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Estimating the economic impacts of FW 47

*a model for estimating the effects of non-
marginal quota changes*

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- Need
- Data
- Methods
- Results
- Properties
- Extensions
- Future work





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-NEED-

- FW 47 proposed two significant (non-marginal) quota changes for commercial Sector sub-ACLs
 - GOM cod
 - GB yellowtail flounder
- Considerations
 - Closed area model assumptions no longer hold
 - Fishery in/out patterns different in FY 2010 then prior years
 - Fishing behavior more targeted under quotas
 - Assuming all ACE converted to catch inconsistent with revealed behavior

...in the case of haddock, pollock and redfish it's just silly



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-DATA-

FY 2010 VTR w/ 16,024 trips

- Catch at stock level (20 stocks, 16 allocated, plus non-groundfish)
 - Stock assigned by reported stat area
 - Stock- and sector-specific discards estimated
 - Landed lbs converted to live lbs
 - DLR (AA) / VTR stock level conversions applied
 - Landings component adjusted by VTR / DLR ratio
 - Stock-level catch and revenues align with values from Sector Annual Report
- Revenue, hp, len, gear, stat area, lat/lon, sector affiliation all maintained



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-METHODS-

- Simulation model
 - Captures jointness of production without explicitly modeling shadow values
- Technology, fishing practices, prices and stock conditions implicitly held constant
- Random draw of trips with cumulative totals for sixteen allocated stocks
 - Simulated FY stops when catch of one stock exceeds allocated ACE
 - 250 model runs (simulated fishing years)



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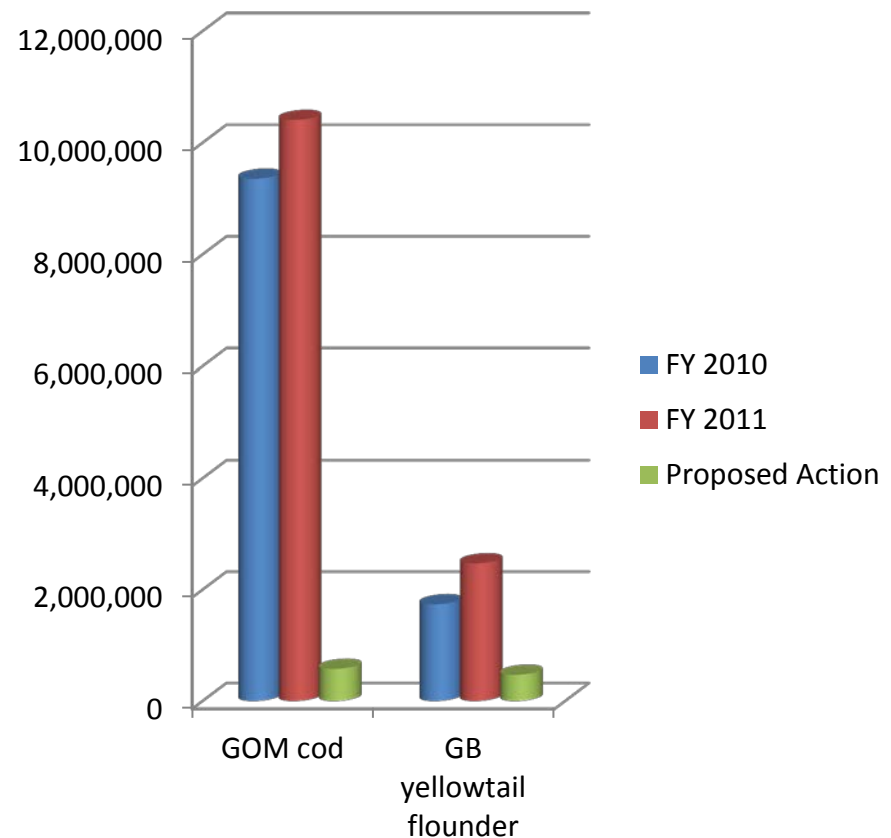
-METHODS-

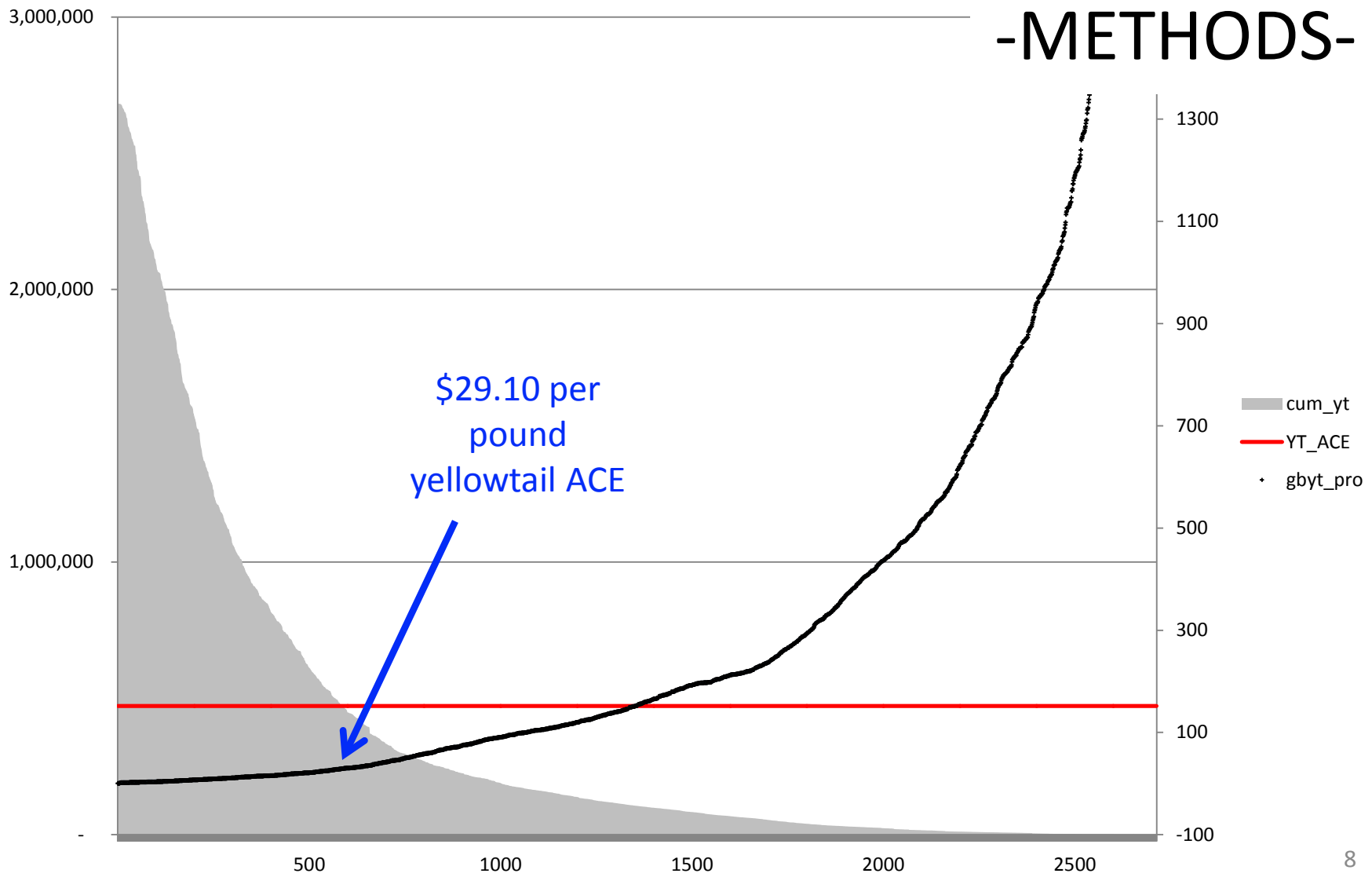
GOM cod and GB
yellowtail quota changes:

- non-marginal
- fishing behavior will change

Which trips should be sampled to simulate FY 2012?

Only those that use their ACE most efficiently







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-METHODS-

- Truncated distribution of selectable trips in GOM and GB
- # trips in dataset decreases from 16K to ~9K
- Selection with replacement, trips replicated
 - Assumes replicability regardless of environmental or stock condition changes (seasonality, etc)



-RESULTS-

runs = 250

SPECIES	STOCK	Catch	ACE	pct	Gross revenue	Percent revenue change from FY10	Percent revenue change from Option 1
American plaice	all	3,224,950	7,063,609	30%	\$ 4,240,364	-7.8%	-28%
Cod	GB	5,629,079	9,934,027	39%	\$ 14,551,700	-11.7%	-35%
	GOM	577,291	577,611	100%	\$ 811,609	-93.2%	-95%
Haddock	GB	15,742,097	60,120,042	18%	\$ 17,216,690	-19.5%	-37%
	GOM	678,543	1,426,390	39%	\$ 554,481	-9.4%	-48%
Halibut	all	50,913	-	0%	\$ 207,816	-27.9%	-35%
		-	-	0%	\$ -		
Ocean pout	all	132,556	-	0%	\$ 338	-70.3%	-64%
Pollock	all	9,470,989	27,597,458	23%	\$ 8,045,332	-24.1%	-43%
Redfish	all	4,549,371	18,265,293	17%	\$ 2,341,542	-11.7%	-38%
White hake	all	4,365,190	7,169,431	43%	\$ 4,253,578	-15.7%	-30%
Windowpane	North	276,778	-	0%	\$ 31,671	17.5%	-36%
	South	254,766	-	0%	\$ 1,128	91.2%	91%
	GB	2,073,581	7,416,348	16%	\$ 3,928,710	-31.4%	-53%
Winter flounder	GOM	71,961	1,496,938	5%	\$ 123,453	-62.8%	-72%
	SNEMA	151,147	-	0%	\$ 866,648	16.1%	5%
Witch flounder	all	1,262,195	3,128,359	29%	\$ 2,897,564	-29.5%	-42%
Wolffish	all	32,589	-	0%	\$ 2	-98.7%	-99%
Yellowtail flounder	CCGOM	861,911	2,239,896	33%	\$ 471,702	-40.0%	-48%
	GB	397,078	471,789	84%	\$ 514,586	-82.4%	-79%
	SNE	327,159	1,289,727	20%	\$ 71,660	-8.0%	-32%
GRAND TOTAL		50,130,142	148,196,919	34%	\$ 61,130,575	-30.8%	-46%



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# runs = 250	Option 2 - Low	Percent revenue change from FY10	Percent revenue change from Option 1
CONNECTICUT	\$8,921	1062%	175%
MASSACHUSETTS	\$57,950,657	-28%	-45%
>30	\$0	-100%	
30-50	\$8,021,622	-50%	-62%
50-75	\$17,331,292	-35%	-52%
>75	\$36,828,697	-19%	-36%
<i>Boston</i>	\$11,530,125	-20%	-40%
<i>Chatham</i>	\$2,393,955	-4%	-28%
<i>Gloucester</i>	\$17,521,848	-31%	-46%
<i>New Bedford</i>	\$25,305,476	-28%	-45%
MAINE	\$1,930,104	-54%	-64%
>30			
30-50	\$787,337	-63%	-76%
50-75	\$838,413	-42%	-52%
>75	\$304,355	-50%	-34%
<i>Portland</i>	\$1,649,427	-52%	-63%
NEW HAMPSHIRE	\$158,950	-91%	-93%
>30			
30-50	\$158,950	-91%	-93%
50-75	\$0	-100%	-100%
>75			
NEW JERSEY	\$7,196	100%	100%
NEW YORK	\$61,314	-1%	-24%
RHODE ISLAND	\$1,008,394	-42%	-46%
>30			
30-50	\$2,084	-82%	-89%
50-75	\$677,100	-34%	-46%
>75	\$328,380	-52%	-43%



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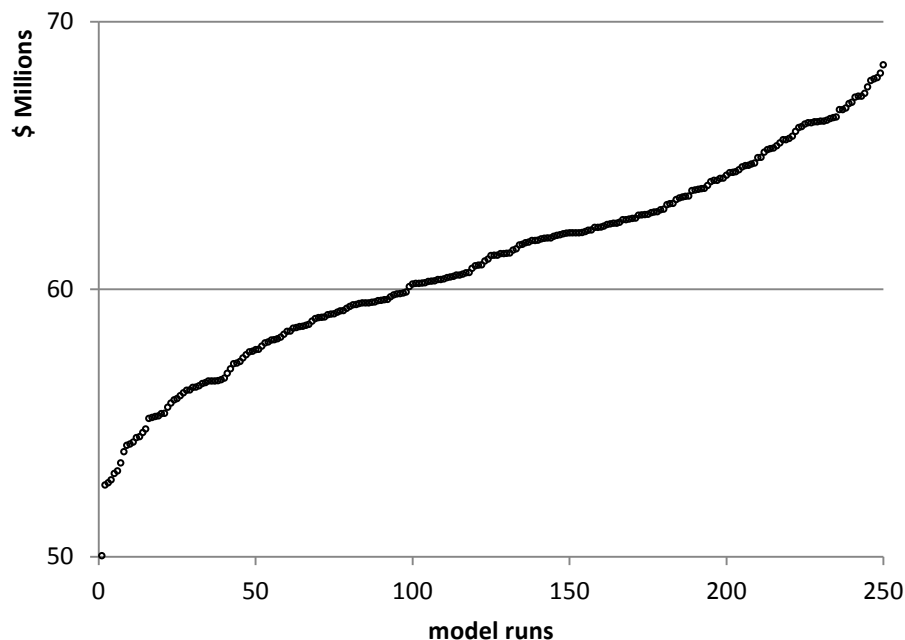
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-PROPERTIES-

Measures of central tendency for 250 simulations
(gross revenues)

Mean: \$60,956,321
CV: 6.06
Min: \$50,037,360
Max: \$68,381,828
Skew: -0.202





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-EXTENSIONS-

Estimates of net lease transfer payments:

	Lease Requirement	GOM cod ACE lease value*		Lease Requirement	GOM cod ACE lease value*
<30 ft	\$0	\$1,907	Maine	\$114,857	\$33,710
30-50 ft	\$1,561,871	\$364,334	Massachusetts	\$6,679,148	\$352,108
50-75 ft	\$4,425,261	\$127,764	New Hampshire	\$6,774	\$81,489
75+ ft	\$3,311,212	\$22,919	New York	\$10,705	\$9,063
			Rhode Island	\$2,485,565	\$22,116
			Other	\$1,296	\$18,437

*based on ACE lease price model, 3x GOM cod FY2011 price



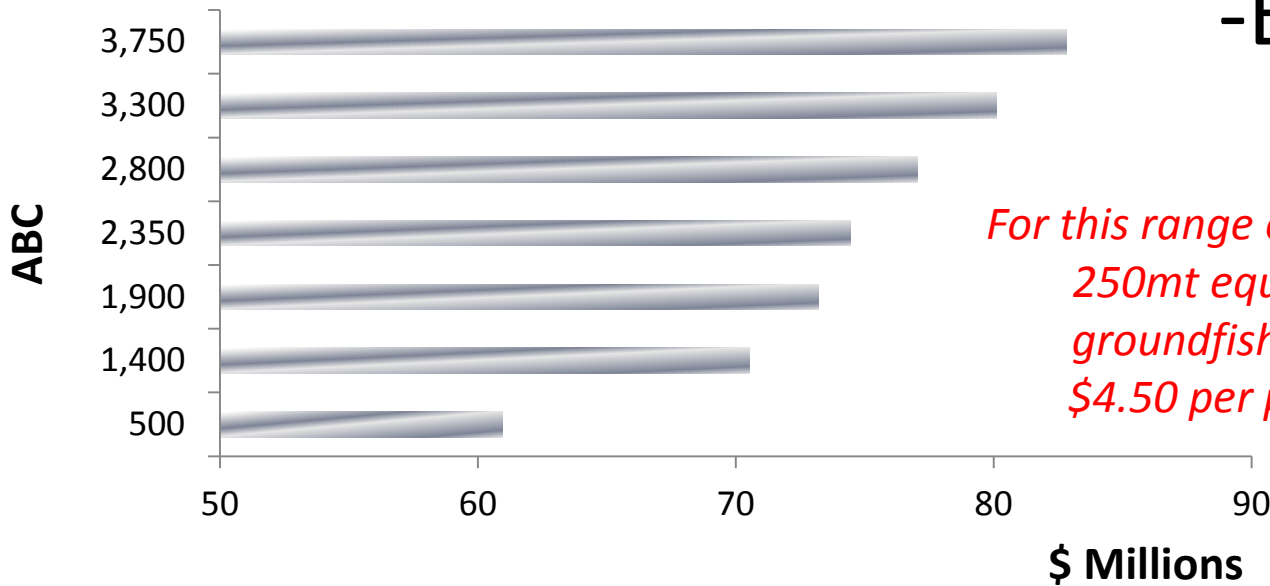
-EXTENSIONS-

Estimating marginal gross revenue changes

model	~ABC (mt)	sub-ACL (mt)	sub-ACL (lbs)
1	1,400	750	1,653,225
2	1,900	1,000	2,204,300
3	2,350	1,250	2,755,375
4	2,800	1,500	3,306,450
5	3,300	1,750	3,857,525
6	3,750	2,000	4,408,600



Estimates based on 100 simulations



-EXTENSIONS-

For this range of ABCs, each additional 250mt equals \$2.5 million in gross groundfish revenues...this is about \$4.50 per pound of additional ABC

ABC	500	1,400	1,900	2,350	2,800	3,300	3,750
Maine	1,929,221	3,189,246	3,427,907	3,588,025	3,798,823	4,008,802	4,193,933
New Hampshire	159,875	569,707	750,858	964,872	1,065,881	1,199,506	1,323,254
Massachusetts	57,577,621	65,346,453	67,594,145	68,479,643	70,717,255	73,398,110	75,770,503
Rhode Island	1,199,497	1,313,828	1,333,875	1,319,820	1,353,561	1,397,425	1,405,454
New York	75,800	83,408	87,493	82,466	89,241	85,288	89,988



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-EXTENSIONS-

Declining marginal gains:

*In the interval from 3.75K to 8K mt, the marginal change is ~
\$750K per 250 mt GOM cod ABC*

Implicit shadow values:

<i>pollock</i>	<i>\$0.870</i>	<i>witch flounder</i>	<i>\$0.296</i>
<i>GOM haddock</i>	<i>\$0.669</i>	<i>am. plaice</i>	<i>\$0.278</i>
<i>GB cod</i>	<i>\$0.631</i>	<i>redfish</i>	<i>\$0.156</i>
<i>white hake</i>	<i>\$0.311</i>	<i>GOM winter fl</i>	<i>\$0.155</i>



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-FUTURE WORK-

- Truncate trips based on net revenues
 - Cost models being developed
- Vary ace-efficiency threshold stochastically within range (vice knife-edge)
- Allow fishing in other stock areas when a non-unit stock ACE is exceeded
- Feed output to I/O, estimate regional economy effects



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