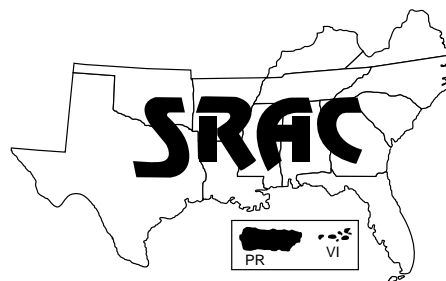


## Southern Regional Aquaculture Center



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# Hybrid Striped Bass Production in Ponds Enterprise Budget

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The hybrid striped bass industry grew rapidly in the 1990s, and is now the 4th largest aquaculture industry in the United States in dollar sales. In the southern region, more than 95 percent of the total hybrid production takes place in earthen ponds. Farms range in size from 1 to 500 or more acres.

An enterprise budget shows annual cost and return information and capital investment requirements for a particular crop. The following budget is based on recommended management practices and conservative estimates of hybrid yield, prices and cost for pond production in the southern region. For more information on growing practices for hybrid striped bass, see the Southern Regional Aquaculture Center publications #300-303.

## The production cycle

The hybrid production cycle begins in early spring when white and striped bass are crossed in a hatchery. Hybrid fry are raised in rearing ponds to 35- to 45-day-old fingerlings. At harvest, the fingerlings are graded by size and trained to pelleted feed.

Most farmers purchase feed-trained hybrids, and then grow these to market size over a 12- to 18-month period. The recommended pond size is 2 to 4 acres, though hybrids are grown in ponds as large as 10 acres. Fingerlings are available from May to June.

There are two methods of pond culture. In the first method, growers stock fingerlings (1 to 3 g in size) at a density of 3,000 to 5,000 fish per acre, and the fish remain in ponds for the entire 15- to 18-month grow-out cycle. Market-size fish weighing 1.25 to 2.5 pounds are harvested either by draining the pond or by selectively seining desired sizes.

In the second method, growers dedicate about one-fourth of available pond space to the growing of 1-g fingerlings purchased from hatcheries. Fingerlings are grown to about 100 g and then harvested (Phase I). Growth to 100 g requires 6 to 8 months. Fingerlings are then graded by size and restocked at a rate of 3,000 to 5,000 per acre for grow-out (Phase II). Fish remain in grow-out ponds for 9 to 12 months. Harvest size ranges from 1.25 to 2.50 pounds depending upon time in the ponds and stocking density.

The total grow-out time from 1- to 3-g fingerling to market size, and the total farm production for the two methods are about the same. Growers expect about 4,000 pounds per acre farm-wide. (For farms with nursery ponds, production is higher in the grow-out ponds—5,168 pounds per acre is assumed for the budgets presented here. This is because of the benefits of grading the fish midway through their growing cycle.)

The economics presented below are based on the second production scenario because a larger number of farmers use this method and more detailed economic figures are available for it. However, the costs and returns are approximately the same for both scenarios.

## Example farm and budgets

This budget example is based on a 33-acre farm with eleven 3-acre ponds. The budget assumes that the farm purchases 1-g fingerlings, stocks them into three nursery ponds, and harvests, grades, and restocks the fingerlings after 6 months into the eight grow-out ponds. Fingerlings are stocked into the nursery ponds at a density of 13,412 fish per acre and harvested 6 months later, typically December to February, when they

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have an average weight of 100 grams. Survival is 85 percent.

The Phase II fish are stocked at a density of 3,800 fish per acre into the eight grow-out ponds. Fish are harvested during the next fall and spring (October to May). Survival is 80 percent with an average size of 1.7 pounds. Average yield is 5,168 pounds per acre. The feed conversion rate is 2.4 pounds of feed per pound of fish grown. Fish are boxed whole, on ice, for sale.

### Variable costs

Variable costs are those expenses related directly to the quantity of hybrid striped bass produced for market. The costs of feed, fingerlings, electricity, labor, and the interest charge on operating capital are the major expenses.

Feed is the largest single cost. Fingerling ponds are fed two to four times daily with a 38 to 48 percent protein feed. Foodfish ponds are fed twice daily with a 38 percent protein feed.

Aeration cost is based on infrequent use during the winter and extensive use of both electrical and PTO aerators during the summer. Well pumping cost is based on the filling of all ponds once per year and turnover of the pond water an additional time each year.

Labor is hired for feeding, equipment maintenance and repair, oxygen management, transfer of fingerlings, and harvesting and boxing of fish for sale. Interest on operating capital is a charge for the use of the capital required to

purchase production inputs. Even if the farmer did not borrow funds from a commercial lender, this charge represents income that could have been earned by investing that money in a bank or some other investment opportunity.

The culture period from 1 g fingerling to market size is 1.5 to 2 years. Therefore, as see in Table 1, farmers will not generate income in the first year of production. Additional interest costs are incurred to sustain the farm until the first harvest in year 2. Table 2 presents operating costs for the second year of production and thereafter. In year 2, with an average yield of 5,168 pounds per acre, the variable cost per pound is \$1.60.

**Table 1. Annual cost and returns, Year 1, fingerling production, for a 33 water-acre hybrid striped bass farm with 3-acre ponds.**

Item	Unit	Quantity	Price or Cost/Unit (\$)	Value or Cost (\$)
Gross receipts				
Hybrid striped bass	lb.		2.40	
Variable costs				
Fingerlings	fish	107,294	0.20	21,459
1 <sup>st</sup> year fingerling feed	lb.	50,160	0.26	13,042
Chemicals	acre	33	100	3,300
Electricity				
aeration	hr.	3,960	0.85	3,366
water supply	hr.	2,151	1.50	3,226
Fuel				
aeration (PTO)	hr.	1,980	1.50	2,970
misc.	acre	83	15.00	1,238
Equipment maint. and repair	total	1	5,085	5,085
Levee repair	total	1	1,320	1,320
Labor (part-time)	month	12	1,500	18,000
Labor (harvest)	hour	8	---	---
Pescalator rental (move, grade fingerlings)	day	500	---	---
Interest on operating capital	dollar	55,879	0.11	6,147
<b>Total variable cost</b>				<b>80,651</b>
Fixed costs				
General overhead	acre	33	20	660
Taxes, insurance	acre	33	20	660
Depreciation	dollar	1	21,708	21,708
Interest charges (ponds, equipment, land)	dollar	1	21,373	21,373
<b>Total fixed cost</b>				<b>44,400</b>
<b>Total cost</b>				<b>125,051</b>

## Fixed costs

Fixed costs are those costs a farmer will have whether or not fish are produced. Depreciation, for example, is a charge that represents the amount of money that would have to be earned each year by the enterprise to eventually replace all the equipment when it wears out. It is not a cash cost, but if equipment cannot be

replaced, the farmer will eventually go out of business. Interest is charged for the same reasons as previously described for interest on operating capital. At average yields, the fixed costs are \$0.35 per pound of fish raised (Table 2).

Table 3 lists the capital investment items that would be required for a 33-acre farm composed of 3-acre ponds. A total of \$371,700 is esti-

mated as the required capital investment for this farm. Depreciation is calculated for items that have a definable useful life.

Capital costs on a per-acre basis are higher than for other pond-raised species. Pond construction costs are higher because the ponds are smaller, the cost of equipment per pond is greater, and harvest equipment is needed.

**Table 2. Annual cost and returns, Year 1 and thereafter, fingerlings and foodfish production, for a 33 water-acre hybrid striped bass farm with 3-acre ponds.**

Item	Unit	Quantity	Price or Cost/Unit (\$)	Value or Cost (\$)	Value/Cost % of total
Gross receipts					
Hybrid striped bass	lb.	124,032	2.40	297,677	
Variable costs					
Fingerlings	fish	107,294.00	0.20	21,459	9%
1 <sup>st</sup> year fingerling feed	lb.	21,459.00	0.26	5,579	2%
2 <sup>nd</sup> year feed	lb.	317,376.00	0.20	63,475	26%
Chemicals (lime, etc.)	acre	33.00	100.000	3,300	1%
Electricity					
aeration	hr.	24,060.00	0.85	20,451	8%
water supply	hr.	6,422.00	1.50	9,633	4%
Fuel					
aeration (PTO)	hr.	6,015.00	1.50	9,023	4%
misc.	acre	82.50	15.00	1,238	1%
Equipment maint. & repair	total	1.00	6,780.00	6,780	3%
Levee repair	total	1.00	1,320.00	1,320	1%
Labor (part-time)	month	12.00	1,500.00	18,000	7%
Labor (harvest)	hr.	7.50	320.00	2,400	1%
Pescalator rental (move, grade fingerlings)	day	4.0	500.00	2,000	1%
Packing boxes, ice	lb.	0.10	124,032	12,403	5%
Interest on operating capital	dollar	180,560	0.11	19,862	8%
Total variable cost				198,421	81%
Income above variable cost				99,255	
Fixed costs					
General overhead	acre	33.00	20.00	660	<1%
Taxes, insurance	acre	33.00	20.00	660	<1%
Depreciation	dollar	1.00	21,707	21,708	9%
Interest charges (ponds, equipment, land)	dollar	1.00	21,373	21,373	9%
Total fixed cost				44,400	19%
Total cost				242,822	100%
<b>Net returns to operator's labor and management</b>				<b>54,855</b>	
<b>Net returns/acre</b>				<b>1,662</b>	
<b>Breakeven price (per lb. sold)</b>					
to cover variable costs				<b>1.60</b>	
to cover total costs				<b>1.96</b>	

**Table 3. Capital investment costs for a 33 water-acre hybrid striped bass farm with 3-acre ponds.**

Item	Unit	Quantity	Cost/Unit (\$)	Total Cost (\$)
Land	acre	41	1,200	49,500
Pond construction				
ponds, ditching	acre	33	2,200	72,600
gravel, grass	pond	11	750	8,250
drainage structure,				
pipes and fittings	pond	11	500	5,500
electrical boxes,				
hookups, lines	pond	11	1,800	19,800
Water supply				
well and motor	well	1	20,000	20,000
pipe and installation	pond	11	1,500	16,500
Feed Bin	each	2	4,500	9,000
Total long-term investment				226,450
Equipment cost (Table 4)				145,250
Total investment				371,700
Investment per water acre				11,264

The total equipment cost for the farm is \$142,250, or \$4,310 per water-acre. Land and development cost per acre is \$5,362, for a total capital investment cost of \$11,263 per acre or \$371,700 for the farm.

### Total cost

To obtain total cost, add total fixed cost to total variable cost. Operating the example farm requires \$242,822 annually.

### Net returns

To obtain net returns, subtract total annual cost from gross receipts. The annual return to this farm's operator is based on an average yield of 5,168 pounds per acre at a price of \$2.40 per pound. This price is the approximate 2-year average for fresh hybrids grown in the U.S. (World Aquaculture Society 2001 presentation, James Carlberg, Kent SeaTech).

In year 2 and thereafter, this 33-acre farm provides the owner/operator with an annual income of \$54,855. The break-even price to cover variable costs is \$1.60 per pound and the break-even price to cover total cost is \$1.96 per pound.

It is important to note that the owner must either have another source of income to pay interest costs for the first year and a half of operation, or have arrangements with creditors to carry over interest charges. Carrying over interest into year 2 would result in an additional one-time charge of approximately \$25,000 in interest costs for the operation.

### Sensitivity analysis

Table 5 presents net returns to the operation based on varying levels of production per acre and price received per pound. The profitability of a hybrid farm is highly sensitive to these two variables. For example, a 15 percent reduction in price (from \$2.40 per pound to \$2.00 per pound) leaves the farm near break-even, while a 15 percent increase in price nearly doubles returns to the farm.

**Table 4. Equipment required for a 33 water-acre hybrid striped bass farm with 3-acre ponds.**

Item	Quantity	Cost (\$)	Useful Life/Years	Annual Depreciation
Feeder (1 ton, gas)	1	5,000	10	500
Electric aerators (10 HP)	11	42,900	5	8,580
Paddlewheel aerator (PTO)	3	12,900	10	1,290
Tractor (50 HP)	3	52,500	10	5,250
Chemical kit	1	200	2	100
Dissolved oxygen meter	1	800	3	267
Pick-up truck (1/2 ton)	1	18,000	5	3,600
Transport tank	1	1,000	4	250
Live car net	1	750	4	188
Harvest boom	1	2,500	10	250
Seine	1	3,200	6	533
Seine reel	1	4,000	10	400
Miscellaneous	1	1,500	3	500
Total		145,250		21,708

## Conclusion

Successful hybrid striped bass farming requires a substantial financial commitment and excellent management and marketing skills. The initial investment in land and facilities for the 33-acre example farm is \$371,000, with annual variable operating costs of

\$200,000. Those with the resources to enter the industry, typically farmers with existing land, equipment, livestock management experience, and strong relations with a creditor, are often dissuaded by the additional capital investment that must be made in specialized equipment and facilities. The fact that hybrids are

sold through unfamiliar seafood marketing channels also can be a deterrent. However, for those with the financial resources and marketing skills, hybrid farming can be a very lucrative enterprise.

**Table 5. Sensitivity of net returns to a change in production per acre and sale price per pound for a 33 water-acre hybrid striped bass farm.**

Sale price (\$)	lbs./acre					
	4,000	4,500	5,168	5,800	6,000	6,500
1.80	(75,022)	(50,422)	(21,564)	5,738	14,378	35,978
2.00	(52,822)	(28,822)	3,242	33,578	43,178	67,178
2.20	(33,622)	(7,222)	28,048	61,418	71,978	98,378
2.40	(14,422)	14,378	54,855	89,258	100,788	129,578
2.60	4,778	35,978	77,661	117,098	129,578	160,778
2.80	23,978	57,578	102,468	144,938	158,378	191,978
3.00	43,178	79,178	127,274	172,778	187,178	223,178

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