

# **Northeast Multispecies (Groundfish)**

## **Amendment 23/Groundfish Monitoring and Framework Adjustment 58**

**Groundfish Committee**  
**Meeting**  
*June 1, 2018*





# **Amendment 23/Groundfish Monitoring**

## For Today's Meeting

- Receive progress report on the potential range of alternatives
- Discuss the draft alternatives in Section 4.1 Fishery Program Administration, which include updates following the last Committee meeting
- Discuss the PDT's analysis to date

# Amendment 23/Groundfish Monitoring – Timeline

2018	
<b>JAN 30-31</b>	<b>NEFMC – Receives progress report</b>
FEB-APR	PDT develops analyses, no action alternatives, and Fishery Program Administration alternatives
<b>APR 17-19</b>	<b>NEFMC – Receives progress report, no action alternatives, and Fishery Program Administration alternatives</b>
APR-JUN	Fishery Data for Stock Assessment Working Group forms; meets to discuss how to address objectives
APR	PDT develops analyses for development of alternatives
MAY	AP/Committee meetings to review PDT analyses, no action alternatives, and Fishery Program Administration alternatives
MAY	PDT develops analyses and alternatives
JUN	Committee meeting to review PDT analyses; recommend range of alternatives
<b>JUN 12-14</b>	<b>NEFMC – Receives progress report; approves range of alternatives</b>

# Draft Alternatives – May 24, 2018

## 4.1 Fishery Program Administration

### 4.1.1 Sector Administration Provisions

#### 4.1.1.1 Sector Reporting Requirements

#### 4.1.1.2 Knowing Total Monitoring Coverage Level at a Time Certain

#### 4.1.1.3 Funding for the Groundfish Monitoring Program

## 4.2 Commercial Fishery Measures

### 4.2.1 Groundfish Monitoring Program

#### 4.2.1.1 Option 1: No Action

#### 4.2.2.2 Groundfish Monitoring Program Revisions\*

\*To be completed

# Draft Alternatives: 4.1.1.1 Sector Reporting Requirements

## Consensus Statement #1

In the draft alternatives in Section 4.1.1.1 (Sector Reporting Requirements), the Plan Development Team should refine Option 2 (Streamline Sector Reporting Requirements) to grant the Regional Administrator the authority to modify specific sector reporting requirements for the June 1 Groundfish Committee meeting.

- The PDT revised this alternative to reflect the Committee's intent of granting the Regional Administrator authority to streamline sector reporting requirements

# Draft Alternatives: 4.1.1.3 Funding for the Groundfish Monitoring Program

## Motion #2:

To move Section 4.1.1.3.2 (Option 2: Additional Options for Industry Funded Cost of Monitoring) to considered but rejected.

*Carried 5/4/2.*

- The PDT revised this section by moving Option 2 to considered and rejected.

# Draft Alternatives: Additional Revisions

- Moved background text to an attachment to the document (Attachment #1 – Background Information on Groundfish Monitoring Program)
  - Eventually will go in either Affected Environment section or appendix



# AP Motion From May 8 Related to A23 Timeline

## Motion #2:

As it relates to the proposed Amendment 23 timeline as presented, the Groundfish Advisory Panel requests the Committee to recommend that the Council delay selection of final range of alternatives until no sooner than the September Council meeting. This would allow for the alternatives to be aligned with completed Plan Development Team analyses and final reports with recommendations offered by the Fishery Data for Stock Assessment Working Group.

*Carried 7/0/0*

# Fishery Data for Stock Assessment Working Group

- Draft meeting summary from April 26 meeting
  - Initial discussion of how to address objectives
  - Assignments for work to address the 4 main deliverables:
    1. Explain how fishery data (dependent and independent) is currently used in stock assessments.
    2. Summarize the utility and limitations of using a CPUE and LPUE as indexes of abundance for Northeast multispecies stocks, including recent efforts.
    3. Identify the fishery dependent data needed to develop a CPUE – without regard to existing fishing practices, regulations, or monitoring systems.
    4. Perform a gap analysis to compare the desired fishery dependent data identified with existing conditions and data for the fishery, to create a CPUE.
- Next meeting: **June 25 at SMAST**

# Plan Development Team Memo – May 29, 2018

- Summarizes updates to the draft Amendment 23 alternatives, following input from the AP and Committee meetings, May 8 and May 9, respectively.
- Outlines additional analyses for Amendment 23.
- Addresses Committee motions related to draft alternatives and analyses.

# Discards of Legal-Sized GOM Cod

## Analysis of observer data

- NEFOP and ASM for CY 2006 – 2017
- Large Mesh Bottom Otter Trawl only

### 1) Length frequency of discarded GOM cod

- For all disposition codes for discarded fish - proportion of cod discarded over minimum size limit (note min. fish size change in 2014)
- Also explored removing common pool trips (CY 2017)
- Recent years with large proportion of discarded cod over minimum size limit
- Caveats – sample size effect

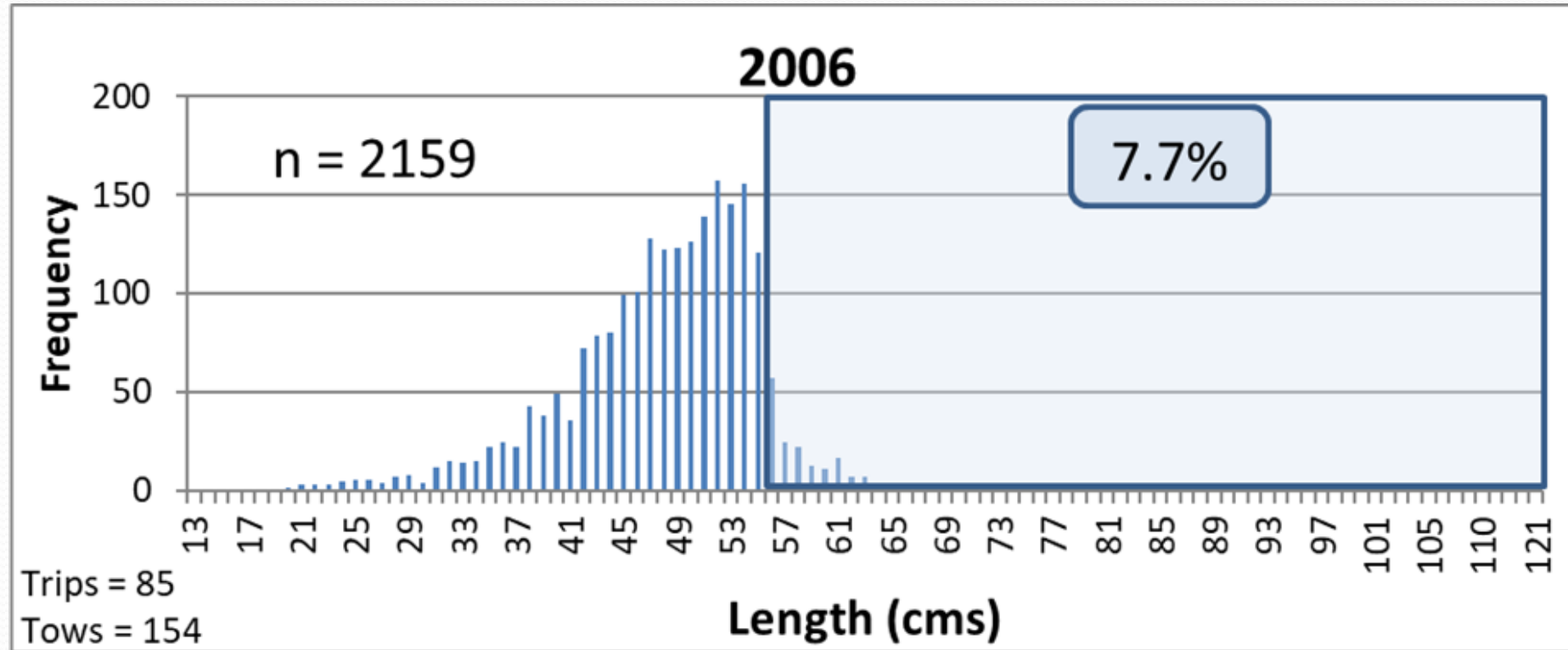
### 2) Disposition codes of discarded GOM cod

- Disposition codes for all length frequency discarded cod samples
- Majority are recorded as code 012 (Regulations Prohibit Retention, Too Small)

## Next steps

- Examine for fixed gear trips (gillnet and longline)
- Explore whether discards of legal-sized fish have occurred for other stocks

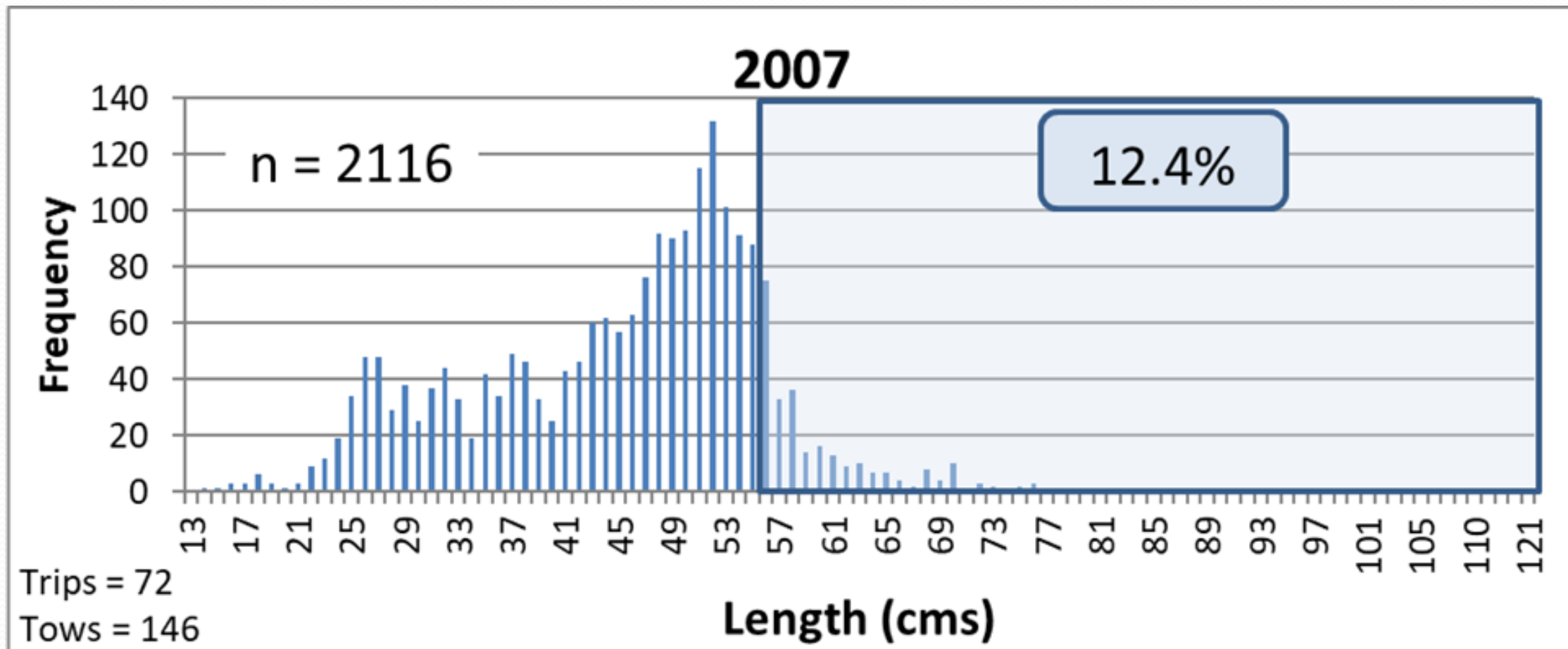
# Length frequency of discarded GOM cod

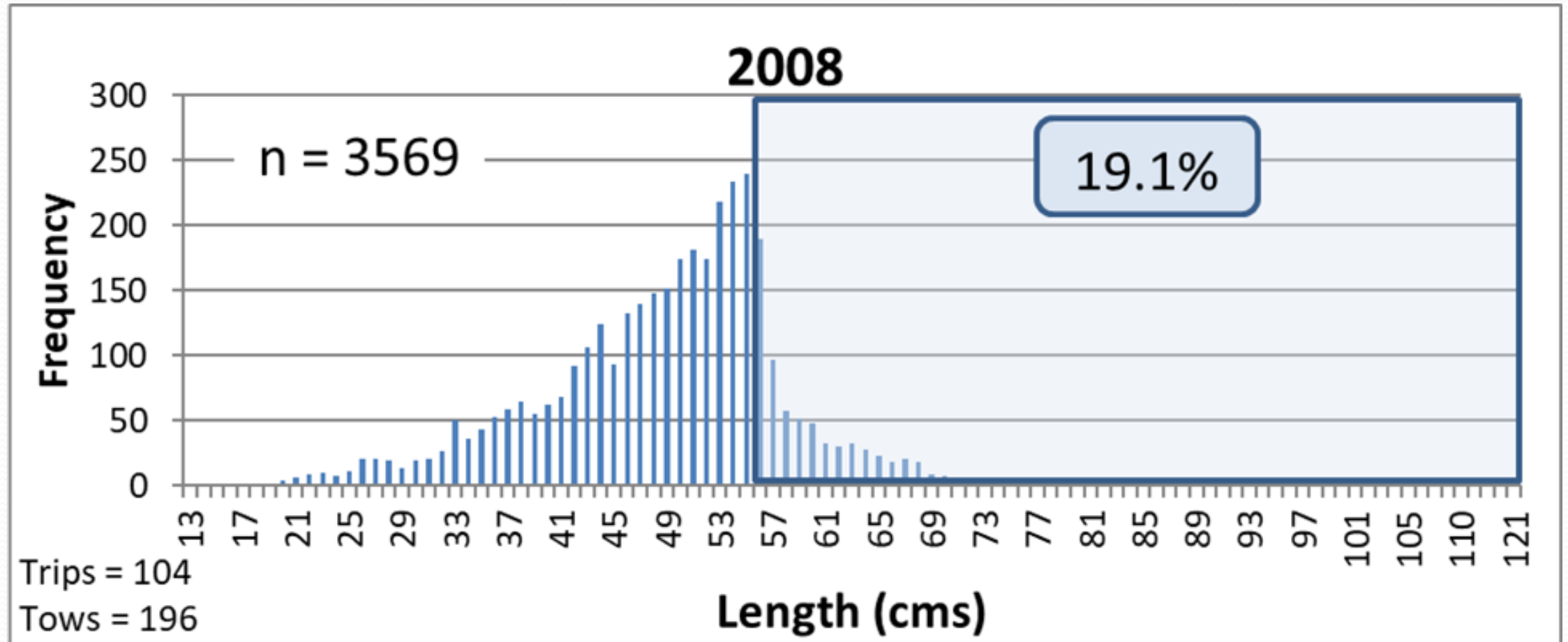


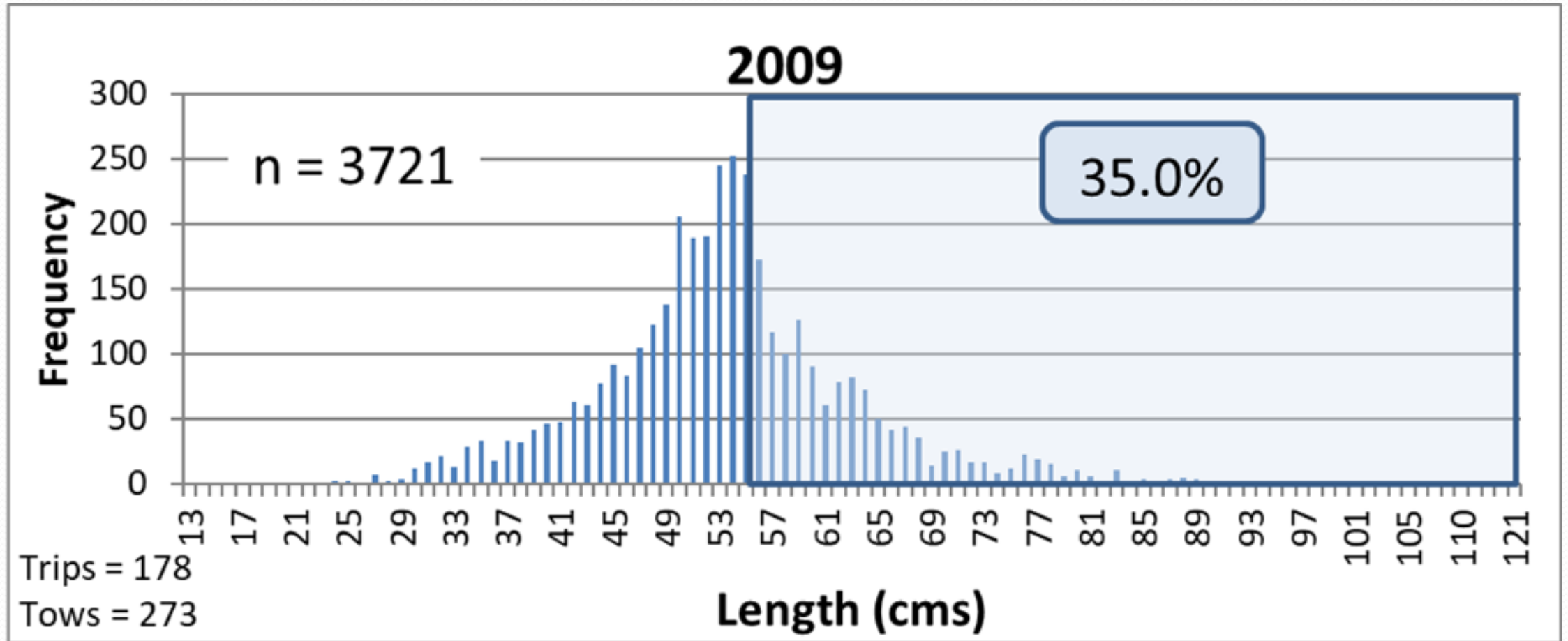
“n” = total number of GOM cod in the length frequency samples

Shaded area = proportion of fish discarded that are over the minimum size limit

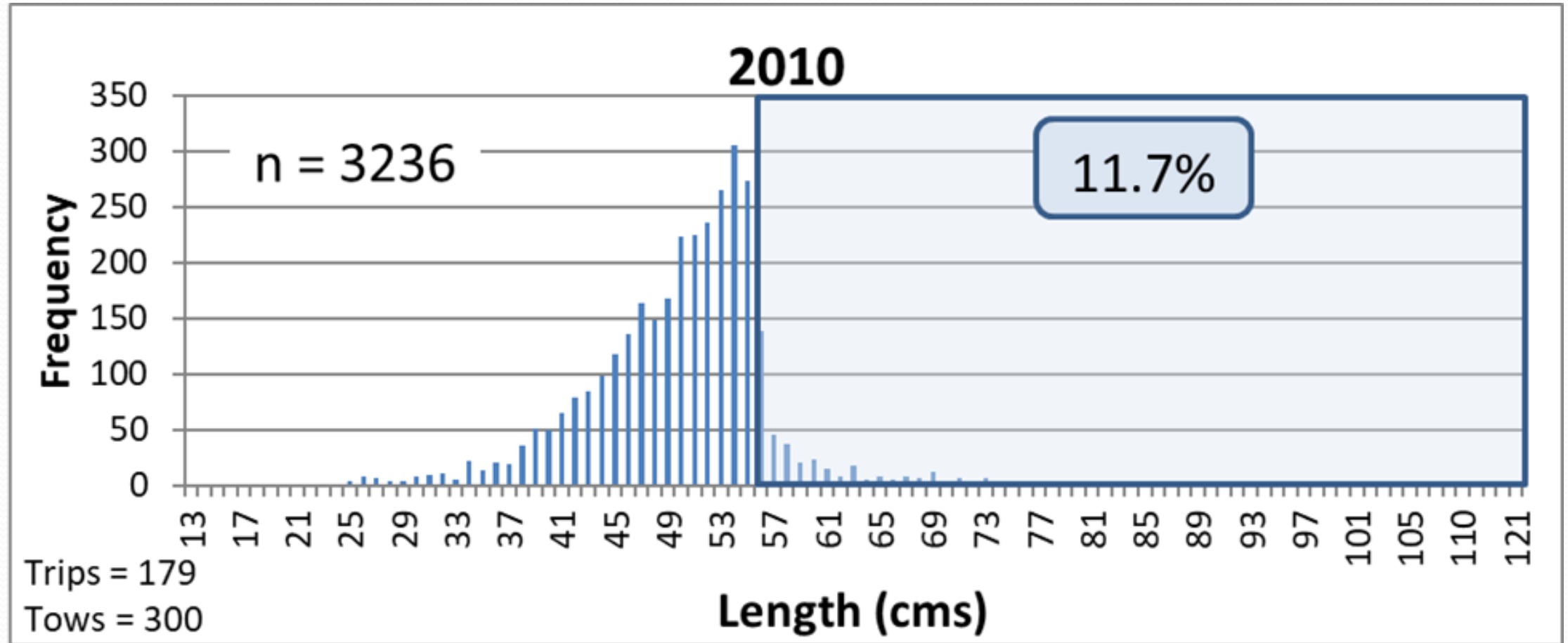
Note the minimum fish size change for GOM cod in 2014 from 22in (55.9cm) to 19in (48.3cm)

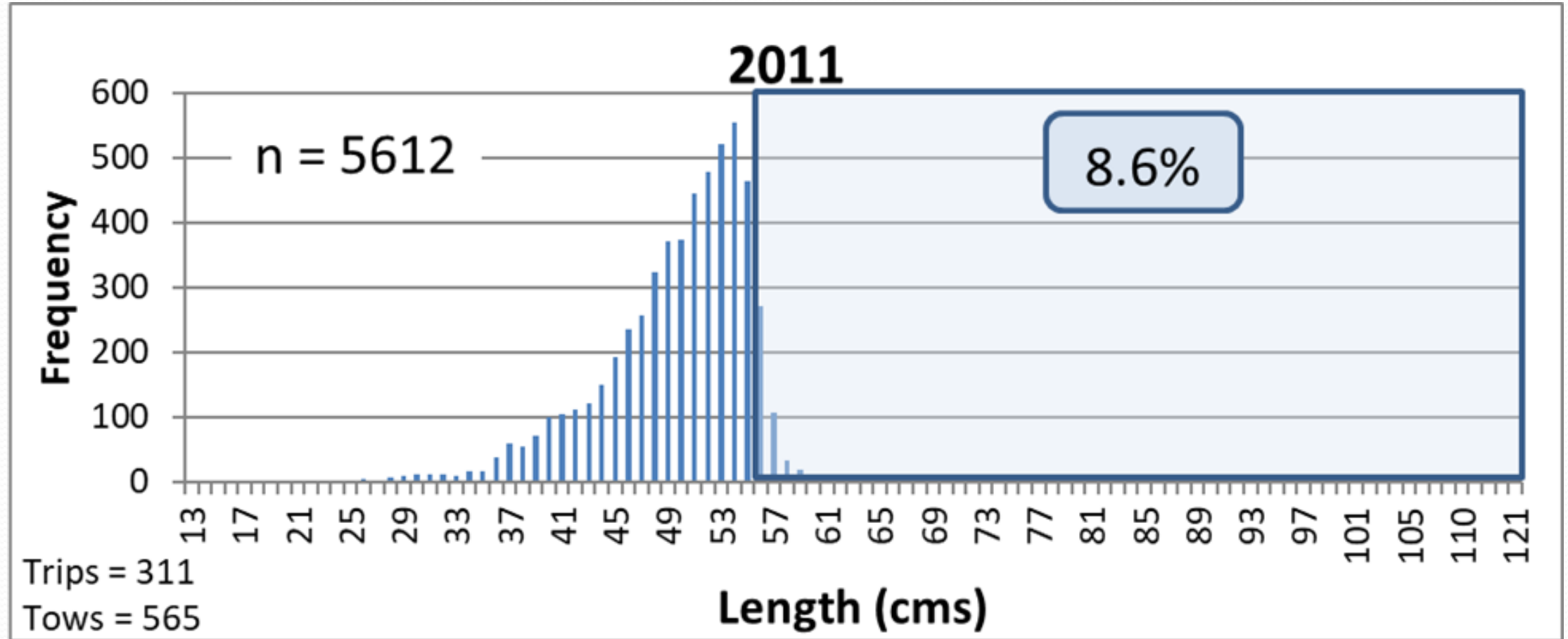


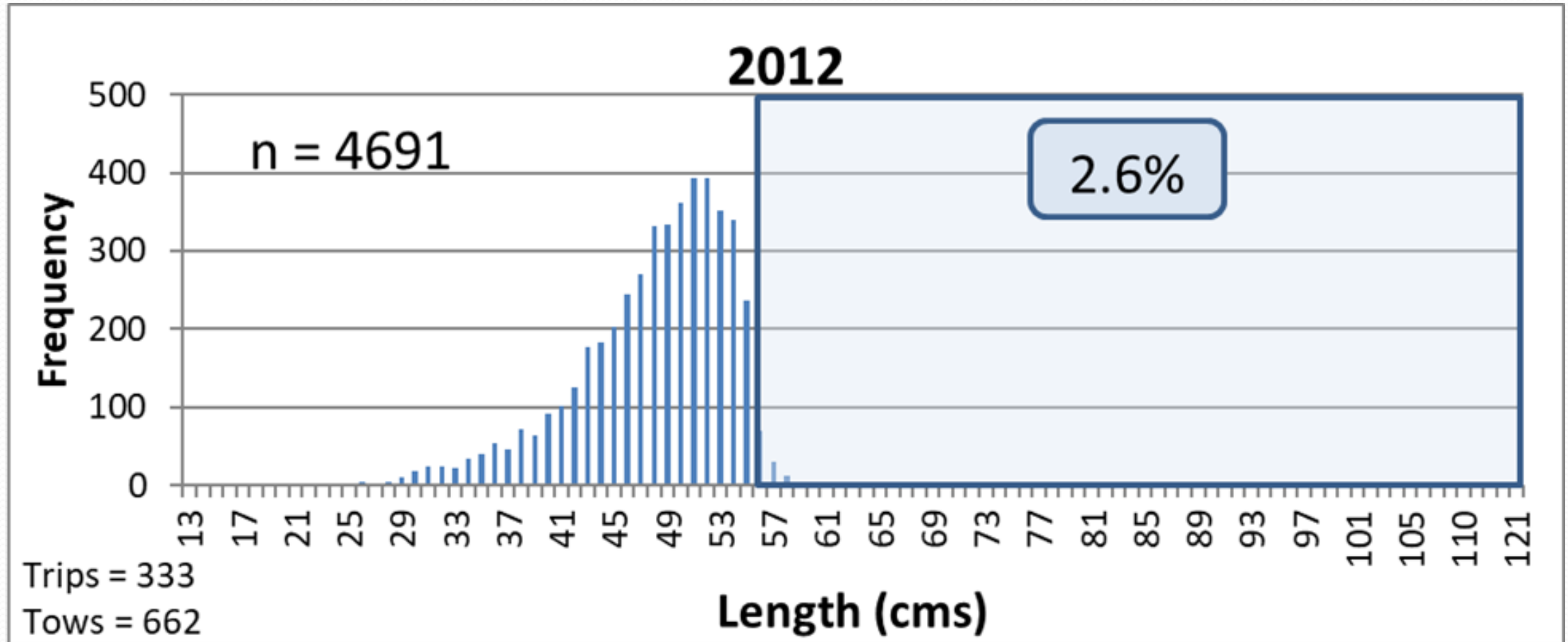


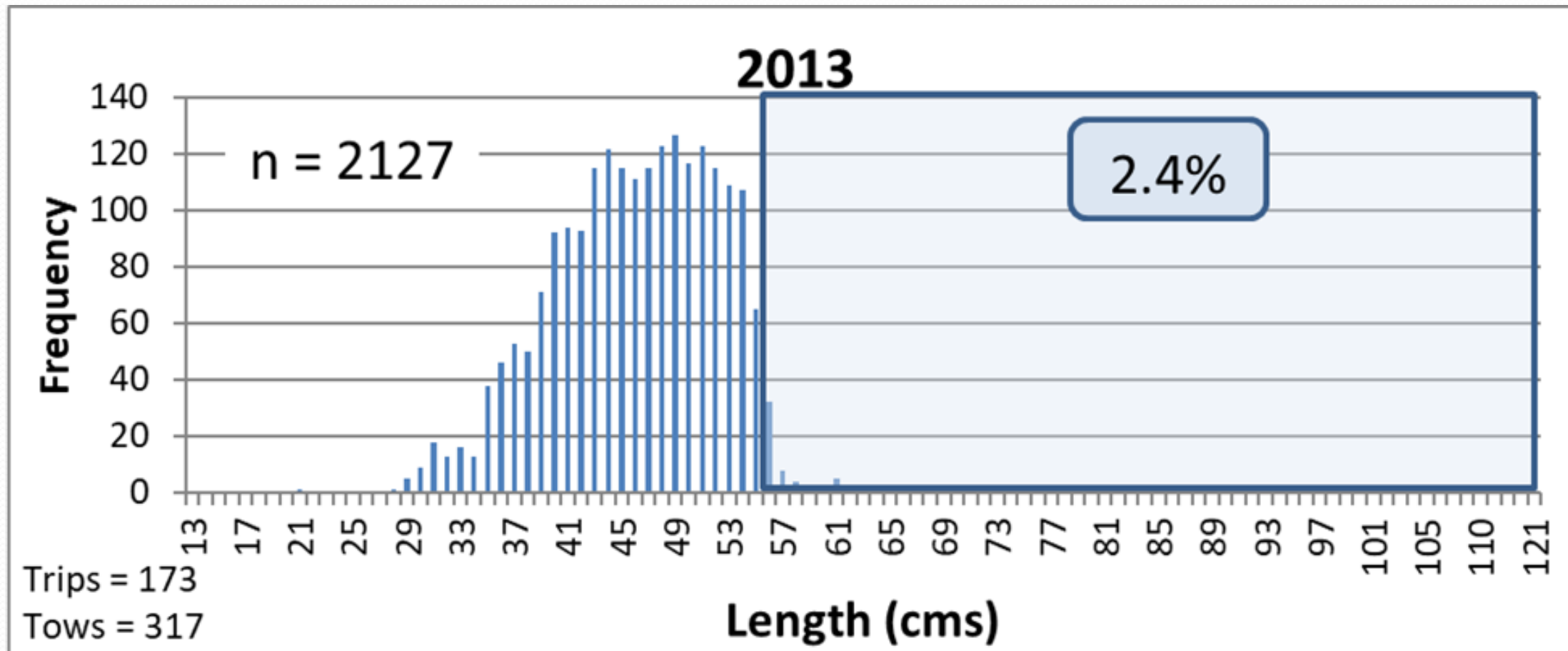


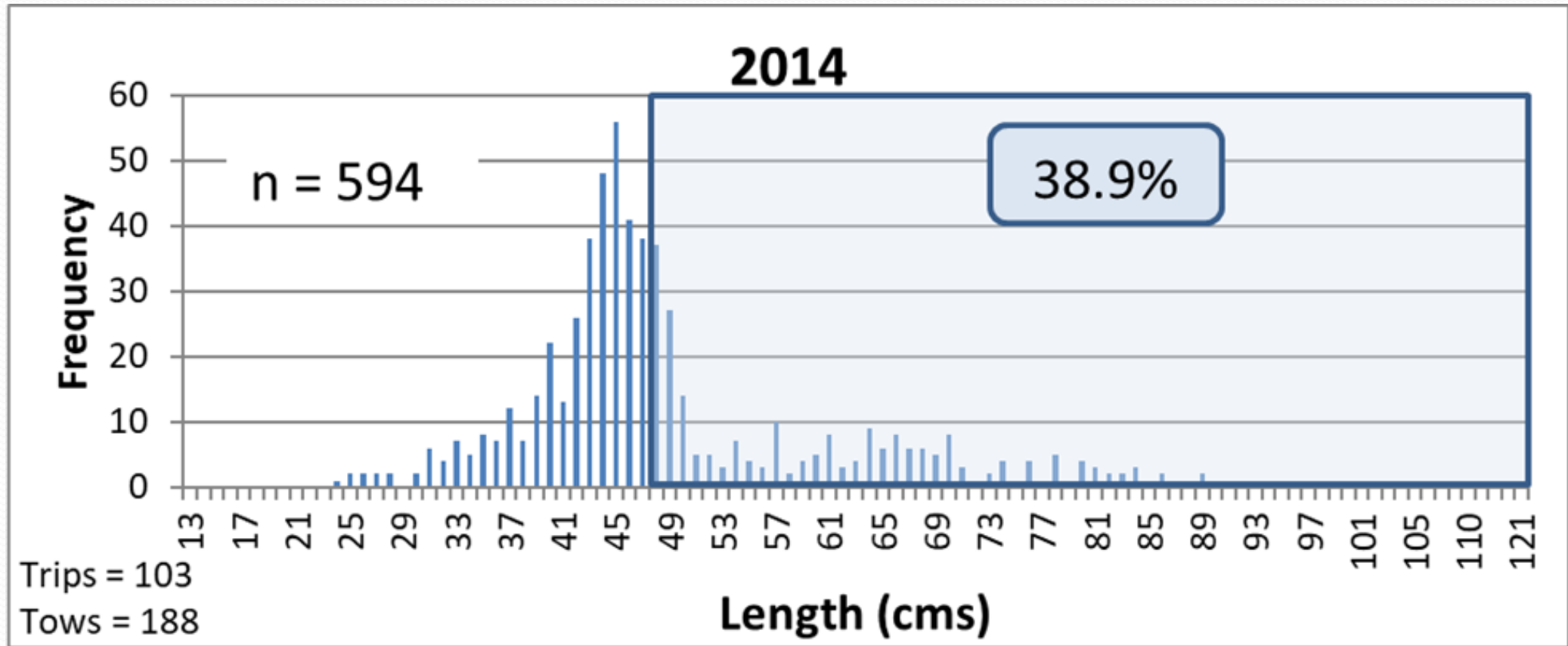




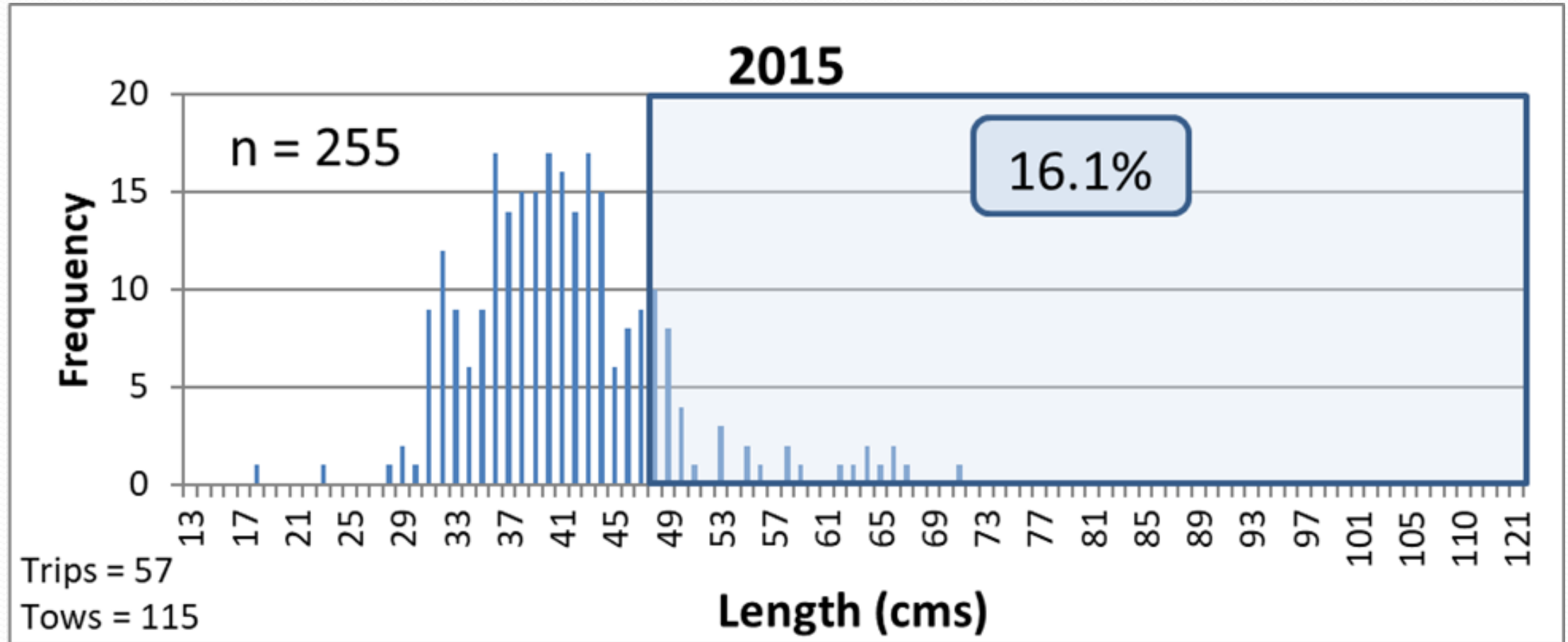


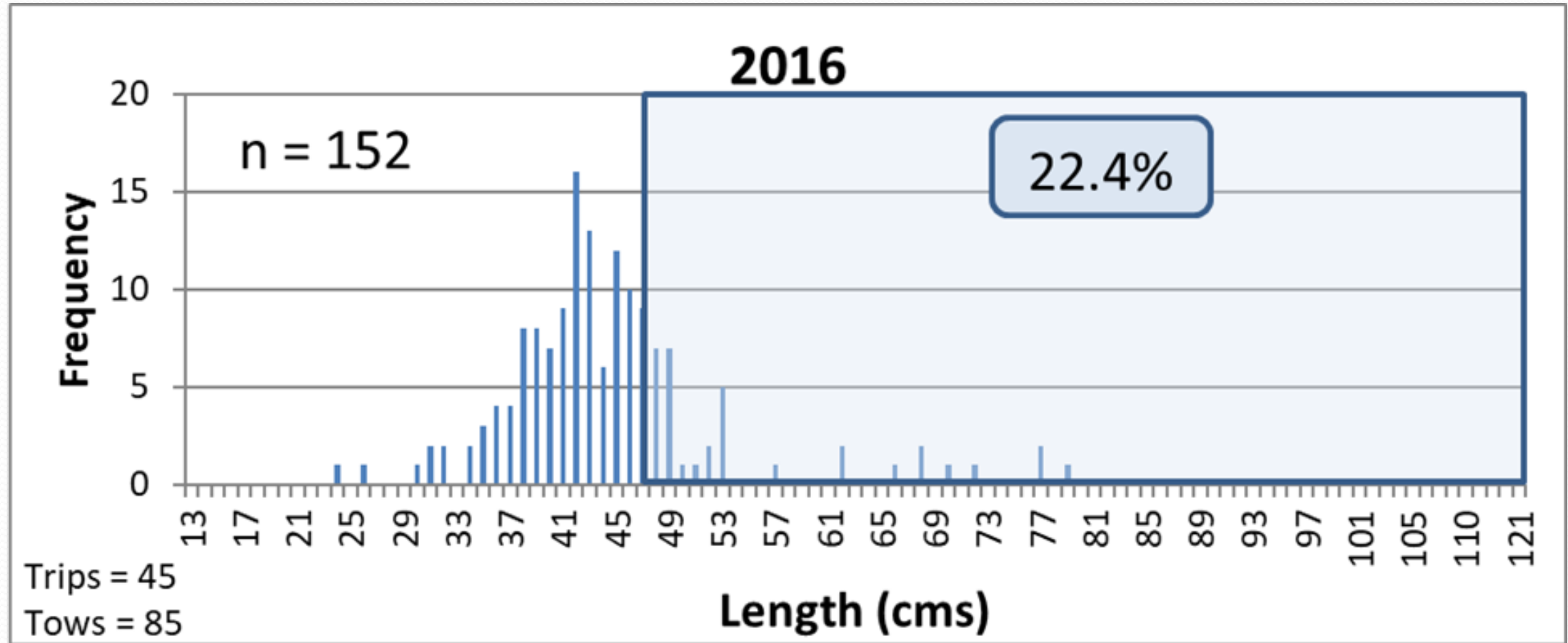


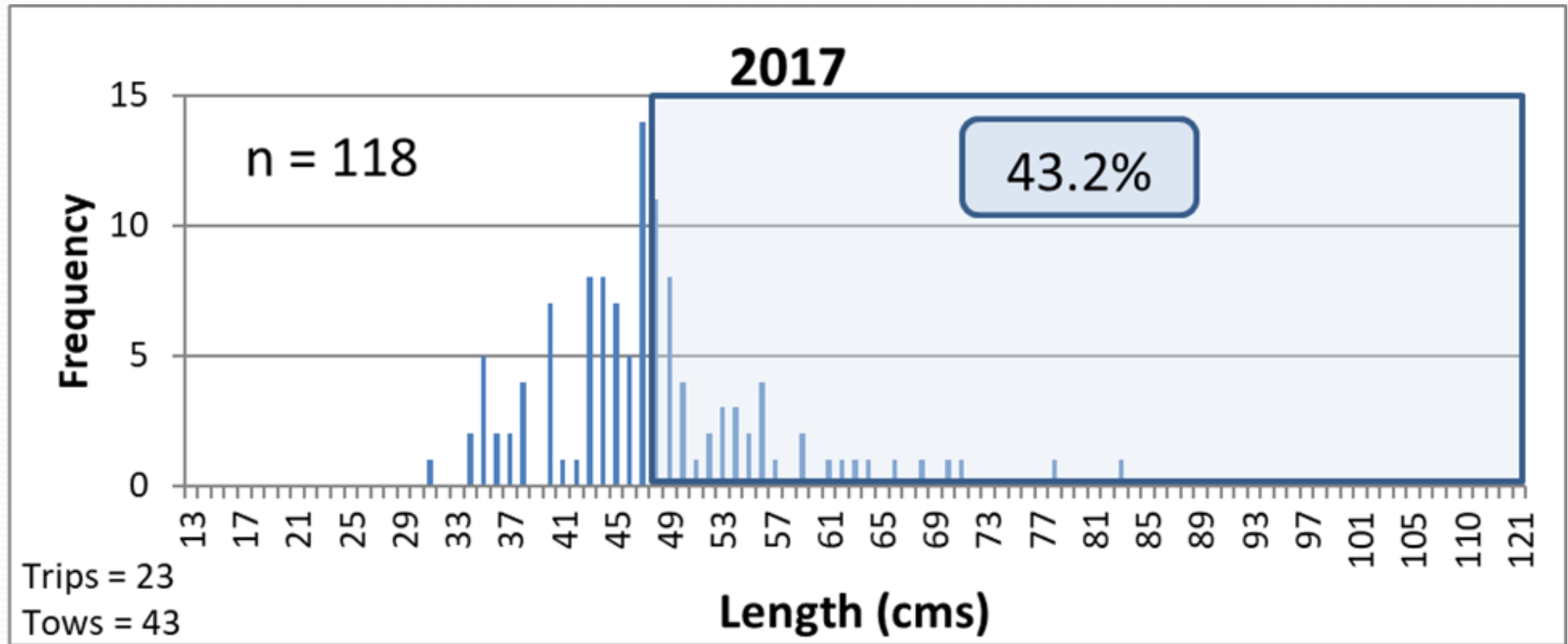




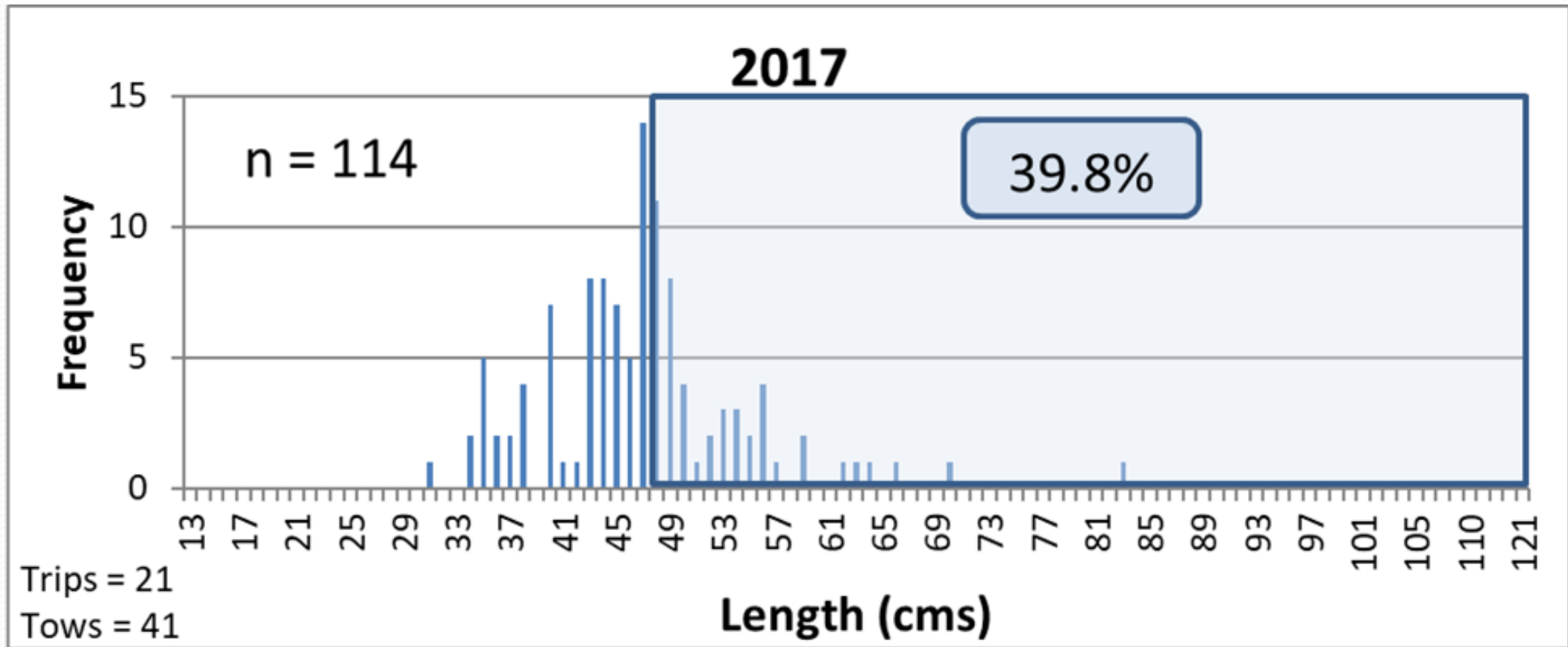
Note: FY 2014 had an emergency action for GOM cod which required additional discarding, and so a higher proportion of legal-sized cod discards is expected for CYs 2014 - 2015.











CY 2017 with common pool trips removed

# Disposition codes of discarded GOM cod

Sum of NUMLEN		Column Labels												
Row Labels		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Grand Total
1		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%
2		0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.01%
7		0.00%	0.00%	0.03%	0.03%	0.09%	0.02%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
11		0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	2.35%	0.00%	0.00%	0.04%
12		90.32%	90.45%	68.20%	57.16%	93.85%	99.36%	99.98%	100.00%	74.41%	90.59%	93.42%	89.83%	87.39%
14		6.86%	2.27%	14.82%	30.21%	2.53%	0.62%	0.00%	0.00%	25.59%	4.71%	3.29%	0.85%	7.53%
15		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.78%	0.03%
63		2.83%	5.20%	16.90%	6.75%	3.28%	0.00%	0.00%	0.00%	0.00%	2.35%	0.00%	2.54%	4.02%
99		0.00%	2.08%	0.00%	5.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.97%	0.00%	0.93%
39		0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Grand Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

- 001 NO MARKET, REASON NOT SPECIFIED
- 002 NO MARKET, TOO SMALL
- 007 NO MARKET, BUT RETAINED FOR OBSERVER FOR SCIENTIFIC PURPOSES
- 011 REGULATIONS PROHIBIT RETENTION, REASON NOT SPECIFIED
- 012 REGULATIONS PROHIBIT RETENTION, TOO SMALL
- 014 REGULATIONS PROHIBIT RETENTION, QUOTA FILLED
- 015 REGULATIONS PROHIBIT RETENTION, NO QUOTA IN AREA
- 063 RETAINING ONLY CERTAIN SIZE BETTER PRICE TRIP QUOTA IN EFFECT
- 099 DISCARDED, OTHER
- 039 POOR QUALITY, PREVIOUSLY DISCARDED



# **Sector Monitoring CV Analysis**



# Using precision to guide the sampling of discards in groundfish

# Discard estimation by observer sampling in NE

- Inference from random sample to population
  - Sample = observed trips
  - Population = all commercial trips
- Ratio estimator for discard rate
  - Design-based (fixed strata)
  - Leverage relationship between kept catch and discards

$$\hat{r} = \frac{d}{k_{all}} \quad \hat{D} = \hat{r}K$$

# Sampling design is driven by precision

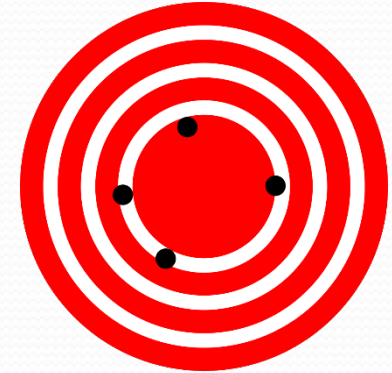
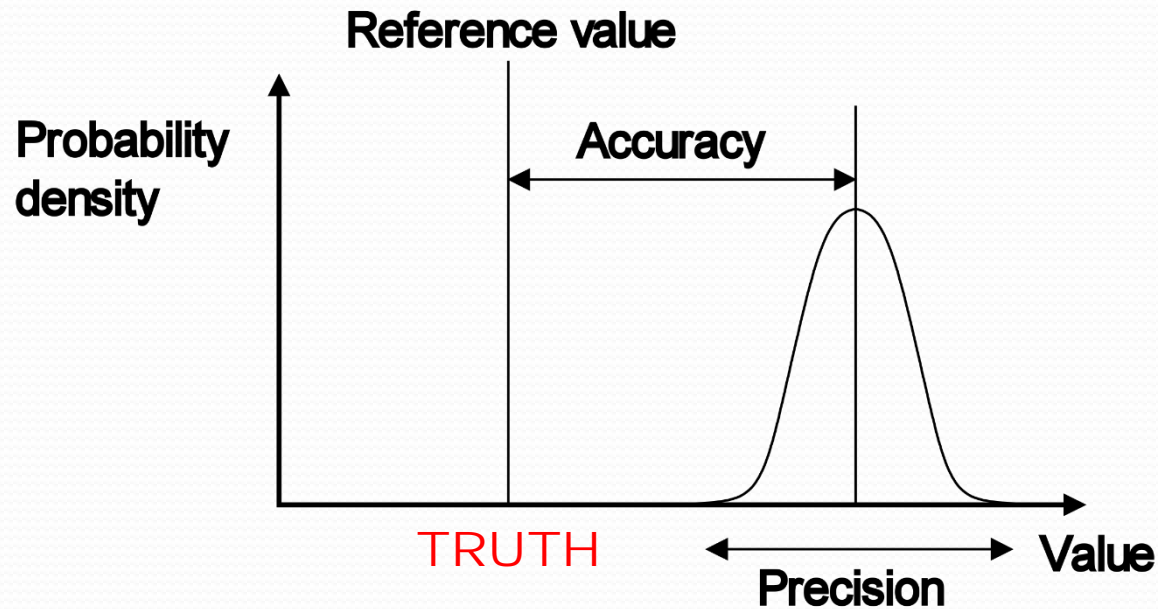
- Precision measured by coefficient of variation (CV)

$$CV(\hat{D}) = \frac{\sqrt{V(\hat{D})}}{\hat{D}}$$

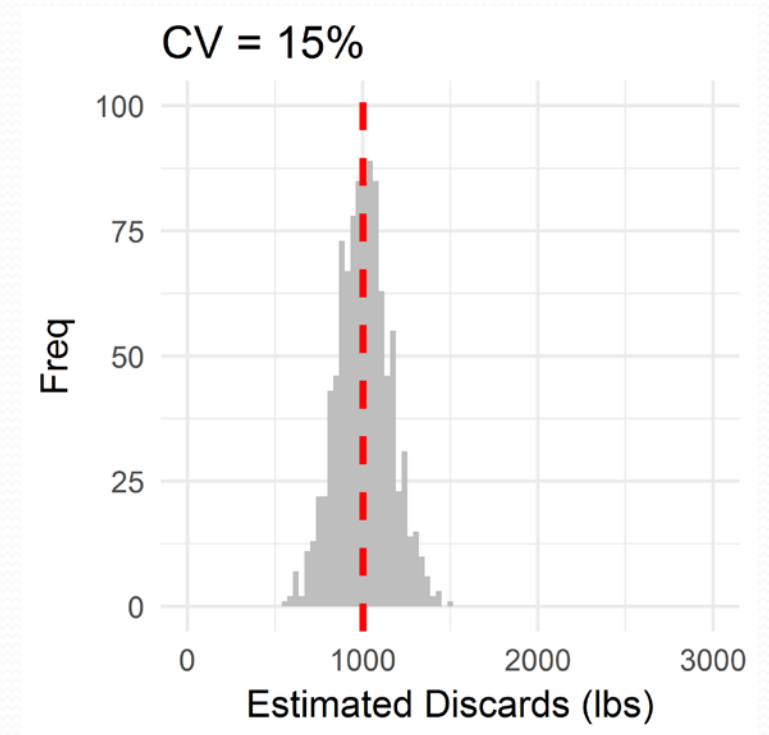
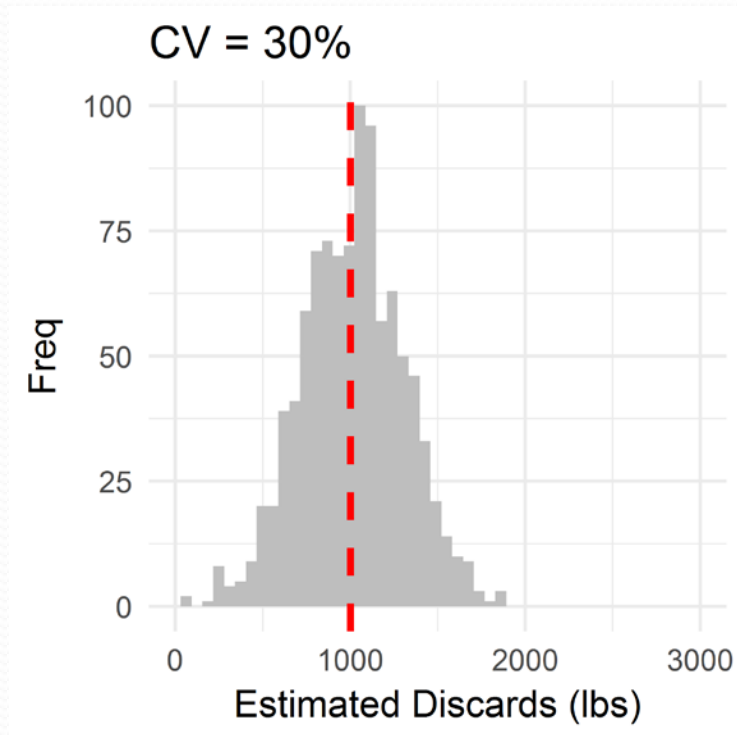
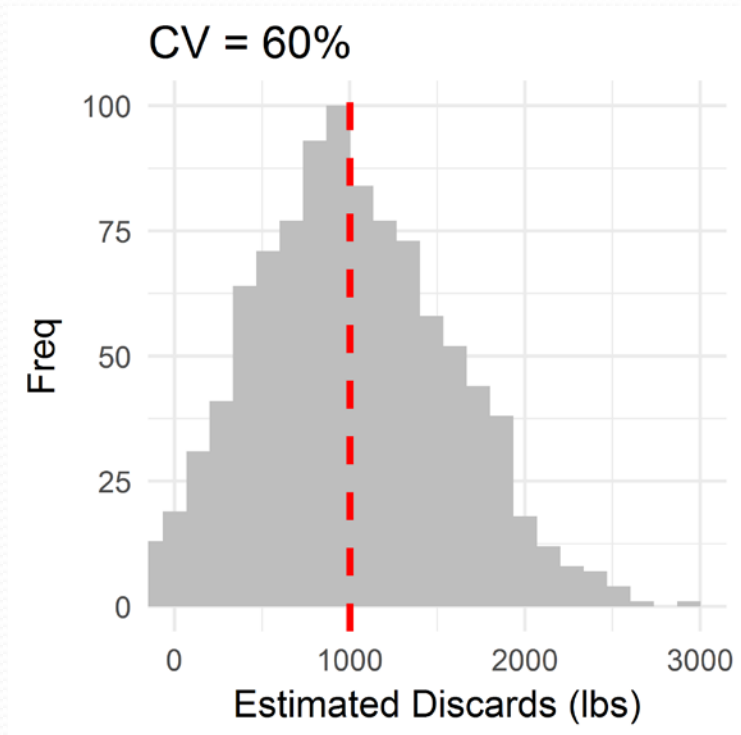
- CV increases with sample variance, decreases with sample size
- Sampling allocated to achieve target
  - CV = 30%
  - At the stock level

# Why precision?

- Assuming no bias, the quality of an estimate
- Only measure available for observed data

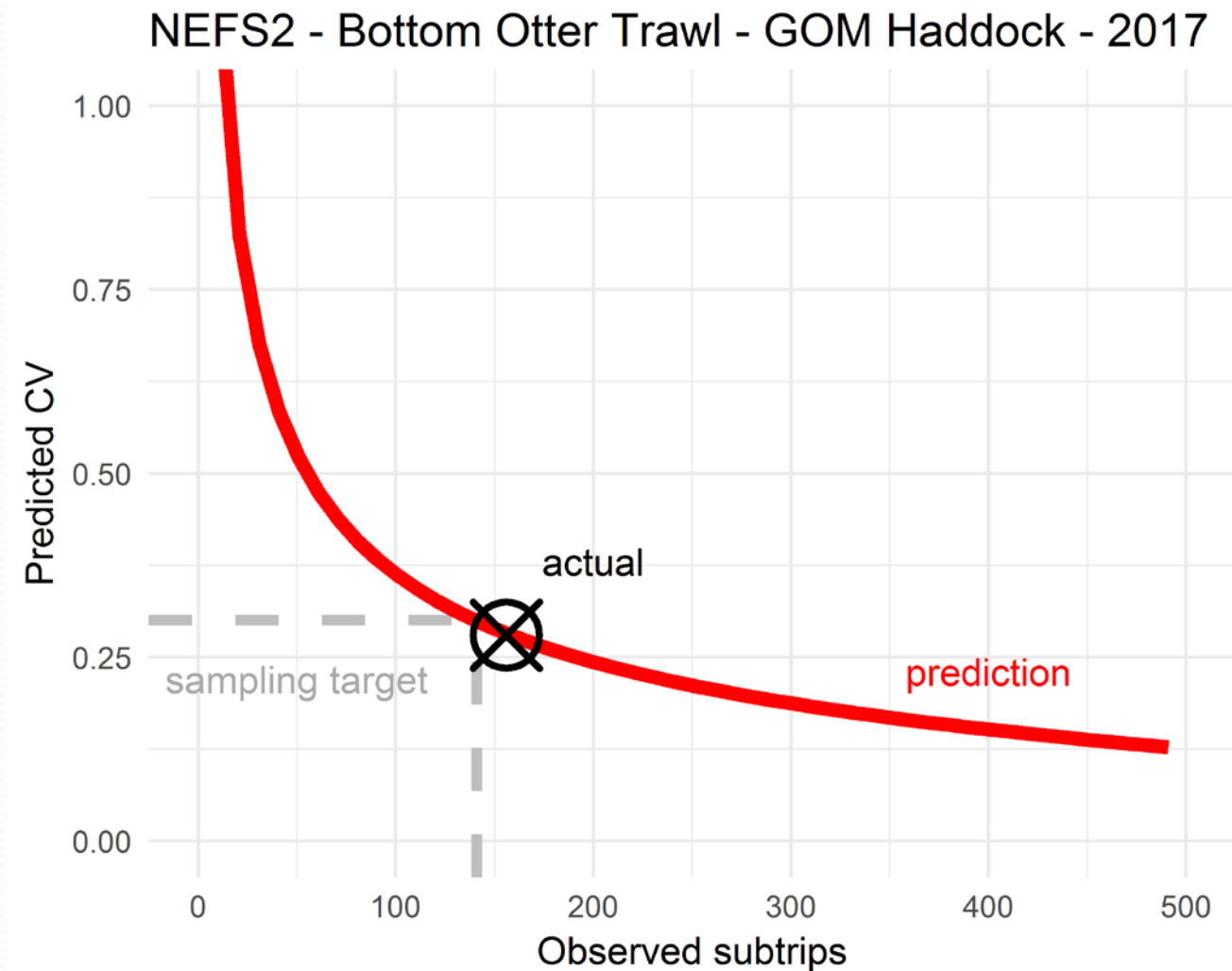


# Probability of accurate estimate from a given sample increases with better precision

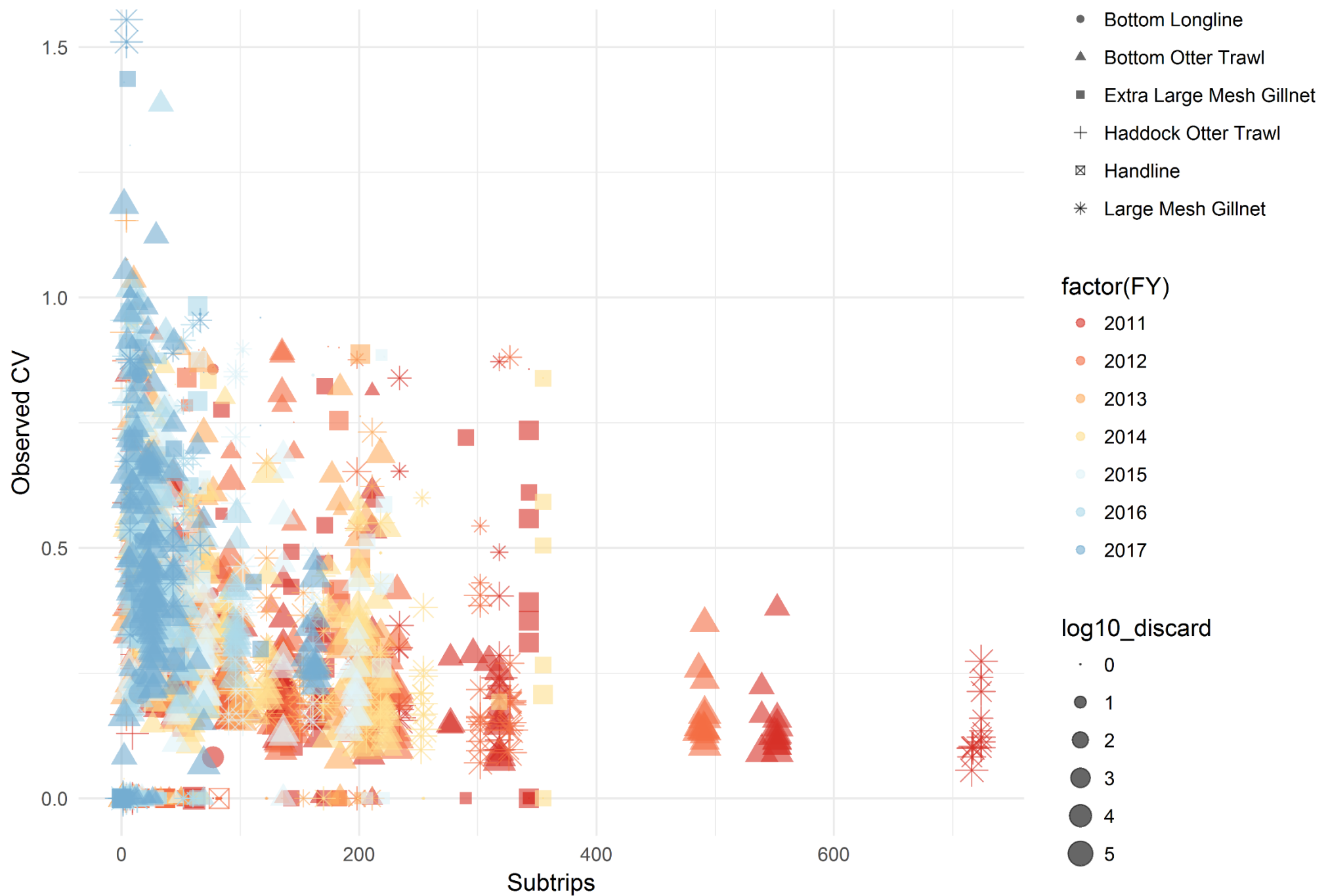




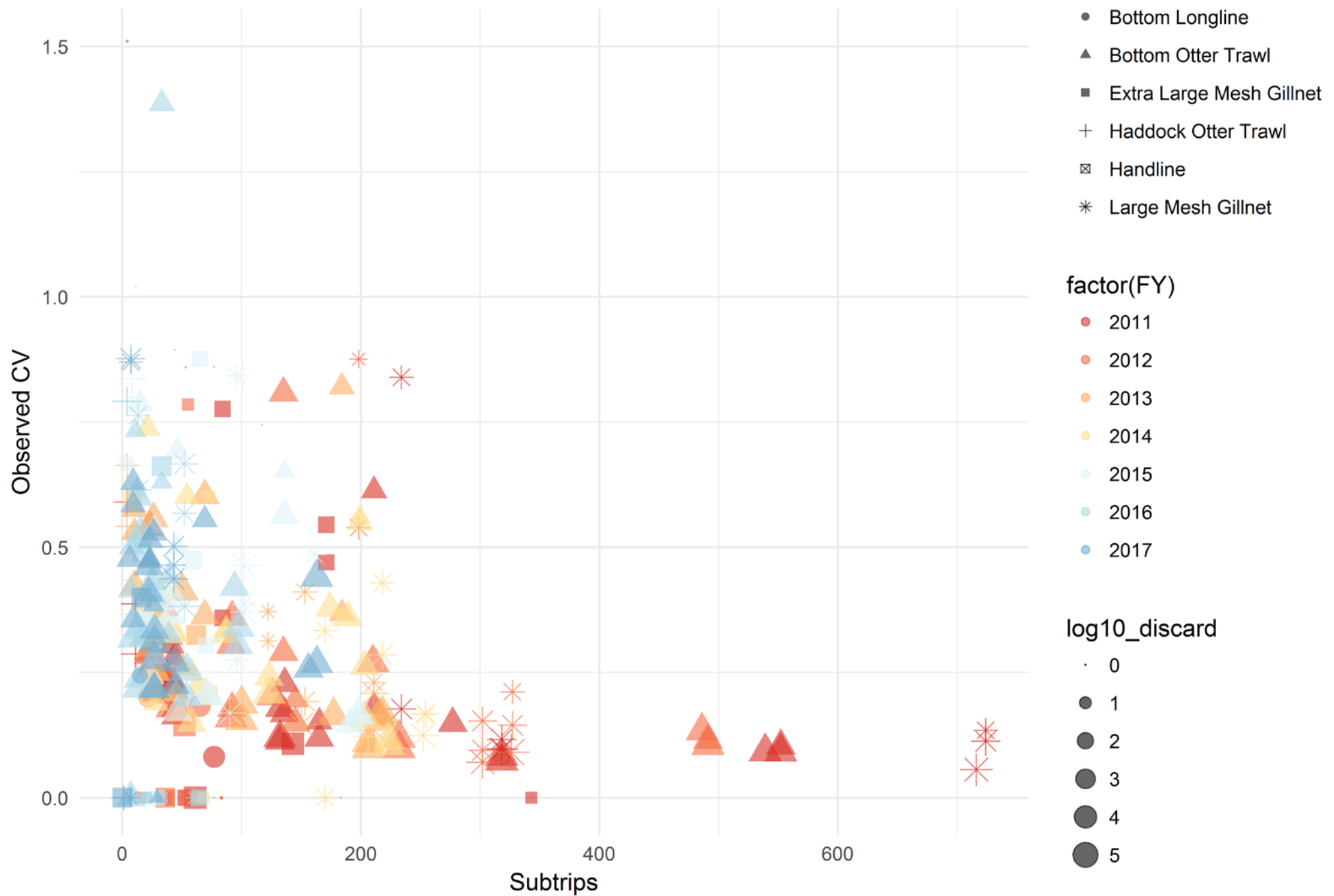
# Precision increases with sample size



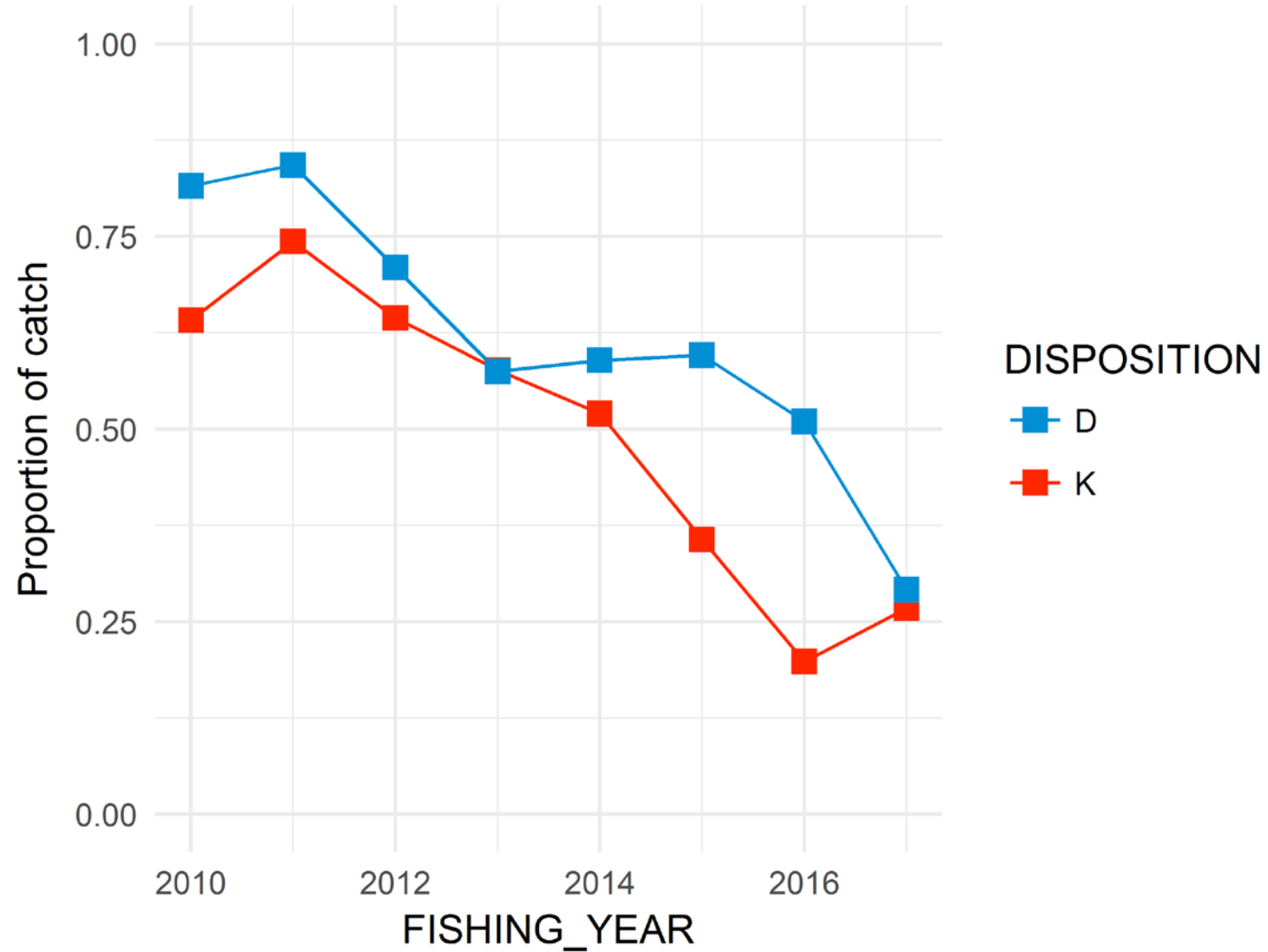
# ALL STOCKS



# GOM Cod, Witch Flounder, Plaice



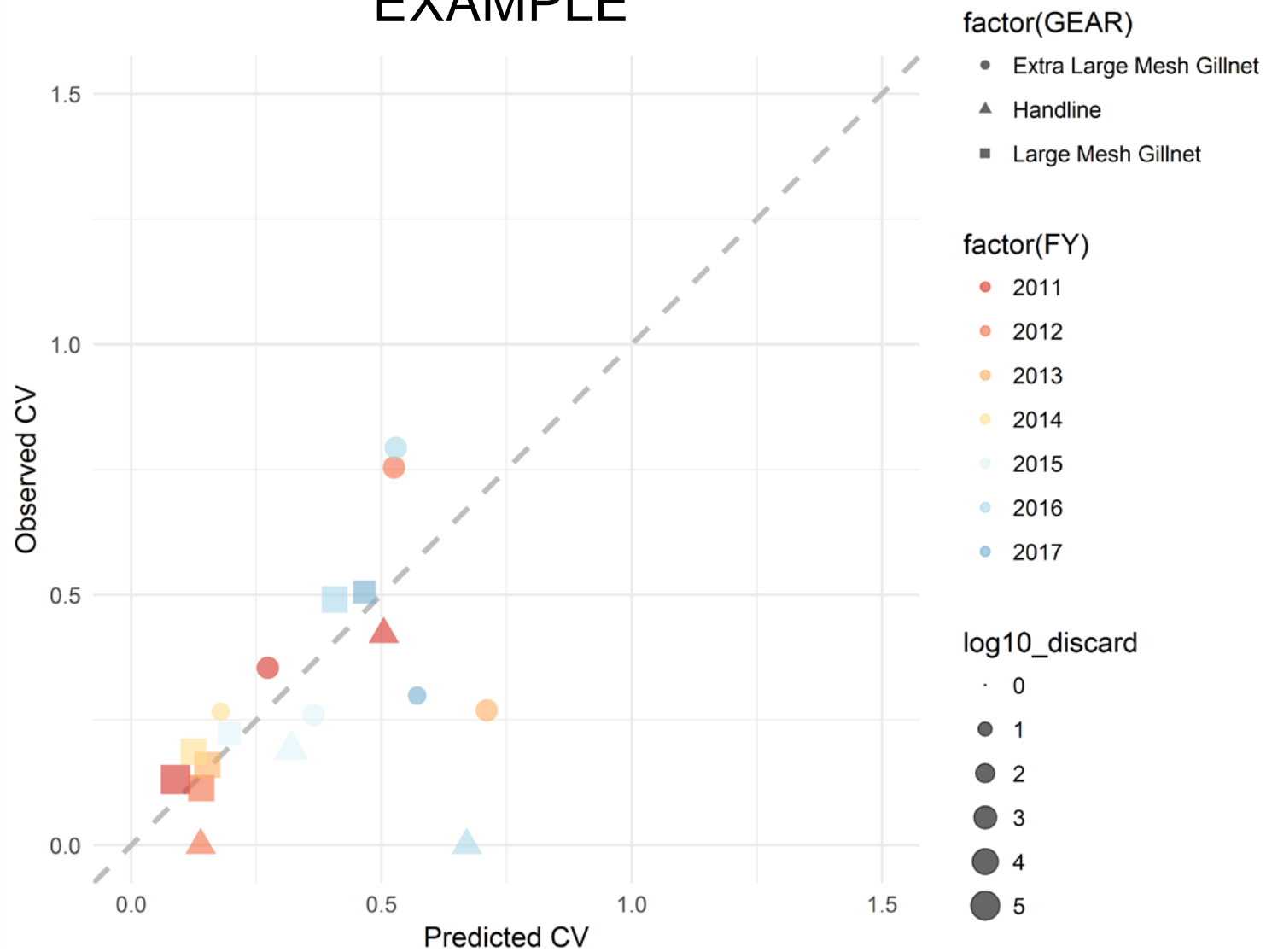
Catch from strata with CV  $\leq 0.30$



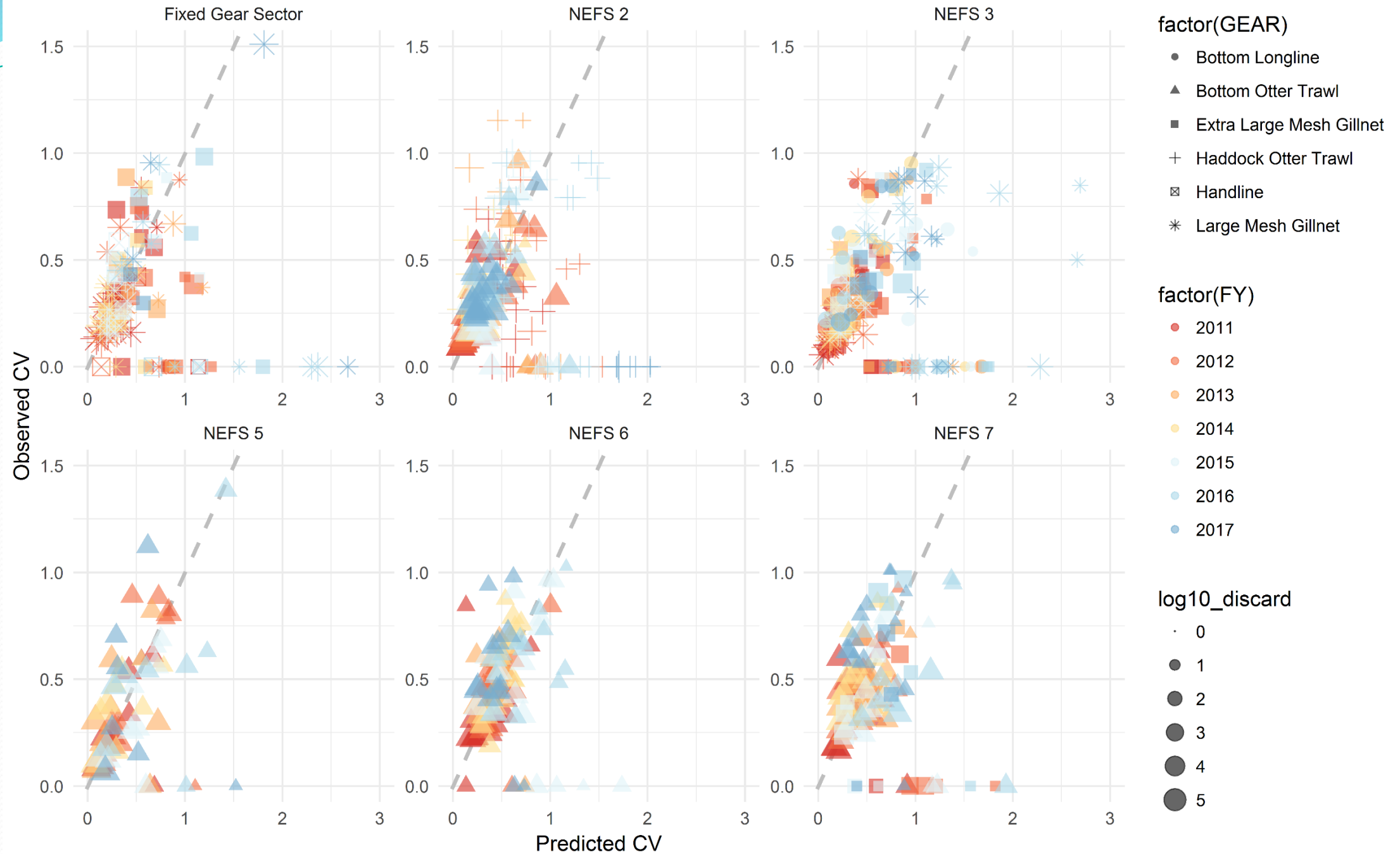
# Sample variation across years – evidence of bias?

- Given the following:
  1. Sample variance in year  $t$
  2. Observed trips in year  $t+1$
- How well does predicted CV match actual CV?
  - Sample size constant
- Sample variation may change due to annual differences:
  - fishing behavior
  - stock distribution/abundance

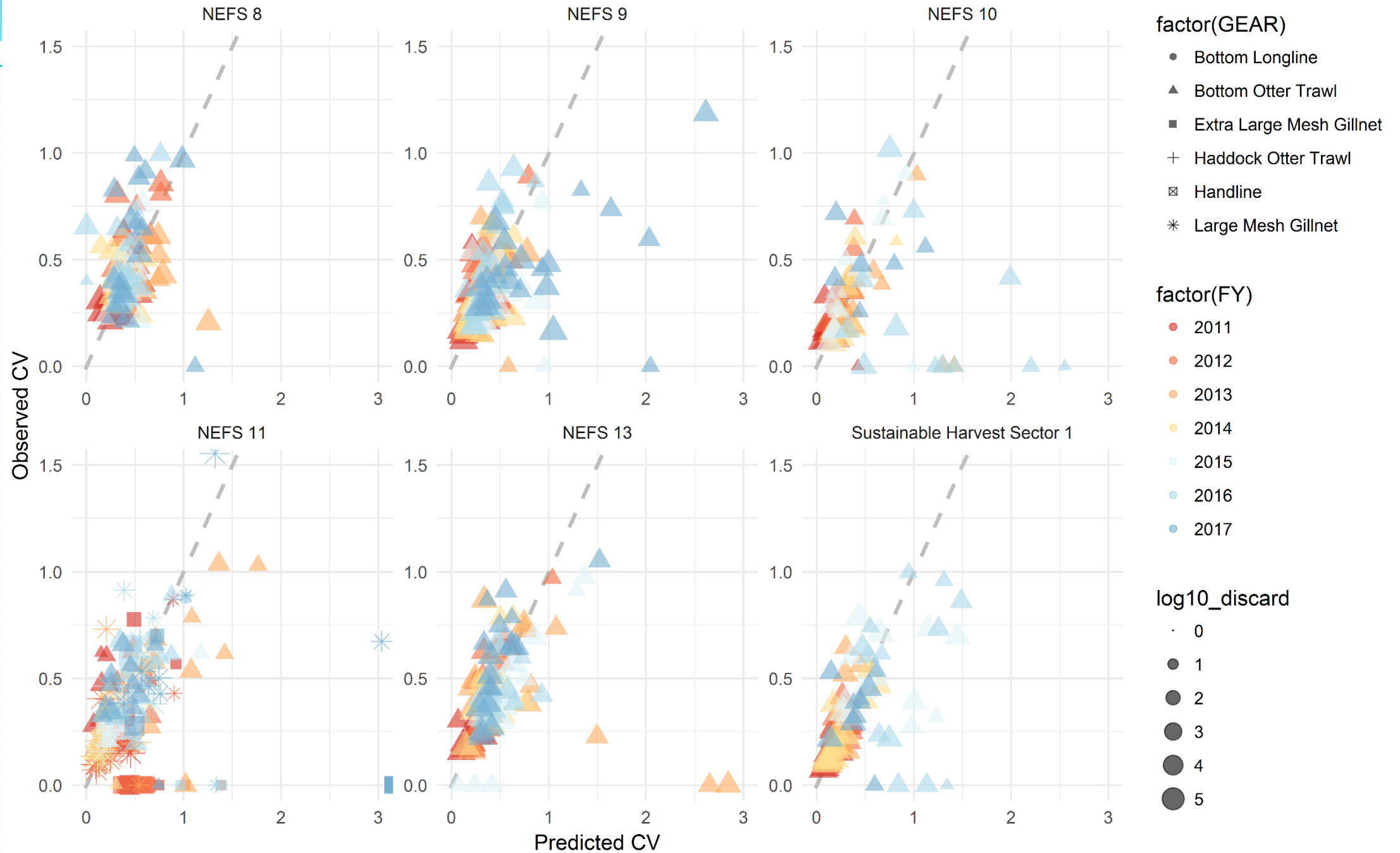
# EXAMPLE



# Discard ratio CVs 2011-2017 by SECTOR

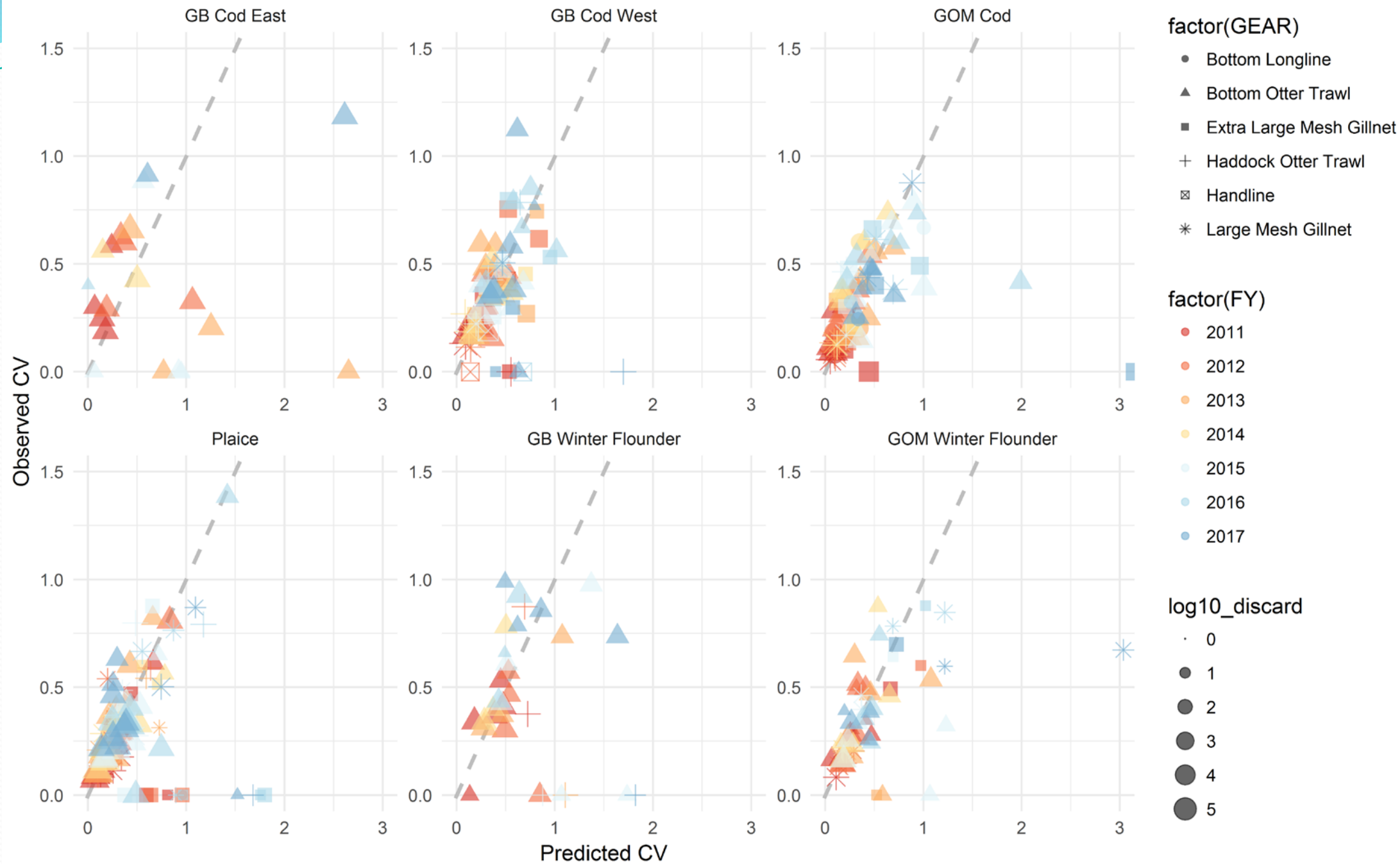


# Discard ratio CVs 2011-2017 by SECTOR

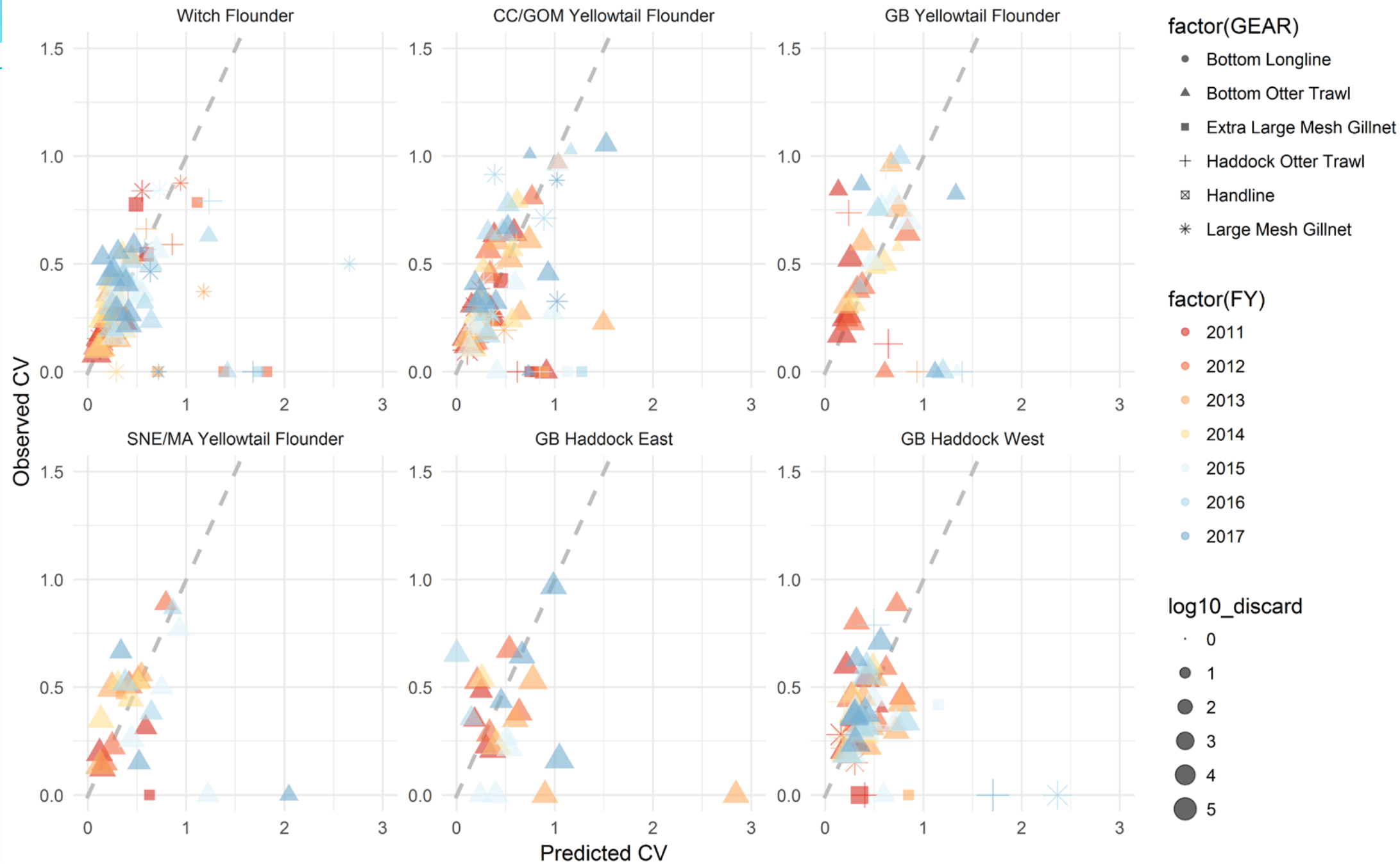




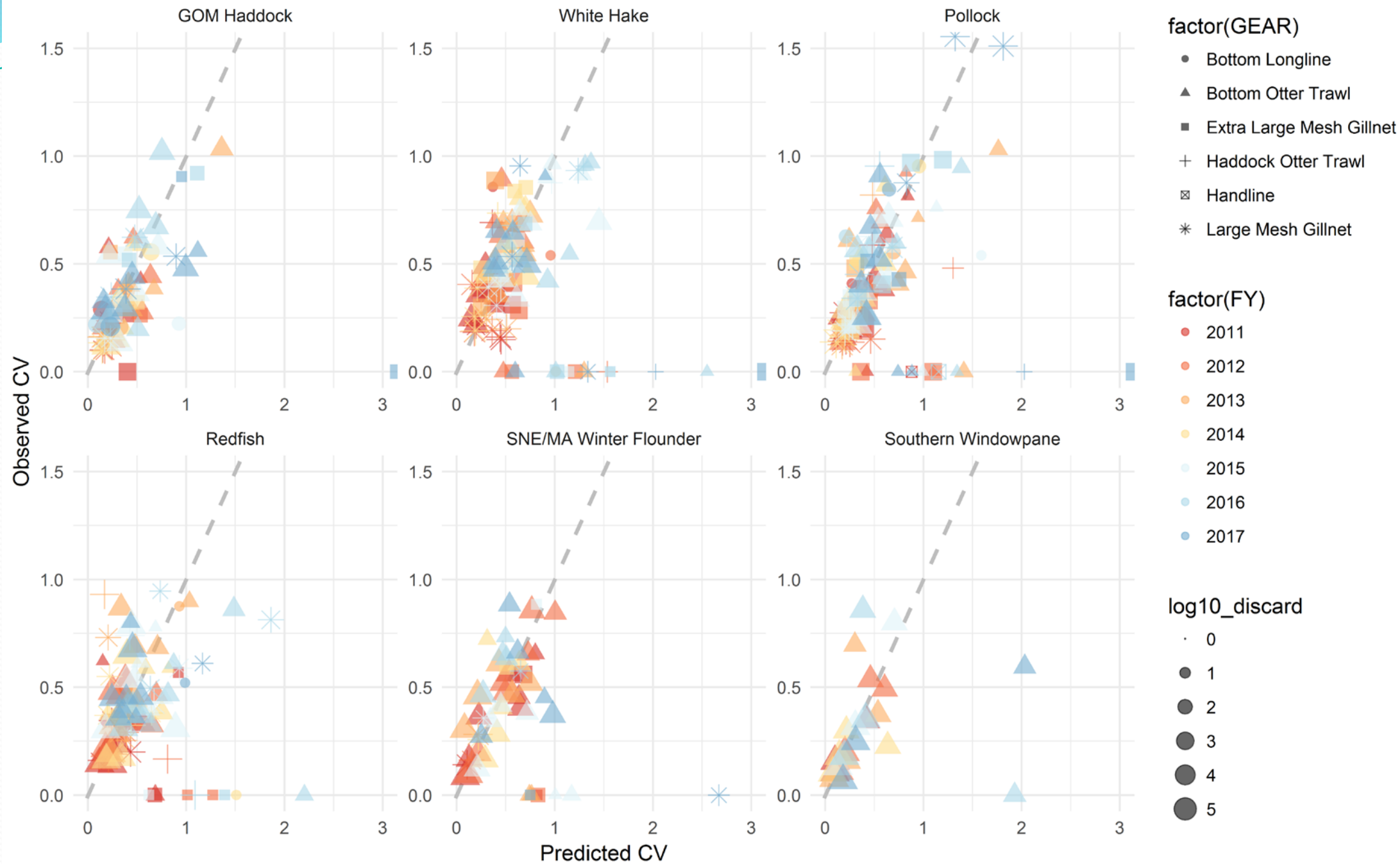
# Discard ratio CVs 2011-2017 by STOCK



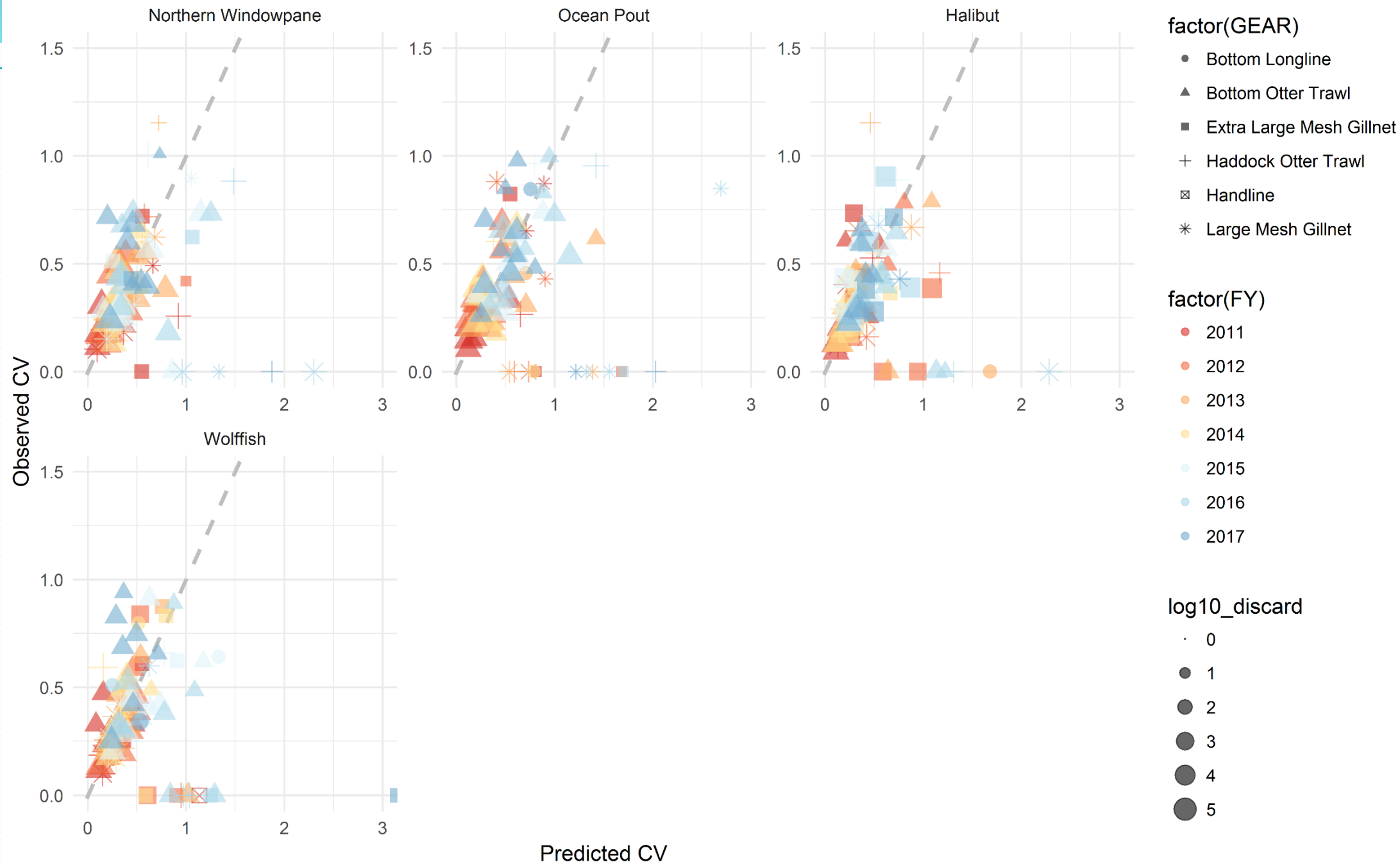
# Discard ratio CVs 2011-2017 by STOCK



# Discard ratio CVs 2011-2017 by STOCK



# Discard ratio CVs 2011-2017 by STOCK



# Conclusions

- No *convincing* evidence of bias, per se
  - Lower than predicted CVs for some sectors
  - BUT... no information on unobserved trips
- High CVs for individual sector/gear/stock strata
  - Not a problem for stock level management
  - Problem for sectors?
    - Only solution is more coverage...



# Observer Bias Analysis

## For Today's Meeting

- Receive progress report on the potential range of alternatives
- Discuss the draft alternatives in Section 4.1 Fishery Program Administration, which include updates following the last Committee meeting
- Discuss the PDT's analysis to date



**Framework Adjustment 58- scheduled  
to be initiated at the June Council meeting**



# DRAFT Scope

- To set specifications for FY2019 for US/Canada stocks (Eastern Georges Bank (GB) cod, Eastern Georges Bank haddock, and Georges Bank yellowtail flounder),
- To revise/establish rebuilding plans for several stocks (ocean pout, GB winter flounder, witch flounder, Gulf of Maine/GB windowpane flounder, and Southern New England/Mid-Atlantic yellowtail flounder ),
- To address Status Determination Criteria issue when analytic assessments fail,
- To provide additional guidance on sector overages, and
- To revise other management measures, if necessary.

# **DRAFT Objectives**

To meet regulatory requirements to prevent overfishing, ensure rebuilding, and help achieve optimum yield in the commercial groundfish fishery.

# **DRAFT Likely Range of Alternatives**

1. Updates to status determination criteria, rebuilding plans, and annual catch limits

- Status Determination Criteria

- Rebuilding Plans

- Annual Catch Limits

2. Fishery administration
  - Guidance on sector overages

# DRAFT Timeline - May 1, 2019 Implementation

2018	
MAR-JUN	Committee/AP/PDT preliminary discussion and analysis
<b>JUN 12-14</b>	<b>NEFMC – Council initiates framework</b>
JUL 10-12	TRAC assessments for US/CA stocks including EGB Cod, EGB haddock, and GB yellowtail flounder
JUL XX	PDT develops options for the SSC to consider for OFLs/ABCs for GB yellowtail flounder
AUG 15	SSC recommends ABC for GB yellowtail flounder
SEP 11-14	TMGC/SC recommends TACs for US/CA stocks
JUL-SEP	Committee/AP/PDT develop alternatives and analysis
<b>SEP 25-27</b>	<b>NEFMC – Receives an update on the development of the action, approve range of alternatives, including discussing US/CA stocks</b>
OCT-DEC	Committee/AP/PDT develop alternatives and analysis
<b>DEC 4-6</b>	<b>NEFMC – Council takes final action/approves framework</b>
DEC-JAN	PDT completes submission document
2019	
JAN XX	Preliminary submission
FEB XX	Final submission of framework document to NMFS
MAY 1	Implementation

## For Today's Meeting

- Discuss the items to include in FW58, and
- Make recommendations

# Evaluating the Observer Effect for the Northeast U.S. Groundfish Fishery

Chad Demarest

NOAA Fisheries, NEFSC

June 1, 2018

# Outline

- ① What motivates observer effects?
- ② Exact matching analysis
- ③ Results
- ④ Implications for monitoring

**Why might vessels behave differently in response to an observer?**



① Hawthorne Effect

*We act differently when we're being watched*

② Inconvenience costs

*Observers incur costs associated with food, slower fish processing and general inconvenience*

③ Within-strata heterogeneity for discard monitoring

*Fishermen don't want to impart their personal discard preferences on their counterparts*

④ Higher catch rates in areas/at times where more undersized fish are relatively more abundant

*Fishing shifts from areas of higher juvenile abundance or vessels use more selective methods/techniques*

⑤ Binding quota constraints

*Fish are retained that may otherwise be discarded, or certain stocks avoided altogether when observed*

## EXACT MATCHING ANALYSIS - METHODS AND DATA

- Exact matching compares same-vessel behavior on sequential trips
- Data cleaning:
  - Trawl and gillnet gears only
  - Trips must be 45 days apart
  - Overlaps with FY treated separately
  - Trip sequences from vessels with  $<3$  unobserved trips in a FY removed from that year
  - US/CA area trips from 2007-09 removed
  - Trips meeting 2015 ELM exemption requirements removed
  - CP trips from 2010 - present removed

## Trip sequences:

- U U U: *three unobserved trips in a row*
- U O U: *one observed trip between two unobserved trips*

## Paired trips:

- Randomly select either the lead or lag (last or first) trip in the sequence to compare to the center trip
- Matched pair of U U or O U
- Standardize pair, dividing by vessel/FY mean value

$$\Delta O_{yfv} = (O - U/U)_{yfv} \quad (1)$$

$$\Delta U_{yfv} = (U^1 - U^2/U)_{yfv} \quad (2)$$

### **EXAMPLE: Kept catch**

Center trip (U) = 1000 lbs

Lead or lag (U) = 800 lbs

Annual vessel U mean = 900 lbs

$$U = (1000 - 800/900)$$

$$U = 0.22$$

Calculate population differences between pooled U's and O's:

$$(M_{\Delta U - \Delta O})_{yfv} = \text{median}(\Delta U)_{yfv} - \text{median}(\Delta O)_{yfv} \quad (3)$$

## Metrics evaluated

- ① Trip duration
- ② Kept catch
- ③ Total revenue
- ④ Kept groundfish
- ⑤ Kept non-groundfish
- ⑥ Groundfish average price
- ⑦ Non-groundfish average price
- ⑧ Number of market categories included in kept catch

## RESULTS

Two levels of aggregation:

- regulatory regime, as
  - pre-Sector years (FYs 2007-2009),
  - initial Sector years (FYs 2010-2012),
  - intermediate Sector years (FY's 2013-2015),
  - contemporary Sector years (FY's 2016-2017); and
- gear type, distinguishing between trawl and gillnet gears.

*(FY-based results included in document for context)*

# RESULTS

*–refer to paper–*

- Vessels catch less fish and fish for less time when observers are on board
  - Effect is more pronounced for trawl vessels than gillnetters
- On observed trips:
  - Trawl vessels keep less groundfish than non-groundfish
  - Gillnet vessels keep less non-groundfish than groundfish, with a trend over time
  - Trawl and gillnet vessels have statistically higher average groundfish prices on observed trips
  - Gillnet vessels land more market categories of groundfish on observed trips in the most recent stanza



**Response to observer presence changed with implementation of sector system**

**Non-uniform changes across metrics implies the composition of the catch is fundamentally different on observed trips**

This work answers the question "*do fisherman change behavior in response to an observer*".

**Yes, they do**

**For discard monitoring, our sample is biased**

The appropriate policy response (Am 23) requires understanding the degree to which any of those five motivations underlie this observer effect

### **Which apply, and in what proportions?**

- ① Hawthorne Effect
- ② Inconvenience costs
- ③ Within-strata heterogeneity for discard monitoring
- ④ Higher catch rates in areas/at times where more undersized fish are relatively more abundant
- ⑤ Binding quota constraints

*If (1) or (2), our discard rates are inaccurate*

- the resulting bias may not be fatal, esp. if catch compositions are unaffected
- a global bias analysis is needed, incorporating observer and deployment effects and demonstrating bottom-line effects

*If (3) or (4), we also have mis-specified discard estimates...options could include:*

- higher observer coverage rates, based on an understanding of the costs and benefits of discard estimation precision and accuracy
- improved stratification, with re-evaluation of sector homogeneity assumptions

but...

*If (5), accuracy and precision of discard estimates are no longer the appropriate policy drivers*

- emphasis shifts to full catch accounting, and calculating at-sea coverage rates based on costs and benefits of catch precision and accuracy

*Circumventing catch restrictions through highgrading and/or illegal discarding undermines the management system in fundamental ways:*

- *degrades the quality of the science underpinning assessments*
- *creates a non-level playing field where those most willing to operate outside legal constraints are afforded a substantial advantage*

**Honest fisherman are left paying the bill**