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## **Costs and Returns Analysis for South Carolina Shrimp Trawlers**

by

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# Costs and Returns Analysis for South Carolina Shrimp Trawlers<sup>1</sup>

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## ABSTRACT

This document provides an explanation on how shrimp trawler owners/operators can analyze the effects of changing costs and ex-vessel prices on the profitability of operating a shrimp trawler. An Excel spreadsheet is provided with sample boat costs and revenues. The spreadsheet allows the trawler owner/operator to enter costs and revenues data for their own vessel. This can be used to estimate average costs of landing a pound of shrimp by the vessel owner/operator and the profit (loss) per pound of landed shrimp. As input costs vary for key items like fuel, ice, BRDS, etc, the trawler owner can estimate the impact of these input costs on the total average cost of landing a pound of shrimp. Similarly, as the ex-vessel (landed) price for a pound of shrimp changes, the vessel owner/operator can estimate the impact of these price changes on the profitability of operating the trawler.

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<sup>1</sup> Original spreadsheet program written by Wilder Ferreria, Dept. of Applied Economics and Statistics, Clemson University and modified by M. Henry.

# **COSTS AND RETURNS ANALYSIS FOR SOUTH CAROLINA SHRIMP TRAWLERS**

## **Introduction**

This document describes how a shrimp trawler owner/operator can estimate the impacts that changing conditions in the industry will have on the profitability of operating a trawler in South Carolina. Using an Excel spreadsheet, the shrimp trawler owner/operators can predict how changes in costs of operating a trawler and variations in prices received for shrimp landed in South Carolina affect profits. Data derived from sample interviews with South Carolina shrimpers are used to provide guidelines on revenues and costs of operating and owning a shrimp trawler. These data are only guidelines for a sample vessel. The actual values for a given vessel need to be entered in the spreadsheet.

After trawler data are entered for a given year, estimates of average variable costs and average total costs of landing a pound of shrimp are generated for the vessel. The before tax return to management of the vessel is then estimated. Note that the captain's share (labor) is included as a cost item along with crew shares, fuel costs, ice costs, etc.

This spreadsheet should be useful in several ways.

1. To document the current profitability of the trawler operations.
2. To help the trawler owner/operator make decisions on whether or not to increase or decrease the number of trips to catch shrimp.
3. To estimate the impact on profitability from changes in input costs and/or prices received for landed shrimp.
4. To help the trawler owner/operator decide whether to invest in new equipment or to cease operating the vessel.

For example,

- Generally, if the trawler owner/operator receives a price for landed shrimp that exceeds the average variable costs of landing a pound of shrimp, then daily trips to catch shrimp are warranted. Ex-vessel prices for shrimp that exceed average variable costs of operating the trawler also provide some contribution to fixed costs (ownership costs like licenses, interest on investment, depreciation, etc).
- However, if ex-vessel prices for landed shrimp are less than average variable costs, then daily trips to land shrimp result in increased losses and contribute nothing to fixed costs. In this case, daily trips should be avoided until ex-vessel prices increase above average variable costs in the short run (during the Fall season, for example).
- Over the longer run, ex-vessel prices need to exceed the average total cost of operating a shrimp trawler if trawling is to generate profits for the owner of the trawler.

### **Some Properties Unique to Trawling That Affect Vessel Profits:**

1. The catch rate varies by day and is subject to vagaries of weather, the number of other trawlers active in the region, and other factors affecting the shrimp population.
2. The size of shrimp landed and the care with which they are handled affect the ex-vessel price offered. Size distributions of the catch are not subject to control by the shrimper.
3. Shrimp can be headed on board (tails) the vessel or sold with heads on. Prices per pound are higher for tails but the weight of tails is about 60% of the head-on shrimp. Larger shrimp command higher prices per pound at the dock and are more likely to be headed on board than small shrimp.
4. Ex-vessel prices paid for shrimp are subject to substantial downward pressure from imported farm raised shrimp. Marketing wild caught shrimp as a premium product may enable domestic shrimpers to command price premiums over imported products in some markets.

### **Using the Spreadsheet**

The spreadsheet has five major sections:

1. Cash Income
2. Operating Cash Expenses: General Variable Costs
3. Operating Cash Expenses: Repair and Maintenance
4. Operating Cash Expenses: Annual Replacement Costs
5. Ownership Costs, Total Cost, and Average Costs of landing a pound of shrimp

The vessel owner/operator should enter data for each line in the spreadsheet under the **YOUR BOAT** column. Sample data for a 70 ft boat are listed along with estimates of unit costs for inputs. These are only guidelines to ensure that all costs are entered. Explanations of each section of the spreadsheet follow.

**Cash Income.** In this section, **only** the total revenues (receipts) you earn from operation of the shrimp trawler are counted.

SOUTH CAROLINA SHRIMP TRAWLING OPERATION - PROFITABILITY ANALYSIS CALENDER YEAR 2004											
ITEM		REVENUE/COST			REVENUE/COST		TOTAL		TOTAL		
A	B	C	D	E	F	G	H	I	J	K	
CASH INCOME*				SAMPLE BOAT	YOUR BOAT			SAMPLE	YOUR BOAT		
1	Average Price PLUS \$.25 per pound packing fee			\$1.96		SAMPLE 70 FT		YOUR		\$235,200	#VALUE!
2	Season Catch IN LBS			120,000		BOAT		BOAT			
3	Total Shrimp Revenue:					\$235,200.00		#VALUE!			
4	GROSS REVENUE FROM OTHER FISH USING SHRIMP VESSEL					\$0.00		#VALUE!			
5	TOTAL CASH INCOME :	*Total Cash Income before deductions: ice, fuel, crew share, or other deductions								\$235,200	#VALUE!
6	NUMBER OF DAYS SHRIMPED IN 2004: _			160							

**Line 1.** You need to enter the average price per pound of shrimp received at the docks where you land shrimp in **column F**. To find the average price paid per pound of shrimp divide total revenues from the landed shrimp (\$235,200 for the sample boat) by the total pounds landed (120,000 for the sample boat). This may require use of trip ticket receipts. Sum over the total pounds landed for all trips during the year. Sum the total revenues **from shrimp sales** on the trip tickets for the year. It is important that you count revenues **BEFORE** any deductions for gas, ice, crew shares, etc. It is also important that you count revenues **BEFORE** packing fees. In the sample boat below, the **average price is \$1.96**. A packing fee of \$.25 per pound is charged by the dock owner so the net price to the trawler is \$1.71. The charges for the packing fees are considered a variable cost to the trawler owner and so are deducted later in the spreadsheet (in the Operating Expenses Section) as you will see. If your gross revenues on the trip tickets are calculated as net price (after packing fees) times pounds landed, then the per pound packing fee (\$.25 below) must be added to the net price (\$1.71 for the sample boat) to arrive at the price needed in **Line 1**.

**Line 2.** In **column F**, enter and the total number of pounds landed. Some shrimp may be headed on board the vessel -- gaining in price per pound but losing total landed poundage. To find the average price paid per pound of shrimp divide total revenues from the landed shrimp by the total pounds (headed on board + heads on). This may require use of trip ticket receipts. Sum over the total pounds landed for all trips during the year.

**Line 3.** Total Shrimp Revenue in **column K** will be calculated from your entries on Lines 1 and 2. YOU DO NOT NEED TO ENTER ANY NUMBERS ON LINE 3. The #VALUE! entry will be replaced here by the formulae in the spreadsheet.

**Line 4.** If you have earned revenues from using your shrimp trawler other than sales of shrimp, enter them in **Column H of line 4**.

**Line 5.** Total Cash Income in **Column M** will be calculated. YOU DO NOT NEED TO ENTER ANY NUMBERS ON LINE 5. The #VALUE! entry will be replaced here by the formulae in the spreadsheet.

**Line 6.** In **column F**, enter the number of days that you shrimped in 2004 (or year for which you are entering costs and revenue data).

**2. Operating Cash Expenses: General Variable Costs.** In this section, expenses to operate the trawler for daily trips are entered. Repair and maintenance expenses will be entered on part 3. Note that all entries in column M will be calculated for you once you enter the values for your boat in column J as described below for each line.

SOUTH CAROLINA SHRIMP TRAWLING OPERATION - PROFITABILITY ANALYSIS CALENDER YEAR 2004												
ITEM	REVENUE/COST							TOTAL	TOTAL			
A	B	C	D	E	F	G	H	I	J	K	L	M
<b>CASH INCOME*</b>												
1	Average Price PLUS \$.25 per pound packing fee			\$1.96			SAMPLE 70 FT BOAT			YOUR BOAT	\$235,200	#VALUE!
2	Season Catch IN LBS			120,000								
3	Total Shrimp Revenue:						\$235,200.00			#VALUE!		
4	GROSS REVENUE FROM OTHER FISH USING SHRIMP VESSEL						\$0.00			#VALUE!		
5	TOTAL CASH INCOME :										\$235,200	#VALUE!
*Total Cash Income before deductions: ice, fuel, crew share, or other deductions												
6	NUMBER OF DAYS SHRIMPED IN 2004:			160								
<b>OPERATING CASH EXPENSES : GENERAL VARIABLE COSTS</b>												
				UNIT Cost	YRS		SAMPLE BOAT		YOUR BOAT			
7	ICE (20 Blks/week@\$10 PER BLOCK for 30 weeks)			\$10.00			\$6,000			1.00	\$6,000	#VALUE!
8	FUEL(15,000 GALLONS PER YEAR@ \$1.75 PER GALLON)			\$1.75			\$26,250			1.00	\$26,250	#VALUE!
9	OIL (150 GALLONS PER YEAR @\$6/ GALLON)			\$6.00			\$900			1.00	\$900	#VALUE!
10	GROCERIES (PAID BY Captain \$100 per week- 30 wks- 2 crew+ Cpt)			UNIT			\$3,000			1.00	\$3,000	#VALUE!
11	PACKING (\$.25 per pound)			\$0.25			\$30,000	#VALUE!		1.00	\$30,000	#VALUE!
12	CREW SHARES/WAGES(20% of Gross Revenues)			20%			\$47,040	#VALUE!		1.00	\$47,040	#VALUE!
13	DOCK ADVANCES FOR MISCELLANEOUS			UNIT			\$0			1.00	\$0	#VALUE!
14	Captain's Labor(20% of Gross Revenue)			20%			\$47,040	#VALUE!		1.00	\$47,040	#VALUE!
15	UTILITIES (e.g. DOCK ELECTRICITY, WATER, ETC.)			UNIT			\$1,000			1.00	\$1,000	#VALUE!
16	TRAWL CABLE AND LINE			\$3,000.00	3		\$1,000			1.00	\$1,000	#VALUE!
17	CHAIN			\$450.00	2		\$225			1.00	\$225	#VALUE!
18	PUMPS (Bilge, Deck, etc)			\$600.00	1		\$600			1.00	\$600	#VALUE!
19	Bag Webbing			\$1,000.00	2		\$500			1.00	\$500	#VALUE!
20	BUSINESS CAR AND TRUCK EXPENSES (1000mi/mo/6mo@.31/mi.)			\$0.31			\$1,860			1.00	\$1,860	#VALUE!
21	LEASE EXPENSES (e.g. OFFICE SPACE, VESSELS, ETC.)			UNIT			\$0			1.00	\$0	#VALUE!
22	PROFESSIONAL FEES (e.g. LEGAL, ACCOUNTANT, ETC.)			UNIT			\$300			1.00	\$300	#VALUE!
23	JOB RELATED INSURANCE CREW ONLY			UNIT			\$0			1.00	\$0	#VALUE!
24	TIE UP FEES AT DOCK (\$1/boat foot / month --12months - 70 ft boat)			\$1.00			\$840			1.00	\$840	#VALUE!

**Line 7 to Line 9.** Enter Ice, Fuel, and Oil expenses for the year in **column J**. Sample boat entries assume the input prices and quantities shown in parenthesis.

**Line 10.** Enter groceries paid for by the captain only in **column J**.

**Line 11.** Enter the packing fees paid to the dock in **column J** if different than the default value. The default value is calculated at \$.25 per pound times the number of pounds you entered on Line 2 (**this will replace the #VALUE! entry shown in column J above**). For the sample boat the default packing fees are 120,000 pounds times \$.25 per pound = \$30,000.

**Line 12.** Enter the crew shares/wages in **column J** if different from the default value (**this will replace the #VALUE! entry shown in column J above**). The default value is calculated as 20% of Cash Income shown on **Line 1, Column M**.

**Line 13.** Enter any dock advances used to cover short term expenses in column J that are deducted from gross revenues.

**Line 14.** Enter the Captain's share in **column J** if different from the default value (**this will replace the #VALUE! entry shown in column J above**). The default value is calculated as 20% of Cash Income shown on **Line 1, Column M**

**Line 15.** Enter cost of dock electricity, water and other utilities in **column J**.

**Lines 16 to 19.** Enter annual costs for trawl cable and line, chain, pumps, and webbing in **column J**. The assumed number of years that each item lasts in listed under the Yrs column. For example, trawl line and cable is assumed to last 3 years with at a cost of \$3,000 or \$1,000 on an annual basis for the sample boat.

**Lines 20 to 24.** Enter other business expenses: car/truck at \$.31 per mile; lease expenses, professional fees (accounting, legal); Job insurance for crew only; and tie up fees at the dock – all in **column J**.

**3. Operating Cash Expenses: Repair and Maintenance.** Note that all entries in column M will be calculated for you once you enter the values for your boat in column J as described below for each line.

SOUTH CAROLINA SHRIMP TRAWLING OPERATION - PROFITABILITY ANALYSIS CALENDER YEAR 2004													
ITEM							REVENUE/COST				TOTAL	TOTAL	
A	B	C	D	E	F	G	H	I	J	K	L	M	
<b>OPERATING CASH EXPENSES : REPAIR AND MAINTENANCE</b>							<b>SAMPLE</b>		<b>YOUR BOAT</b>		<b>SAMPLE</b>		<b>YOUR BOAT</b>
25	ELECTRONICS (ANNUAL REPAIR)				\$1,000.00	1	\$1,000				1.00	\$1,000	#VALUE!
26	ANNUAL Repaint -Bottom				\$2,000.00	1	\$2,000				1.00	\$2,000	#VALUE!
27	Fiberglass bottom				\$10,000.00	5	\$2,000				1.00	\$2,000	#VALUE!
28	ANNUAL Repaint - Rest of Boat				\$1,000.00	1	\$1,000				1.00	\$1,000	#VALUE!
29	NETS ANNUAL REPAIR				\$1,000.00	1	\$1,000				1.00	\$1,000	#VALUE!
30	ENGINE ( ANNUAL EQUIVALENT OVERHAUL)				\$12,000.00	3	\$4,000				1.00	\$4,000	#VALUE!
31	FREEZER (ANNUAL REPAIR/MAINT)				\$0.00	1	\$0				1.00	\$0	#VALUE!
32	General repair -- welding, etc)				\$1,500.00	1	\$1,500				1.00	\$1,500	#VALUE!
33	Zinc collars for railway				\$300.00	1	\$300				1.00	\$300	#VALUE!
34	OTHERS: RAILWAY, LIFT EXPENSES ( twice a year)				\$2,000.00	1	\$2,000				1.00	\$2,000	#VALUE!

**Line 25.** Enter annual repair expenses for electronic gear in **Column J**.

**Line 26.** Enter annual cost to repaint bottom of vessel -- excluding railway or lift expenses in **Column J**.

**Line 27.** If the vessel has a fiberglass bottom, provide annualized cost of repairs needed in **Column J**. (Note that these repairs are assumed to be required only every 5 years at a cost of \$10,000 or \$2,000 per year).

**Line 28.** Enter annual cost to repaint the non-bottom remainder of the boat in **Column J**.

**Line 29.** Enter the annual cost of net repairs in **Column J**.

**Line 30.** Enter the annualized cost of Engine repairs. (Note that these “major overhauls” of the engine are assumed to be needed every three years at a cost of \$12,000 or \$4,000 per year) in **Column J**.

**Line 31.** For freezer boats, enter the annual repairs to the freezer unit in **Column J**.

**Line 32.** Enter annual general repair costs – welding, etc in **Column J**.

**Line 33.** Enter costs for zinc collars needed for rail expenses in **Column J**.

**Line 34.** Enter costs for railway, lift expenses for the year in **Column J**.

**4. Operating Cash Expenses: Annual Replacement Costs.** Note that all entries in column M will be calculated for you once you enter the values for your boat in column J as described below for each line.

SOUTH CAROLINA SHRIMP TRAWLING OPERATION - PROFITABILITY ANALYSIS CALENDER YEAR 2004												
A	B	C	D	E	F	G	REVENUE/COST			TOTAL	TOTAL	
							H	I	J	K	L	M
<b>OPERATING CASH EXPENSES : ANNUAL REPLACEMENT COSTS*</b>												
35	NEW ELECTRONICS PURCHASED IN 2004				\$1,000.00	1	\$1,000			1.00	\$1,000	#VALUE!
36	NEW DOORS & SLEDS				\$2,200.00	1	\$2,200			1.00	\$2,200	#VALUE!
37	NEW BRD'S PURCHASED IN 2004 (4 @ \$45)				\$180.00	1	\$180			1.00	\$180	#VALUE!
38	NEW TED'S PURCHASED IN 2004 (4 nets, 2 per net @ \$300)				\$2,400.00	1	\$2,400			1.00	\$2,400	#VALUE!
39	Main NETS PURCHASED IN 2004 (2 @ \$2100 -Spectra)				\$4,200.00	1	\$4,200			1.00	\$4,200	#VALUE!
40	Small Nets/ Tri-net Doors (1@ \$150)				\$150.00	1	\$150			1.00	\$150	#VALUE!
41	Baskets/ deck equip/ scoops, shovels				\$500.00	1	\$500			1.00	\$500	#VALUE!
42	Boots( three people)				\$150.00	1	\$150			1.00	\$150	#VALUE!
43	Rain Gear ( three people)				\$300.00	2	\$150			1.00	\$150	#VALUE!
44	Floats(20@ \$9)				\$180.00	3	\$60			1.00	\$60	#VALUE!
45	Rope				\$1,000.00	1	\$1,000			1.00	\$1,000	#VALUE!
46	Blocks, Rigging , shackles				\$1,000.00	1	\$1,000			1.00	\$1,000	#VALUE!
47	Wench parts				\$2,000.00	1	\$2,000			1.00	\$2,000	#VALUE!
48	Sulfites, Everfresh( \$37 per month)				\$259.00	1	\$259			1.00	\$259	#VALUE!
49	Oil/air filters (3 per year @\$45)				\$135.00	1	\$135			1.00	\$135	#VALUE!
50	Flares, life prewervers, lights				\$200.00	2	\$100			1.00	\$100	\$0
51	OTHER: MISC DOCK EXPENSES						\$0			1.00	\$0	#VALUE!
* If equipment expenses are depreciated over several years enter 0 and include in annual depreciation charges below.												
52	TOTAL LOAN FOR OPERATING EXPENSES				\$0.00	**						
53	INTEREST RATE ON OPERATING LOAN				0.00	%	\$0.00	#VALUE!		1.00	\$0	#VALUE!
** Cash needed to cover operating expenses. It will be estimated if figure is not entered.												
54	TOTAL VARIABLE CASH EXPENSES :										\$196,839	#VALUE!

**Line 35.** Enter cost of new electronics that will be expensed in one year in **Column J**.

**Lines 36 to 40.** Enter annual costs of new doors/sleds; BRDs; TEDs, Main Nets; and Small Nets in **Column J**. (Note that some price guidelines are provided in the parenthesis for each line).

**Lines 41 to 42.** Enter the annual costs of baskets/deck equipment/scoops and shovels; and Boots in **Column J**.

**Line 43.** Enter the annualized cost of rain gear (assumed to last 2 years) in **Column J**.

**Line 44.** Enter the annual cost of Floats (assumed to last three years) in **Column J**.

**Lines 45 to 51.** Enter the annual costs of Rope; Blocks, rigging and shackles; Wench parts; Sulfites; Oil and Air Filters; Flares, lifer preservers, and lights; and Miscellaneous dock expenses in **Column J**.

**Lines 52 - 53.** If you obtained a loan for operating capital, enter the loan amount in Line 52 and loan interest rate in Line 53 in **column E**. Interest cost will be computed for you and entered in column J.

**Line 54.** After entering all of your operating expenses in Lines 1 to 53, the Total Variable Operating Expenses will be calculated and the result entered for you in column M.

## 5. Ownership Costs, Total Cost, and Average Costs per pound of Shrimp Landed.

SOUTH CAROLINA SHRIMP TRAWLING OPERATION - PROFITABILITY ANALYSIS CALENDER YEAR 2004															
A	B	C	D	E	F	G	REVENUE/COST		H	I	J	K	L	M	
	ITEM						SAMPLE	YOUR BOAT					TOTAL	TOTAL	
													SAMPLE	YOUR BOAT	
	<b>OWNERSHIP COSTS: TAXES, FEES AND INSURANCE</b>														
55	DEPRECIATION CHARGES(ELECTRONICS,anchor, propeller )***					UNIT	\$1,987						1.00	\$1,987	#VALUE!
56	DEPRECIATION CHARGES(VESSEL)***					UNIT	\$5,000						1.00	\$5,000	#VALUE!
57	PROPERTY TAXES PAID ON VESSEL AND EQUIPMENT					UNIT	\$2,000						1.00	\$2,000	#VALUE!
58	INTEREST ON INVESTMENT (For example, a \$100,000 boat at 5%)					UNIT	\$5,000						1.00	\$5,000	#VALUE!
59	HULL INSURANCE AND/OR PROPERTY INSURANCE					UNIT	\$7,000						1.00	\$7,000	#VALUE!
60	OTHER INSURANCE					UNIT	\$0						1.00	\$0	#VALUE!
61	TOTAL OWNERSHIP COSTS :													\$20,987	#VALUE!
	***This should include depreciation on vessel and all equipment as reported on Federal income tax forms only.														
	<b>OTHER FIXED COSTS:</b>														
62	COST OF LICENSES/REGULATORY FEES					UNIT	\$500						1.00	\$500	#VALUE!
63	OTHER						\$0						1.00	\$0	#VALUE!
64	TOTAL OTHER COSTS :													\$500	#VALUE!
65	TOTAL COST :													\$218,326	#VALUE!
66	Total Cost per pound of shrimp landed (ATC):						ATC	AVERAGE TOTAL COSTS PER POUND						\$1.82	#VALUE!
67	Total Variable Cost per pound of shrimp landed (AVC):						AVC	AVERAGE TOTAL VARIABLE COSTS PER POUND						\$1.64	#VALUE!
68	Total Variable Cost Per Day shrimped (AVPD):						AVPD	AVERAGE TOTAL VARIABLE COSTS PER DAY						\$1,230	#VALUE!
69	BEFORE TAX RETURN TO MANAGEMENT													\$16,874	#VALUE!

**Line 55.** Enter depreciation charges for equipment from your income tax returns **in Column J**.

**Line 56.** Enter depreciation charges for your vessel from your income tax returns **in Column J**.

**Line 57.** Enter property taxes paid on vessel and equipment **in Column J**.

**Line 58.** Enter the “interest on investment” in your vessel and equipment **in Column J**. This means that if you could sell your boat and equipment today for \$100,000 and receive a 5% annual rate of return on that \$100,000 you will be foregoing \$5,000 in interest income by not selling your boat. This is a cost of keeping your boat. So you need to estimate current market value for your boat and equipment, and using 5% estimate the cost of not selling you boat in Column J.

**Line 59.** Enter the cost of hull and/or property insurance **in Column J**.

**Line 60.** Enter the cost of other insurance associated with operations of your vessel **in Column J**.

**Line 61.** Total Ownership Cost will be calculated for you.

**Line 62.** Enter the cost of licenses and fees you paid to operate the vessel for commercial fishing **in Column J**.

**Line 63.** Enter any other costs of operating the vessel not entered in lines 1 to 62 **in Column J**.

**Line 64.** Total Other Costs will be calculated for you.

**Line 65.** Total Cost will be calculated for you.

**Line 66.** The average total cost per pound of landed shrimp will be calculated for you.

**Line 67.** The average variable cost per pound of landed shrimp will be calculated for you. This is the cost per pound of shrimp landed to operate the vessel on daily trips for the pounds of shrimp listed **in row 2**. It does not include ownership costs that you pay even if the vessel sits idle all year.

**Line 68.** The **average total VARIABLE cost per day** of shrimping is shown **in Column M for your vessel**; it is estimated for the sample boat as \$1,230 per day to shrimp as shown in column L. **Recall** that licenses, taxes, insurance and other fixed costs are paid even if you do not shrimp on a given day.

**Line 69.** The before tax return you receive for management of your vessel is shown **in Column M**. Note that your labor earnings as Captain are not included (they are estimated as the Captain’s share in line 14).

## Conclusions.

As indicated in the introduction, the results from the spreadsheet can be used in several ways: to document the current profitability of the trawler operations; to help the trawler owner/operator make decisions on whether or not to increase or decrease the number of trips to catch shrimp; to estimate the impact on profitability from changes in input costs and/or prices received for landed shrimp; and to help the trawler owner/operator decide whether to invest in new equipment or to cease operating the vessel.

Consider the information provided for the Sample boat on the spreadsheet.

- The trawler owner/operator received a price of \$1.96 for landed shrimp. This exceeds the **average variable costs (AVC)** of landing a pound of shrimp, \$1.64, found in the spreadsheet. So continuing to operate the trawler to catch shrimp is warranted.
- Over the longer run (beyond the current shrimp season), the ex-vessel price of \$1.96 also exceeds the **average total cost (ATC)** of operating a shrimp trawler, \$1.82, found in the spreadsheet. As long as landed price for shrimp exceeds **ATC** of catching shrimp, trawling will generate profits for the owner of the trawler. In this case, new investment in vessels and equipment may be warranted.
- Another way to use this information is to compare the **total variable cost per day shrimped** with expected cash income (price times pounds landed) from the days catch. In the case of the sample vessel, the variable cost to operate the vessel for the average day is \$1230. As long as the expected cash income from a days catch exceeds \$1230, it makes economic sense to continue shrimping.

What would happen to AVC, ATC and profitability if fuel costs doubled, or catch fell by 20%? Each or both of these effects can be entered into the spreadsheet in the appropriate rows. The impacts on ATC and AVC are estimated and the shrimp trawler owner must re-evaluate the decisions to continue shrimping. Of course, there will be “good years” and “bad years” for the landing of shrimp, shrimp prices, and input costs. What matters for the long run viability for commercial shrimping is that average price received over the life of a vessel exceeds the average total cost of landing a pound of shrimp.

A more comprehensive profitability information system is suggested for a shrimp trawler owner/operator to collect and use data **throughout the year**. The spreadsheet developed for this study might be expanded into an economic decision analysis application to facilitate current operating decisions and potential investment decisions. For example, one could answer questions about the optimal number of days to shrimp. Trawler owners are price “takers” at the dock such that the average revenue they receive for a pound of shrimp is fixed by the market (mainly imports). They could land 300 pounds or 400 pounds in a day but the average price received would not vary for a given size count (this also means the added or “marginal” revenue for another pound of landed shrimp is constant). However, reducing the catch by 100 pound per day (say at the end of the season or during baiting) will increase the average variable cost **per pound of landed shrimp**. Here the same fishing effort in a ten hour day requires the same variable outlays but yields fewer pounds landed. This means that reduced landings are associated with higher average costs per pound of shrimp because of rising “marginal”

costs to land the last 100 pounds of shrimp. The profit maximizing trawler owner will stop daily shrimping when the added cost of a day's trawl exceeds the added revenues realized from the landings.