



# **Bootstrap Analysis of Drift Gillnet Fishery Operation under Hard Caps**

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# Motivation

- A simulation method has been developed to analyze DGN hard cap alternatives under consideration by the Council
- **Objectives:**
  - Use recent DGN effort, observed marine mammal and turtle bycatch, retained finfish catch, prices and costs data to simulate the operation of the DGN fishery under hard caps
  - Gauge conservation and economic risks under hard caps alternatives



# Objectives and Tradeoffs

1. A choice between alternatives will involve tradeoffs between potentially lower bycatch levels and a risk of lost profitability
2. More restrictive caps increase economic risk, due to a heightened chance of reaching a cap early in the season



# Scope of Analysis

- Simulate hard caps alternatives to compare bycatch reduction to average vessel-level and total profitability
- Compare operation of caps under different levels of observer coverage (e.g. 30 percent versus 100 percent)
- Compare one-year to five-year caps



# Data Sources

- CDFW logbook data since 2001 for recent effort
- Set-level DGN observer retained finfish catch and bycatch species mortality / serious injury (M/SI) counts since 2001
- California Fisheries Information System landings database to estimate price per fish for retained market species catch
- SWFSC cost and earnings survey data to estimate average variable cost per set and average fixed cost per season



# Bootstrap Simulation

- Annual effort per vessel is resampled from logbook data
- Observer records on market and protected species interactions used to simulate retained market catch and protected species M/SI
- Cost survey and revenue data used to estimate profitability at the vessel and fleet level



# Test Cases

- No action alternative: No hard caps
- 1-year and 5-year versions of Alternative 5 (PPA)
- 100% observer coverage
- 20 active vessels
- 10,000 simulated seasons



## Comments and Preliminary Results (1)

- Preliminary results suggest expected profitability could be substantially reduced under the 1-year cap version of the PPA with less reduction under the 5-year cap PPA compared to an uncapped fishery
- Bycatch rate reductions under hard caps are generally small





## Comments and Preliminary Results (2)

- 100% coverage would offer greater certainty on M/SI counts, but may not be attainable given various limitations
- The effect of hard caps with incomplete observer coverage would depend on how takes are estimated for the unobserved part of effort
- Based on this analysis, equivalent conservation benefits could potentially be achieved using a limit on the number of permits



# Next Steps (1)

- Adding short-finned pilot whale, dolphin group and pinniped group will enable analysis of the full range of hard cap alternatives
- Consider whether and how to adjust variable cost for recent fuel price decline
- Finalized analysis planned for March 2015 Council meeting



## Next Steps (2)

- Technical details which need to be resolved to complete analysis include
  1. How unobserved bycatch would be estimated under incomplete observer coverage
  2. Once shut down under a five-year cap, at what point the fishery would reopen



# Summary

1. An analysis under development simulates the operation of the DGN fishery under hard cap alternatives
2. The method uses data from recent DGN fishery experience to gauge bycatch and economic risks
3. Preliminary results indicate small differences in bycatch rates and large differences in economic risks across caps alternatives