Discussion of Economic Data Collection

Christopher Liese
Social Science Research Group
SE Fisheries Science Center
NOAA Fisheries

February 24, 2025

Outline

- Need for Economic Data
- Bad Example: Collecting Economic Data independent from a Logbook
- Good Example: Collecting Econ Data on a Logbook
- Method
  - The Questions
  - Sampling Designs
- Illustration of For-Hire Results

Need for Economic Data

Economic analysis is a requirement of the Magnuson-Steven Fishery Conservation and Management Act

e.g., National Standards:

1. …prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry
2. …based upon the best scientific information available.
3. …an individual stock of fish shall be managed as a unit throughout its range…
4. …shall not discriminate between residents of different States….
5. …consider efficiency in the utilization of fishery resources…
6. …take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7. …minimize costs and avoid unnecessary duplication.
8. ….shall, consistent with the conservation requirements of this Act… …provide for the sustained participation of [fishing] communities, and… … minimize adverse economic impacts on such communities.
9. … minimize bycatch and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10. … promote the safety of human life at sea.

Typical Economic Information Needed in Regulatory Actions

For-hire Sector

Describe Status Quo and Estimate Changes…

- … in number of fish harvested or trips purchased
- … in consumer surplus to anglers; needs valuation of species or trips to consumers
- … in number of trips targeting the species and revenue generated; needs charter fee
- … in producer surplus to for-hire operators; needs charter fee and cost estimates

The Importance of Revenue Data in Fisheries Disaster Determinations and Allocations

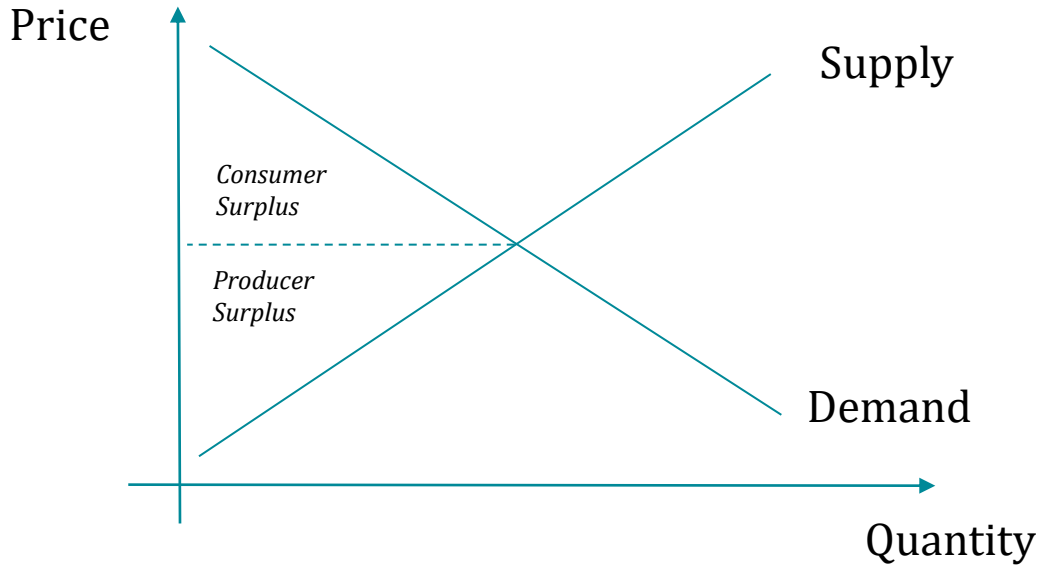
Important changes to the MSA under the Fisheries Resource Disaster Improvement Act (FRDIA):

- Added for-hire and other sectors (e.g., processors) to those that could be considered in the determination.
- One sector of a fishery may experience a disaster while others do not - depends on % revenue loss
- Revenue loss thresholds the same (excluding "subsistence"):
  - A positive determination was made in cases where the % loss in revenue during the disaster "year" relative to the previous 5 year baseline > 80%
  - If revenue loss was between 35% and 80%, additional info needed to demonstrate that impacts were "severe" in order to make a positive determination
  - If revenue loss < 35%, then no disaster was deemed to occur

- Consequence: Credible for-hire revenue data needed

Other Economic Analysis

- The price and quantity of a good or service are a prerequisite of most economic analyses…

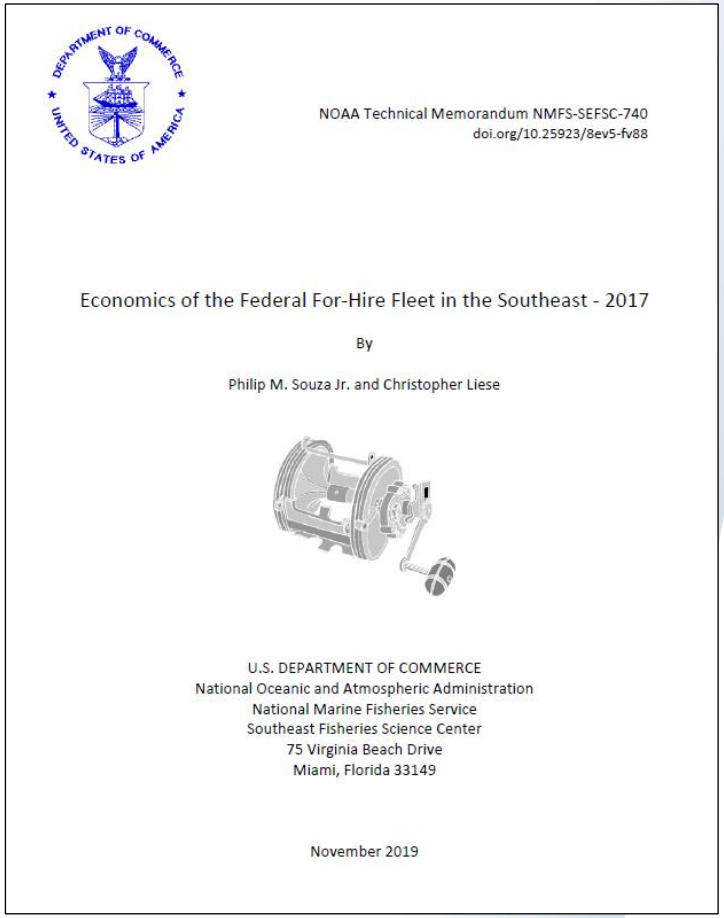


- No econ analysis in commercial fishery without the price of fish!

Bad Example of Econ Data Collection (ad hoc, without logbook)

Most “recent” econ data collection – 2017

- Voluntary, ‘pilot study’ survey
- 2 page mail survey
- Conducted over one year, in 6 waves (for seasonality)
- Sampled half the eligible population
- Response rate by wave from [37% to 53%]; overall 45%
- Page 1: 8 questions for eligibility and characterize business
- Page 2: 15 questions about last trip



NOAA Technical Memorandum NMFS-SEFSC-740
doi.org/10.25923/8ev5-fv88

Economics of the Federal For-Hire Fleet in the Southeast - 2017

By

Philip M. Souza Jr. and Christopher Liese

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

November 2019

NOAA FISHERIES

Last trip questions:

Before I can ask 8 econ questions at bottom, have to characterize trip:

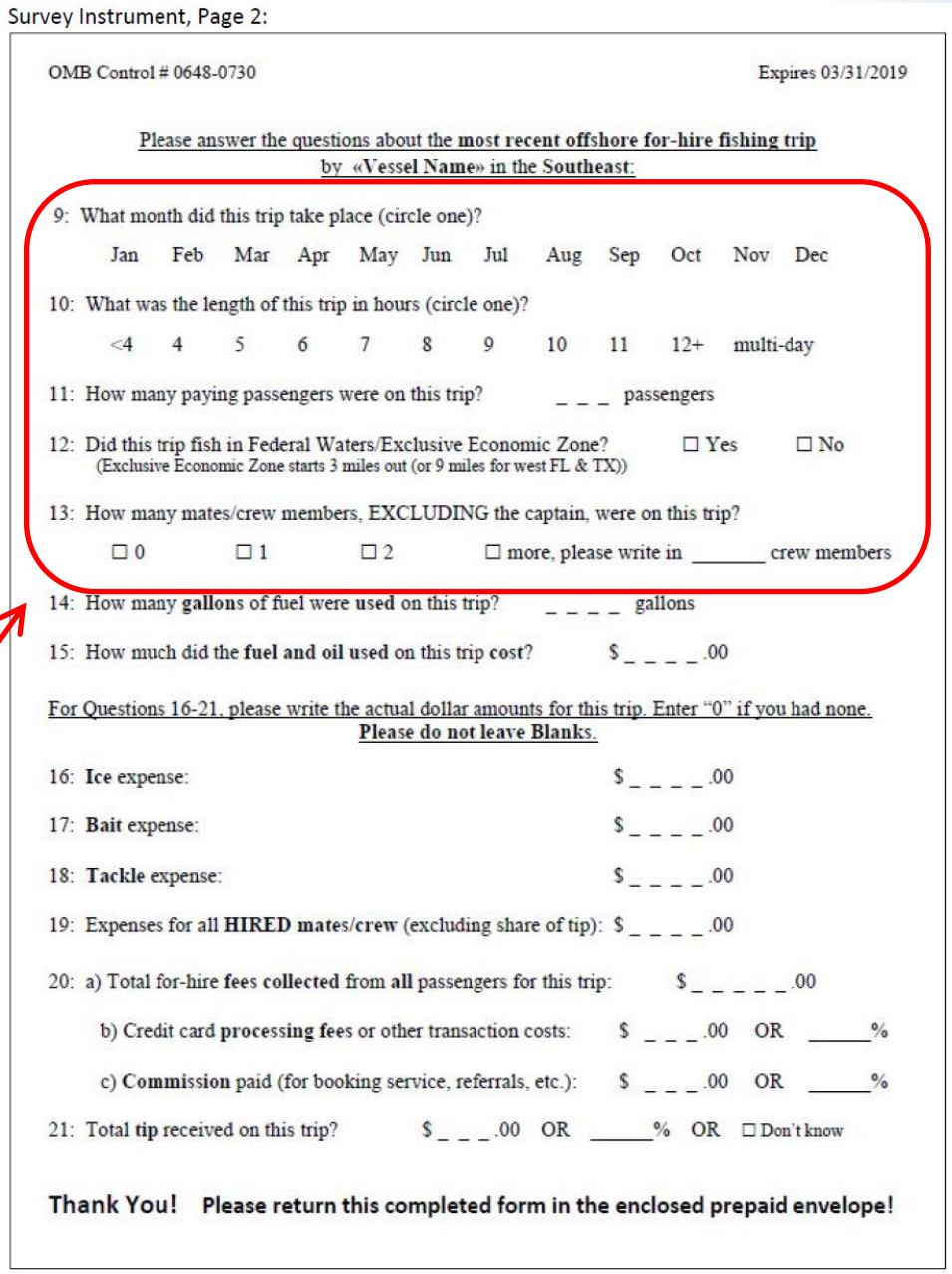
Page 1:

- Trip in last 12 months?
- Off-shore trip?
- In the Southeast?

Page 2:

- Very much logbook questions
  - Month
  - Trip length
  - # of passengers
  - EEZ
  - # of crew

Survey Instrument, Page 2:



OMB Control # 0648-0730 Expires 03/31/2019

Please answer the questions about the **most recent offshore for-hire fishing trip** by «**Vessel Name**» in the **Southeast**:

9: What month did this trip take place (circle one)?

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

10: What was the length of this trip in hours (circle one)?

<4 4 5 6 7 8 9 10 11 12+ multi-day

11: How many paying passengers were on this trip? _ _ _ passengers

12: Did this trip fish in Federal Waters/Exclusive Economic Zone? ☐ Yes ☐ No
(Exclusive Economic Zone starts 3 miles out (or 9 miles for west FL & TX))

13: How many mates/crew members, EXCLUDING the captain, were on this trip?

☐ 0 ☐ 1 ☐ 2 ☐ more, please write in _____ crew members

14: How many **gallons** of fuel were **used** on this trip? _ _ _ _ gallons

15: How much did the **fuel and oil used** on this trip **cost**? $ _ _ _ _ .00

For Questions 16-21, please write the actual dollar amounts for this trip. Enter "0" if you had none.
Please do not leave Blanks.

16: **Ice** expense: $ _ _ _ _ .00

17: **Bait** expense: $ _ _ _ _ .00

18: **Tackle** expense: $ _ _ _ _ .00

19: Expenses for all **HIRED mates/crew** (excluding share of tip): $ _ _ _ _ .00

20: a) Total for-hire **fees collected** from **all** passengers for this trip: $ _ _ _ _ _ .00

b) Credit card **processing fees** or other transaction costs: $ _ _ _ .00 OR _____%

c) **Commission** paid (for booking service, referrals, etc.): $ _ _ _ .00 OR _____%

21: Total **tip** received on this trip? $ _ _ _ .00 OR _____% OR ☐ Don't know

Thank You! **Please return this completed form in the enclosed prepaid envelope!**

NOAA FISHERIES

GOM Charter Vessels

Table 15: Activity Status of GOM Charter Vessels

	Count	% of Responses	% of Active
Responses	209	100%	
- Not Active (no trip last year)	50	24%	
- Active	159	76%	100%
- No SE offshore trips	21	10%	13%
- SE offshore trips	138	66%	87%

Table 16: Vessel Operations of Active GOM Charter Vessels with Off-shore Trips

	Mean	St. Dev.	Min.	Max.	Median
Count	138	-	-	-	-
Vessel Operations					
Trips	90	72	1	325	75.0
Days At Sea	88	69	1	280	75.0
Offshore Trips	87%	25%	0%	100%	100%
Charge Per Angler	22%	-	-	-	-
Repeat Customers	62%	21%	0%	100%	60%
Captain is Owner	70%	-	-	-	-
Vessel Market Value	$147,373	$202,010	$10,000	$1,800,000	$92,500

NOAA FISHERIES

Table 19: Trip Economics in Percentage of Revenue Terms by Trip Length of Off-shore Trips by GOM Charter Vessels

	GOM Charter	Half Day (2-6 hours)	Full Day (7-10 hours)	Extended Day (11-14 hours)	Multi-day (>24 hours)
Count	138	43	59	29	7
Average Trip Economics (% of Revenue)					
Revenue	100%	100%	100%	100%	100%
Transaction Fees	3%	4%	3%	3%	1%
Supply Costs	27%	26%	26%	31%	27%
Labor Costs	27%	29%	27%	27%	28%
TNR Excl. Labor	70%	70%	71%	67%	73%
TNR Incl. Labor	42%	41%	44%	39%	44%

NOAA FISHERIES

Producer Surplus = Cash Flow per Angler (CFpA)

Table 26: Comparison of Cash Flow per Angler (CFpA) Derived from Current and Previous Research Efforts

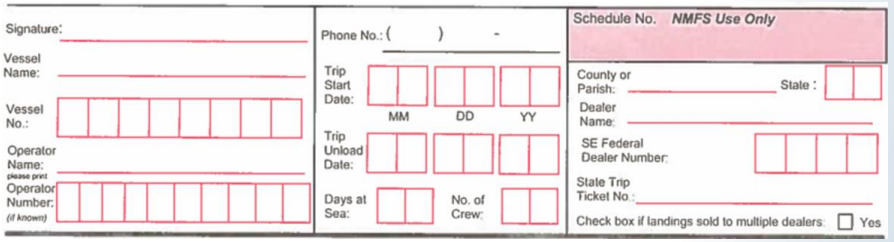
For-Hire Mode	Region	Source	Data Year	Sample Size	Trip Types	TNR excl. Labor	CFpA (in $year of data)	CFpA (in $2017*)
Charter	**Gulf of Mexico**	**6**	**2017**	**138**	**Last off-shore trip of representative vessel**	**1,236**	**225**	**225**
Charter	Gulf of Mexico	5	2009	87	Typical trip of representative vessel	659	139	159
Charter	- west Florida	5	2009	42	Typical trip of representative vessel	574	122	139
Charter	- AL, MS	5	2009	22	Typical trip of representative vessel	831	164	187
Charter	- Louisiana	5	2009	11	Typical trip of representative vessel	977	192	219
Charter	- Texas	5	2009	12	Typical trip of representative vessel	774	167	190
Charter	LA to east Florida	3	2002/03	1,205	Representative trip (FHS sample)	516	123	166

NOAA FISHERIES

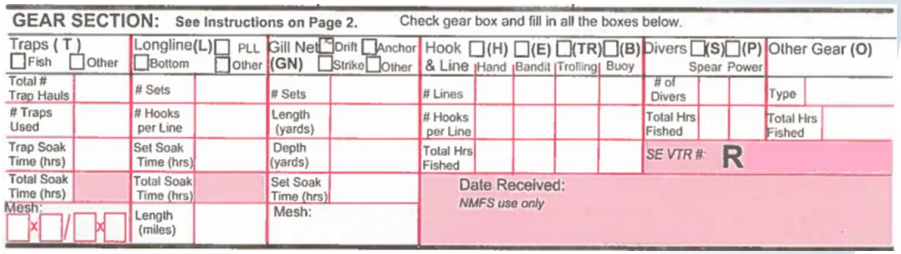
Good Example of Econ Data Collection (with logbook)

Commercial Trip Logbooks (since 1993)

- SE Coastal Fisheries Vessels Logbook for:
  - Gulf of Mexico Reef Fish
  - South Atlantic Snapper-Grouper
  - King and Spanish Mackerel
  - Shark
  - Atlantic Dolphin/Wahoo
- Many of the for-hire species
- Fish price on trip tickets/dealer reports

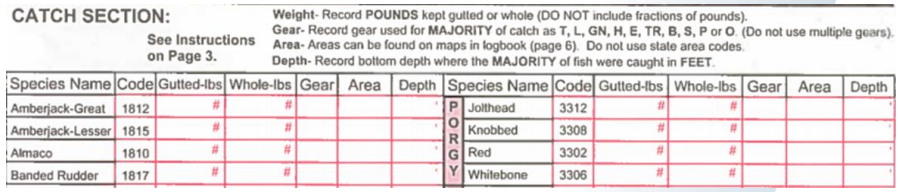


Signature:
Vessel Name:
Vessel No.:
Operator Name: please print
Operator Number: (if known)
Phone No.: ( ) -
Trip Start Date: MM DD YY
Trip Unload Date:
Days at Sea:
No. of Crew:
Schedule No. NMFS Use Only
County or Parish:
State :
Dealer Name:
SE Federal Dealer Number:
State Trip Ticket No.:
Check box if landings sold to multiple dealers: Yes



GEAR SECTION: See Instructions on Page 2. Check gear box and fill in all the boxes below.

Traps (T) Fish Other	Longline(L) Bottom PLL Other	Gill Net (GN) Drift Anchor Strike Other	Hook & Line (H) (E) (TR) (B) Hand Bandit Trolling Buoy	Divers (S) (P) Spear Power	Other Gear (O)
Total # Trap Hauls	# Sets	# Sets	# Lines	# of Divers	Type
# Traps Used	# Hooks per Line	Length (yards)	# Hooks per Line	Total Hrs Fished	Total Hrs Fished
Trap Soak Time (hrs)	Set Soak Time (hrs)	Depth (yards)	Total Hrs Fished	SE VTR #: R	
Total Soak Time (hrs)	Total Soak Time (hrs)	Set Soak Time (hrs)	Date Received: NMFS use only		
Mesh: x / x	Length (miles)	Mesh:			



CATCH SECTION: See Instructions on Page 3.

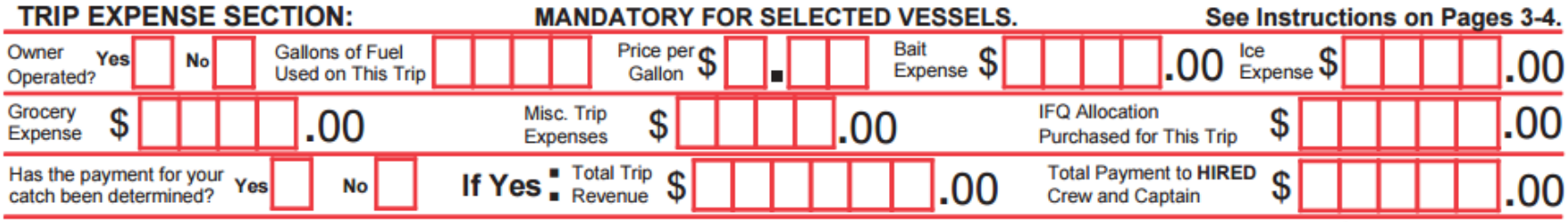
Weight- Record POUNDS kept gutted or whole (DO NOT include fractions of pounds).
Gear- Record gear used for MAJORITY of catch as T, L, GN, H, E, TR, B, S, P or O. (Do not use multiple gears).
Area- Areas can be found on maps in logbook (page 6). Do not use state area codes.
Depth- Record bottom depth where the MAJORITY of fish were caught in FEET.

Species Name	Code	Gutted-lbs	Whole-lbs	Gear	Area	Depth		Species Name	Code	Gutted-lbs	Whole-lbs	Gear	Area	Depth
Amberjack-Great	1812	#	#			'	P	Jolthead	3312	#	#			'
Amberjack-Lesser	1815	#	#			'	O	Knobbed	3308	#	#			'
Almaco	1810	#	#			'	R	Red	3302	#	#			'
Banded Rudder	1817	#	#			'	G	Whitebone	3306	#	#			'
							Y							

NOAA FISHERIES

Sample Trip-level Economics (since 2002/5)

- Stratified sample of permitted **vessels** at start of year
- Selected vessel supposed to report econ data for ALL logbook trips across the year



TRIP EXPENSE SECTION: **MANDATORY FOR SELECTED VESSELS.** **See Instructions on Pages 3-4.**

Owner Operated? **Yes** ☐ **No** ☐ | Gallons of Fuel Used on This Trip ☐☐☐☐ | Price per Gallon $ ☐.☐☐ | Bait Expense $ ☐☐☐☐.00 | Ice Expense $ ☐☐☐☐.00

Grocery Expense $ ☐☐☐☐.00 | Misc. Trip Expenses $ ☐☐☐☐.00 | IFQ Allocation Purchased for This Trip $ ☐☐☐☐☐.00

Has the payment for your catch been determined? **Yes** ☐ **No** ☐ | **If Yes**: Total Trip Revenue $ ☐☐☐☐☐☐.00 | Total Payment to **HIRED** Crew and Captain $ ☐☐☐☐☐.00

Trip-Level Economics, cont.

Economic Results (n=1,448)

	Mean	SE	90% L.B.	90% U.B.	Median
SOI Trip					
Owner-Operated	70%	3.6	64%	75%	-
Days at Sea	4.7	0.3	4.2	5.2	4
Crew Size	2.8	0.1	2.7	2.9	3
Fuel Used	219	17	191	247	150
Landings (gutted lbs)	2,308	193	1,988	2,627	1,233
Total Revenue	10,063	929	8,524	11,601	4,482
Cost					
Fuel	587	44	515	660	407
Bait	390	45	316	465	140
Ice	166	17	138	194	100
Groceries	276	28	229	323	150
Miscellaneous	252	39	188	316	50
Hired Crew	2,400	258	1,972	2,828	896
IFQ Purchase	2,019	307	1,511	2,528	119
OC Owner-Captain Time	714	108	536	893	196
Trip Net Cash Flow*	3,972	543	3,072	4,872	1,608
Trip Net Revenue*	5,277	623	4,245	6,309	1,772

Time Series – Trip-Level Economics (Page 5)

	2014	2015	2016	2017	2018	Average
Number of Observations	1,237	1,787	1,955	1,943	1,448	
Response Rate (%)	78%	85%	94%	95%	94%	
SOI Trip						
Owner-Operated	73%	65%	68%	61%	70%	67.4%
Fuel Used per Day at Sea (gallons/day)	46	46	40	49	46	45
Total Revenue	100%	100%	100%	100%	100%	100%
Costs (% of Revenue)						
Fuel	6.8%	4.9%	4.3%	5.1%	5.8%	5.4%
Bait	3.1%	3.4%	3.6%	4.1%	3.9%	3.6%
Ice	1.4%	1.5%	1.7%	1.6%	1.6%	1.6%
Groceries	2.4%	2.4%	3.1%	3.2%	2.7%	2.8%
Miscellaneous	2.5%	2.4%	3%	2.5%	2.5%	2.6%
Hired Crew	28.2%	25.9%	27%	27.6%	23.8%	26.5%
IFQ Purchase	14.6%	26.5%	18.5%	19.1%	20.1%	19.8%
OC Owner-Captain Time	6.5%	6.2%	7.4%	6.4%	7.1%	6.7%
Trip Net Cash Flow*	41%	33%	38.8%	36.8%	39%	37.7%
Trip Net Revenue*	49.2%	53.2%	49.8%	49.5%	52%	50.7%
Labor - Hired & Owner	34.7%	32.1%	34.4%	33.9%	31%	33.2%
Fuel & Supplies	16.1%	14.7%	15.7%	16.6%	17%	16%
Input Prices						
Fuel Price (per gallon)	$3.67	$2.64	$2.13	$2.34	$2.68	$2.69
Hire Crew Wage (per crew-day)	$343	$291	$261	$297	$244	$287
Productivity Measures						
Landings/Fuel Use (lbs/gallon)	13.3	12.6	11.4	10.7	10.5	12
Landings/Labor Use (lbs/crew-day)	221	204	169	196	176	193

Annual Economic Reports

Proposed Method

Economic Questions for the For-Hire Logbook

- Charter fee
- Fuel used (in gallons)
- Fuel price

Economic analysis will use all other logbook data fields as well, e.g.:

- Estimated labor costs using crew number
- Trip length, passengers, species target, region, season, etc. to help categorize trips

Reduce Burden by Random Sampling of Vessels for Economic Reporting

- Stratified random sample of vessels
- Exception: 1st year only, 20% pure random sample
- Selected vessels need to report econ data for one year
- Sampling without replacement of previous year's selected vessels, so no vessel selected two years in a row
- Develop strata using previous years' logbook data to minimize overall sample size while still being able to provide needed management advice
- Different sample sizes can be selected for each stratum:
  - A "base sample" focused on generating annual results for the overall population and major sub-populations
  - A changing "spot light" sample focused on one smaller subpopulations of vessels each year; vessels in this subpopulation would be over-sampled for one year in order to generate meaningful economic results; no time series
- Result based on sample surveys are estimates (with a margin of error) vs. 'facts' generated by a census

Census vs. Econ Sample vs. Post-stratified SOI – Segment of Interest

Overall logbooks (census) and econ sample

	Vessels	Trips
All Logbooks	1,770	36,962
Econ-Sample	373	8,312

Create SOIs as needed for analysis

SOI – Gulf Red Snapper

	Vessels	Trips
All Logbooks	402	3,783
Econ-Sample	92	751

SOI – SE Lionfish

	Vessels	Trips
All Logbooks	49	310
Econ-Sample	10	81

~~Illustration~~ of Econ Results using Logbook-linked Data

NOAA FISHERIES

Trip Averages (n=44,254)

	FL	AL	MS	LA	TX	Total
Obs. (# of Trips)	31,140	7,113	696	1,497	3,808	44,254
Anglers						
Hours						
Catch						
Charter Fee						
Crew						
Fuel, gallons						
Fuel, price						
Cost_Fuel						
Cost_Labor						
Trip Cash Flow						
CFpA						

NOAA FISHERIES

Trip Averages by Target Species

	Red Snapper	Snapper, Other	King Mackerel	Tuna	Billfish
Obs. (# of Trips)	15,162	7,911	978	1,599	293
Anglers					
Hours					
Catch					
Charter Fee					
Crew					
Fuel, gallons					
Fuel, price					
Cost_Fuel					
Cost_Labor					
Trip Cash Flow					
CFpA					

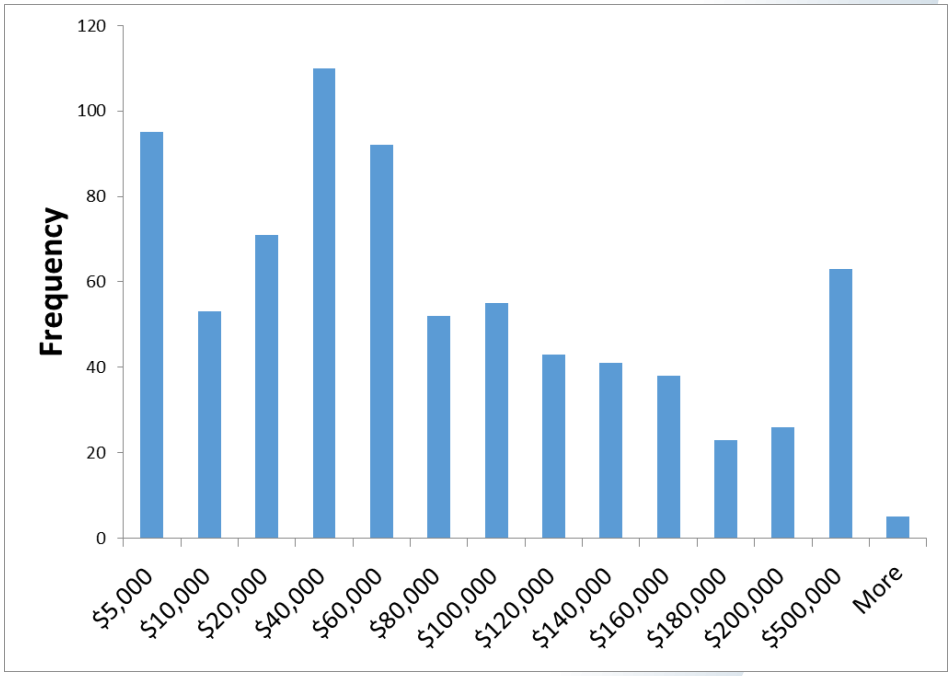
NOAA FISHERIES

Vessel-level Aggregation

Vessel Averages (n=767)

Vessels	767
Number of trips	58
Total fuel gallons	
Revenue - Charter fees	
Fuel cost	
Labor cost	
Total trip cash flow	

Histogram of Vessel Revenue



NOAA FISHERIES

Conclusion

- Economic data are essential for informing the economic effects portion of policy documents, allocating disaster relief funding, and science-based fisheries management in general (e.g., optimum yield, allocation).
- For a sample of vessels, for a one year period, add 3 economic questions to the for-hire logbook
- Adaptive, stratified sampling design to minimize sample size while generating quality results as needed by fishery management

Questions?

NOAA FISHERIES