Oregon's Marine Fisheries, Overfished Groundfish Stocks, and Marine Reserves

Stephen Ralston
National Marine Fisheries Service
110 Shaffer Road
Santa Cruz, CA 95060

Based upon a classification presented in a recent report (Oregon Department of Fish and Wildlife 2001), the marine fisheries of the State of Oregon can be grouped into seven principal categories. These include: salmon (*Oncorhynchus tshawytscha* and *O. kisutch*), Dungeness crab (*Cancer magister*), pink shrimp (*Pandalus jordani*), tuna (primarily *Thunnus alalunga*), groundfish (over 80 species), Pacific whiting (*Merluccius productus*), and catches of "other" species. During the most recent five years that were tabulated in the report (1996-2000) Pacific whiting accounted for 62% of the landed weight of all Oregon's marine fisheries and groundfish represented another 19%. The remaining five fishery sectors each contributed less than 7% to the total marine catch. However, a very different distribution emerges when the ex-vessel value of the catch is considered. Over the same time period, Pacific whiting accounted for only 8% of the total value of marine landings in the State, whereas groundfish, Dungeness crab, pink shrimp, and tuna contributed 36%, 29%, 11%, and 9%, respectively.

When time series of landings over the last three decades are examined, some major trends in the marine fisheries of the State of Oregon become evident. For example, during the 1970's catches of salmon accounted for over $30 million/yr ex-vessel to the State's economy (all economic values adjusted to year 2000 dollars), but fell to less than $5 million in 1983. The fishery then expanded and reached a second peak of $52 million ex-vessel during the last half of the 1980's. However, salmon catches then fell during the 1990's and the fishery is now valued at less than $4 million/yr. Like salmon, Dungeness crab, pink shrimp, and tuna have demonstrated clear periodic fluctuations in their landings. For example, crab vary on a distinct 9-10 year cycle and shrimp on an even stronger 12-14 year cycle.

Landings in the groundfish fishery expanded following implementation of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) in 1976. Previous groundfish catches hovered around 10,000 mt/yr. However, by 1982 total landings of groundfish in the State of Oregon peaked at 45,000 mt/yr. As groundfish fisheries became increasingly regulated by the Pacific Fishery Management Council (PFMC) during the late 1980's and early 1990's catches more-or-less stabilized in the 30,000-40,000 mt/yr range. However, from 1994-2000 landings fell almost every year as the PFMC imposed increasingly austere management measures on the west coast groundfish fishery, to the point that catches are now less than 20,000 mt/yr. Although ex-vessel revenues have also dropped, that decline has not been as precipitous. In 2000 the ex-vessel value of the Dungeness crab fishery exceeded that of the groundfish fishery, the first time that has occurred since 1978. Even so, due to cyclic patterns in the catches of salmon, crab, shrimp, and tuna, the total economic value of the State's marine fisheries during the last half of the 1990's is 83% of the 1970-2000 long-term mean ($87.6 million/yr).

As groundfish stocks were depleted during the "fishing up" phase, i.e., in a developing fishery the period when fishery removals exceed sustainable catches, stock assessments conducted for the PFMC indicated declining stock abundances, as expected. Harvests during this period were based on a widely accepted exploitation rate ($F_{35\%}$). However, rather than

approaching an equilibrium near a biomass level that could support a robust fishery, many stocks of groundfish, including especially rockfishes (*Sebastes* spp.), declined to unacceptably low population sizes. Due to requirements contained in the newly re-authorized MSFCMA, in 1997 the PFMC established biomass-based biological reference points for all groundfish stocks. In particular, now the target population level for harvested stocks is to reduce total spawning stock output to 40% of the unfished level ($B_{40\%}$). In addition, a minimum stock size threshold (MSST) of 25% of unfished spawning output ($B_{25\%}$) was established, below which a stock is declared overfished.

Following the adoption of the new MSST in 1998, a number of rockfish stocks have now been declared overfished, including bocaccio (*S. paucispinis*), Pacific ocean perch (*S. alutus*), cowcod (*S. levis*), canary rockfish (*S. pinniger*), darkblotched rockfish (*S. crameri*), widow rockfish (*S. entomelas*), and yelloweye rockfish (*S. ruberrimus*). It seems that rockfishes are particularly vulnerable to overexploitation due to erratic recruitment success and extreme life history characteristics (the longevity of some species is well in excess of 100 yr). In retrospect, it is now clear that the $F_{35\%}$ harvest rate, which works well for many species in other parts of the world, was much too aggressive for rockfish. Consequently, the PFMC has now altered its harvest rate policy to conform more closely to the biological characteristics of these species.

Once a stock is declared overfished, a rebuilding plan needs to be developed to bring about stock recovery within a specified period of time. The re-authorized MSFCMA provides little leeway in this regard. As a result, total allowable catches of many rockfish species have been drastically reduced to facilitate recovery to the $B_{40\%}$ target spawning output. For example, the $F_{35\%}$ exploitation rate experienced by widow rockfish during the early 1990's was just over 11% of the available biomass. Under rebuilding that rate has now been reduced to less than 3% and recovery is expected to take several decades. In the case of bocaccio, the current harvest rate is less than 1% of the available biomass.

Up to this point the PFMC has constrained the impacts of fishing on groundfish stocks by regulating catch. The reductions in harvest rate cited above are a tangible demonstration of that philosophy. However, alternative forms of management are possible, including area-based schemes like marine reserves. There is a substantial history of area-based management in fisheries and an abundant scientific literature that describes the direct tradeoff that occurs between area-based controls and catch restrictions. While the PFMC has recently enacted stringent catch controls to achieve a sustainable west coast groundfish fishery, there may be good reasons to couple that approach with marine reserves. Complicating this issue is the frequently cited dual objective of marine reserves to promote sustainable fisheries and to conserve marine biodiversity. Because of this dichotomy, it will be a challenge for fishery managers to meld the conflicting goals of conservation and exploitation to insure sustainable fisheries and a healthy marine environment into the foreseeable future.