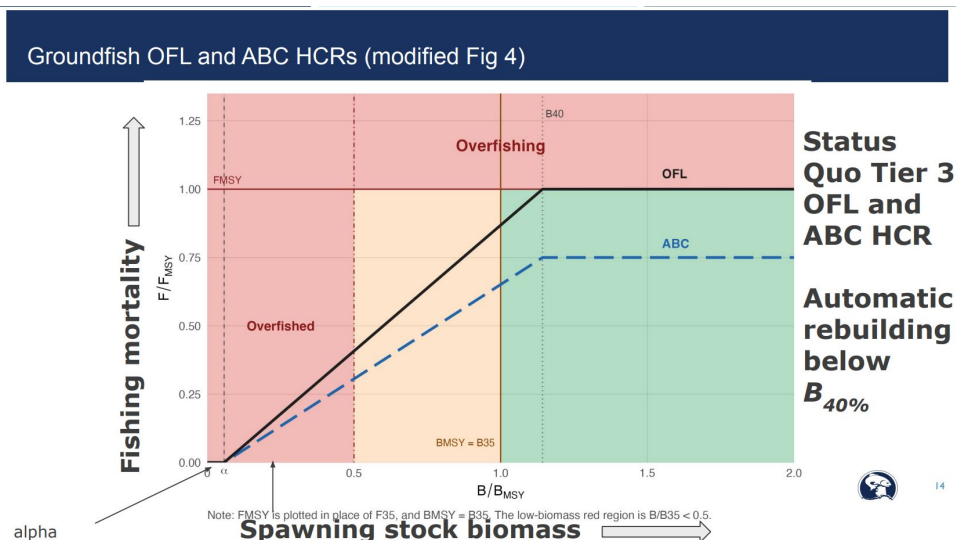


The tier system used to categorize information availability for groundfish stocks.

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An example groundfish harvest control rule



This diagram is a visual representation of the HCR used for groundfish stocks in Tier 3. It helps visualize how the HCR informs ABC recommendations that limit fishing mortality to a level that prevents overfishing, and maintain biomass at the level that maintains long term sustainable yield.

Built-in precaution

Groundfish HCRs help support a precautionary approach in the following ways.

- B35 is the biomass target for a sustainable biomass level. This refers to 35% of unfished biomass and is used as a proxy for BMSY in NPFMC groundfish control rules. However, the Tier 3 control rule includes an inflection point (sometimes referred to as a “kink”) at a slightly higher threshold of B40. Below this level, the allowable fishing mortality declines linearly as biomass declines. This built-in precaution helps rebuild the stock before biomass drops below the level at which the stock would be defined as overfished.
- The slope of the OFL and ABC control rules intersects the x axis at a level greater than 0, leading to a faster reduction in fishing mortality as biomass below the inflection point at B40.
- For Steller sea lion prey stocks (pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited at or below a threshold of B20 or 20% of the unfished spawning biomass. (This is a separate management measure and not a feature of the HCR itself).

Looking ahead

The HCRs and tier system that are currently used in the NPFMC process are described in the Groundfish Fishery Management Plans and in Federal regulations, and have been in place since 2004. Since they were implemented, no groundfish stock has been overfished or undergone overfishing. The Council may consider making adjustments to HCRs so they continue to perform well under changing environmental and fishery conditions.