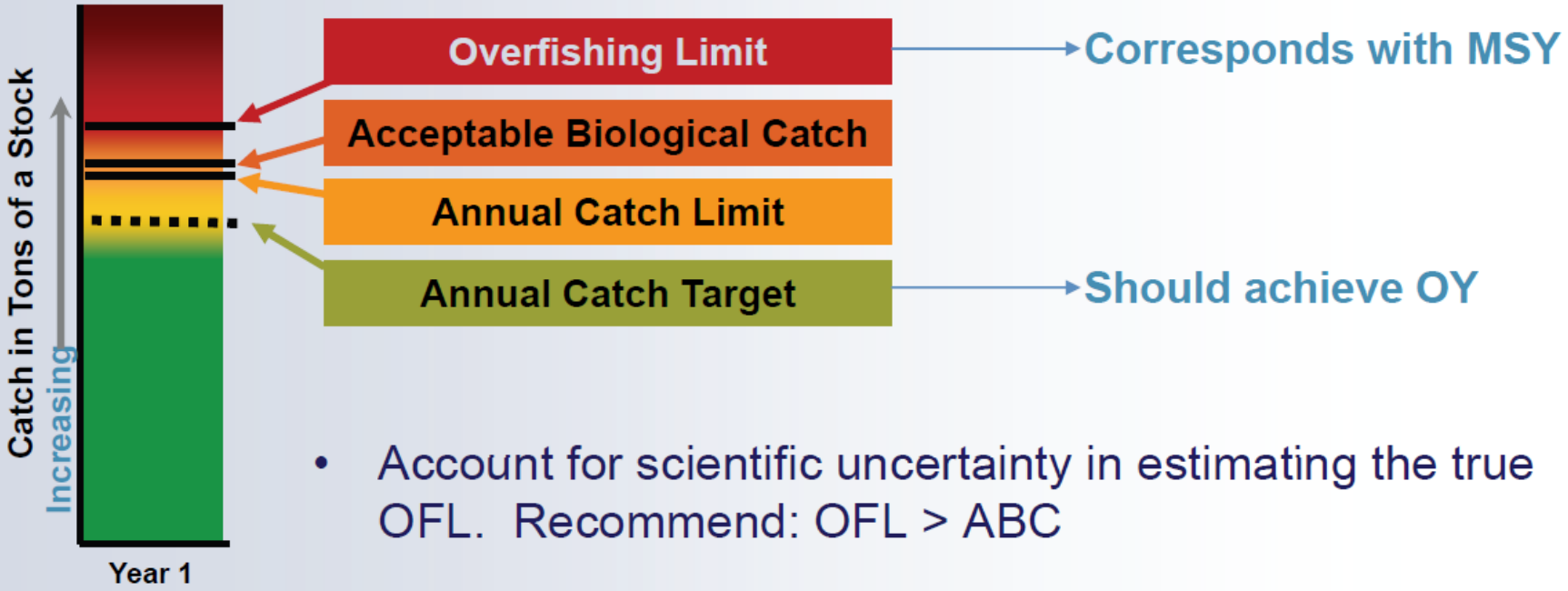
NOAA FISHERIES
Southeast Regional Office

Gulf Red Snapper
ACT Buffer

Gulf SSC Meeting
January 2016

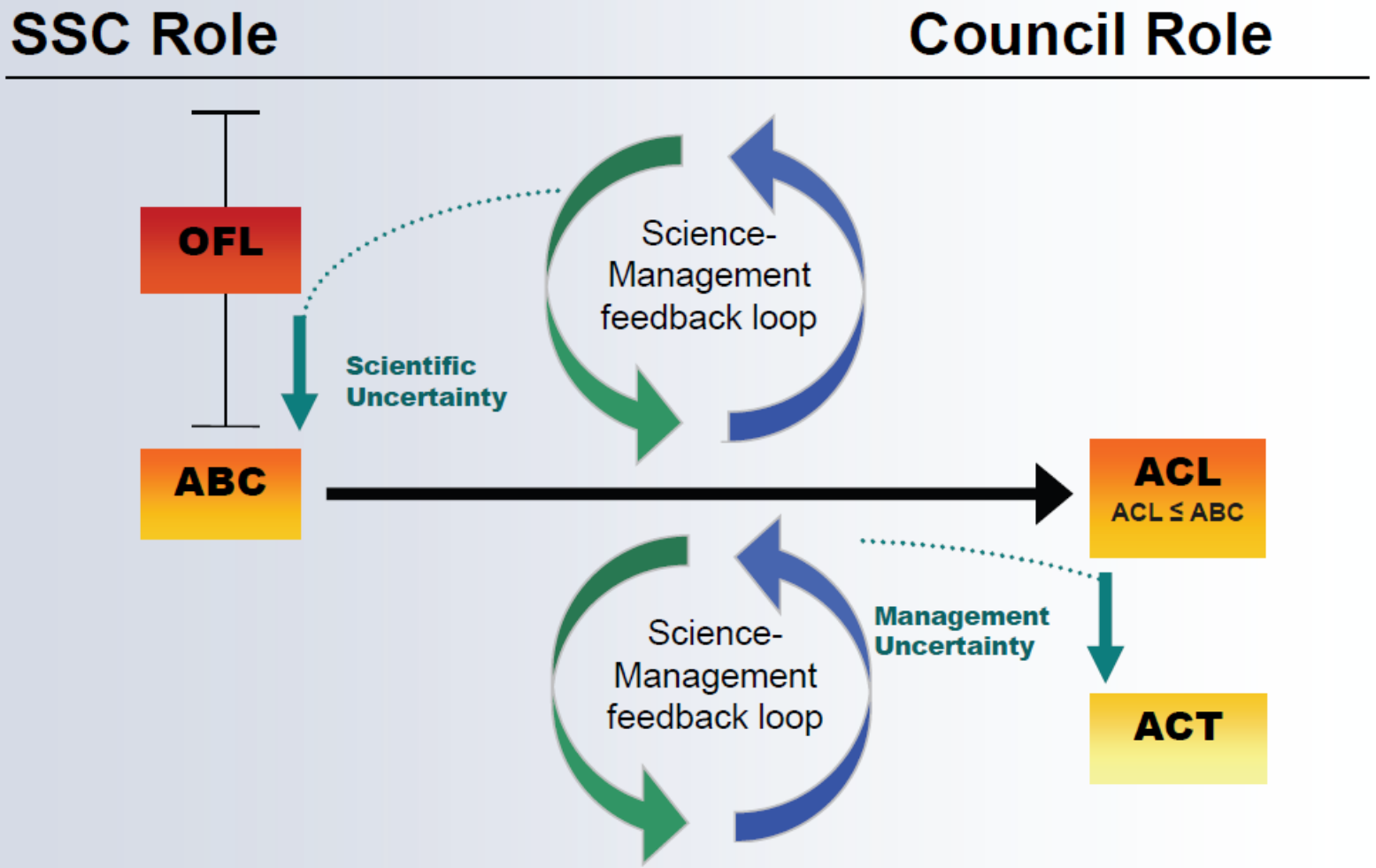
Reference Points
OFL ≥ ABC ≥ ACL ≥ ACT



- Account for scientific uncertainty in estimating the true OFL. Recommend: OFL > ABC
- The ACL may not exceed the ABC.
  - ABC is one of the "fishing level recommendations" under MSA § 302(h)(6).
- Account for management uncertainty in controlling the actual catch to the target. Recommend: ACL > ACT

From NOAA Fisheries Service Presentation (Oct 2010): "Annual Catch Limits and Accountability Measures: MSA Requirements and National Standard 1 Guidelines"

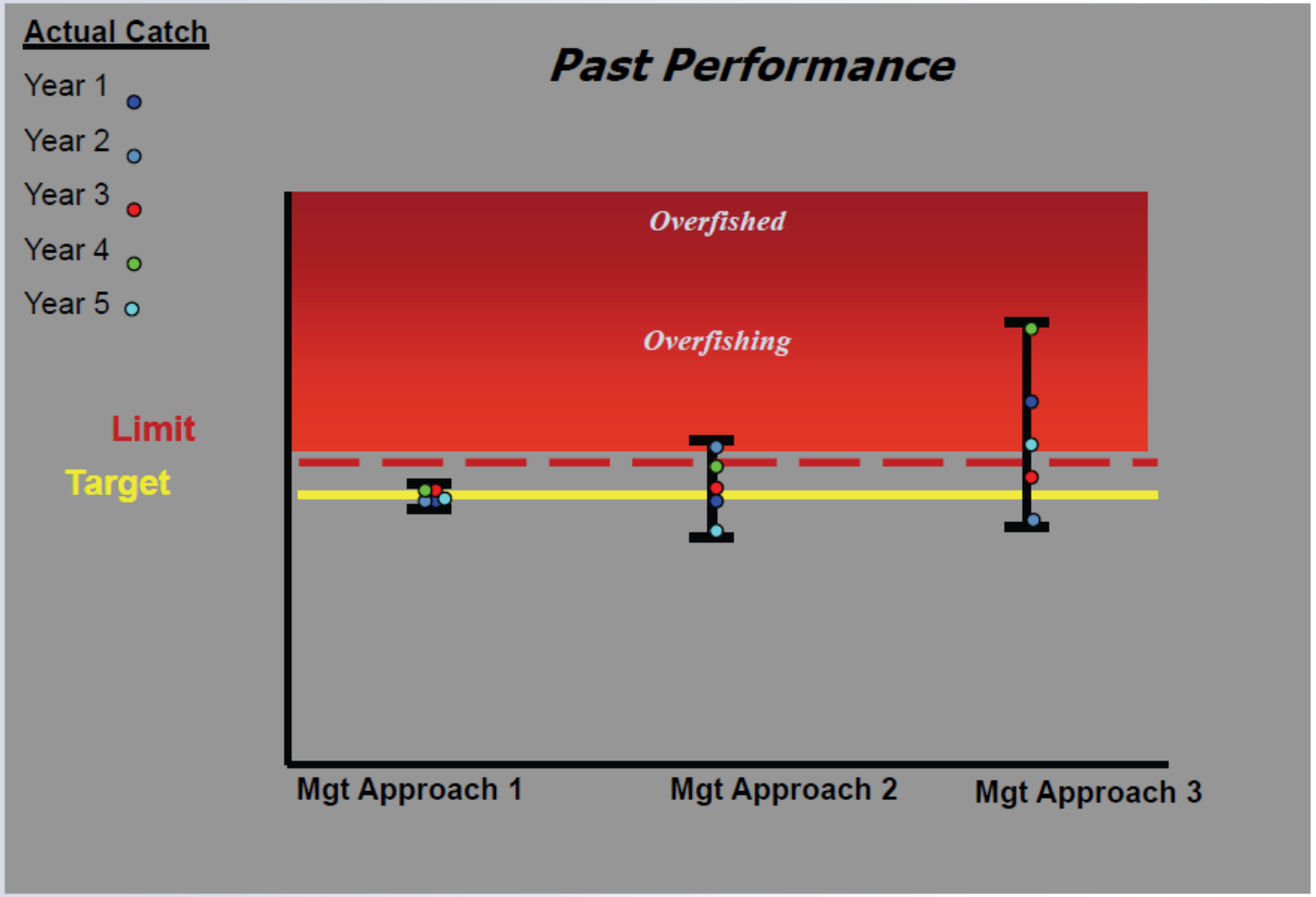
Roles in Setting ACLs



From NOAA Fisheries Service Presentation (Oct 2010): "Annual Catch Limits and Accountability Measures: MSA Requirements and National Standard 1 Guidelines"

Management Uncertainty

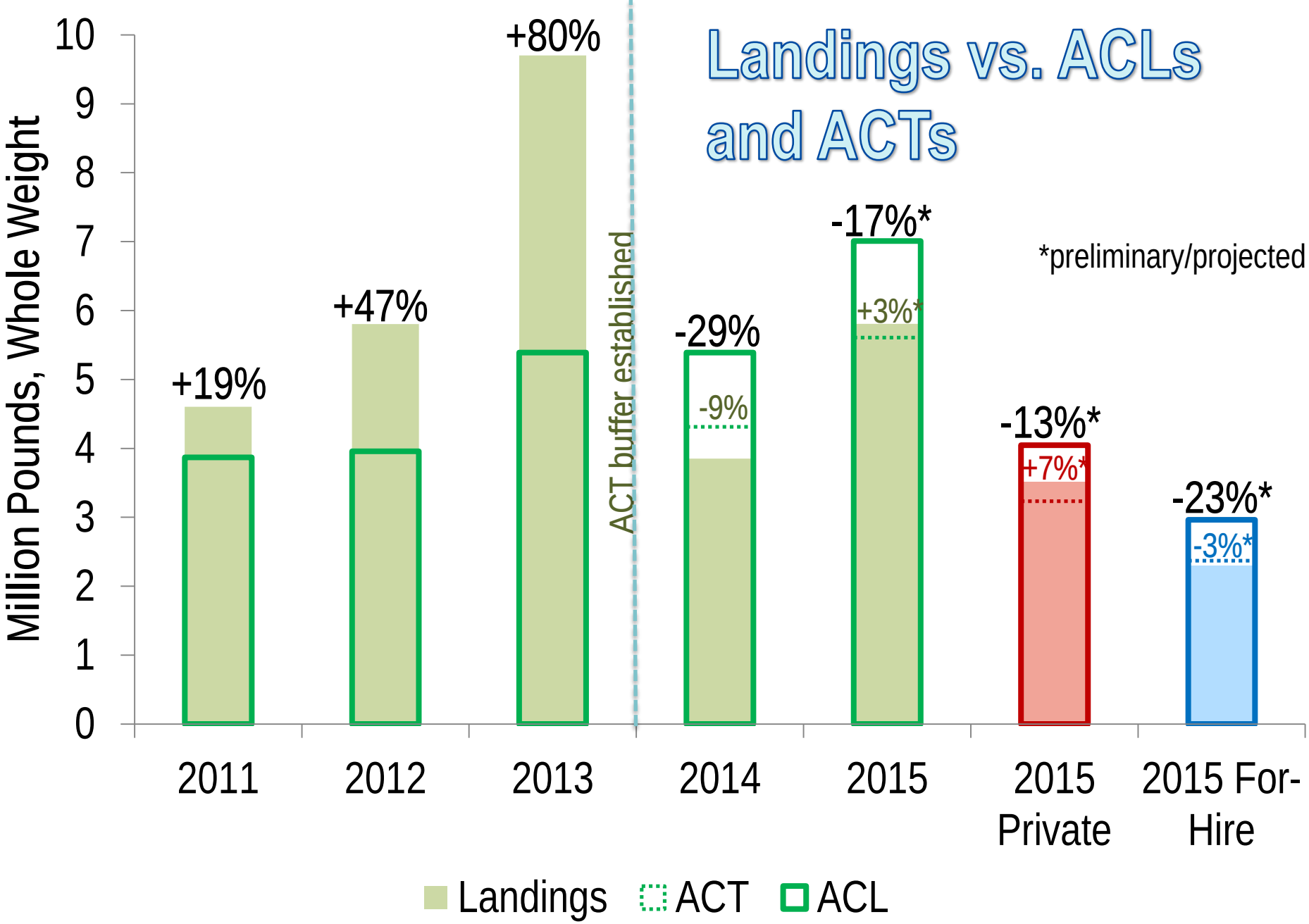
Example, could assess past performance of achieving the target catch.



NOAA FISHERIES

From NOAA Fisheries Service Presentation (Oct 2010): "Annual Catch Limits and Accountability Measures: MSA Requirements and National Standard 1 Guidelines"

Landings vs. ACLs and ACTs

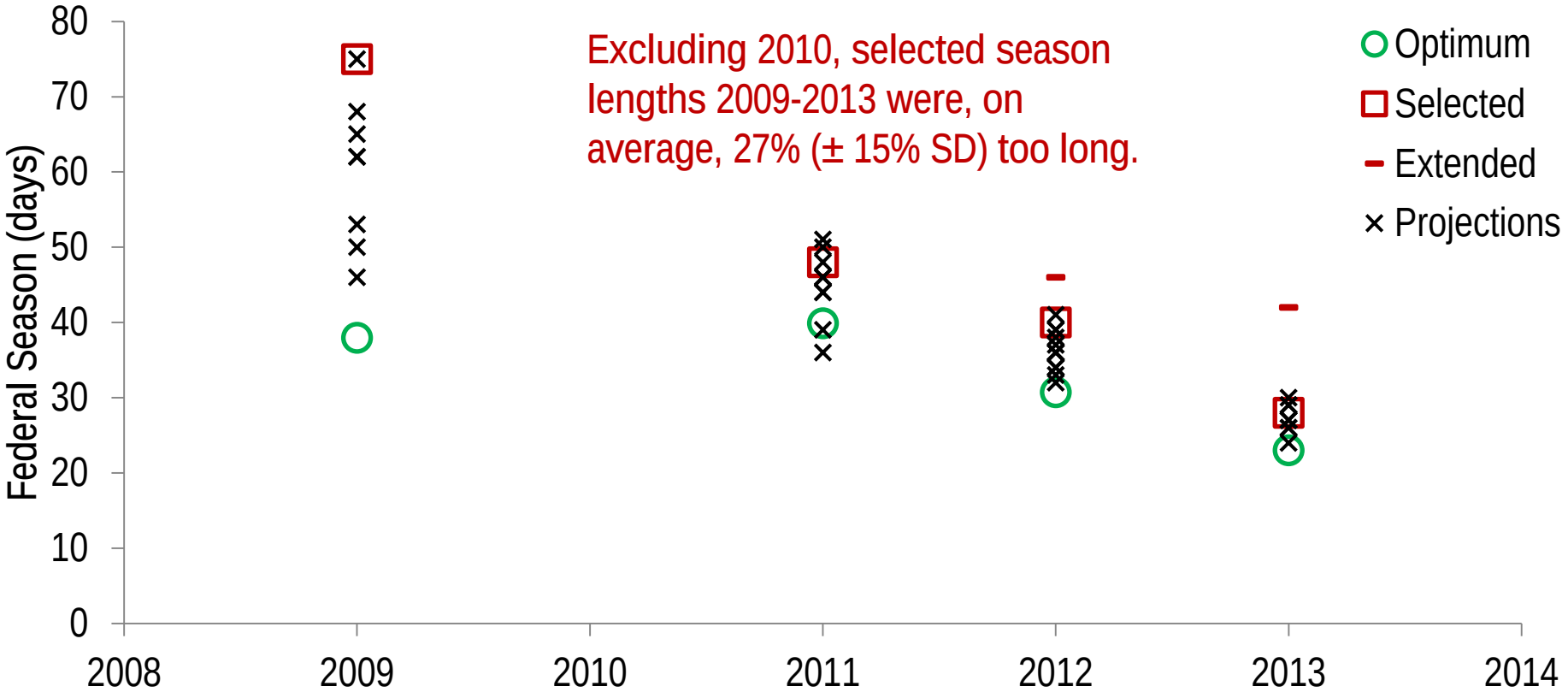


Major Sources of Management Uncertainty

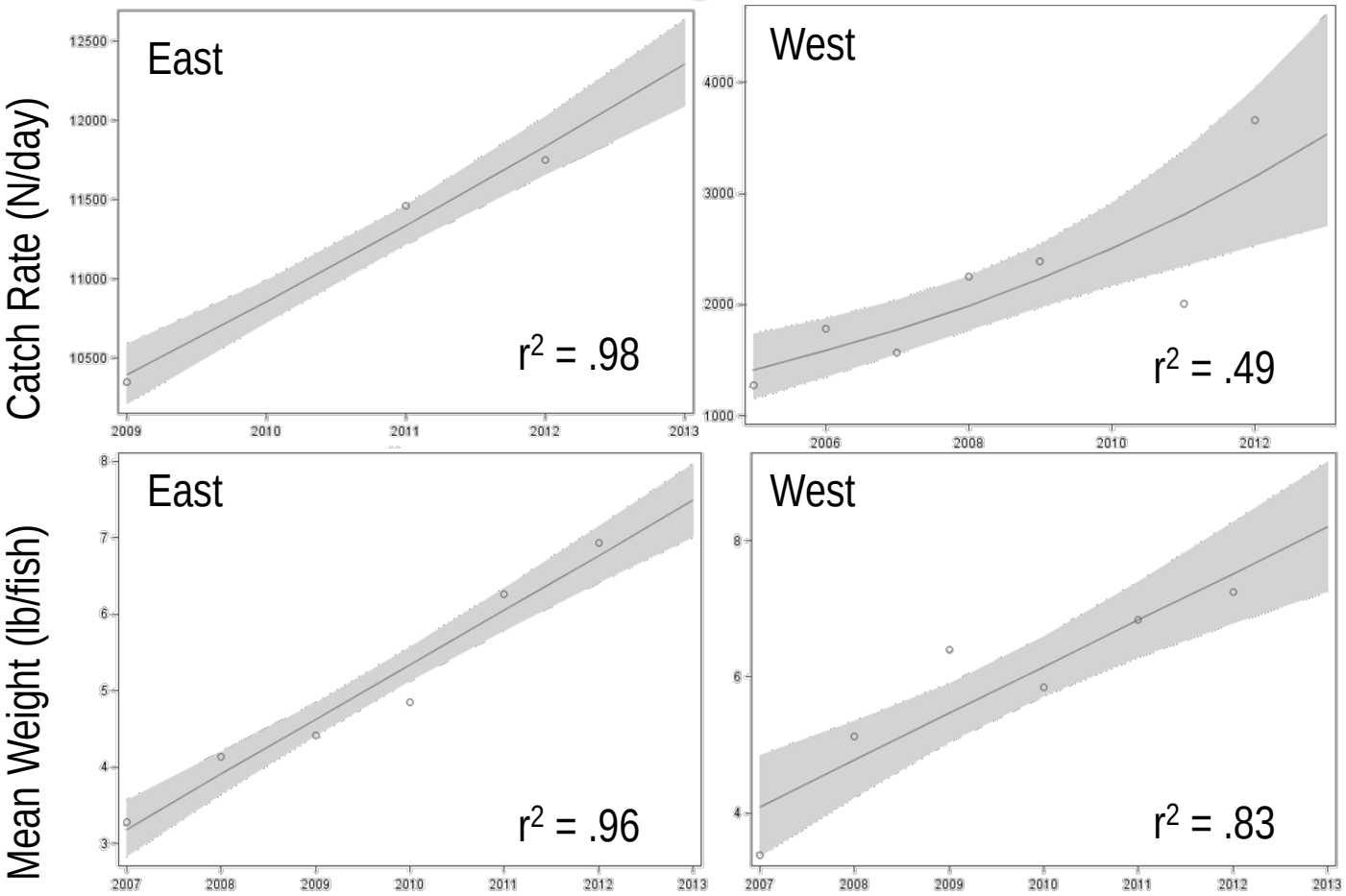
- Prediction of state season lengths
- Prediction of state catch rates
- Effort compression during federal season
- Catch rates vs. rebuilding
- Fuel prices, economy, angler behavior
- Weather conditions
- States managing toward unofficial “ACLs” vs. “ACTs”
- Time-lag in receiving recreational landings estimates
- Fall re-openings uninformed by Wave 3 data
- Challenges estimating fall catch rates
- Precision issues with landings data
- Changes in recreational surveys
- Multiple sources for landings data, often with different estimates

Retrospective: 2006-2013 Season Lengths

2009: overage (effort compression)
2010: underage (oil spill and associated closures)
2011: overage (model run selected for season assumed effort compensation was saturated)
2012: overage (average weights higher than projected, 6-day fall reopening uninformed by Wave 3 data)
2013: overage (APAIS adjustment, 14-day fall reopening uninformed by Wave 3 data)



2013 Season Projections



42 day federal season
5.39 mp quota
9.58 mp landed
78% overage*

*Due in part to APAIS adjustment in 2013

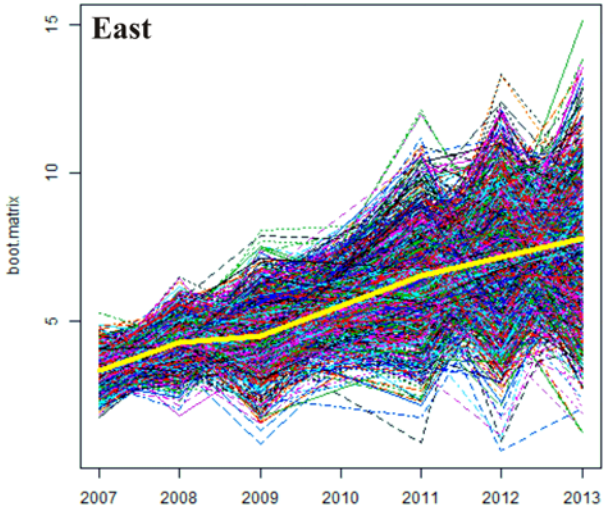
MRIP Wave 3 estimates received after fall reopening announced

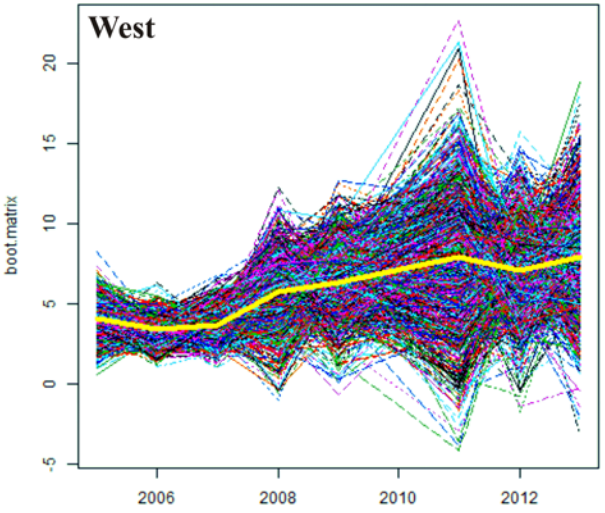
Projections for fall catch rates based on pre-2013 MRFSS data

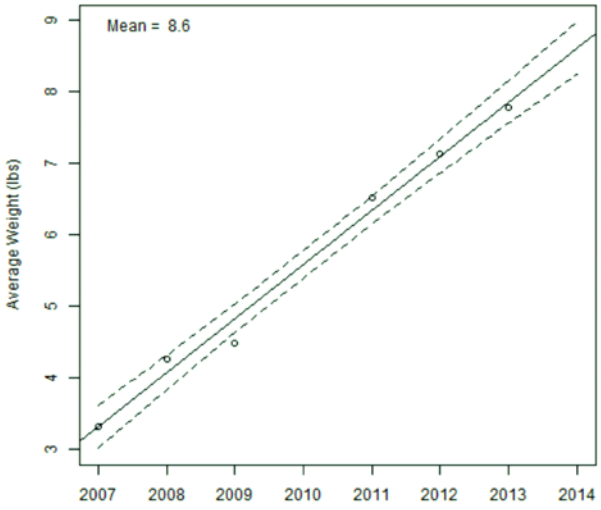
- Projections incorporating state incompatibility indicate federal season between 23-30 days. Federal season set at 28 days for 4.145 mp quota.
- Quota increase to 5.39 mp; 14-day October reopening announced 9/13/2013.

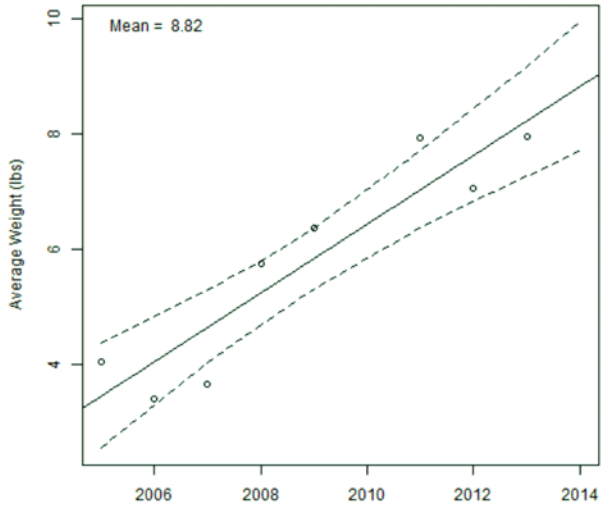
2014 Projections: Mean Weight

Private/Charter

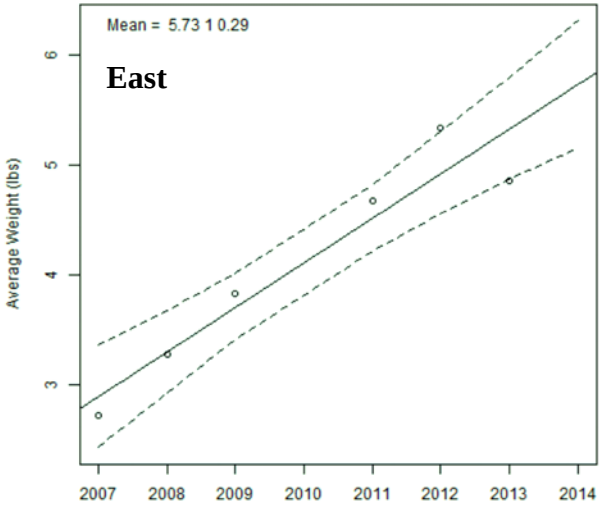


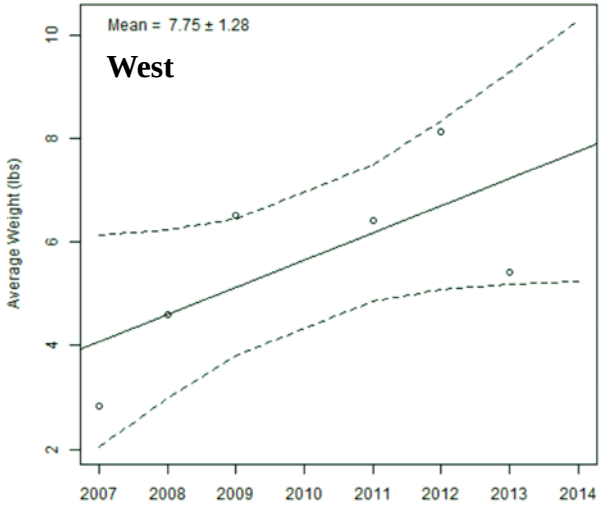






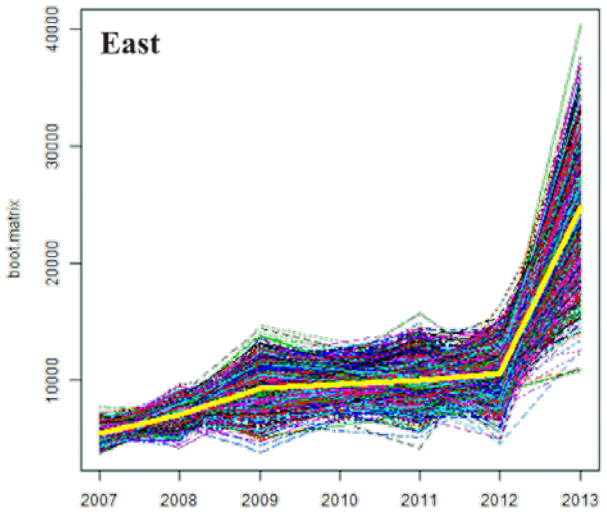
Headboat

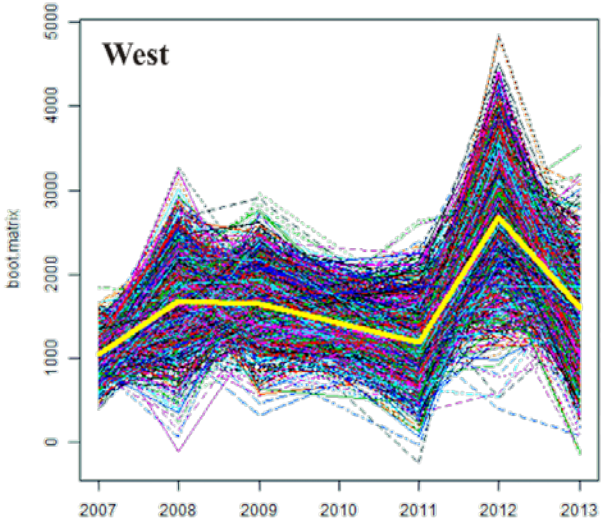




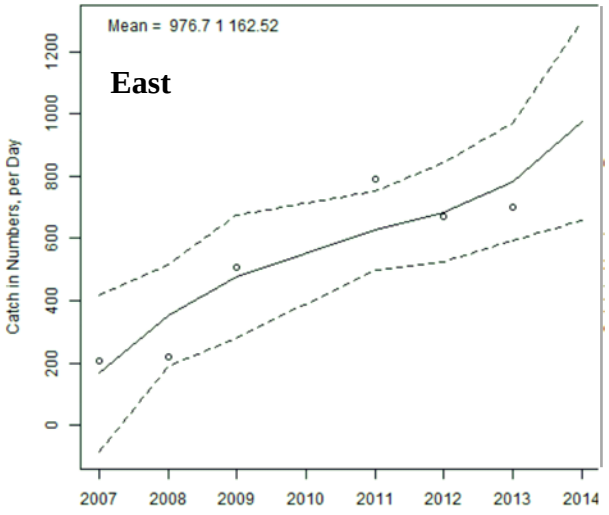
2014 Projections: Catch Rates (N/day)

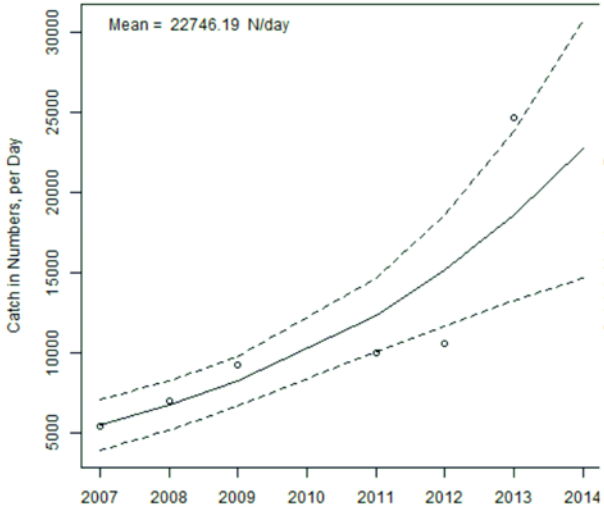
Private/Charter

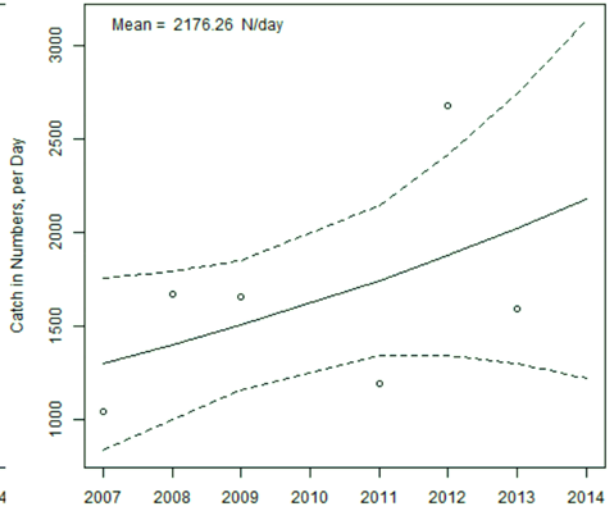


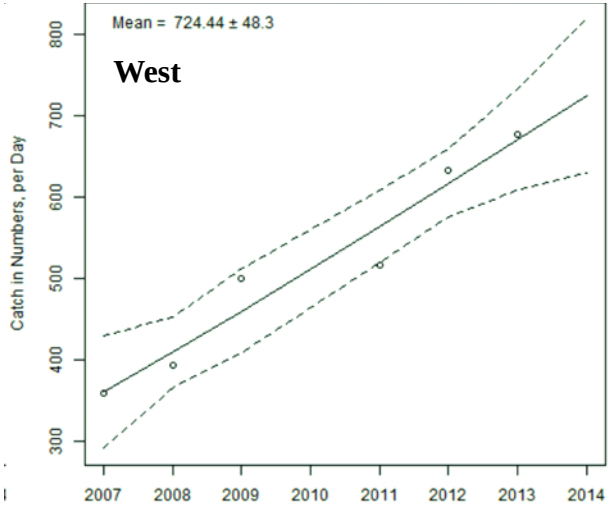


Headboat

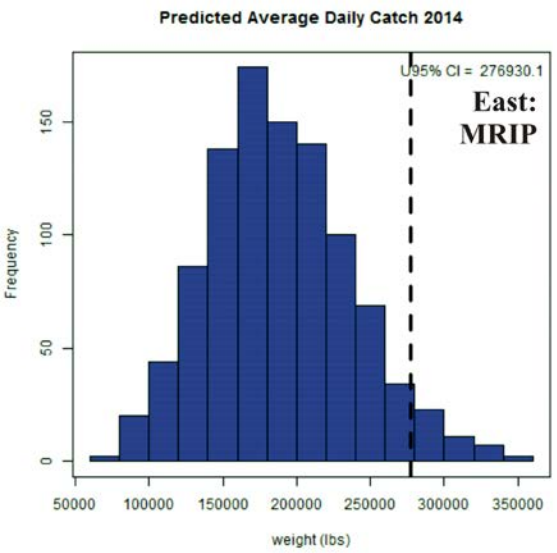


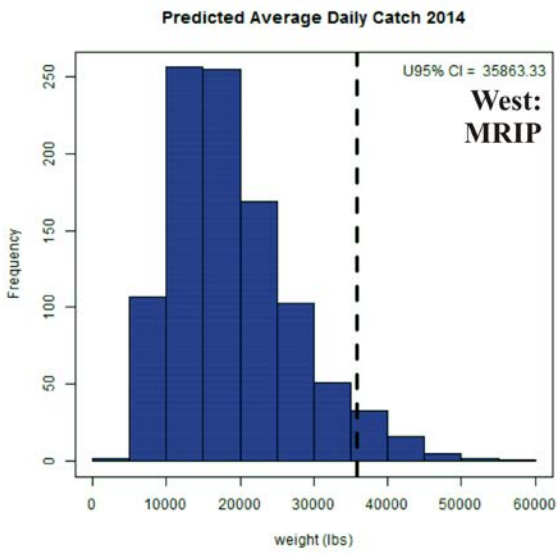


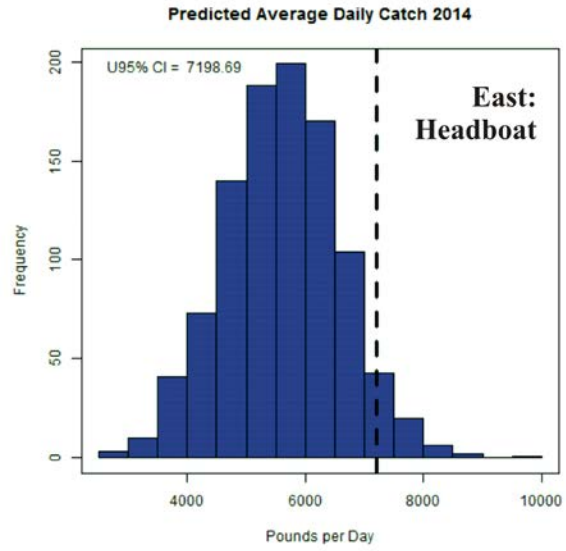




2014 Season Projections







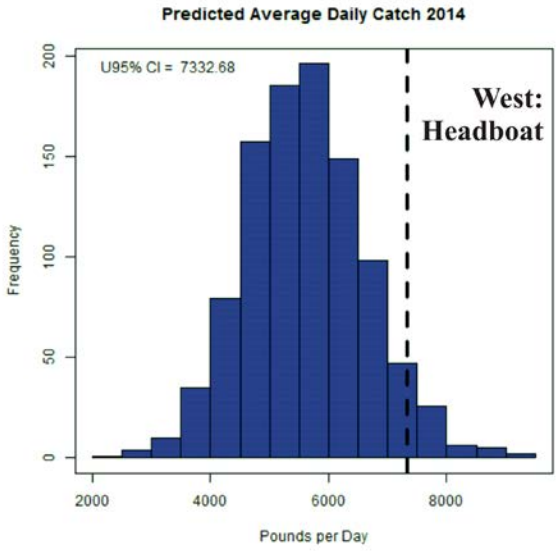
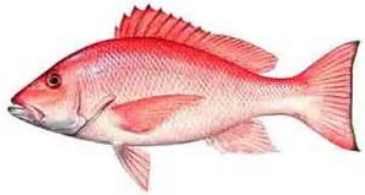


Table 3 – Federal season catch rates (lbs/day) associated with various confidence limits generated from bootstrap forecasts. Note: federal season catch rates do not incorporate additional landings from extended state seasons.

Confidence Limit	Federal Catch/Day (lbs ww)
50% (Mean)	219,489
75%	255,770
85%	279,866
95%	327,325

9 day federal season
4.312 mp ACT
3.826 mp landed
11% underage (vs. ACT)

2014 ACT Buffer



Buffer (%)	Rec ACT (lbs ww)	Federal Season (days)	Prob. of Exceeding Quota
0%	**5.39**	**15**	**50%**
10%	4.851	12	30%
20%	4.312	9	15%
30%	3.773	6	5%
40%	3.234	3	<1%
60%	1.889	0	<1%

Recreational Quota = 5.39 mp ww

Assumes state seasons will be:
FL – 52 days
AL – consistent with fed
MS – consistent with fed
LA – 286 days
TX – 365 days

Assumes FL state season private catch rates are ~60% of private catch rates during the fed season

Projected 85% UCL federal catch rate would reach ACL with 9 federal days.

Why the 11% underage in 2014?

Projected federal catch rate: 226,011 lb ww/day
Observed federal catch rate: 233,958 lb ww/day

} Only 3.5% overestimate

Underestimated state seasons, overestimated some state catch rates:

State	Size Limit	Bag Limit	Projected Season	Projected Days Open	Actual Season	Actual Days Open
FL	16" TL	2-fish	May 24-July 14*	52	May 24-July 14	52
AL	16" TL	2-fish	Same as federal season	9	July weekends	21
MS	16" TL	2-fish	Same as federal season	9	July + Oct-Nov 2 weekends	36
LA	16" TL	2-fish	Feb 21-Apr 13 (3-day weekends), Apr 14-Dec 31	286	Feb 21-Apr 13 (3-day weekends), Apr 14-Dec 31	286
TX	15" TL	4-fish	Jan 1-Dec 31	365	Jan 1-Dec 31	365

2015 Projections

A

Catch Rate	Charter	2014
	Private	2014
	HB	2014
Avg. Weight	Charter	↑
	Private	2014
	HB	2014

B

Catch Rate	Charter	2014
	Private	2014
	HB	2014
Avg. Weight	Charter	↑
	Private	↑
	HB	↑

C

Catch Rate	Charter	2014
	Private	2014
	HB	2014
Avg. Weight	Charter	2014
	Private	2014
	HB	2014

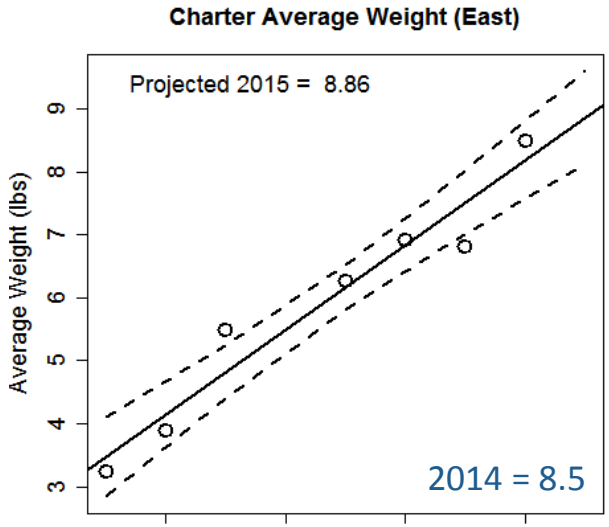
D

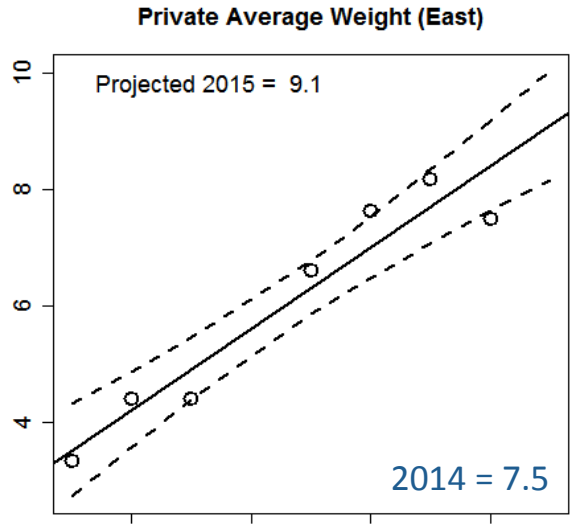
Catch Rate	Charter	Avg. 2013-14
	Private	Avg. 2013-14
	HB	Avg. 2013-14
Avg. Weight	Charter	↑
	Private	Avg. 2013-14
	HB	Avg. 2013-14

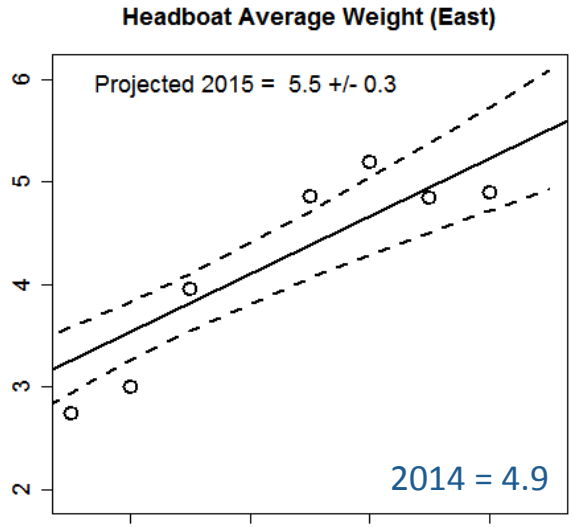
Many other catch rate and average weight scenarios were evaluated using regressions based approaches on different input time series and predictor variables.

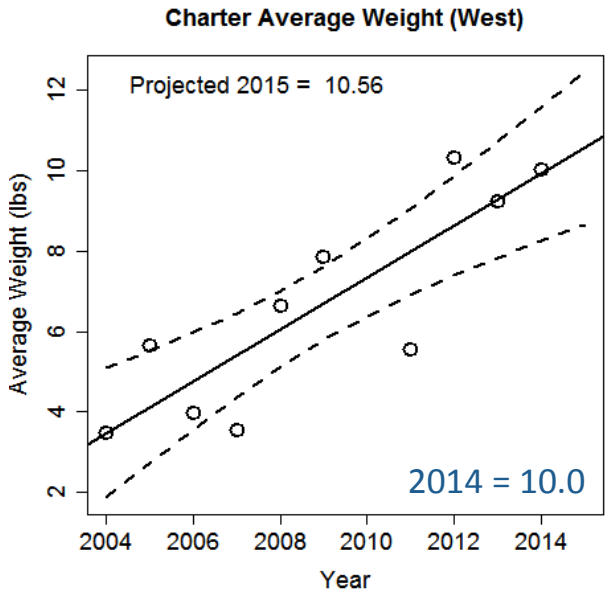
Average Weights

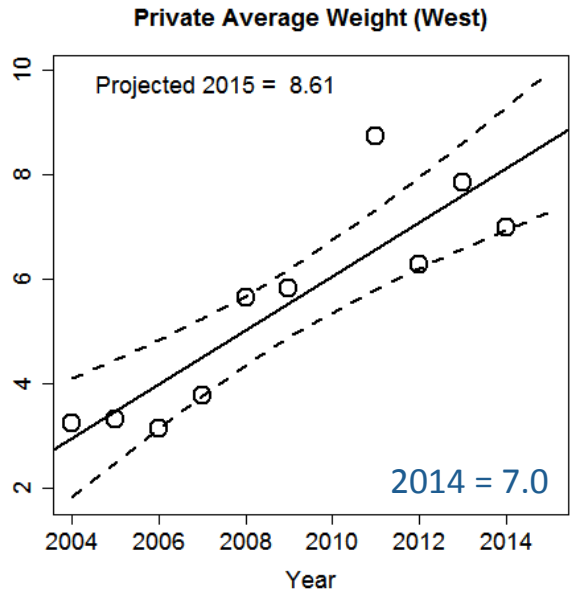
Federal average weights from June 2004-2014 used as inputs

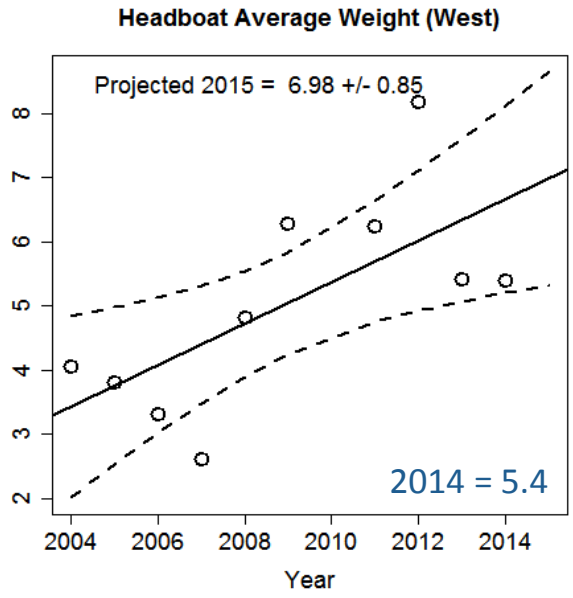






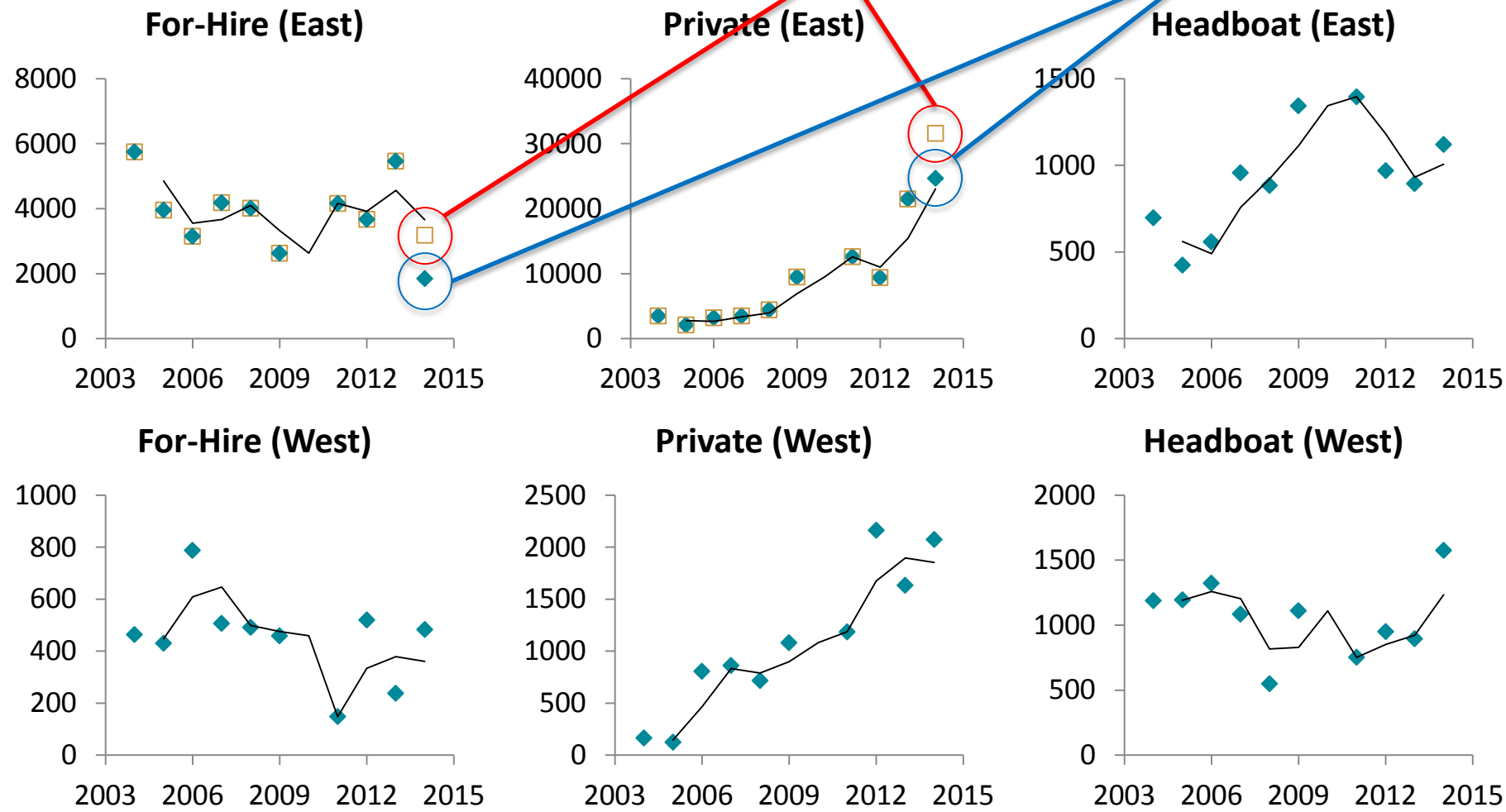






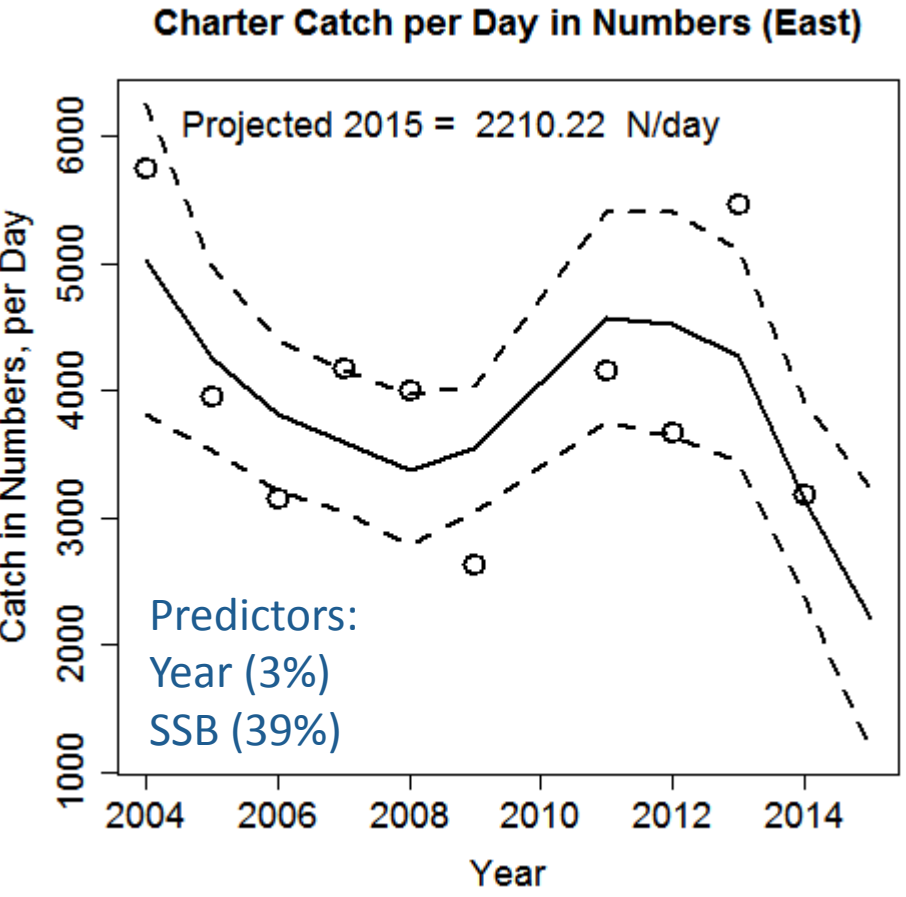
Catch Rates

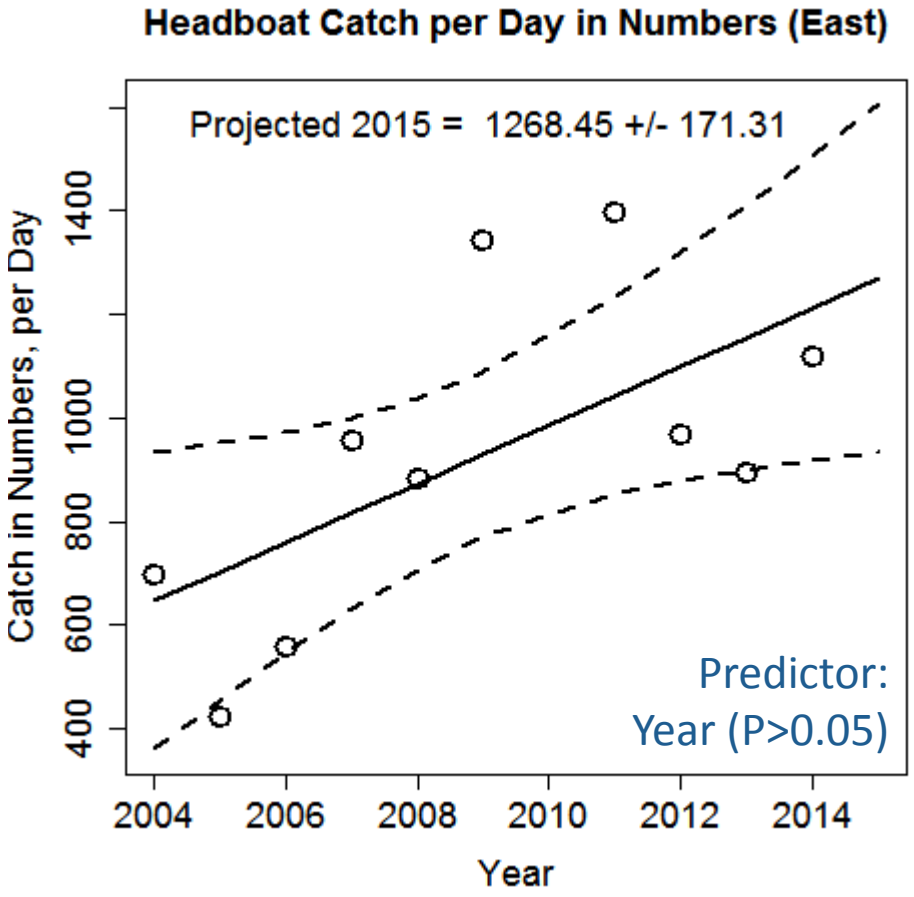
2014a (MRIP Wave 3) 2014 (MRIP June 1-9)



Federal catch rates shown for June 2004-2014 in # Fish per open federal day

State water catch rates (not shown) based on 2014 observed catch rates in pounds/day

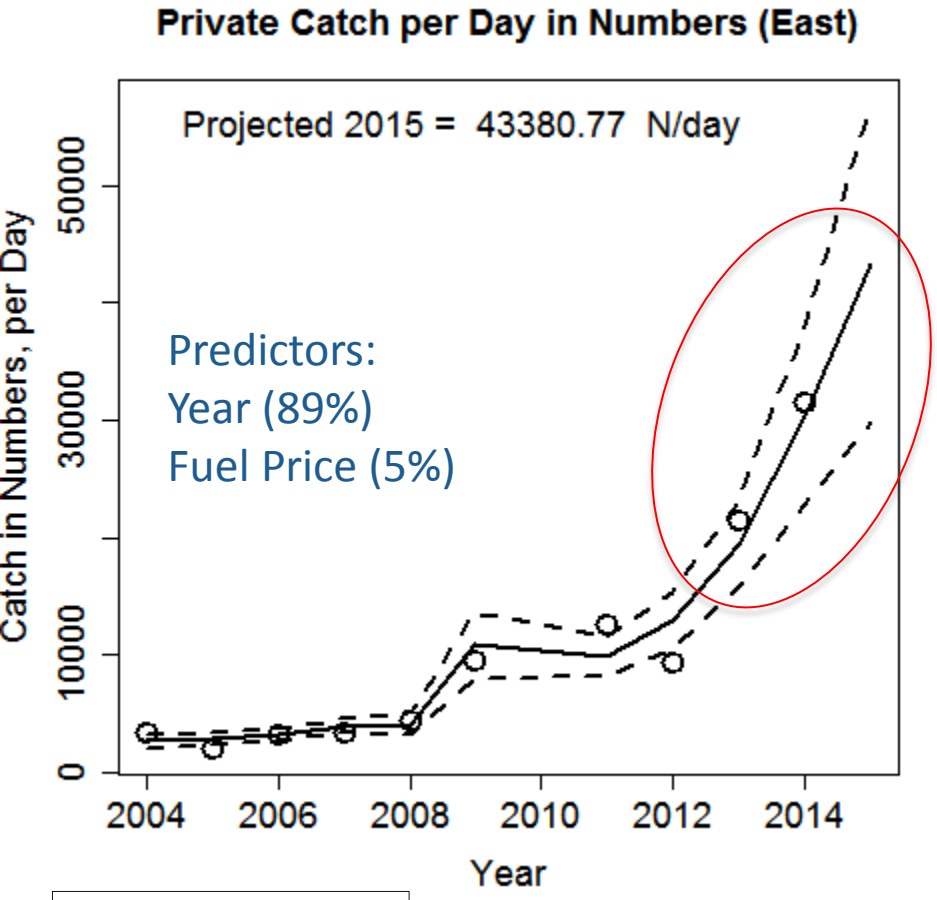


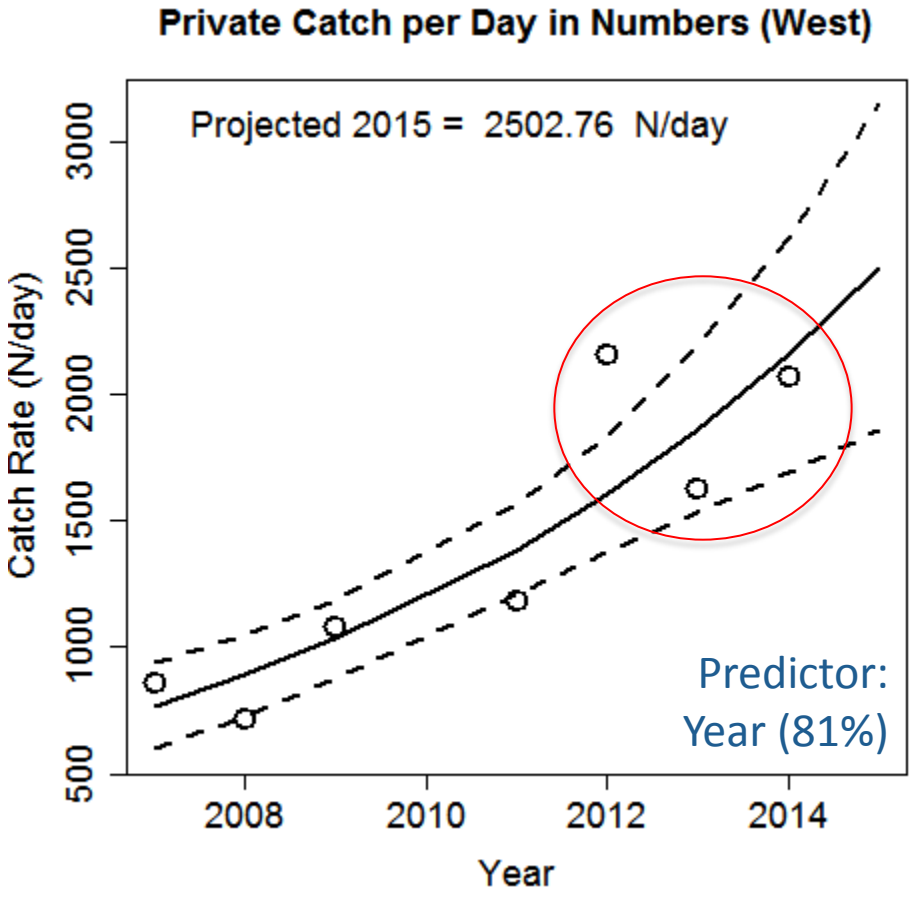


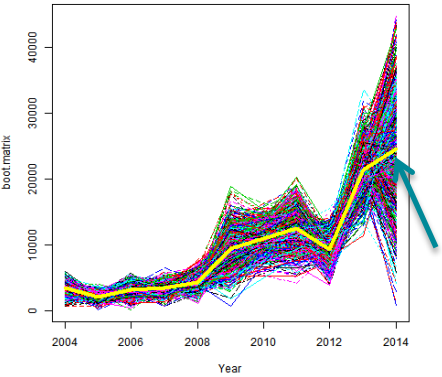
No significant regressions for Charter (West), Headboat (East), or Headboat (West)

Charter (East) projection shows steep decline

Headboat (East) projection above last 3 years







Projected rate of increase for Private (East) may be unrealistic

Projected catch rate for Private (West) slightly higher than past two seasons.

Higher uncertainty in 2014 Private data due to short federal season

Season Length Projections

Sector Separation

Non-compatible state seasons:

Run	Season Length	
	For-Hire	Private
A	45	11
B	45	7
C	46	9
D	40	11
Mean	**44**	**10**

No Sector Separation

Non-compatible state seasons:

Run	Season Length
A	17
B	12
C	14
D	17

Sector Separation

Compatible state seasons:

Run	Season Length	
	For-Hire	Private
A	45	16
B	45	9
C	46	12
D	40	16

No Sector Separation

Compatible state seasons:

Run	Season Length
A	21
B	15
C	18
D	21

Retrospective 2015

					Observed		Projected	
	ACL	ACT	Observed	Projected	% ACL	% ACT	% ACL	% ACT
For-Hire*	2,965,230	2,371,000	2,226,300	2,297,391	75%	94%	77%	97%
Private	4,044,770	3,234,000	3,346,520	3,509,359	83%	103%	87%	109%
GULF	7,010,000	5,605,000	5,570,174	5,806,749	79%	99%	83%	104%

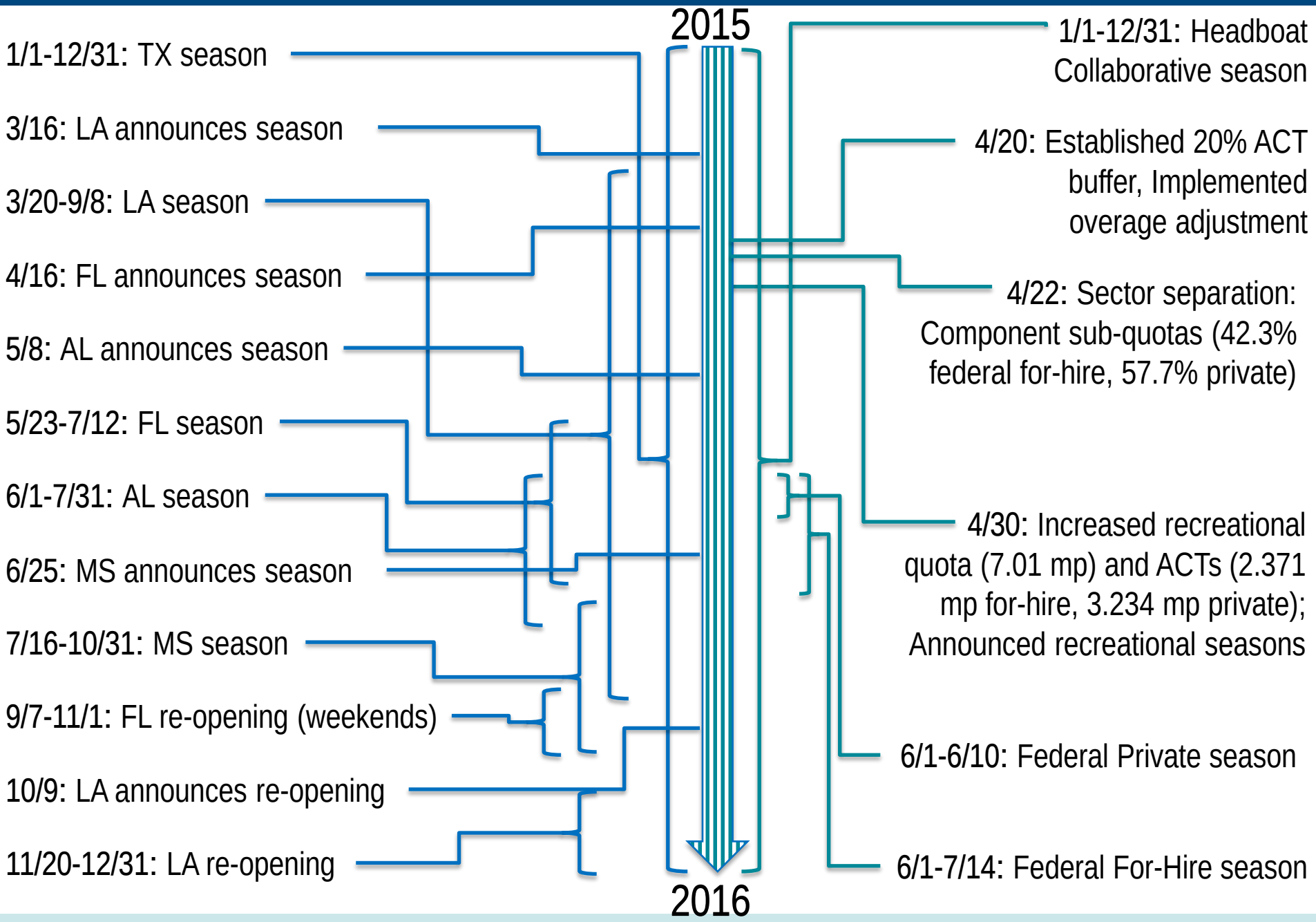
*Computation includes headboat collaborative

Primary sources of ACT overage (estimated at 3.6%, or 201,749 lb ww):

- Alabama July 1-31 opening (144,726 lb ww)
- LA private mode state season landings ~1.7X higher than anticipated (~200,000 lbs)

Federal season projection performance:

- For-Hire Wave 3-4
  - Estimated mean 2.25 mp (range: 2.13-2.48 mp)
  - Observed 1.98 mp (14% overestimate)
- Private Wave 3
  - Estimated mean 2.59 mp (range: 2.16-3.26 mp)
  - Observed 2.40 mp (8% overestimate)


2015
1/1-12/31: TX season
3/16: LA announces season
3/20-9/8: LA season
4/16: FL announces season
5/8: AL announces season
5/23-7/12: FL season
6/1-7/31: AL season
6/25: MS announces season
7/16-10/31: MS season
9/7-11/1: FL re-opening (weekends)
10/9: LA announces re-opening
11/20-12/31: LA re-opening
1/1-12/31: Headboat Collaborative season
4/20: Established 20% ACT buffer, Implemented overage adjustment
4/22: Sector separation: Component sub-quotas (42.3% federal for-hire, 57.7% private)
4/30: Increased recreational quota (7.01 mp) and ACTs (2.371 mp for-hire, 3.234 mp private); Announced recreational seasons
6/1-6/10: Federal Private season
6/1-7/14: Federal For-Hire season
2016

Possible Approaches to Change the ACT Buffer

1. Regression-based confidence limits (2014 approach)
2. Mean ± SE of “realistic scenarios” to generate confidence limits (could be applied to 2015 approach)
3. Management retrospective analysis

#1: Regression Confidence Limits

Estimates what % UCL on regression-estimated federal catch rate would reach the ACL at the season length where the mean federal catch rate would hit the specified ACT

Example: In 2014, ACT @ 20% Buffer resulted in 9-day federal season. 85% UCL on federal catch rate estimated to hit ACL with 9-day federal season; thus, P(Overfishing) estimated at 15%.

Issues:

- 2014 regression method didn't work for 2015 data due to apparent stabilization of catch rates
  - APAIS adjustment?
  - Rebuilding asymptote?
- Unknown if this approach will work again for 2016 on

#2: "Realistic Scenarios" Approach

- Multi-step process:
  1. Determine mean and SE federal catch rates across realistic scenarios
  2. Add estimated fixed landings (For-Hire = HBC; Private = State Seasons)
  3. Determine federal season length at ACL and ACTs using different buffers
  4. Determine P(overfishing) at given buffers:

$$\frac{(ACL_{sector} + 1\ lb\ - FixedCatch)}{days_{ACT@buffer} * SE_{catchrate_{sector}}} - \frac{Mean_{catchrate_{sector}}}{SE_{catchrate_{sector}}} = Z$$

$$1 - NORMSDIST(Z)\ =\ P(overfishing)$$

"Realistic Scenarios" Approach:

Application to 2015 Projections + 2015 Observed State Catches

	Catch Rate (lbs ww/day) from Scenarios A-D in SERO-LAPP-2015-04	
Mode	**Mean**	**SE**
For-Hire*	48,471	3,540
Private	237,494	25,909
Source	**Fixed Catch (lbs)**	
HBC	280,497	n/a
States**	1,171,893	n/a

*excluding Headboat Collaborative (HBC)
**observed and projected 2015 MRIP Charter landings waves 1-2, 5-6; Private landings waves 1-2, 4-6 (assumes all Wave 3 from federal season for simplicity of demonstration)

Mode	ACL	ACT @ 5%	ACT @ 10%	ACT @ 15%	ACT @ 20%
For-Hire	2,965,230	2,816,969	2,668,707	2,520,446	2,372,184
Private	4,044,770	3,842,532	3,640,293	3,438,055	3,235,816

	Season (days) at Different Buffers				
Mode	**ACL**	**ACT @ 5%**	**ACT @ 10%**	**ACT @ 15%**	**ACT @ 20%**
For-Hire	55	52	49	46	43
Private	12	11	10	10	9

	Z-Statistic to Exceed ACL by 1 lb				
Mode	**ACL**	**ACT @ 5%**	**ACT @ 10%**	**ACT @ 15%**	**ACT @ 20%**
For-Hire	n/a	0.80	1.70	2.72	3.88
Private	n/a	0.69	1.50	2.45	3.59

	P(Overfishing)				
Mode	**ACL**	**ACT @ 5%**	**ACT @ 10%**	**ACT @ 15%**	**ACT @ 20%**
For-Hire	50%	21%	4%	0.3%	0.01%
Private	50%	24%	7%	0.7%	0.02%

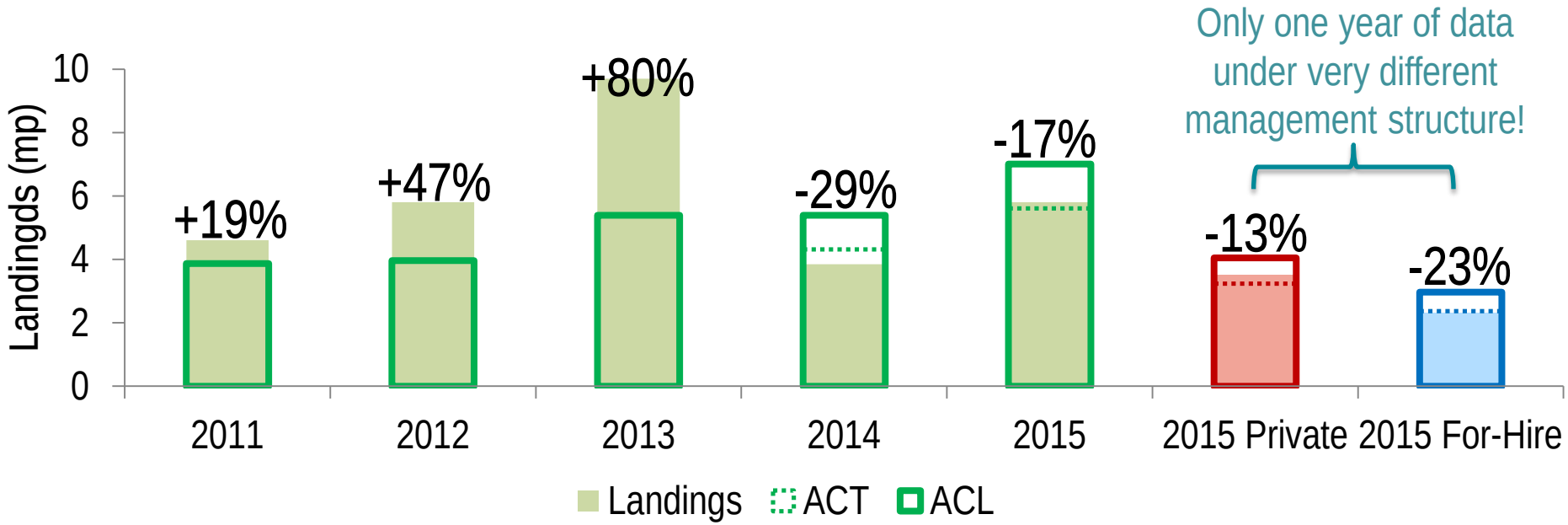
Caveats:

- Assumes state catches have no uncertainty, which is NOT true
- Averaging across similar, non-regression based scenarios results in far lower estimates of uncertainty than the 2014 approach
- Does not consider PSE of recreational landings estimates
- Underestimated uncertainty leads to the very low computed P(overfishing) values

More elaborate approach with bootstrapping may be necessary

#3: Management Retrospective Analysis

- Since 2010, Gulf-wide ACL has been exceeded in 3 of 5 years (mean overage = 20%)
- Since implementing 20% buffer, ACL has not been exceeded (mean underage = 23%)
- Management uncertainty for Private mode is higher than For-Hire due to:
  - higher daily catch rates with greater associated uncertainty
  - state seasons often announced or changed after federal season announced
  - state catch rates uncertain, although information improving
  - state jurisdictions (3 nmi vs. 9 nmi)
  - higher PSEs for estimated catches



QUESTIONS?

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