

Appendix A

Many Puget Sound groundfish stocks have been in a steep decline since shortly after the Boldt Decision in 1976. Despite sufficient WDFW data to raise concern, harvest management to date has not stopped declines, much less begun restoring many stocks.

The following figures and text originate from these data sources:

- Protection and Restoration of Marine Life in the Inland Waters of Washington State. James E. West, May 1997; Puget Sound/Georgia Basin Environmental Report Series: Number 6
- Puget Sound Groundfish Management Plan. Wayne Palsson, et al. December 1998, WA Dept of Fish and Wildlife
- The Biology and Assessment of Rockfishes in Puget Sound. Wayne Palsson, et al., FPT 09-04, WA Dept of Fish and Wildlife, September 2009.
- WDFW briefing on Cabezon to Fish and Wildlife Commission, Fall 2009

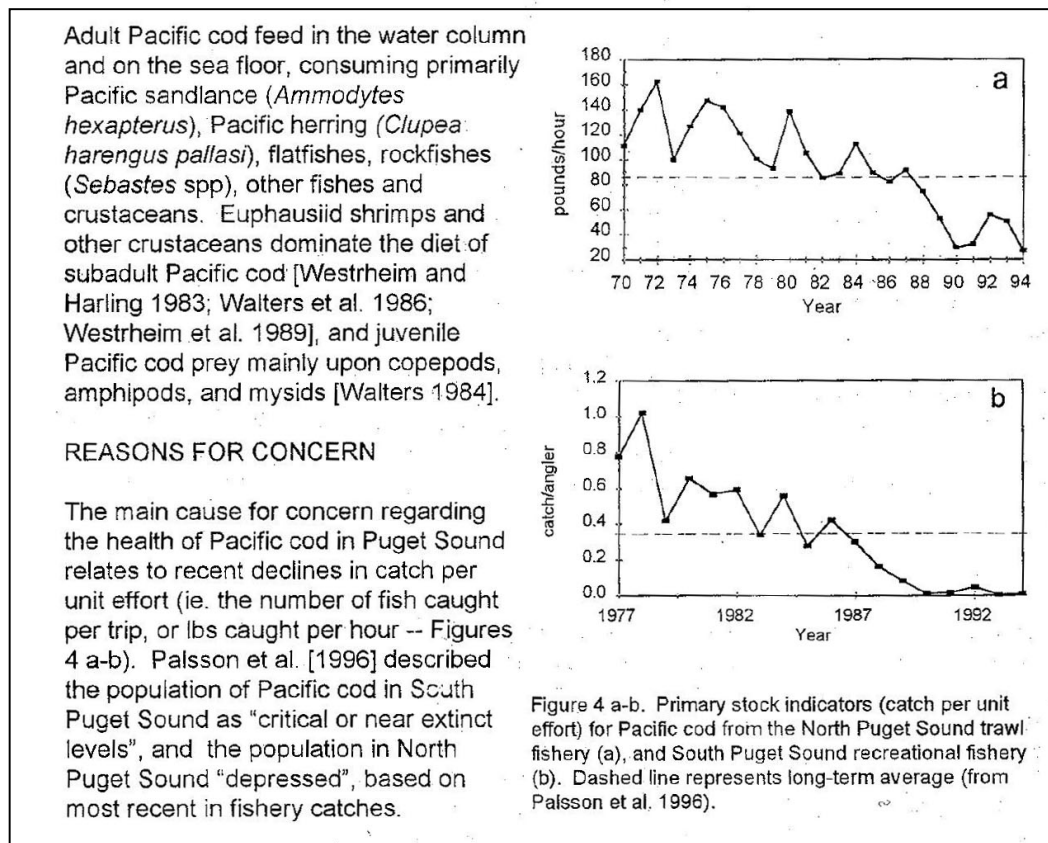


Figure 1. Pacific Cod declines in Puget Sound.

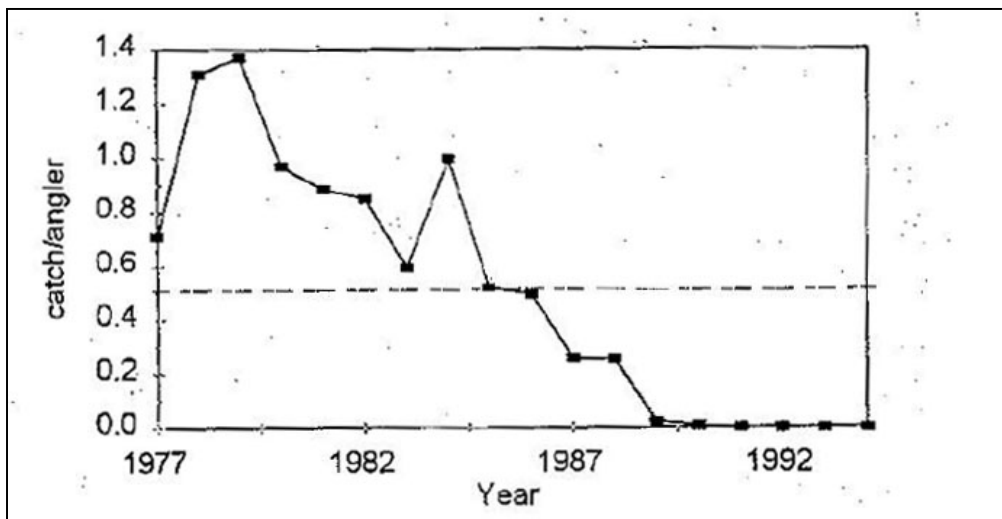


Figure 2. Catch per unit effort of walleye pollock from the South Puget Sound recreational fishery. Dashed line represents long-term average. Pollock in South Puget Sound were once the most common species taken in the recreational fishery. This population experienced a sharp decline in its abundance during the 1980s and is “at a critical status” in the area (Palsson et al. 1996).

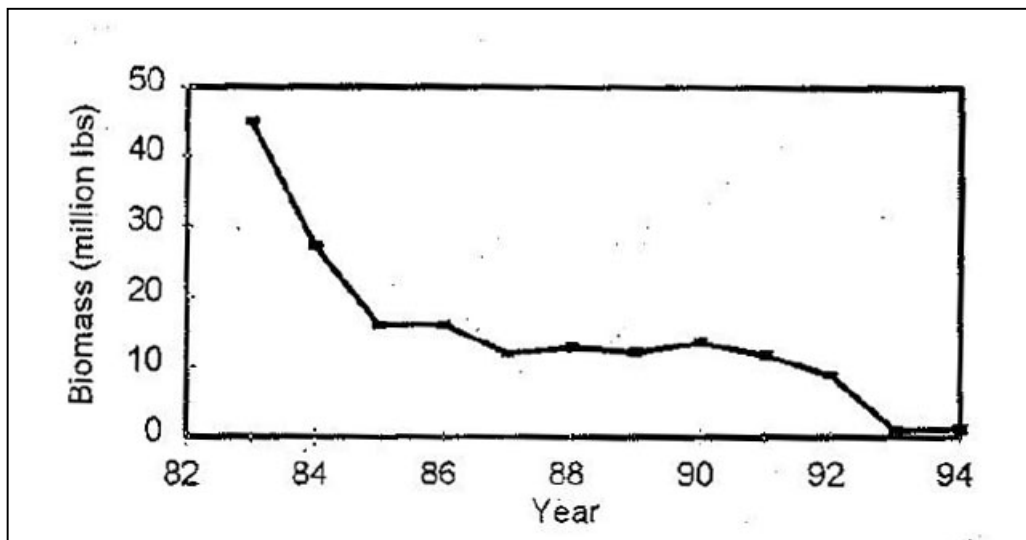


Figure 3. Biomass of Pacific hake in South Puget Sound estimated from WDFW hydro-acoustic trawl surveys, 1983-1994 (from Palsson et al. 1996). At one time, Pacific hake comprised the largest fishery (by weight) in Central Puget Sound. The commercial fishery is now closed by regulation of WDFW because of low abundance. Palsson et al (1996) described the stock status of Pacific Hake in South Puget Sound as “critical” because of the sharp decline in abundance of the species observed in the WDFW hydro-acoustic hake survey conducted annually at Port Susan.

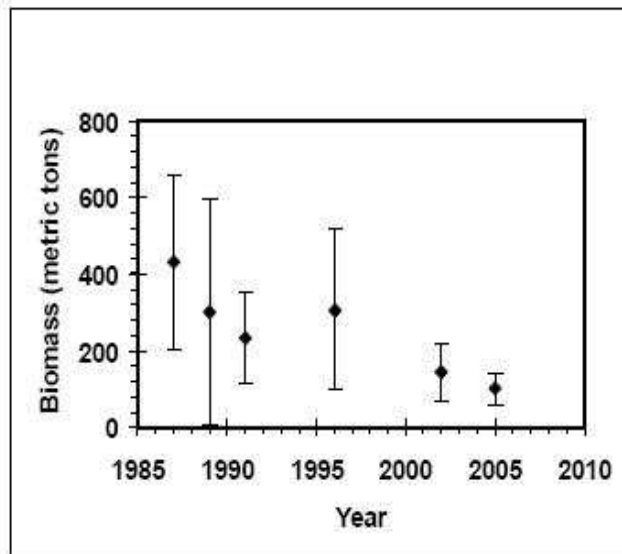


Figure 4. WDFW trawl survey estimates and 95% confidence limits for quillback rockfish in South Puget Sound.

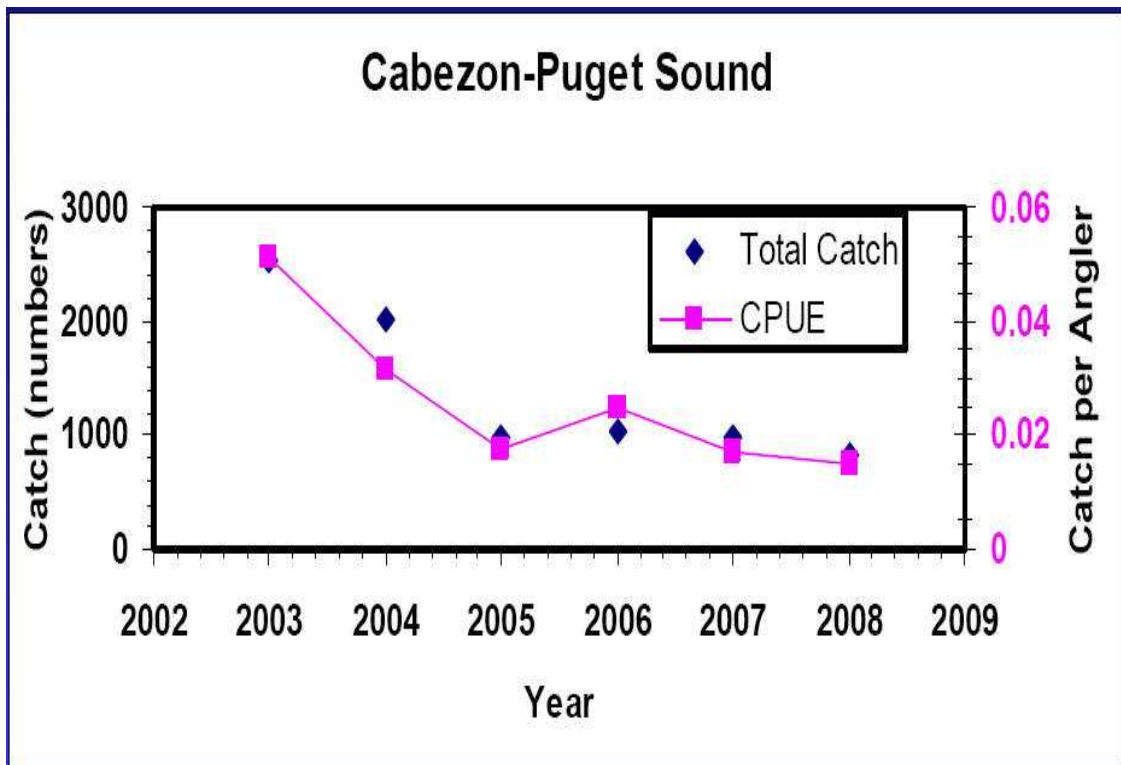


Figure 5. Recent WDFW total catch and catch per angler data for Puget Sound Cabezon. Note a 65% decline during the last six years, above and beyond steep declines experienced since the mid-1960s.

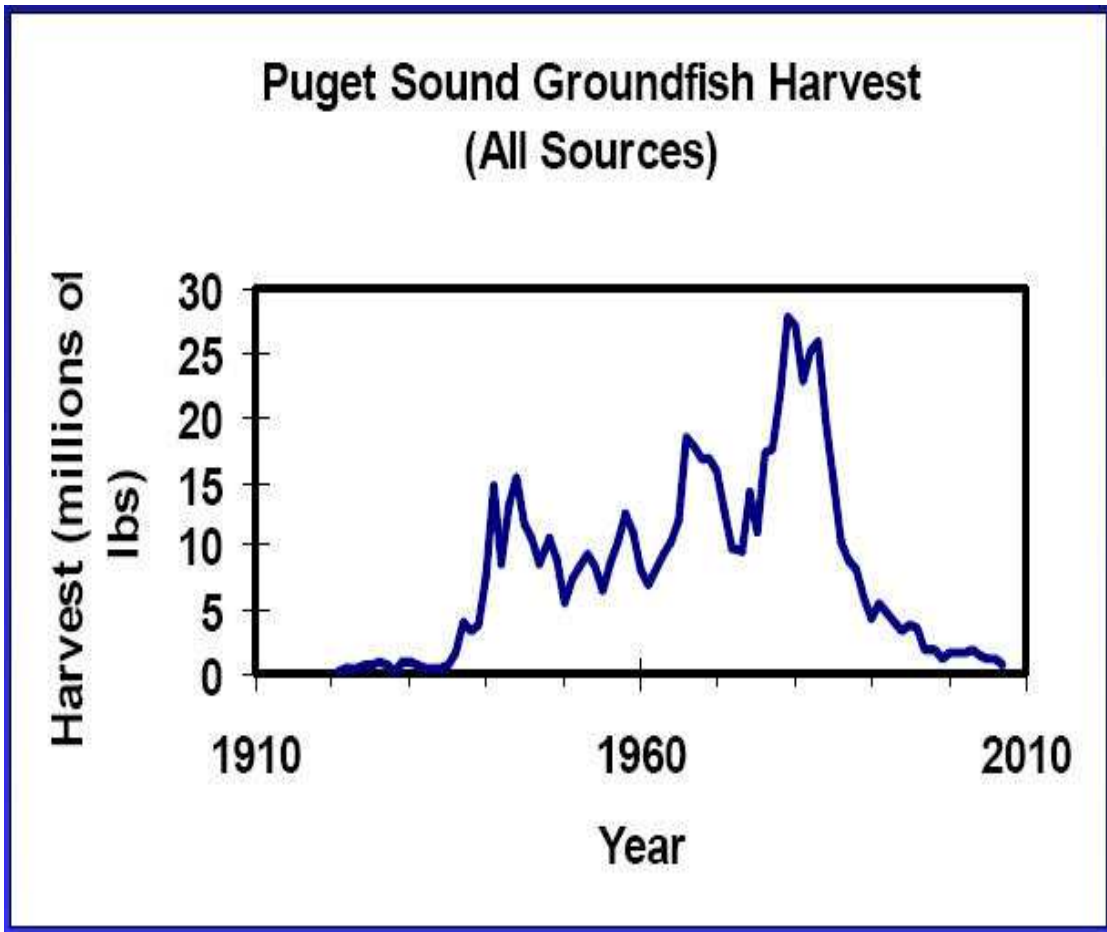


Figure 6. WDFW data on harvest of Puget Sound Groundfish. The data corroborate the documented declines in abundance of Pacific Cod, Walleye Pollock, Pacific Hake, Rockfish, and Cabezon described above.

Background Documentation

1. <http://wdfw.wa.gov/conservation/fisheries/rockfish/>
2. Sobel, Jack and Craig Dahlgren. 2004. *Marine Reserves. A Guide to Science, Design, and Use*. Island Press, Washington. 383pp
3. Norse, Elliot and Larry B. Crowder. 2005. *Marine Conservation Biology. The Science of Maintaining the Sea's Biodiversity*. Marine Conservation Biology Institute. Island Press, Washington. 470pp.
4. Lubchenco, J. et al 2007. *The Science of Marine Reserves*. Partnership for the Interdisciplinary Studies of Coastal Oceans. PISCO. 22pp.
http://www.piscoweb.org/files/images/pdf/SMR_US_HighRes.pdf or
http://www.piscoweb.org/files/images/pdf/SMR_US_LowRes.pdf
5. <http://wdfw.wa.gov/conservation/cwcs/>
6. Samonte G., Karrer L., and Orbach M., 2010. People and Oceans. Managing marine areas for human well being. Science and Knowledge Division, Conservation International, Arlington, Virginia, USA. <http://www.science2action.org/what-we-produce/typography-mainmenu-27> .
7. Kaufman, L. and Tschirky, J. 2010. Living with the sea. Local efforts buffered effects of global change. Science and Knowledge Division, Conservation International, Arlington, VA, USA <http://www.science2action.org/what-we-produce/typography-mainmenu-27> .
8. Orbach, M. and Karrer, L. 2010. Marine managed areas: what why and where. Science and Knowledge Division. Conservation International, Arlington, Virginia, USA. These publications and others are available at <http://www.science2action.org/what-we-produce/typography-mainmenu-27>