



MEASURING the EFFECTS of CATCH SHARES



Methods of Analysis: December 2015

West Coast Groundfish

Ecological Indicators: **Ratio of Discards to Landings**

Have discarding practices changed?

This indicator measures the fraction of caught fish that are discarded by fishing vessels, by species.

Discard and landings estimates were obtained from the West Coast Groundfish Observer Program. Discard ratios were calculated for all species, the species that accounted for 95% of the total catch, and assessed species. Discard ratios for each of these groups are obtained by summing the discards and landings for corresponding species, and by calculating as follows:

$$\frac{\textit{Discards}}{\textit{Discards} + \textit{Landings}}$$

Ecological Indicators: **Ratio of Catch to Quota**

Have fleetwide catches stayed within quota?

This indicator shows the amount of fish caught compared to the total catch limit.

Landings and discards data for 2004 – 2010 specific to the West Coast groundfish fishery trawl sector were obtained from the West Coast Groundfish Observer Program. Through the observer program, on-board observers estimate discards for monitored vessels. Observer coverage prior to the catch share program was around 20% of vessels from 2002 to 2010 (Bellman et al. 2009) and 100% of vessels after catch share implementation in 2011.

Total fishing mortality values (used where total catch was unavailable as a result of low observer coverage), summed across all commercial and recreational sectors for each stock, were obtained from annual discard and total catch reports from 2004-2010. For 2011-2013, total catch values

(sum of landings and discards) for the trawl sector were obtained from the Pacific Coast Groundfish Individual Fishing Quota database.

Quotas (or total allowable catch, TAC) values were compiled for the West Coast groundfish fishery. The calculations of quota have changed over time, and there was careful consideration for the values used in the analysis. From 2004-2010, the trawl sector was managed with trip limits instead of quotas. Trip limits were set on a bimonthly basis but were not a hard cap on landings. As a result, quotas for 2004-2010 were calculated from coast-wide management values – optimum yield or allowable biological catch where OY was not available - (including all commercial and recreational sectors) reported in annual discard and total catch reports.

In order to isolate quotas for the non-whiting groundfish trawl sector for 2004-2010 we used the proportion of trawl catches to total catches as the proxy to extrapolate the proportion of total OY (or ABC) that could equate to the trawl sector quota. This calculation was necessary to keep catch-to-quota ratios comparable before and after catch share implementation. Catches were calculated as the sum of landings and discards from the trawl sector; while discards did not technically count towards bimonthly trip limits from 2004-2010, the intent of the analysis is to compare catch (landings + discards) before and after catch share implementation. Discards of lingcod and sablefish were assumed to have a 50% mortality rate, and catch calculations for these species were adjusted accordingly. The proportions of trawl catches to total catches were calculated using Equation 1:

Equation 1

$$P_{x,t} = \frac{T_{x,t}}{F_{x,t}}$$

where P is the proportion, T is trawl catches, and F is total catches for species x in year t . Trawl quotas were calculated using Equation 2:

Equation 2

$$TAC_{x,t} = PAvg_x * MV_{x,t}$$

where $PAvg$ is the arithmetic mean of proportions P from 2004 to 2010 for species x , MV is the coast-wide management value (OY or ABC) from Annual Groundfish Fishing Mortality reports for species x in year t .

For 2011-2013, quotas were the allowable catch limits specific to the trawl sector reported in the Pacific Coast Groundfish Individual Fishing Quota database.

Target and Constraining Species

Management of multispecies fisheries is constrained by the Federal requirement to rebuild overfished species. In these multispecies groundfish fisheries, both valuable target and overfished species are often caught together. As a result, fishers likely have to forego profits in order to stay within catch limits for overfished species. Fisheries scientists and managers familiar with the West Coast Groundfish fishery were consulted to identify target species. Based on these discussions, we assumed the target species to be Dover sole, sablefish, lingcod, longspine thornyhead, petrale sole, and shortspine thornyhead.

Constraining species are those with rebuilding plans. For the West Coast groundfish fishery these species were canary rockfish, Pacific ocean perch, yelloweye rockfish, darkblotched rockfish, bocaccio, cowcod, and widow rockfish.

NWFSC Annual discard and total catch reports:

http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/species_management.cfm

Pacific Coast Groundfish Individual Fishing Quota database:

<https://www.webapps.nwfsc.noaa.gov/ifq/>