

## APPENDIX MS6. FINDING THE ACCELERATOR AND BRAKE IN AN INDIVIDUAL QUOTA FISHERY: LINKING ECOLOGY, ECONOMICS, AND FLEET DYNAMICS OF US WEST COAST TRAWL FISHERIES

Isaac C. Kaplan, Daniel S. Holland, and Elizabeth A. Fulton

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The work is available through <http://icesjms.oxfordjournals.org/>, or by email request to the first author ([Isaac.Kaplan@noaa.gov](mailto:Isaac.Kaplan@noaa.gov)).

### ABSTRACT:

In 2011, the Pacific Fisheries Management Council implemented an individual transferrable quota (ITQ) system for the West Coast groundfish trawl fleet. Under the ITQ system, each vessel now receives transferable annual allocations of quota for 29 groundfish species, including target and bycatch species. Here we develop an ecosystem and fleet dynamics model to identify which components of an ITQ system are likely to drive responses in effort, target species catch, bycatch, and overall profitability. In the absence of penalties for discarding over-quota fish, ITQs lead to large increases in fishing effort and bycatch. The penalties fishermen expect for exceeding quota have the largest effect on fleet behavior, capping effort and total bycatch. Quota prices for target or bycatch species have lesser impacts on fishing dynamics, even up to bycatch quota prices of \$50/kg. Ports that overlap less with bycatch species can increase effort under individual quotas, while other ports decrease effort. Relative to a prior management system, ITQs with penalties for exceeding quota lead to increased target species landings and lower bycatch, but with strong variation among species. In addition to providing insights into how alternative fishery management policies affect profitability and sustainability, the model illustrates the wider ecosystem impacts of fishery management policies.