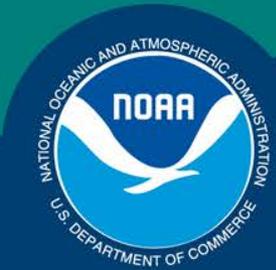


*Science, Service, Stewardship*



# Economic Research of Pacific Halibut Recreational Fishing in Alaska\*

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Seattle, Washington

**NOAA**  
**FISHERIES**  
**SERVICE**

\*Opinions expressed are those of the authors and do not reflect those of NMFS, NOAA, or the U.S. Department of Commerce.

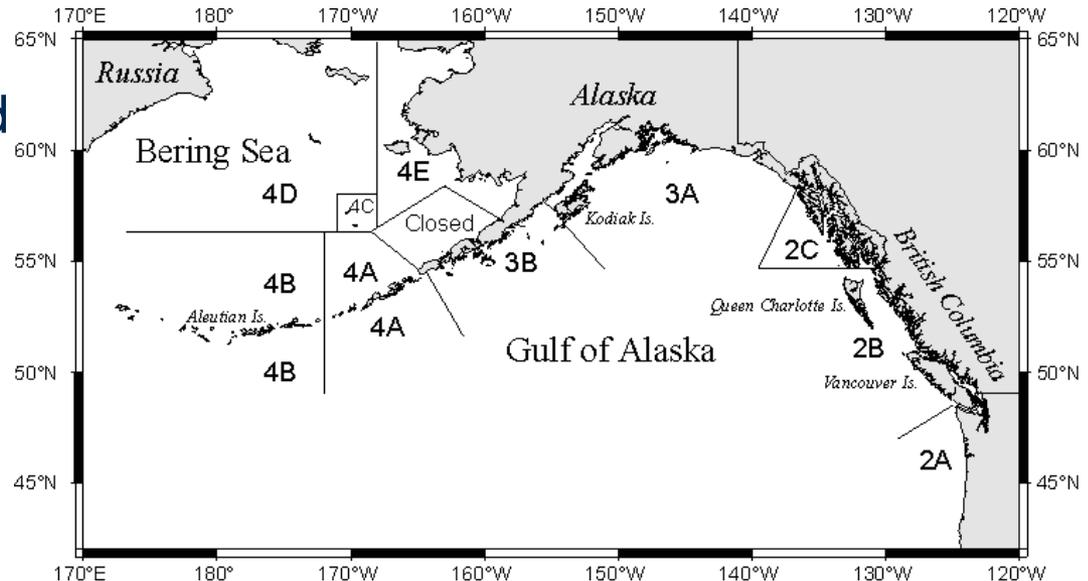


# Pacific Halibut Fisheries off Alaska

Two main IPHC regulatory areas where both guided and unguided Pacific halibut sport fishing occur

**Area 2C** (Southeast Alaska)

**Area 3A** (Southcentral Alaska)

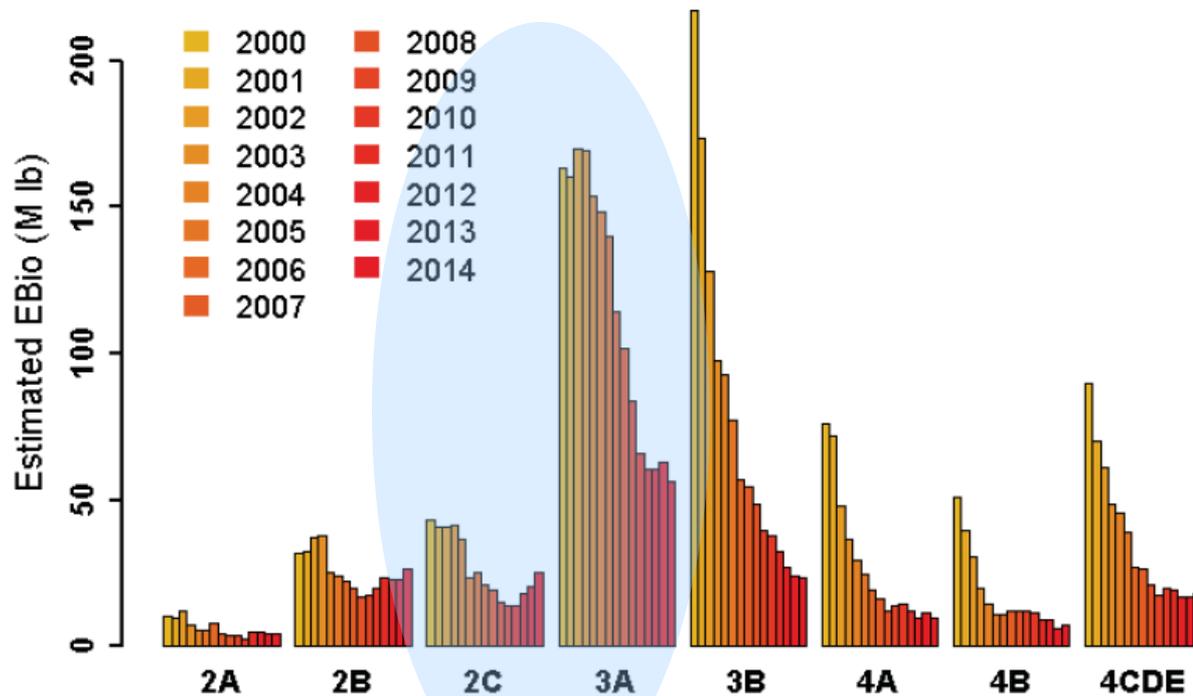


## Important Issues

- Declining stocks over the last decade
- Until 2014, allocation was determined using a guideline harvest level policy
- Guided (charter) sector has grown substantially (until recent years)
- Halibut IFQ program excludes non-commercial and non-CDQ entities, thereby precluding the flow of IFQ across sectors
- **Catch Sharing Plan (CSP)** implemented in 2014
  - Sets formula for commercial/recreational allocation depending on stock
  - Allows leasing of IFQ from commercial sector to charter sector



## Declining Stocks

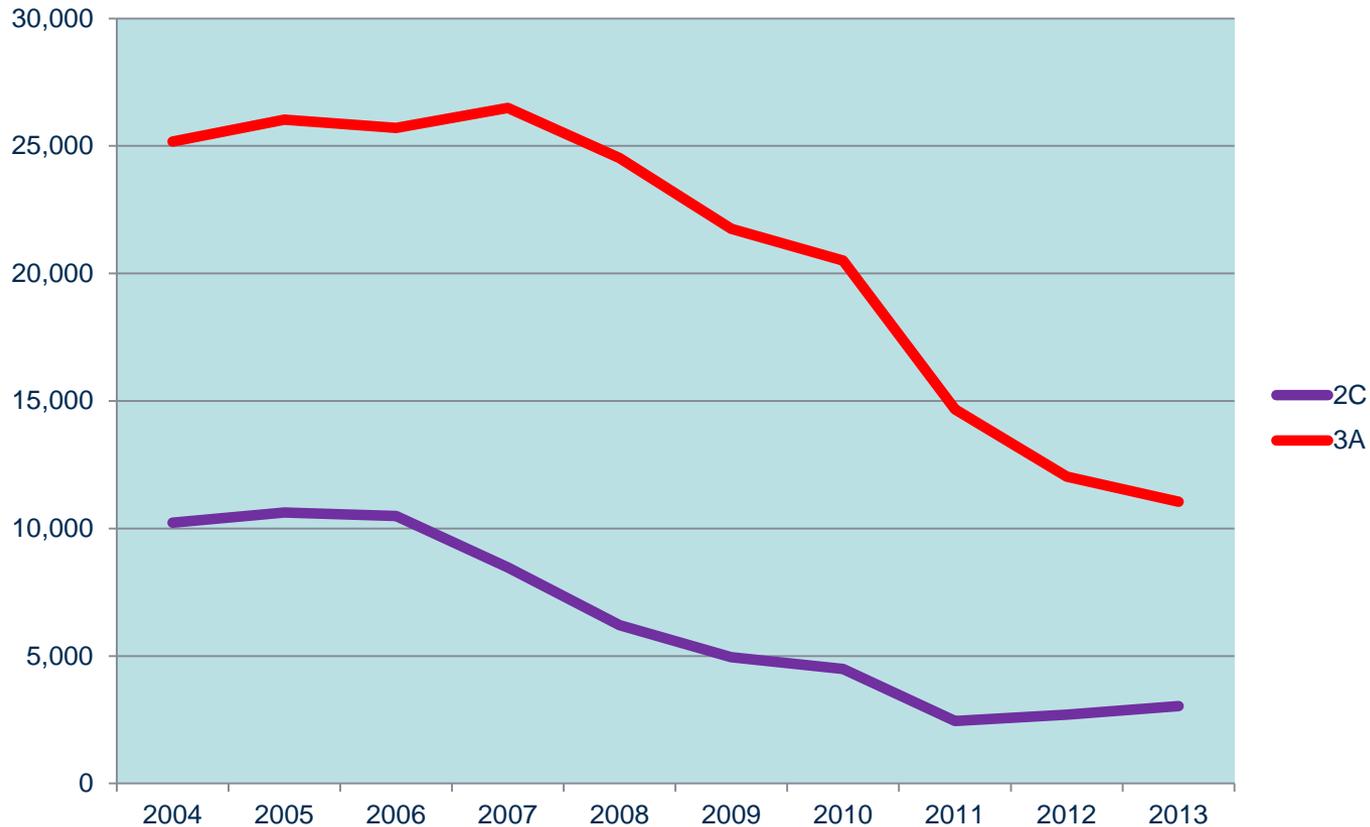


**Figure 6. Apportionment-based exploitable biomass estimates by year and area, calculated by applying the proportions in Table 2 to the 2013 stock assessment estimates of coastwide Ebio.**

Source: Webster, R.A., and I.J. Stewart, 2014. "Apportionment and regulatory area harvest calculations" IPHC Report of Assessment and Research Activities 2013: 197-216.

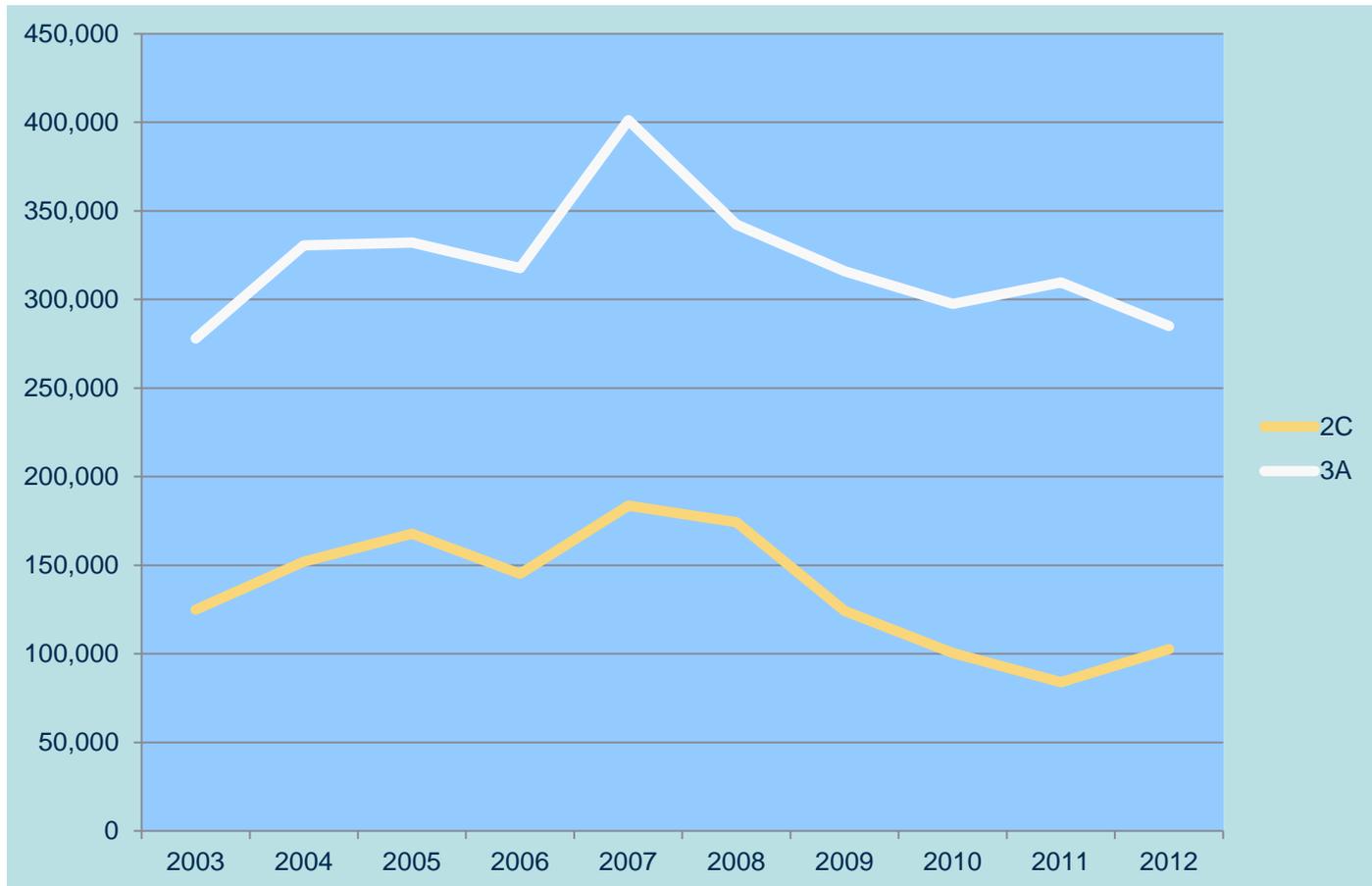


## Pacific Halibut Commercial Catch, 2004-2013 (in 1,000 lbs net weight)





## Pacific Halibut Sport Harvests, 2003-2012 (in numbers of fish)





## Charter Pacific Halibut Management in Alaska (Areas 3A & 2C)

- In the charter boat sector, regulatory changes have occurred for Pacific halibut in recent years
- Regulations on anglers (bag and size limits)
- Charter boat angler-specific regulations in Area 2C
  - 2007 – 2008: 2 fish, 1 any size, 1 no longer than 32 inches
  - 2009 – 2010: 1 fish, no size limit
  - 2011: 1 fish, no fish longer than 37 inches
  - 2012 – 2013: 1 fish, no fish between 45 and 68 inches (reverse slot)
  - 2014: 1 fish, no fish between 44 and 76 inches
- NEW in 2014, Area 3A charter angler regulation: 1 fish any size, 1 fish less than 29 inches
- Under CSP, these regulations will be evaluated annually for both Area 2C and 3A



## AFSC Economic Research on Pacific Halibut Fishery

- **Goals**
  - Measure the demand for, and value of, recreational fishing opportunities
  - Evaluate the effects of policy changes and allocation decisions on anglers, the charter boat sector, and economy (ex post and ex ante analyses)
    - E.g., Measured values can be used for evaluating economic efficiency of allocation
- **Main activities**
  - Primary data for analyses collected through surveys of anglers and businesses
  - Developing economic models of behavior and preferences



## Data Collection: NMFS Economic Surveys

### AFSC-led data collections:

- Alaska Saltwater Sport Fishing Economic Survey
  - Focuses on anglers, conducted 2007 and 2012
- Alaska Saltwater Sport Fishing Charter Business Survey
  - Focuses on charter boat businesses, conducted 2012-2014
- Alaska Halibut Catch Sharing Plan Survey
  - Focuses on subset of charter boat businesses (charter halibut permit [CHP] holders), planned for 2015

### NMFS national-level data collection:

- National expenditure survey
  - Focuses on anglers (durable and trip-level expenditures), conducted 2006-2007, 2011-2012



## Data Analyses: Alaska Saltwater Sport Fishing Survey

Obtaining baseline information about the fishery (demand and value of fishing trips) (using 2007 data)

- Using information on where and how often people fished, travel costs, and fishing trip characteristics (i.e., revealed preference)
  - Lew and Larson (2011, *Land Economics*).
    - WTP for Pacific salmon fishing trips
- Using information on what people say they would choose in hypothetical questions (i.e., stated preference)
  - Lew and Larson (2012, *North American Journal of Fisheries Management*).
    - Estimated marginal value (per pound) of a Pacific halibut in charter sector to be between \$3.49 (\$2.55-\$4.79) for residents and \$9.81 (\$6.02-\$14.03) for non-residents (compared to \$0.55-\$1.82 per pound in commercial fishery)



## Data Analyses: Alaska Saltwater Sport Fishing Survey (cont.)

### Estimating economic impacts of changes in fishing regulations (using 2007 data)

- The economic models are used to predict changes in fishing behavior/participation and, in combination with regional economic impact models (e.g., IMPLAN, Computable General Equilibrium models), generate estimates of total economic impacts on output and employment
  - Allocation decisions would affect restrictions placed on anglers and charter businesses
  - Estimating total economic impacts of bag limit changes for Pacific halibut (Lew and Seung 2010, *North American Journal of Fisheries Management*)
  - Accounting for input variation (Lew and Seung 2014, *Marine Resource Economics*; Seung and Lew 2013, *Annals of Regional Science*)



## Next Steps: Alaska Saltwater Sport Fishing Survey

### 2007 survey data

- Current analysis: Combining SP and RP data for 2007 data

### 2012 survey data

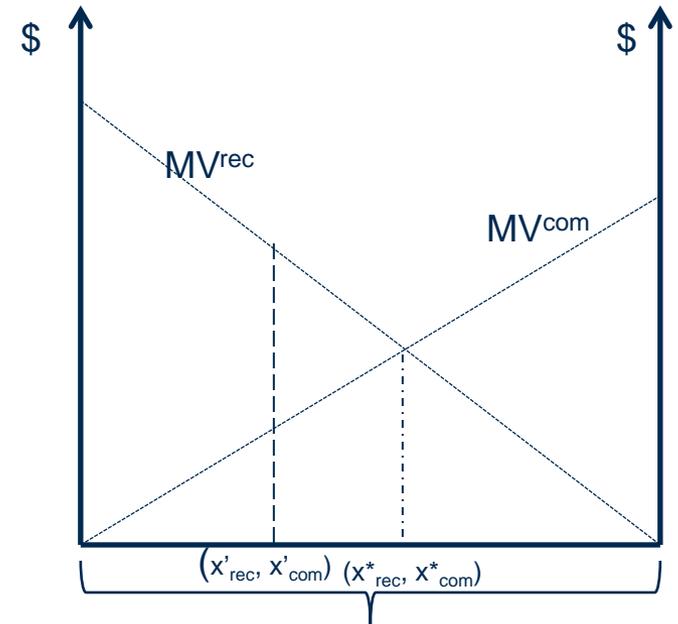
- Stated preference data to reveal angler preferences for trips with and without halibut size limits (maximum size limits and reverse slot options)
- Some planned analyses:
  - Revealed preference and stated preference analyses to estimate baseline demand and value of recreational fishing trips
  - Conducting economic impact analyses
  - Evaluating economic efficiency of sectoral allocation

Future surveys every 3-5 years (depends upon funding)



## Challenges: Angler Valuation

- What exactly is the value of an additional fish?
  - Marginal value of an additional fish in the bag limit?
  - Marginal value of an additional fish in expected catch?
  - Guided vs unguided values?
- Can we estimate the marginal value of a fish as a function of allocation?
  - Link regulations to allocation levels (political process for setting regulations)
- Values (and number of anglers) change over time



Total Allocation ( $x_{rec} + x_{comm}$ )



## Data Analyses: Alaska Saltwater Sport Fishing Charter Business Survey

- Costs, earnings, and employment survey conducted 2012-2014
  - Employment by season and worker type
  - Services offered
  - Earnings
  - Costs (labor and non-labor)
- Generate population-level estimates after correcting for missing data (total revenues, total costs, employment, etc.)
  - Includes total profit estimates
  - Methodologies applied to 2012 survey data (Lew, Himes-Cornell, and Lee, working paper)
  - Analyses of data from 2012-2014 surveys in tech memo (in progress)



## Next Steps: Alaska Saltwater Sport Fishing Charter Business Survey

- Estimate economic impacts associated with regulatory and institutional changes
- Model and estimate firm-level profit functions and entry-exit decisions to enable measurement of how changes in allocation and/or regulations will affect firms
- Post-CSP surveys will collect same information for 2015 and 2016 seasons and enable comparisons of pre- and post-CSP effects on employment, costs, and earnings



## Challenges: Charter Sector

- Low response rates present challenges
- Understanding firm-level behavior
- Linking profit estimates to allocation and regulations
- Understanding effects of CSP
  - How has the leasing component of the CSP affected fishing behavior?
  - How would behavior change if elements of the program were relaxed?



## Other Research Needs: Subsistence Fishery Values

- Almost all subsistence harvest occurs in 2C and 3A
  - Small relative to other sectors (~650,000 lbs in 2011 and 2012)
  - Of total 2012 subsistence harvest in Alaska, 56% in 2C and 36% in 3A
- Equimarginal principle suggests the need to understand values from this sector as well
- Little is known about the economic value of these fisheries