Catch Apportionment Workshop
September 4, 2008

- Goals of Workshop
  - Explain the basis for current assessment framework and apportionment method
  - Explore merits and impacts of alternate apportionment schema
  - Identify any improvements to current apportionment approach

Agenda and Process

- Staff presentations, open discussions, interactive examination
- Staff presentations
  - Review of PIT tagging results – Ray Webster
  - Brief review of assessment, harvest policy, and current apportionment – Steven Hare
    - Break
  - Alternate apportionment schema – Steven Hare and participants
  - Estimating impacts of apportionment – Juan Valero
- Questions

Characteristics of Candidate Apportionment Methods

- Should address coastwide stock management
- Should have apportionment 'Sum to 1', i.e., be consistent across all regulatory areas of the coast
- Should achieve target harvest rate and provide protection for area-specific spawning contributions
- Should be sensitive to stock changes, i.e., provide feedback for ongoing apportionment
- Should be precautionary and robust to uncertainty about stock structure and stock status

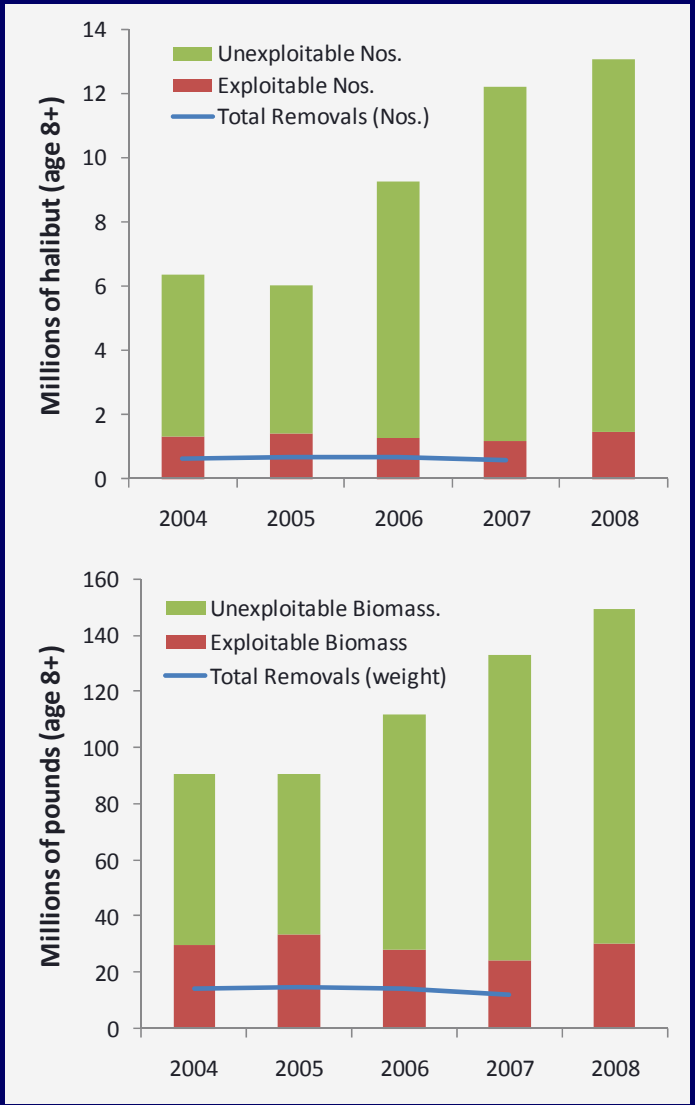
Significant Questions Raised at Apportionment Workshop

- A full list of questions and comments contained in Blue Book (Hare, Webster, Valero, and Leaman) pp. 51-82
- Here, we cover several of the most important questions raised

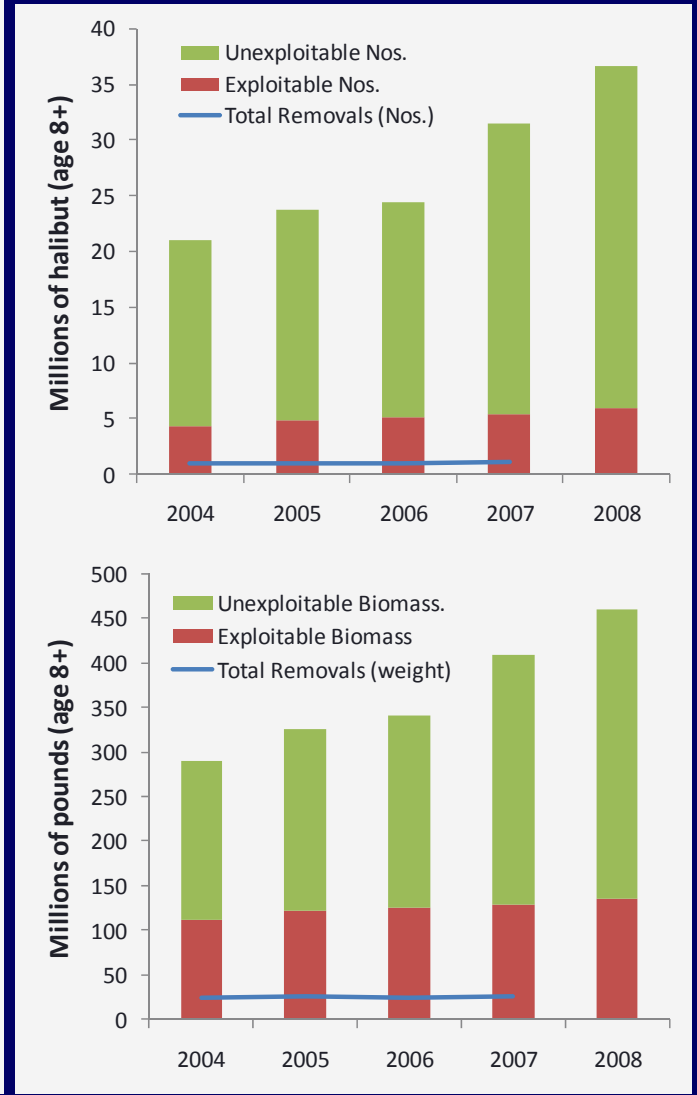
1. If the exploitation rates in Area 2, particularly Area 2B, have really been as high as 40-50% then how can we still have stock left to fish on?

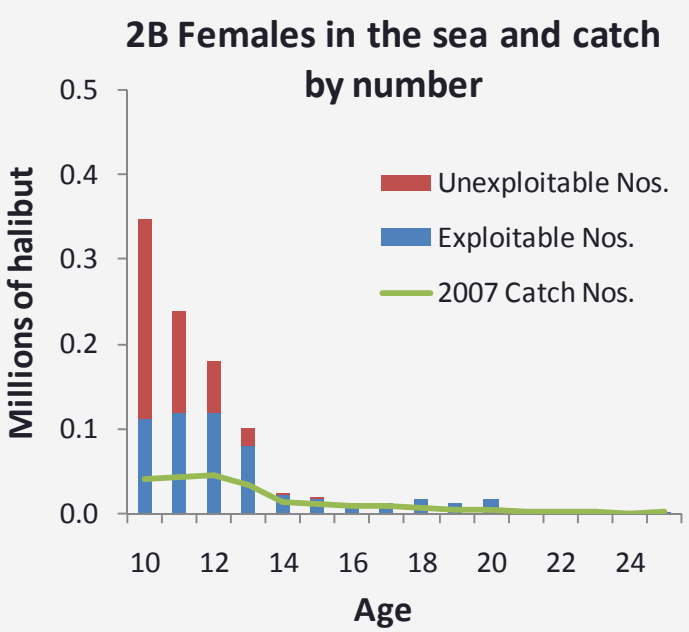
How can high harvest rates in Area 2 be maintained?

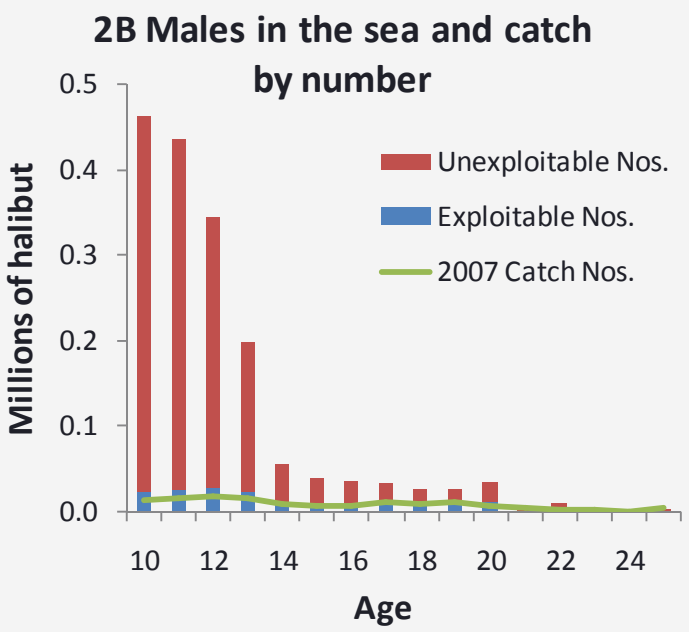
Area 2B



Area 3A




2B Females in the sea and catch by number
Millions of halibut
0.5
0.4
0.3
0.2
0.1
0.0
Unexploitable Nos.
Exploitable Nos.
2007 Catch Nos.
10 12 14 16 18 20 22 24
Age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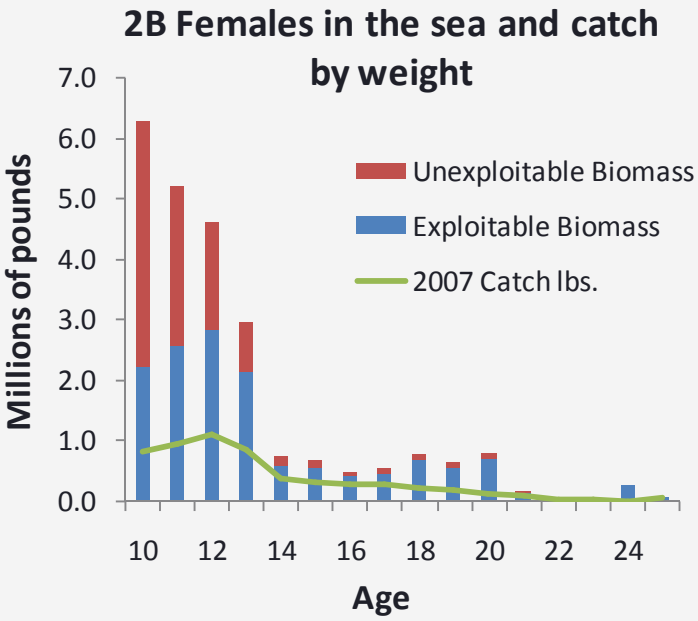
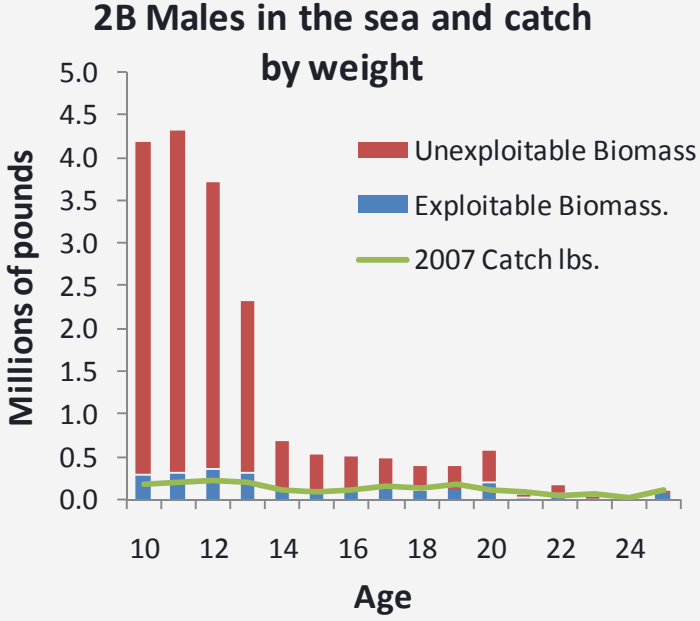
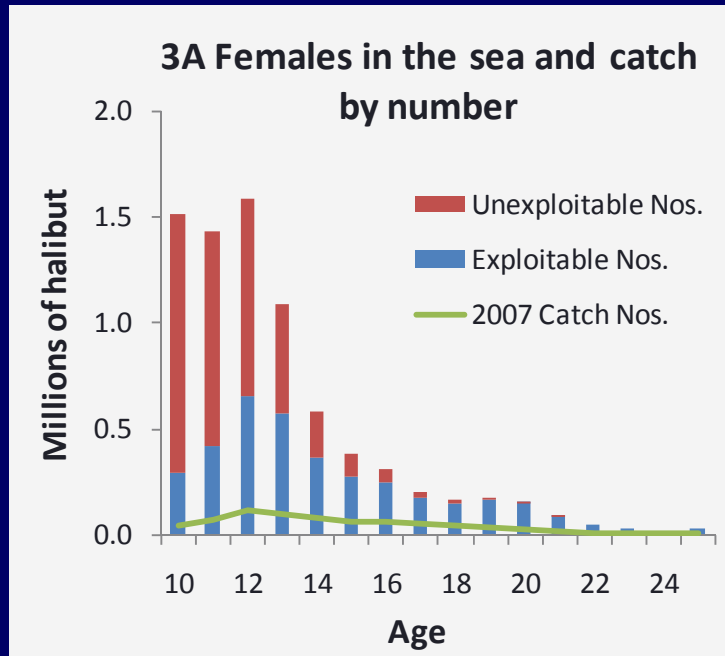
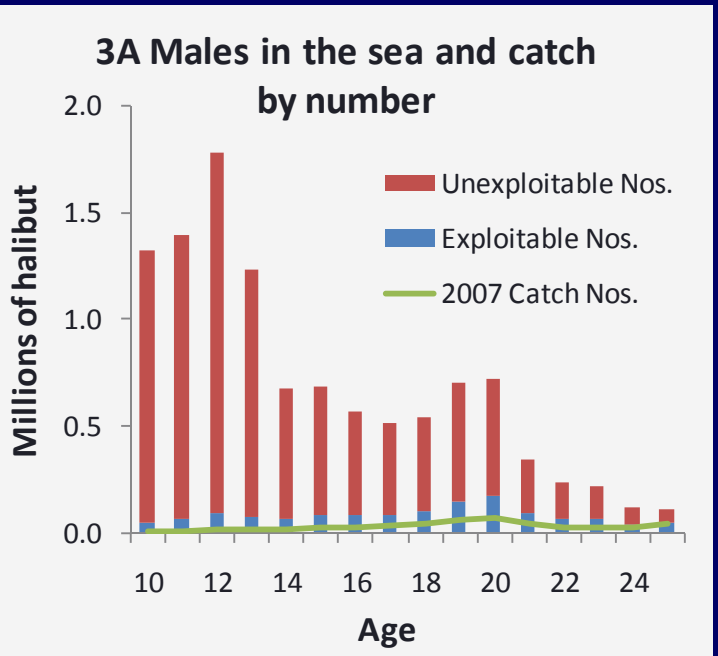

2B Females in the sea and catch by weight
Millions of pounds
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Unexploitable Biomass
Exploitable Biomass
2007 Catch lbs.
10 12 14 16 18 20 22 24
Age


2B Males in the sea and catch by weight
Millions of pounds
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Unexploitable Biomass
Exploitable Biomass.
2007 Catch lbs.
10 12 14 16 18 20 22 24
Age


3A Females in the sea and catch by number
Millions of halibut
2.0
1.5
1.0
0.5
0.0
Unexploitable Nos.
Exploitable Nos.
2007 Catch Nos.
10
12
14
16
18
20
22
24
Age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Millions of halibut
2.0
1.5
1.0
0.5
0.0
Unexploitable Nos.
Exploitable Nos.
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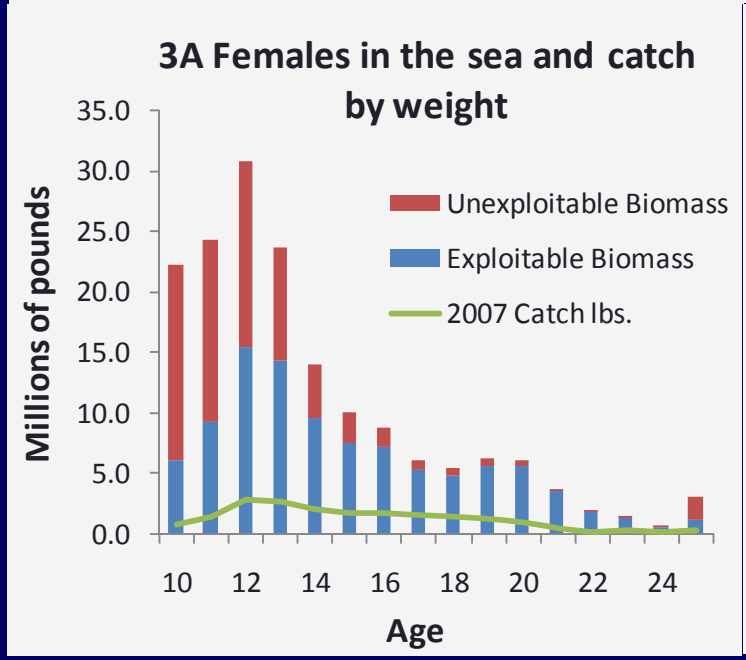
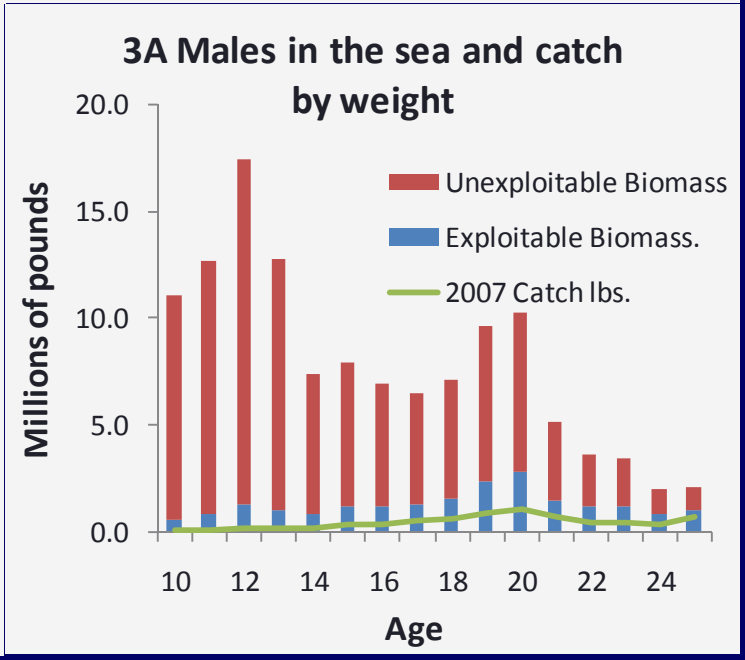
10
12
14
16
18
20
22
24
Age


3A Females in the sea and catch by weight
Millions of pounds
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Unexploitable Biomass
Exploitable Biomass
2007 Catch lbs.
10
12
14
16
18
20
22
24
Age

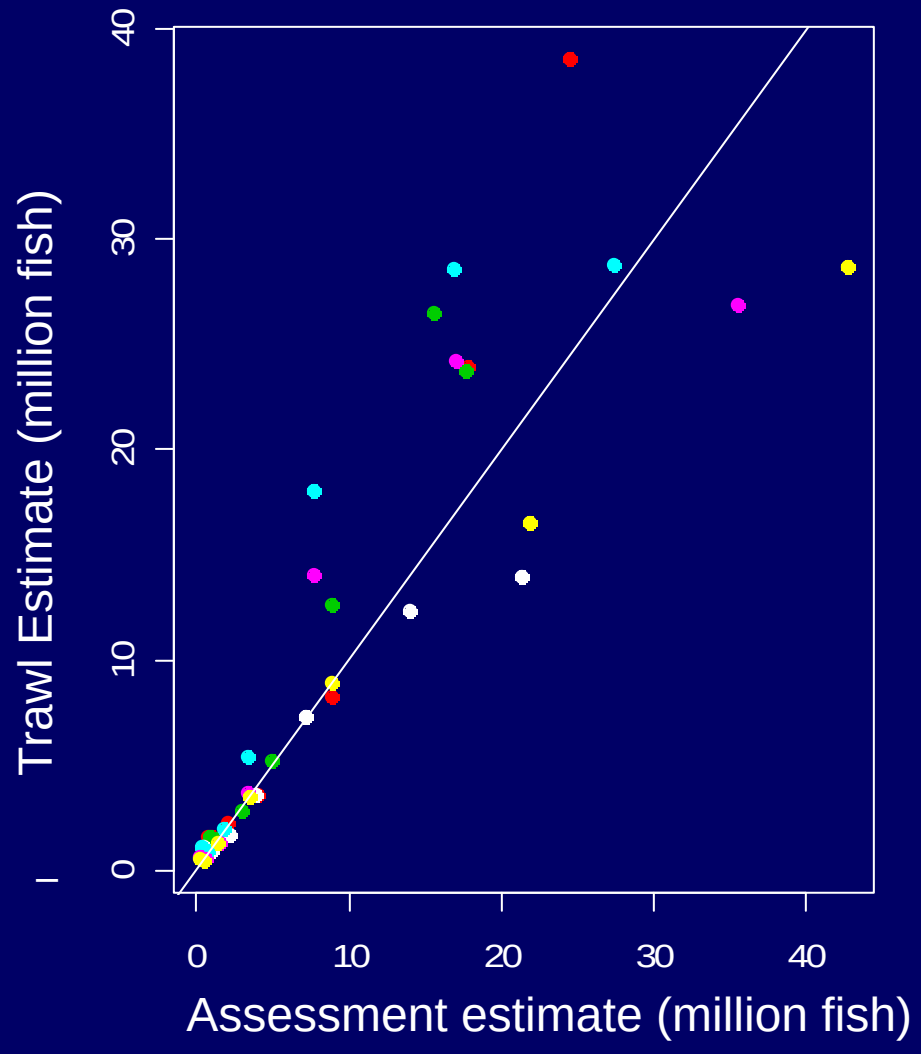

3A Males in the sea and catch by weight
Millions of pounds
20.0
15.0
10.0
5.0
0.0
Unexploitable Biomass
Exploitable Biomass.
2007 Catch lbs.
10
12
14
16
18
20
22
24
Age

1. If the exploitation rates in Area 2, particularly Area 2B, have really been as high as 40-50% then how can we still have stock left to fish on?
2. The applicability of the coastwide survey data for biomass apportionment depends on catchability being equal, or nearly so, among all regulatory areas. Is this actually true? How can it be verified?

Estimating Catchability

- Previous studies have looked at trawl-setline comparisons. If trawl survey catchability is the same in different areas, and setline survey catchability is the same in different areas, then the ratio of the two should be the same in different areas
- Such comparisons produce data that are highly variable but do not indicate catchabilities that differ by a factor of 3-4 times
- Comparison of setline and trawl estimates of density agree well where both are extensive, indicating that setline fishing is unbiased compared with trawl fishing

Comparison of NMFS trawl estimates of abundance to IPHC stock assessment estimates (for areas 3A and 3B) – by 10 cm length groups

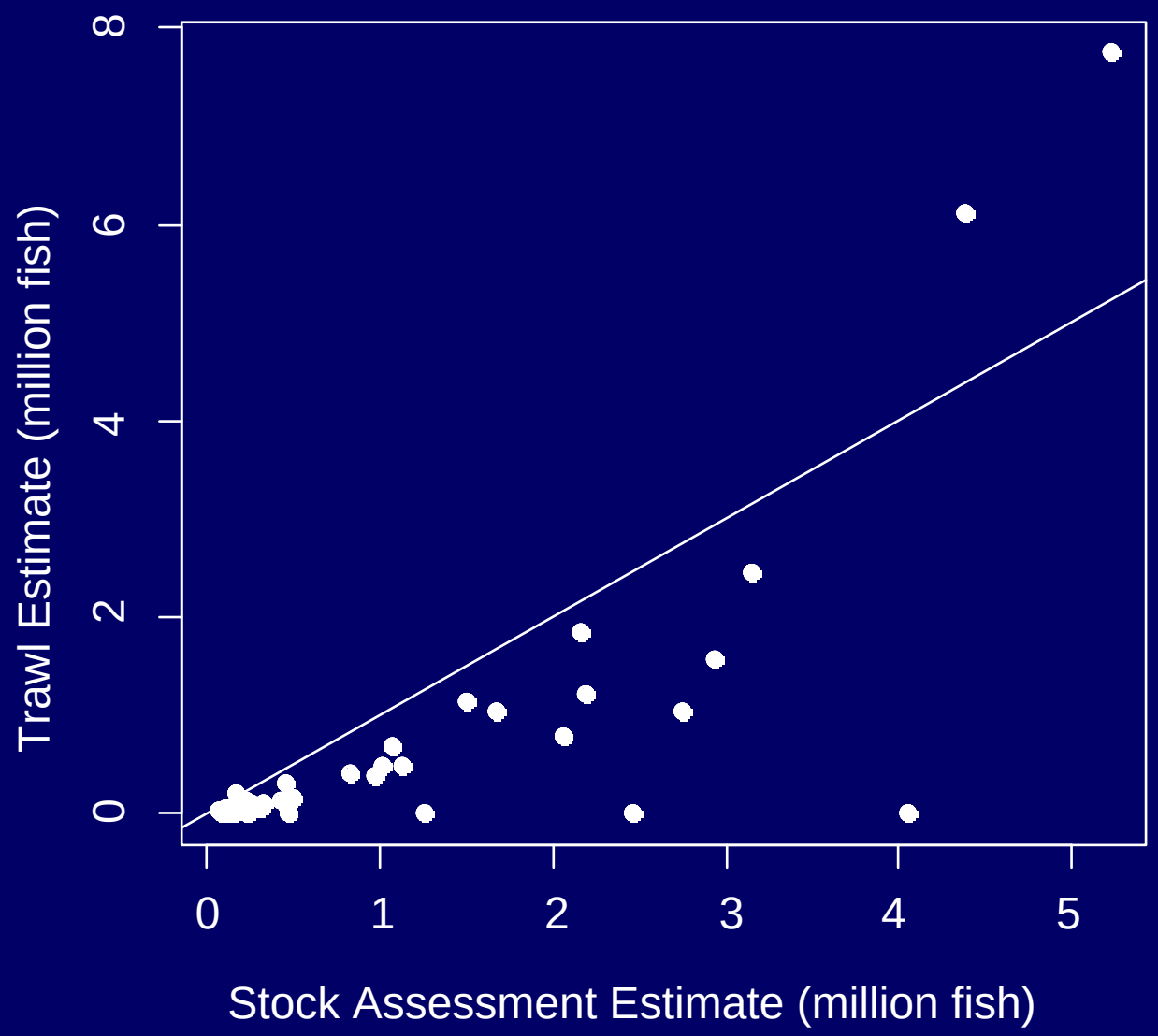


All NMFS trawl survey years (1996, 1999, 2001, 2003, 2005, 2007) represented. Each dot is millions of halibut in a 10 cm length group (60-69, 70-79, … 120+)

3A = Yakutat + Kodiak

3B = Chirikof + 0.7*Shumagin

IPHC has not used the NMFS trawl survey data for Area 2C, as it has for other Areas. What does the comparison of the NMFS survey and the IPHC assessment look like for Area 2C?



Estimating Catchability

- Repeating trawl-setline comparisons unlikely to provide better data and cannot be conducted in all areas where halibut fishing occurs
- The key element is to obtain an unbiased estimate of halibut density across all areas, then apply setline fishing to determine if the same CPUE is obtained from the same density estimate
- Removal experiment conducted in 2008 but unsuccessful because of localized in-migration of halibut on short time frame
- During 2009, staff will be investigating how a coastwide catchability experiment could be designed and conducted

1. If the exploitation rates in Area 2, particularly Area 2B, have really been as high as 40-50% then how can we still have stock left to fish on?
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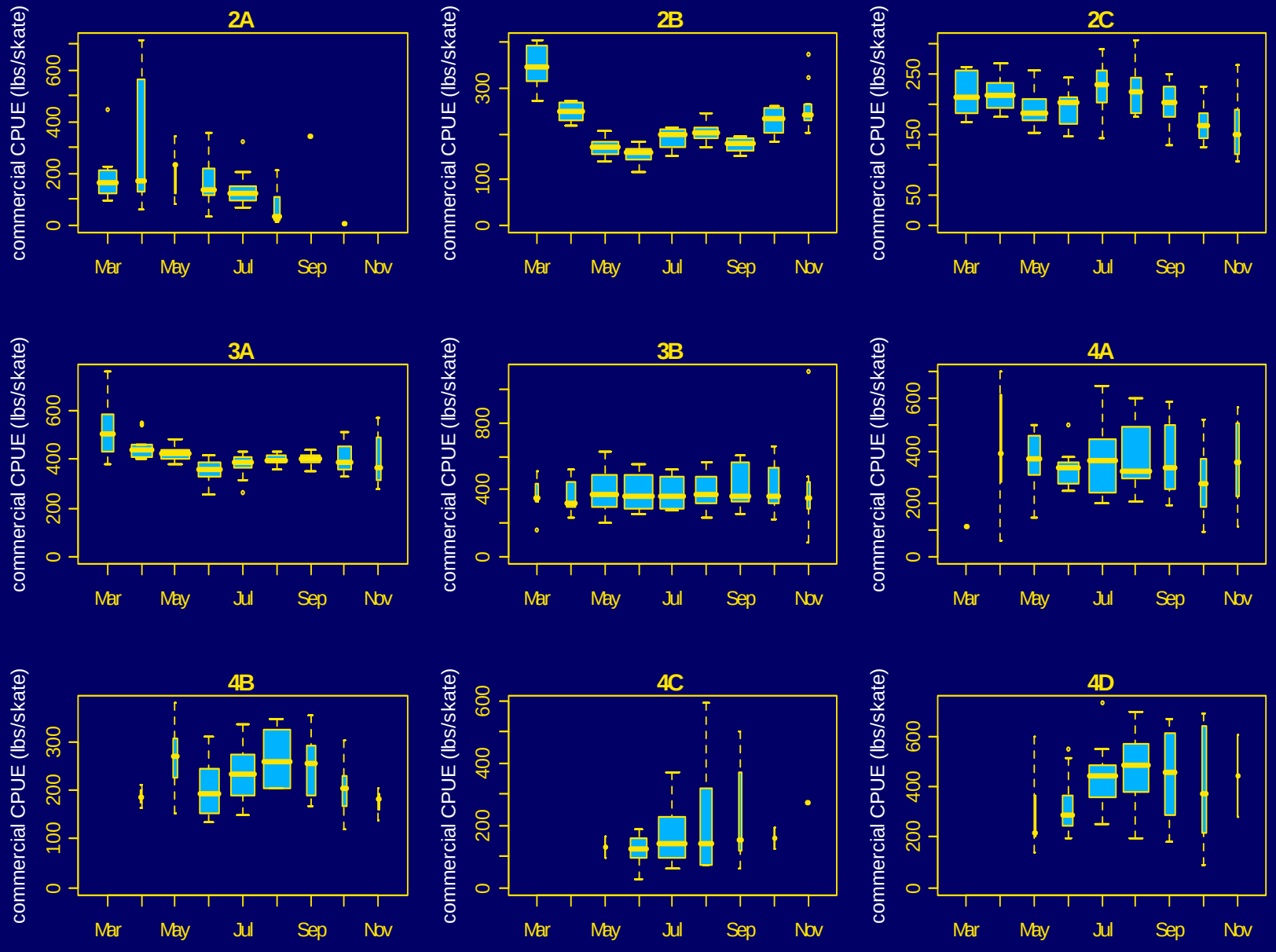
3. Does commercial fishing near survey stations affect survey CPUE?

Survey Timing

Proportion of commercial catch taken prior to the mean survey date

Area	2002	2003	2004	2005	2006	2007
2A	85%	90%	86%	81%	88%	91%
2B	52%	49%	50%	45%	53%	54%
2C	66%	68%	65%	65%	60%	60%
3A	68%	62%	63%	61%	61%	54%
3B	55%	59%	53%	48%	56%	48%
4A	42%	33%	28%	40%	32%	44%
4B	48%	40%	50%	28%	52%	71%

Seasonal variation in commercial CPUE (1998-2007)

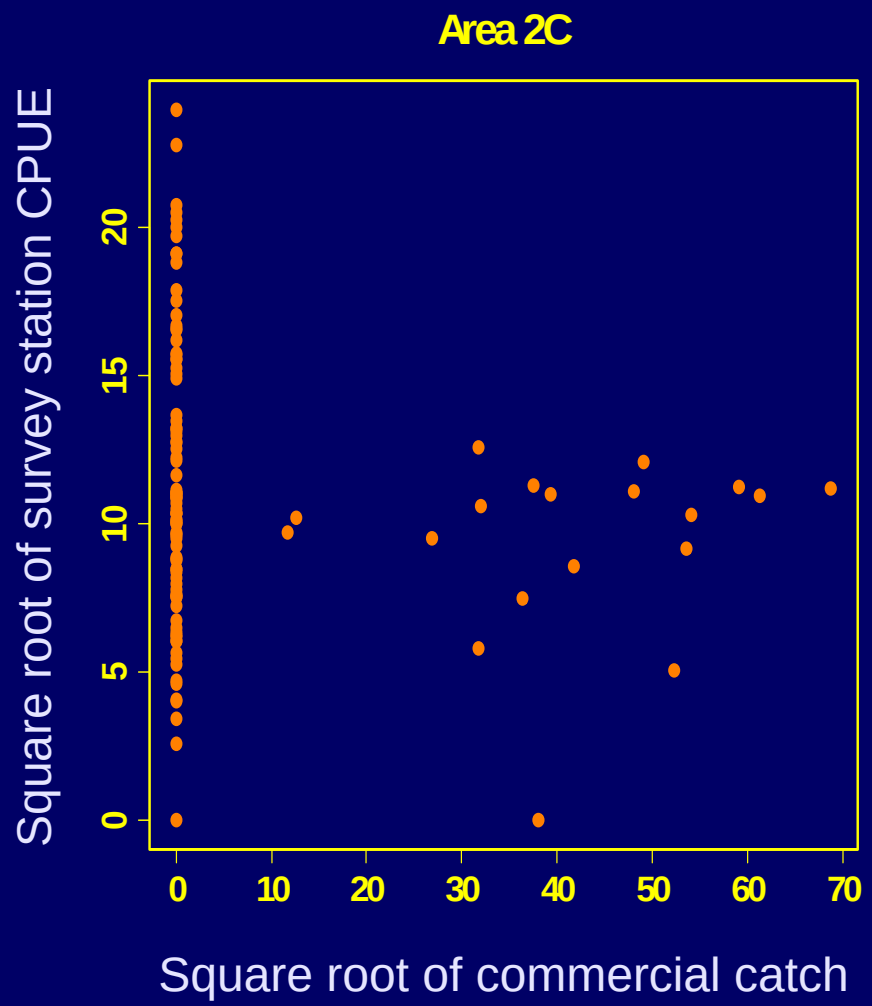


Commercial effort:

Proportion of effort within 5 days and 5 nmi of survey set.

Area	2003	2004	2005	2006
2B	0.8%	0.6%	0.9%	0.9%
2C	0.6%	1.8%	1.0%	0.6%
3A	0.9%	1.3%	1.2%	1.3%
3B	1.0%	0.9%	1.6%	1.6%
4A	1.8%	2.0%	3.0%	1.8%

Relationship between survey station CPUE and commercial catch (taken within 5 days and 5 nmi of survey set).



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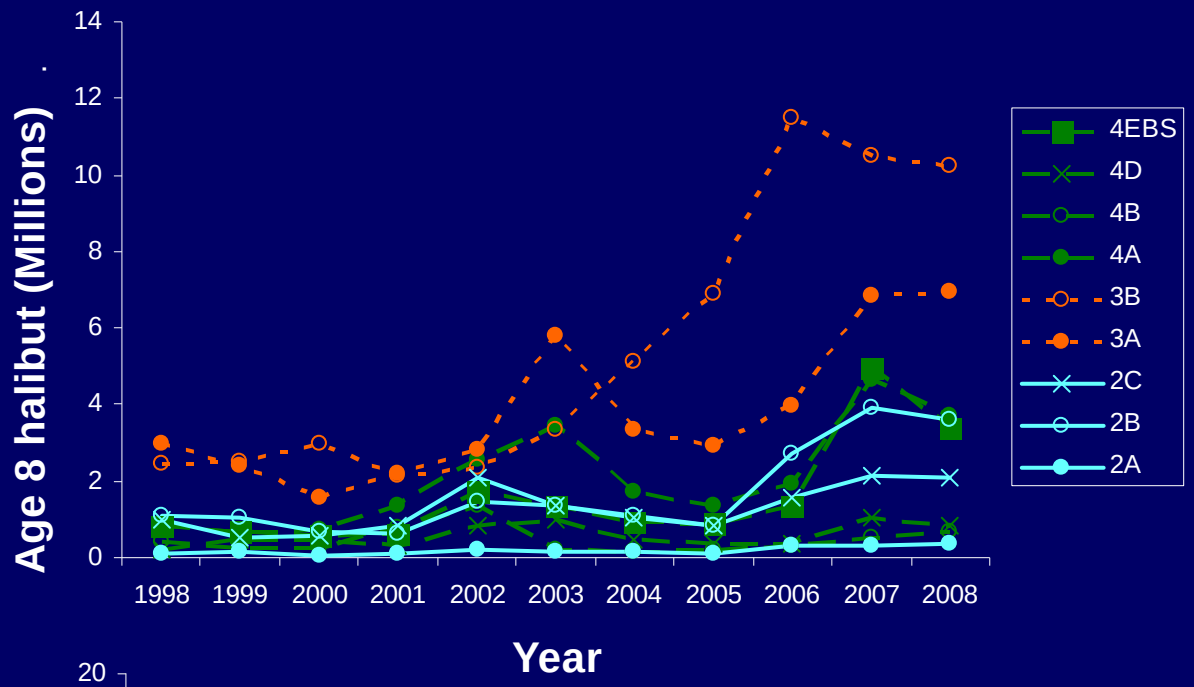
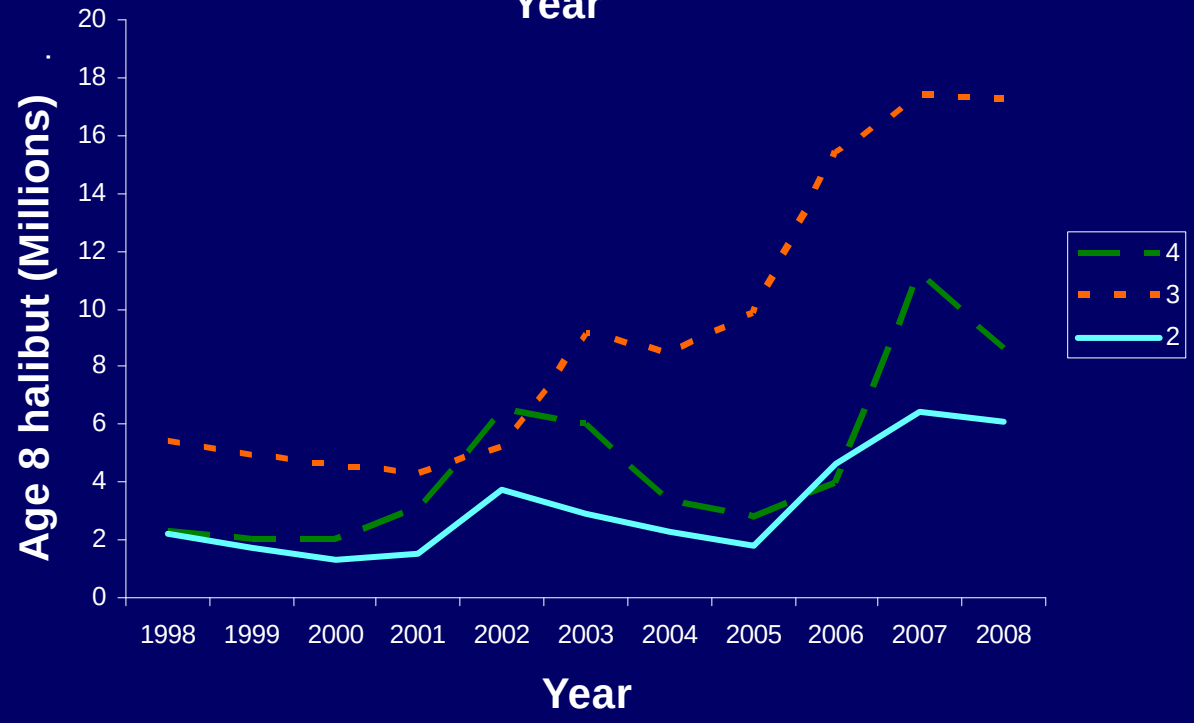
2. The applicability of the coastwide survey data for biomass apportionment depends on catchability being equal, or nearly so, among all regulatory areas. Is this actually true? How can it be verified?
3. Does commercial fishing near survey stations affect survey CPUE?
4. Is the decline in recruitment in Area 2 caused by increased harvest in Areas 3 and 4?


Age 8 halibut (Millions)
14
12
10
8
6
4
2
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Year
4EBS
4D
4B
4A
3B
3A
2C
2B
2A


Age 8 halibut (Millions)
20
18
16
14
12
10
8
6
4
2
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Year
4
3
2

5. Have you factored hook competition differences among areas into the survey CPUE comparisons?
   - We have survey data with which to examine this and Dr. Hare will present the results of this analysis in a later presentation
6. What is wrong with using long-term averages of historical catch as an apportionment method?
   - Historical catches were based on adopted catch limits, which contained errors because they failed to account for the continued movement of fish among areas
   - Will perpetuate unequal harvest rates across the stock
   - Any long-term averages will be insensitive to changes in stock distribution among areas