



Economic and Social Analysis

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NOAA Fisheries / NEFSC / SSB

New Council Member Training

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Fishery management is popu

Who catches how much of wha



"The fish off the coasts
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"Conservation and management
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United States fishing industry."

"If it becomes necessary to allocate
various United States fishermen,
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"Conservation and management
efficiency in the utilization of fish
shall have economic allocation a

"Conservation and management
and avoid unnecessary duplication

"Conservation and management
importance of fishery resources
and social data .in order to (A)
recreations, and (B) to the econo
impacts on such communities." E

"REQUIRED PROVISIONS —

...include a fishery impact state
analyze the likely effects, if any,
economic, and social impacts,
measures on, and possible inter
(A) participants in the fishery
plan or amendment;
(B) participants in the fishery
authority of another Council, or
representatives of those partici
(C) the safety of human life at
such measures may affect the s

(MSA, Sec 303 (a) (9))

Fishery Impact Statements
documents, providing a ce

Historical trends in the AFI
• participation and count
• disaggregated by state

Predicted outcomes in the
(includes separate section)
• use same/similar categor
sufficient context
• must address:
• overall impacts of
• differential impacts

Q: How do we do our anal

A: It depends.

Fishery management is people management.

Who catches how much of what, and when and where can it be caught?



Fisherman and former NEFMC member David Goethel. Credit: Boston Globe



New England Groundfishing Industry Rally
By: Christian Science Monitor

Credit: Getty Images



Credit: NOAA

*"The fish off the coasts of the United States, the highly migratory species of the high seas, the species which dwell on or in the Continental Shelf appertaining to the United States, and the anadromous species which spawn in United States rivers or estuaries, constitute valuable and renewable natural resources. **These fishery resources contribute to the food supply, economy, and health of the Nation and provide recreational opportunities.**" [MSA, Sec 2(a)]*



*"Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery **for the United States fishing industry.**" [MSA, NS 1]*

*"If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that **no particular individual, corporation, or other entity acquires an excessive share of such privileges.**" [MSA, NS 4]*

*"Conservation and management measures shall, where practicable, **consider efficiency in the utilization of fishery resources;** except that no such measure shall have economic allocation as its sole purpose." [MSA, NS 5]*

*"Conservation and management measures shall, where practicable, **minimize costs** and avoid unnecessary duplication." [MSA, NS 7]*

*"Conservation and management measures shall...**take into account the importance of fishery resources to fishing communities by utilizing economic and social data** ...in order to (A) provide for the **sustained participation** of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." [MSA, NS 8]*

"REQUIRED PROVISIONS.—Any fishery management plan ... shall...

*...include a **fishery impact statement** ... which shall **assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on,** and possible mitigation measures for—*

*(A) **participants in the fisheries and fishing communities** affected by the plan or amendment;*

(B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and

(C) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery."

[MSA, Sec 303 (a) (9)]

Fishery Impact Statement requirements are incorporated into NEPA documents, providing a central analytical framework.

Historical trends in the Affected Environment section

- participation and count data, net or gross revenues, catch, etc
- disaggregated by state and/or port, gear type, vessel size, etc

Predicted outcomes in the Environmental Consequences/Impacts section
(*includes separate sections for economic and social impacts*)

- use same/similar categories as in Affected Environment to provide sufficient context
- must address:
 - overall impacts of alternatives/options
 - differential impacts on sub-populations

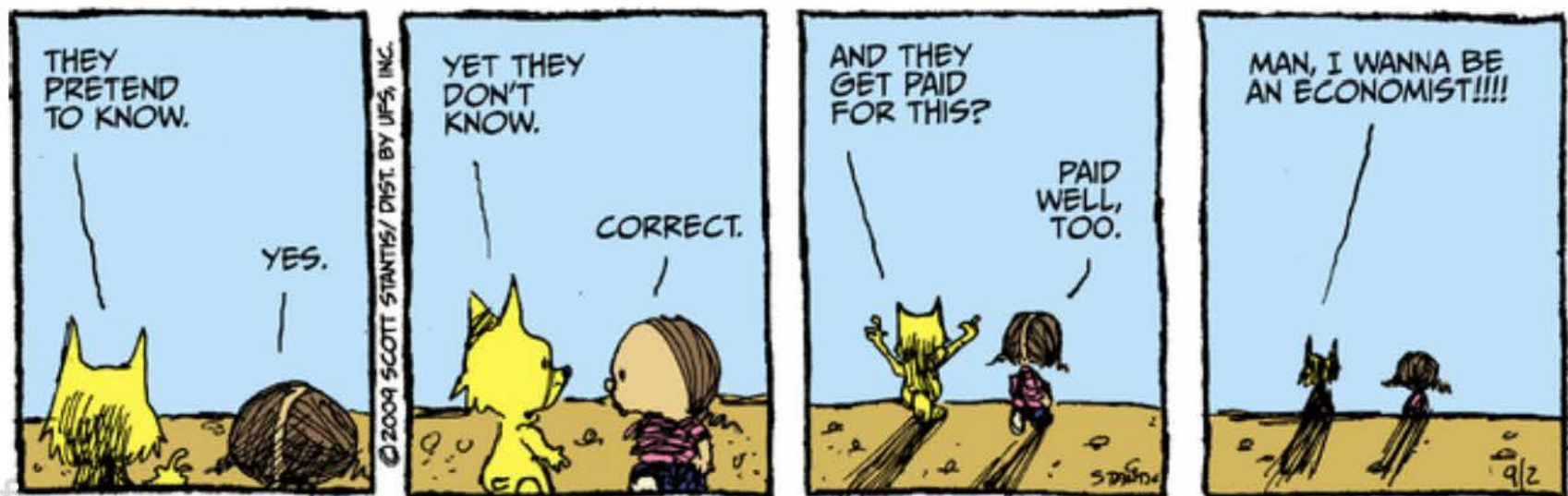
Q: How do we do our analyses?

A: It depends.

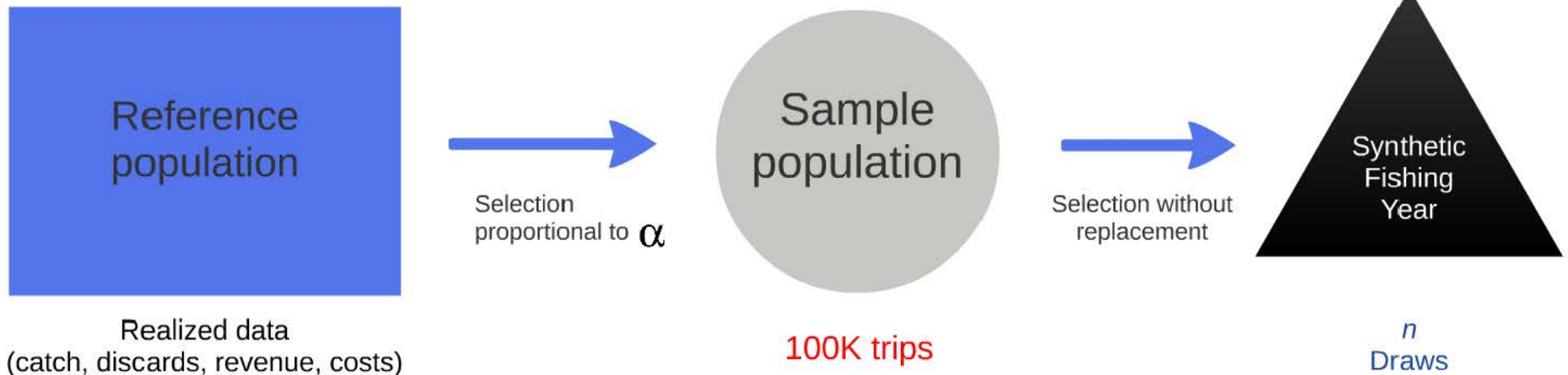
First, start with a question...like:

How will these new quotas affect revenues for commercial fisherman?

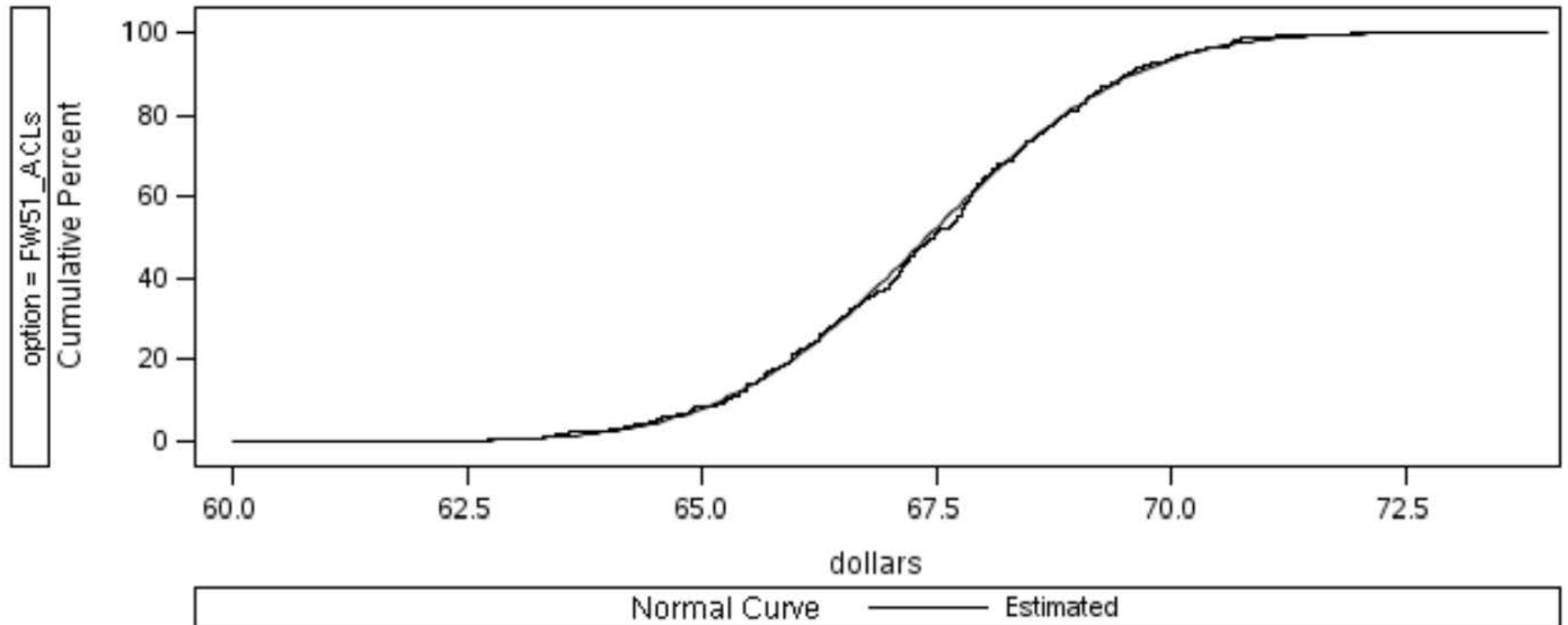
Data → Theory → Model → Prediction



An example: The Quota Change Model



Cumulative Distribution Function for dollars



Disaggregated results:

	FY14 Baseline			FW 53 <u>ACLs</u>			FW 53 <u>ACLs</u> + Closure A			FW 53 <u>ACLs</u> + Closure B			FW 53 <u>ACLs</u> + Zero Retention GOM cod			FW 53 <u>ACLs</u> + ZR GOM cod + Closure A			FW 53 <u>ACLs</u> + ZR GOM cod + Closure B		
	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev	Rev	p5 rev	p95 rev
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	43.8	39.7	48.2	40	35	45.3	41.2	36.5	46.1	41	36.1	45.9	39.6	34.8	44.6	40.6	36	45.4	40.7	36	45.5
<i>Boston</i>	12.9	11.8	14.1	12.1	10.4	13.8	12.9	11.3	14.7	12.8	11	14.7	12	10.3	13.7	12.8	11.1	14.6	12.8	11.2	14.5
<i>Gloucester</i>	10.3	9.4	11.4	7.5	6.5	8.4	8.2	7.2	9.3	8.1	7.1	9.1	7.3	6.4	8.3	7.9	6.9	8.8	7.9	6.8	8.9
<i>New Bedford</i>	15.4	14	16.8	16.4	14.9	18.1	16.9	15.5	18.2	16.8	15.4	18.1	16.3	14.9	17.8	16.8	15.5	18.2	16.8	15.4	18.2
Maine	14.8	13.2	16.4	12.4	10.7	14.1	12.9	11	14.7	12.4	10.9	14.2	12	10.4	13.7	12.6	11	14.5	12.4	10.7	14.2
<i>Portland</i>	12.3	11	13.7	10.7	9.1	12.1	11.4	9.8	13	11.1	9.7	12.6	10.4	9	11.9	11.3	9.8	12.9	11.1	9.7	12.7
New Hampshire	2.4	2.1	2.7	1.4	1.2	1.6	1.3	1.1	1.5	1.3	1.1	1.5	1.3	1.1	1.5	1.2	1	1.4	1.2	1	1.4
New Jersey	0.3	0.2	0.3	0.2	0.1	0.3	0.2	0.1	0.3	0.2	0.2	0.3	0.2	0.1	0.3	0.2	0.2	0.3	0.2	0.1	0.3
New York	0.9	0.7	1.2	1.2	0.9	1.6	1	0.7	1.3	1	0.7	1.3	1.2	0.9	1.6	1	0.7	1.2	1	0.7	1.3
Rhode Island	2.1	1.8	2.5	2.7	2.3	3.2	2.6	2.1	3	2.6	2.1	3.1	2.7	2.3	3.2	2.5	2.1	3	2.5	2.1	3
<i>Point Judith</i>	1.6	1.4	1.8	2.1	1.8	2.4	1.9	1.7	2.2	1.9	1.7	2.2	2.1	1.8	2.3	1.9	1.7	2.2	1.9	1.7	2.2
Other Northeast	0.1	0	0.1	0	0	0	.	.	.	0	0	0	0	0	0	0	0	0	0	0	0

Subsidy removal: Using cost survey data to estimate owner-level profitability

Table 4 - Summary of 2011-2012 Fixed Cost Survey data (nominal dollars)

Cost Category	Length Groups	N	Mean (\$)	SD (\$)
Repair/Maintenance	Over 80ft	42	105,916	357,757
	40ft-80ft	280	29,583	139,277
	<40ft	373	9,209	27,771
Upgrade/Improvement (After depreciation)	Over 80ft	27	5,778	18,862
	40ft-80ft	172	3,798	15,251
	<40ft	236	1,669	7,385
Business	Over 80ft	43	208,650	452,332
	40ft-80ft	257	40,779	177,891
	<40ft	381	13,865	46,338
Haul-out cost	Over 80ft	20	10,619	49,806
	40ft-80ft	198	2,770	15,672
	<40ft	301	1,139	7,335

Table 5—Estimated crew share, RMUI, Business/Haul-out and Sector Costs by vessel size class, mean and std dev of FY10-15 per-vessel estimates (nominal dollars)

Length cat	Crew share		RMUI		Business and Haul-out		Sector costs	
	Mean (\$)	SD (\$)	Mean (\$)	SD (\$)	Mean (\$)	SD (\$)	Mean (\$)	SD (\$)
<30'	10,200	7,925	3,968	386	8,980	809	525	379
30'to<50'	36,809	6,989	14,790	337	20,516	561	1,408	296
50'to<75'	108,902	13,558	40,905	754	63,720	1,223	4,948	740
75'+	281,614	20,597	74,569	1,402	145,030	13,277	12,679	1,097

Table 9 – Estimated counts of vessels with positive and zero or negative returns to owner (ASM costs not included) by year (*2014 data are preliminary, **2015 data are predictions)

	2010	2011	2012	2013	2014	2015
# vessels RTO ≤0	133	114	157	156	111	86
# vessels RTO >0	307	270	222	163	187	135
proportion fleet ≤0	30%	30%	41%	49%	37%	39%
Total number of vessels	440	384	379	319	298	221

Table 10 – Estimated counts of vessels with positive and zero or negative returns to owner by year, including hypothetical ASM costs (*2014 data are preliminary, **2015 data are predictions)

	2010	2011	2012	2013	2014	2015
# vessels RTO ≤0	159	136	173	164	120	130
# vessels RTO >0	281	248	206	155	178	91
proportion fleet ≤0	36%	35%	46%	51%	40%	59%
Total number of vessels	440	384	379	319	298	221

Social Impact Assessment

- Definition: *"a scientific method of gauging the social and cultural consequences of alternative fishery management actions or policies"*
- Performed as part of NEPA analysis, identical in structure to economic impacts analysis, and often co-integrated
- Nation-wide efforts:
 - defining NS8 fishing communities
 - standardizing social indicators:
 - *Social Vulnerability*
 - *Commercial and Recreational Fisheries Engagement and Reliance*
 - *Gentrification Pressure Vulnerability*

Other economic analyses

- Regulatory Impact Review (EO 12866)
 - Benefit/Cost analysis
 - All affected sectors/fishing businesses
 - Medium-term time horizon (real dollars, discount rate)
 - Economically significant rule
 - >\$100mil annual affect (2001 dollars, ~\$136 mil today)
 - Significant economic impact on particular region or sector
- Regulatory Flexibility Act (RFA)
 - Short term change in financial status
 - Limited to regulated entities (owners/businesses, not vessels)
 - *Will rule have a significant economic impact on a substantial number of small entities?*
 - *size standard (2016 = \$11mil)*

Best Practices

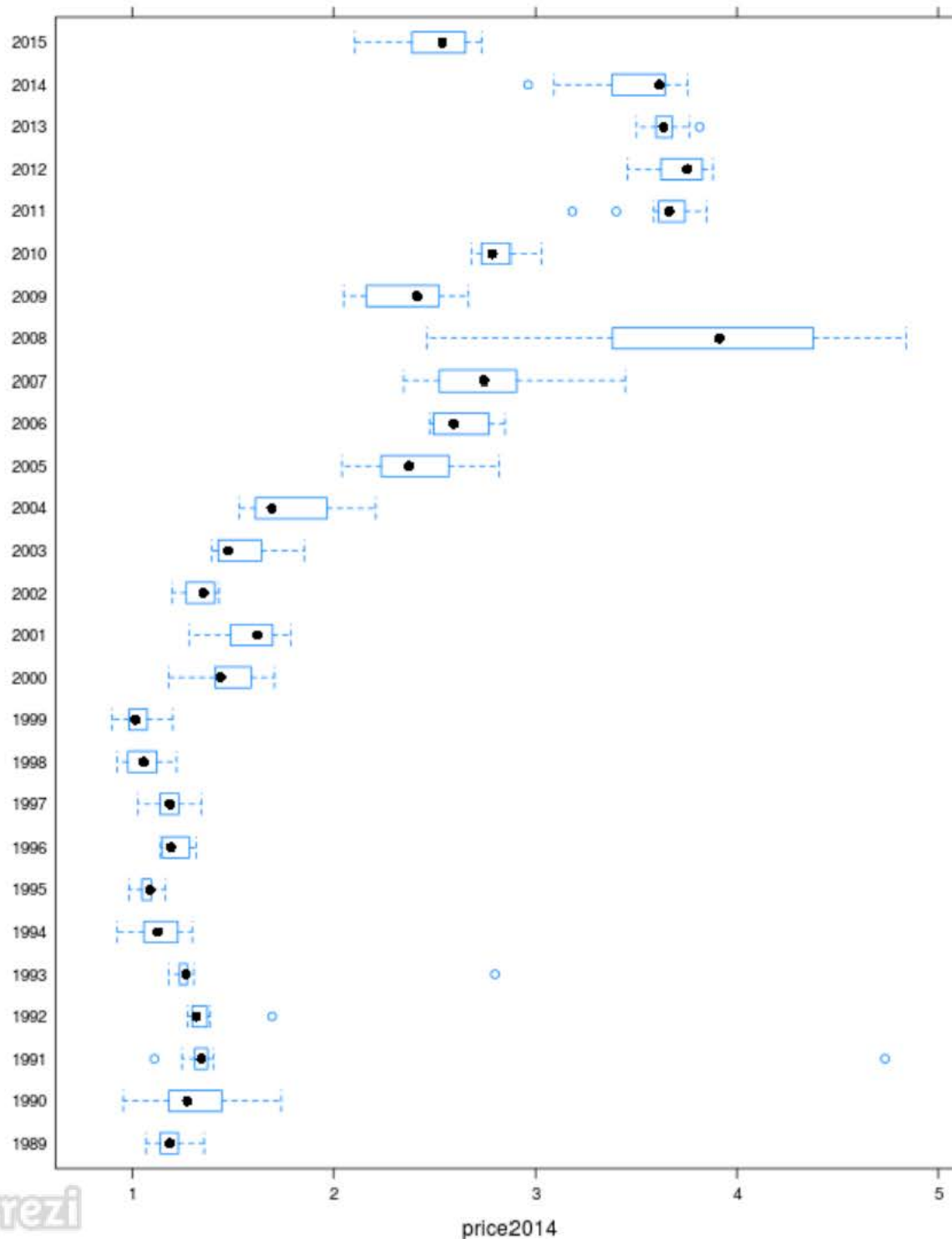
- Baseline data at same scale as impacts/predictions (NEPA: AHE=EC)
- Data, theory, model and results clearly explained
 - *Assumptions specified*
- Time-series data (say, more than three years) expressed in real dollars
 - *nominal vs real*
 - inflation can distort perceptions
 - \$100 today was:
 - \$90 in 2010
 - \$81 in 2005
 - \$71 in 2000
- Include costs whenever possible
 - revenue changes can mask cost increases/decreases
 - options may have different costs (shifts in effort location, additional administrative or regulatory compliance costs, etc)
 - fuel prices, for example, can play a large role

Assumptions underlying QCM:

- *stock conditions, fishing practices and harvest technologies existing during the reference period are representative;*
- *trips are repeatable;*
- *demand for groundfish is constant (noting implicit prices will vary between the reference population and the sample population);*
- *both quota opportunity costs and operating costs are constant;*
- *ACE flows seamlessly from lessor to lessee such that fishery-wide caps can be met without leaving ACE for constraining stocks stranded.*

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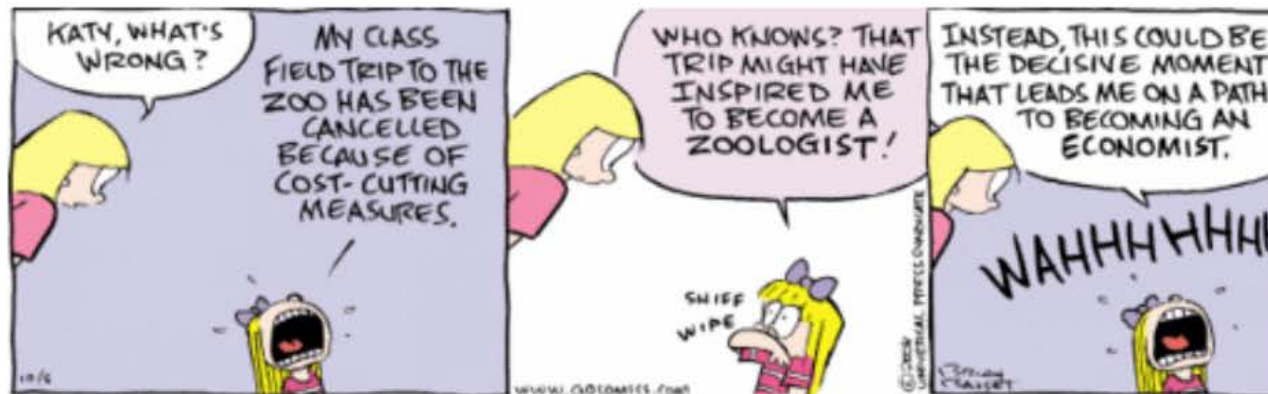
Daily savings on fuel between 2012 and 2015 for a 500 VHP vessel averages about \$450/day

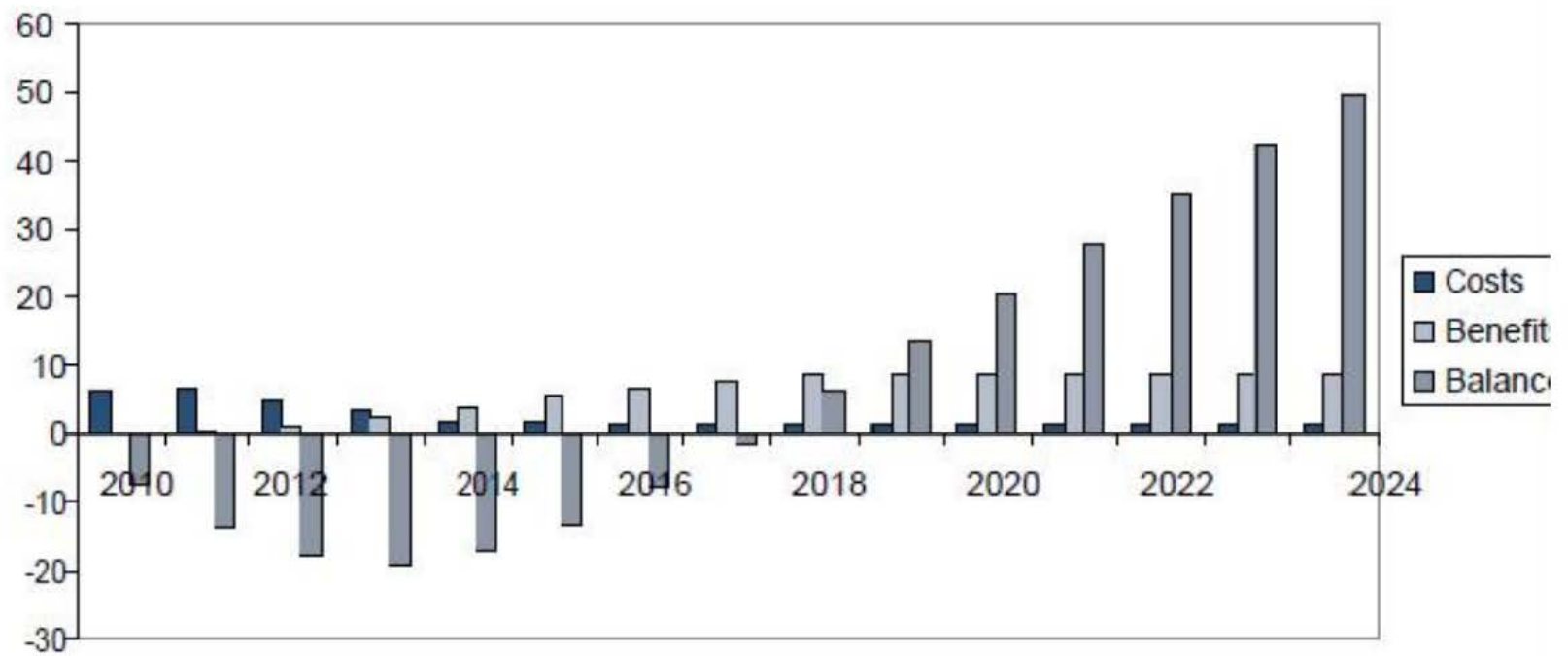
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Common questions

- Input/output modeling (jobs, jobs, multipliers, jobs...)
- Recreational vs. commercial valuation
 - Valuing goods that don't trade in markets
 - WTP vs. WTA
 - Stated preference vs Revealed preference
 - Final product markets and multipliers
- Costs and benefits with non-uniform time trends - THE DISCOUNT RATE -
- Peer-review and the role of the SSC





10 year rebuilding

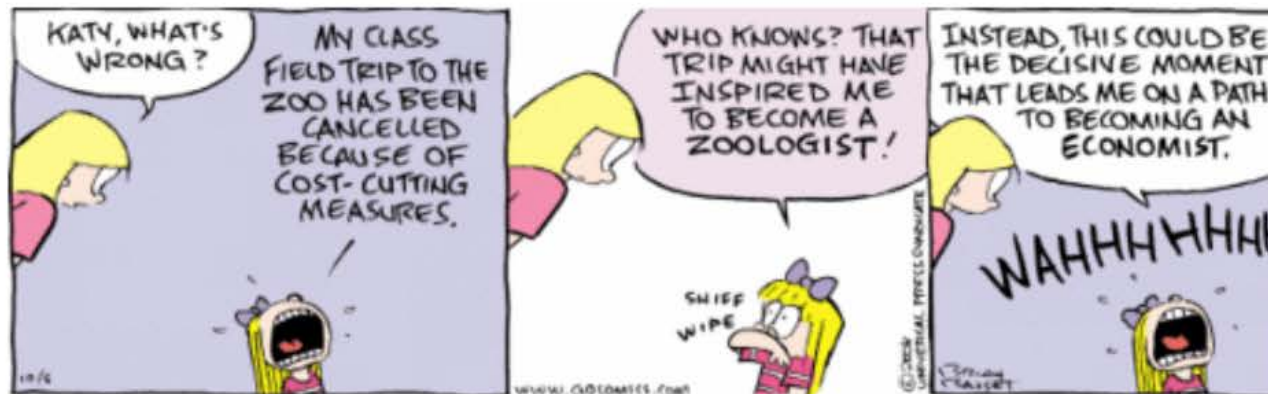
	Option1: <u>F_{msy}</u>	Option2: <u>75_F_{msy}</u>
discount rate		
3%	\$170	\$158
7%	\$133	\$123

F_{msy}

	Option 1: 8-year	Option 2: 10-year
discount rate		
3%	\$159	\$167
7%	\$124	\$130

Common questions

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Questions?