

LOUISIANA ALLIGATOR FARMING

1991 ECONOMIC IMPACT



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INTRODUCTION

Alligator production in the United States increased steadily between 1986 and 1989 (Joanen et al. 1990), primarily as the result of successful farming practices.¹ Harvests from an expanding farming industry increased nearly tenfold during 1986-89, though wild production increased by less than twofold. Most of the farming activity occurs in the southeastern U.S. and is led by Louisiana (66,500 alligators produced in 1989) and Florida (16,385 alligators produced in 1989).

The tenfold increase in farm-raised alligator production indicates that rapid changes took place in the industry. The rapid growth of natural resource-based businesses often requires new regulations, and this was the case with the Louisiana alligator farming industry. In mid 1990, for example, farmers faced new regulations regarding the minimum square footage requirements per alligator produced in confinement. Also, the discharge of waste water from farms became regulated. These regulations, along with others, were developed to foster a favorable business environment for producing high-quality hides. Thus, 1990 marked the point from which alligator production practices began to change.

This study involved interviews with farmers during the spring and summer of 1990. Not only were producers facing new regulations from that point forward, they were also adopting newer technology such as round growing structures and manufactured feed. In addition, with the greatly increased production, they faced uncertainty about market strength. The information collected in this study can serve as a benchmark of the economic impact of the industry from which the future can be measured. Farmers' records were sufficient to estimate the economic impact but not well enough developed to yield financial feasibility estimates. Interested individuals can contact Dr. Kenneth Roberts at Louisiana State University (504-388-2145) for a copy of the financial analysis software developed for alligator farmers.

Louisiana residents have been hunting alligators (*Alligator mississippiensis*) for their hides since before the turn of the century. Alligator farming, on the other hand, represents a much more recent activity from which commercial sales date back only to 1973 (Joanen et al. 1990). Production of farm-raised alligators has increased significantly during the past six years (Joanen, 1990). A total of 2,886 alligator hides was harvested from Louisiana farms in 1984, but by 1989 production had risen to 66,500. It is estimated that 150,000 alligators were produced

on Louisiana farms in 1990, indicating that more alligators were sold from Louisiana farms in 1990 than in the previous six years combined.

Much of the original research regarding closed-system alligator farming in Louisiana was conducted at the Rockefeller Refuge (Joanen and McNease 1971, 1974, 1975, 1987). Incorporating information gained from the early research at Rockefeller Refuge, farmers have continued to experiment with alligator hut design, feeding regimes, equipment, water heating, and waste treatment to develop farms that are based on efficient current technology. This efficiency is reflected in the growth rates of farm-raised alligators, which are generally two to three times the length and weight of wild alligators in the same age group (Joanen and McNease 1987 and Coulon 1988). Using new technology to grow alligators indoors at this accelerated rate has made it economically feasible to produce them in a controlled environment.

Alligator farms, like most other types of farms, operate at various production levels. Farmers may have from a few hundred to several thousand alligators on inventory each year. The vast majority of farm-raised alligators were typically grown to a length of four feet in the 1980s and then processed, even though alligators larger than four feet tend to sell at a premium on a per-foot basis.

The four-foot length has been the standard for two reasons. Up to four feet, alligators are still achieving high feed conversion rates (Joanen and McNease 1987), suggesting financially acceptable returns with respect to feed costs. Secondly, farmers are limited by space requirements. If older and larger alligators, which require more square feet of floor space to minimize fighting and stress, are not sold, the number of hatchlings that can be added each year is restricted. This, in turn, results in a lower rate of turnover and a reduction in long-run profitability for the farm. This second reason has also prompted farmers to consider selling the faster growing alligators when they reach a given size, which then allows the farmer to hold slower growing alligators longer. It has also been suggested that alligators be turned outside to ponds during their final spring and summer to reduce crowding and allow the growing of larger alligators.

Alligator farming practices provide benefits to the state in many areas. Some are realized in the form of income generated for farmers, laborers, and manufacturers of feeds and equipment. Jobs are also created both on and off the farm. These benefits are not well documented and provide the basis for this current study. In this way, a basic reference point from which to measure and evaluate change can be established.

¹Farm is used to refer to the production of alligators in a housing system that may or may not also include the use of fenced impoundments.

OBJECTIVES

The general goal of the research was to depict the total economic impact from the harvest and farming of alligators in Louisiana. Specific objectives to achieve the goal are:

1. To identify and specify the costs of alligator production systems for hides and meat.
2. Estimate the revenues from both the wild-caught and farm-raised alligator industries by identifying the hide footage, meat yield, and associated prices.
3. Specify the costs incurred by farming businesses that have spin-off or multiplier effects.

DATA

The successful completion of this study required the use of data from the Fur and Refuge Division of the Louisiana Department of Wildlife and Fisheries (LDWF) and the collection of primary data from alligator farmers. Data indicating the number of hides, footage, estimated average price, and wild-versus-farmed supply were provided by Fur and Refuge Division staff, while information about revenue and production costs came from alligator farmers in Louisiana.

Because of the wide-ranging production potential of farms, it was important to study various farm sizes separately. Three distinct size categories were selected for this study—small, medium, and large. A small farm was defined as one with fewer than 800 alligators, excluding alligators being held as brood stock. Similarly, medium farms held from 800 to 3,000 alligators, while large farms held more than 3,000 alligators. Each farm was in the business of producing alligators for hides and meat. A random drawing was conducted among alligator farmers for each of the three size categories, and the names of seven small, nine medium, and eight large alligator farms were selected for the study. In-depth, personal interviews were then conducted with these 24 farmers. The rest of the alligator farmers on the list (supplied by the Fur and Refuge Division) were then sent a shorter mail survey. Of the 41 mail surveys sent out, 15 were completed and returned.

RESULTS

Farmers were surveyed in the spring and summer of 1990 concerning their farming practices. Since the industry is changing rapidly, the survey period must be kept in mind. The personal surveys, in addition to providing the detailed cost information needed to complete the project's primary goal, also yielded other valuable information that is discussed here.

Farmers grew their alligators for an average of 14.8 months before processing them. Thus, it took the average farmer almost 15 months after hatching to raise his alligators to a length of four feet. These alligators, on average, are raised in huts at a temperature of 89° F, the temperature recommended by published research (Joanen and McNease 1989).

The average alligator farm was 8.6 acres in size and contained an average of 2.5 gator huts. Each hut was about 1,801 square feet, and cost \$23,615 to build. This cost was for the complete hut and included the costs of blown-in insulation, hot water heaters, water pipes in the cement slab, and drains for the floors. Construction materials were generally wood and concrete block. The majority of huts were heated using a system in which water was heated with gas and circulated through pipes in the concrete slab. The tanks were refilled with heated water daily.

The surveys revealed that a number of alligator farmers used assets they had originally purchased for other farming activities. Examples include those also used in row crop or dairy operations, such as tractors, trucks, and land. The use of these assets tended to reduce beginning costs incurred by some alligator farmers. Therefore, costs incurred by an alligator farmer not previously involved in the farming industry may be greater than for those who added alligators to their existing farms.

COSTS

The costs associated with operating a production facility (farm) may be grouped in various ways. An obvious division of costs is between those incurred during the start-up of the farming operation and those generated during normal operation of the farm. Throughout this paper these expenses will be referred to as *start-up* and *operating* costs. The start-up and operating costs incurred by Louisiana alligator farmers are studied for small, medium, and large farm categories.

Start-up and operating costs were estimated both in total and on the maximum number of alligators that could be held when farms were operating at capacity. A farm's capacity, instead of the number of alligators sold by a farm, was selected to calculate the average operating cost per alligator because (1) there were often two crops of alligators being raised simultaneously, and (2) first-year farmers had not harvested their initial crops. The production of two age classes at once made it difficult for farmers to break out operating expenses; therefore, assigning a percentage of operating costs to each class was not possible. Farmers new to the industry had not yet marketed any alligators, and for that reason they

could not equate operating expenses with the number of alligators sold.

Using the capacity method of estimating average operating expenses, on a per-alligator basis, tends to underestimate the actual cost. Underestimates occur because the total operating cost is divided by a larger number of alligators than is actually being raised (rarely do producers operate at capacity in alligator farming or any other business).

Start-Up Costs

Costs associated with establishing an alligator farm are those for land, buildings, ponds, fencing, production machinery, processing equipment, and eggs and hatchlings. Estimates of these start-up costs were obtained for the three size classifications of alligator farms from the survey data.

The estimated total start-up cost associated with all alligators on all farms as of January 1990 was calculated to be approximately \$13.8 million (Table 1). Buildings used to house the alligators contributed most to the start-up costs of alligator farms. These buildings, valued at almost \$5.2 million, represented 37 percent of the total start-up costs. Production machinery, costing about \$2.9 million, was the second largest start-up expense for alligator farmers. The third largest expense when starting an alligator farm was eggs and hatchlings. Eggs and hatchlings cost farmers approximately \$2.6 million and, in anticipation of future price increases, may soon be the second largest start-up cost. Other

buildings (\$1.2 million), ponds and fences (\$9 million), land (\$7 million), and processing equipment (\$2 million) accounted for the rest of the start-up costs. Results for each of the three size categories will be listed in terms of dollars per alligator held at farm capacity. This procedure provides a base for easy comparison among farms of different sizes. Total costs for each size category can be calculated by multiplying the cost per alligator (in that category) by the total number of alligators held by farmers with that size farm.

Small alligator farms had investments, i.e., start-up costs, of slightly over \$115 per alligator. Medium farms invested approximately \$91 per alligator, and large farms had investments of just under \$52 per alligator. The start-up costs indicate that, as farms get larger, the cost per alligator decreases. Total start-up costs, however, increased with farm size because of the increased number of alligators housed on the larger farms. For example, total start-up costs for a small farm were estimated to equal about \$59,862, based on the average housing of 520 alligators. Start-up investments for medium and large farms were estimated to equal \$124,975 and \$281,527, respectively, based on the production of 1,372 and 5,437 alligators.

It is noteworthy that medium farms had significantly higher egg costs. This may be related to the time period when egg contracts were secured with landowners and the LDWF egg supplement program. Some small farms participating in the

LDWF egg supplement program may have been able to secure all or most of their eggs from the LDWF at no cost. The egg supplement program, therefore, tends to reduce small farm egg cost per alligator. Large farms have, in general, been in business longer than farms in the small or medium classifications, which may have given them an advantage in obtaining long-term egg contracts with landowners at lower costs (egg prices have been increasing recently because of greater demand). Medium farms, on the other hand, typically have not been in business for a sufficient period of time to secure long-term egg contracts at the older, lower price. They also may not be able to meet their egg needs through the

Table 1. Estimated Start-Up Costs for Louisiana Alligator Farmers on a Per Alligator Capacity Basis and in Total, 1989.

Item	Farm Size			Average	Total Cost*
	Small	Medium	Large		
Land	\$ 14.77	\$ 4.15	\$ 2.31	\$ 3.45	\$ 740,184
Buildings Housing Alligators	32.97	30.72	20.62	24.07	5,163,809
Other Buildings	5.95	9.23	4.74	5.56	1,192,129
Ponds and Fences	15.47	7.71	3.05	4.38	939,236
Production Machinery	30.80	19.03	10.41	13.55	2,907,260
Processing Equipment	4.16	3.33	0.85	1.14	244,584
Eggs/Hatchlings	11.00	16.92	9.80	12.20	2,617,461
Total	\$115.12	\$91.09	\$51.78	\$64.35	\$13,804,663

* Average cost multiplied by the number of alligators on farms (214,546) as of January 1990 (LDWF data).

LDWF egg supplement program. Therefore, farmers with medium farms may be entering into agreements with landowners at higher per-egg costs than farmers with large farms.

Operating expenses

Operating costs consist of feed, labor, repairs, interest on loans, and other costs.² Expenses were estimated at a total of \$7.1 million³ for all alligator farms in 1989 (Table 2). Feed costs were the largest component of operating expenses for alligator farmers in Louisiana, accounting for 42 percent of operating expenses overall. In dollar terms, it cost almost \$14 to feed an alligator for one year, or \$17 to feed it to a length of four feet in a 14.8-month

actually operated at 90 percent capacity, and had a mortality rate equal to the average given in the personal surveys, the operating expenses for small, medium, and large farms would be \$30.69, \$48.74, and \$30.18, respectively. These operating expenses were calculated using averages of 520 alligators for small farms, 1372 alligators for medium farms, and 5437 alligators for large farms. Average mortality rates for the three farm sizes were 2.87, 2.73, and 5.01 percent, respectively. Comparing these operating expenses with those listed in Table 2 indicates a \$3.86, \$6.07, and \$4.38 increase per alligator in the small, medium, and large farm classes, respectively.

An important source of feed for farm-raised alligators was processed pellets. This dry feed was generally purchased for \$.27 per pound. Other feeds given to alligators were nutria, fish, beef, chicken, and horse meat. Nutria, the preferred feed, was not always available. The purchase price of nutria, when available, ranged from \$.10 to \$.27 per pound. Fish prices were \$.02 to \$.21 per pound. Horse meat and beef had a price range of \$.16 to \$.20 per pound. Chicken was the least expensive feed on a per-pound basis, ranging in price from \$.05 to \$.13 per pound. While chicken was the least expensive feed, it was also one of the least preferred.

Annual operating expenses were greatest for medium alligator farms, on a per-alligator basis. Medium-farm operators spent over \$42 per alligator in 1989, indicating total grow-out costs of \$51 over 14.8 months. One farmer in the medium category listed feed costs that were much higher than other farmers' feed costs in this size category. Excluding that farmer from

the results yielded an average annual operating expense for medium farmers of approximately \$37 per alligator. Small farmers spent just under \$27 per year (\$33 for 14.8 months) and large farmers spent just under \$26 per alligator (\$32 for 14.8 months). Because this was a first attempt at studying the Louisiana alligator farming industry, size classifications were selected somewhat arbitrarily and may require fine tuning in future studies. The medium classification showed much larger annual operating costs than other size categories, indicating that it may be appropriate to subdivide this category to better understand which farms incur these higher costs.

The explanation of higher operating expenses for medium farms may rest in the management.

Table 2. Estimated Annual Operating Expenses for Louisiana Alligator Farms on a Per Alligator Basis and in Total, 1989.

Item	Farm Size			Average	Total Cost*
	Small	Medium	Large		
Feed	\$ 10.21	\$ 16.42	\$ 12.14	\$ 13.83	\$ 2,967,171
Labor	4.19	5.94	5.09	6.75	1,448,187
Repairs	1.15	2.52	2.05	2.14	459,130
Other	8.74	9.58	4.09	6.26	1,342,224
Loan Interest**	2.54	8.21	2.43	3.90	836,729
Total	\$26.83	\$42.67	\$25.80	\$32.88	\$7,053,441

* Average cost multiplied by the number of alligators on farms (214,546) as of January 1990 (LDWF data).

** Calculated at eight percent interest.

NOTE: If farms with high feed costs were excluded, medium farms' total operating expenses would have been \$38.01.

growing period. Among the three farm categories, feed costs for large farms represented 47 percent of the total operating expenses. Both small and medium farms had feed costs that were 38 percent of their annual operating expenses.

As previously discussed, the stated procedure for calculating operating expenses tends to underestimate the actual cost. For example, if farmers

² Other costs are the yearly costs of electricity, gas, fuel, tags, salt, insurance, and other goods purchased each year to produce and process alligators.

³ These estimates were calculated by dividing the total cost of each item listed on the survey by the number of alligators the farm could hold. The result yielded the average cost per alligator for each item. Total cost for the industry was then calculated by multiplying the average cost per alligator by the total number of alligators on farms (214,546) as of January 1990.

Small farms are basically owner-operated and small enough that no outside labor is required for efficient operation. Large farms, on the other hand, often hire managers whose sole responsibility is to oversee the farm's operation. A manager who is able to keep tight control of the farm's operation may, in conjunction with the owner, be able to efficiently operate a large alligator farming business. Medium farms are mixed on the practice of hiring outside labor and management. Inefficiencies may result in either situation. Farmers not hiring outside labor may be "spread too thin" and, thus, not be able to keep tight enough controls on the day-to-day costs of operating the farm. Medium operations that do hire outside labor may not have enough work to keep them fully employed. In this case, the cost of labor on a per-alligator basis is higher than in the large farm category. It was also evident that medium farms had much higher interest expenses. Small farms are self-financed and the largest farms are probably investor-owned. The medium farm is again between these situations and consequently borrows money to begin operation.

REVENUES

The revenues generated by alligator farming are the motivating force driving the industry.

Revenue is the total dollar value of output supplied by the industry. Determining the revenues also allows the economic impact of alligator farming to be studied. It is also possible to estimate the number of jobs created by the industry, earnings (profits) for the industry, and the additional value output produced by the market because of the presence of alligator farmers.

Revenues generated from alligators have expanded for both wild-caught (Table 3) and farm-raised (Table 4) alligators over recent years. Wild-caught alligators are those taken legally by licensed hunters in Louisiana.

In 1972, 1,350 wild alligators were taken in Louisiana, and their skins were valued at \$75,505.

Table 3. Revenues from Wild-Caught Alligators in Louisiana.

Year	Number	Average Length	Skin Revenues	Meat Revenues	Total Revenues
1972	1,350	6.11	\$ 75,505	\$ 0	\$ 75,505
1973	2,921	7.00	268,994	0	268,994
1974	0	0.00	0	0	0
1975	4,420	7.05	258,791	0	258,791
1976	4,389	7.01	512,240	0	512,240
1977	5,474	7.04	488,499	0	488,499
1978	0	0.00	0	0	0
1979	16,300	7.00	1,711,500	125,000	1,836,500
1980	17,692	6.08	1,609,972	125,000	1,734,972
1981	14,870	6.11	1,821,575	125,000	1,946,575
1982	17,142	6.10	1,621,633	125,000	1,746,633
1983	16,154	6.11	1,452,568	125,000	1,577,568
1984	17,389	7.00	2,556,183	675,000	3,231,183
1985	16,691	7.10	2,482,619	1,395,000	3,877,619
1986	22,429	6.11	3,611,000	2,250,000	5,861,000
1987	23,892	7.00	6,689,760	3,000,000	9,689,760
1988	23,526	7.00	7,905,024	3,000,000	10,905,024
1989	24,953	7.03	9,011,625	3,000,000	12,011,625
Total	229,592		\$42,077,488	\$13,945,000	\$56,022,488

Source: LDWF alligator management data from the Fur and Refuge Division.

By 1980, the number of wild-caught alligators in Louisiana increased to 17,692 and had a total value, skins plus meat, of approximately \$1.7 million. The total for 1989 was 24,953 alligators valued at over \$12.0 million dollars. The figures show an almost twentyfold increase in alligators harvested, and a more than hundredfold increase in revenues generated by hunters from 1972 to 1989.

Fur and Refuge Division records indicate that 2,886 alligators were sold by seven farmers in 1984. Seventy farmers sold 66,500 alligators in 1989. These alligators averaged approximately four feet in length and yielded about 4.5 pounds of boneless meat each. Skin prices, on a per-foot basis, rose steadily over the five years. Farm-raised alligator

Table 4. Revenues From Farm-Raised Alligators in Louisiana.

Year	Number	Estimated Length	Estimated Price (ft)	Skin* Revenues	Meat** Revenues	Total Revenues
1984	2,886	4.00	\$ 13.08	\$ 151,014	\$ 126,549	\$ 277,563
1985	4,580	4.00	13.05	239,084	207,525	446,608
1986	5,708	4.00	16.41	374,770	331,297	706,067
1987	10,676	4.00	24.92	1,064,067	974,685	2,038,752
1988	26,579	4.00	29.90	3,178,925	3,032,694	6,211,619
1989	66,500	4.00	32.00	8,512,000	1,197,000	9,709,000
Total	116,929			\$13,519,859	\$5,869,751	\$19,389,610

Source: LDWF alligator management data from the Fur and Refuge Division.

* Farm skins were listed as selling for \$32 per foot in 1989. Other years' prices were assumed to increase at the same percentage rate as those for wild-caught alligators.

**Meat revenues were listed as \$4.00 per boneless pound in 1989. The other years used \$4.00 per pound deflated by the CPI. This method may tend to over-estimate the meat's revenue.

prices in 1989 averaged \$32 per foot for skins and about \$4 per pound for boneless meat. These figures indicate that Louisiana alligator farmers had revenues over \$9.7 million for 1989, compared with less than \$200,000 in 1984. This suggests that total farm revenues increased fiftyfold from 1984 to 1989. The revenue increases reveal the very rapid growth that has been taking place in the Louisiana alligator farming business over the last five years.

INDUSTRY ECONOMIC IMPACT

The economic impact of alligator farming on Louisiana occurs both directly and indirectly. It is seen directly in the revenues generated by alligator farmers and the costs that they incur. The indirect effects, however, are not as easily seen, though it is possible to estimate them by using multipliers. A multiplier shows the additional economic impact that an expenditure has on an economy as it is spent.

Several multipliers are used to study the Louisiana economy and they differ depending upon the industry being analyzed. Of the various multipliers, the one for the animal meat industry most closely resembles the practices of the alligator industry and was therefore used for the current study (Regional Input-Output Modeling System, 1988). The results obtained by using this multiplier are expressed in 1987 dollars. Because of inflationary effects since 1987, the actual impacts are understated.

Output (Sales) Impacts

The output multiplier allows changes in sales for all industries to be estimated as a result of alligator industry sales. Output impacts represent the change in sales that occurs in the industries listed in Table 5 as a result of out-of-state sales of alligator products.

Total revenues generated because of Louisiana alligator sales were estimated to be over \$37.9 million in 1989. Of this figure, \$24.1 million was realized by the industry category, agricultural products and agricultural, forestry, and fishery services. Just under \$5.7 million worth of output was in the households category, reflecting wages, salaries, and other income. Over \$3.2 million

dollars were generated in the manufacturing sector of food and kindred products and tobacco. Other industries that had over \$1.0 million in sales because of the Louisiana alligator industry were chemical and petroleum refining, wholesale trade, and real estate.

Alligator farming accounted for 45 percent of the totals listed above. Agricultural products and agricultural, forestry, and fishery services added about \$10.8 million in output for 1989. Households increased by over \$2.5 million and sales of food and kindred products increased by over \$1.4 million for 1989. The total sales resulting from Louisiana alligator farms was estimated to be slightly under \$17.0 million.

Employment Impacts

Employment multipliers estimate the number of jobs that are generated because of alligator sales. The multiplier indicates the number of full-time jobs created for each million dollars of output (revenue). Following through with these simple calculations reveals that approximately 182 Louisiana jobs were supported by alligator farming in 1989 (Table 6), while an additional 225 jobs resulted from the wild harvest of alligators. Together, the jobs created by wild and farmed alligators total 407. The job multipliers listed (Table 6) are also broken down by which industries receive the created jobs. According to the calculations, 24 jobs were created in wholesale trade, 28 jobs were created in retail trade, 14 jobs were created in the transportation sector, and 14 jobs

Table 5. Impacts on Output (Sales) in Louisiana From 1989 Alligator Industry Sales.

Industry	Source		Total
	Farm	Wild	
Ag. products and Ag. forestry, and fishery services	\$10,775,923	\$13,331,584	\$24,107,507
Forestry and fishery products	7,113	8,880	15,913
Coal mining	889	1,100	1,989
Crude petroleum and natural gas	133,365	164,995	298,360
Miscellaneous mining	13,337	16,499	29,836
New construction	0	0	0
Maintenance and repair construction	178,710	221,093	399,803
Food and kindred products and tobacco	1,440,346	1,781,944	3,222,290
Textile mill products	2,667	3,300	5,967
Apparel	33,786	41,799	75,585
Paper and allied products	34,675	42,899	77,574
Printing and publishing	31,119	38,499	69,618
Chemicals and petroleum refining	545,909	675,379	1,221,288
Rubber and leather products	8,002	\$9,900	17,902
Lumber and wood products and furniture	14,226	17,599	31,825
Stone, clay, and glass products	13,337	16,499	29,836
Primary metal products	7,113	8,800	15,913
Fabricated metal products	19,560	24,199	43,759
Machinery, except electrical	37,342	46,199	83,541
Electric and electronic equipment	13,337	16,499	29,836
Motor vehicles and equipment	32,008	39,599	71,607
Transportation equip., except motor vehicles	8,002	9,900	17,902
Instruments and related products	889	1,100	1,989
Miscellaneous manufacturing industries	5,335	6,600	11,935
Transportation	414,322	512,584	926,906
Communication	117,362	145,195	262,557
Electric, gas, water, and sanitary services	278,289	344,289	622,578
Wholesale trade	673,051	832,674	1,505,725
Retail trade	327,190	404,787	731,977
Finance	227,610	281,591	509,201
Insurance	138,700	171,595	310,295
Real estate	538,796	666,579	1,205,375
Hotels and lodging places and amusements	51,568	63,798	115,366
Personal services	51,568	63,798	115,366
Business services	207,161	256,292	463,453
Eating and drinking places	160,038	197,994	358,032
Health services	220,497	272,791	493,288
Miscellaneous services	190,268	235,393	425,661
Households	2,540,166	3,142,602	5,682,768
Total	\$16,953,410	\$20,974,145	\$37,927,555

Source. Calculated from alligator survey data and Regional Input-Output Modelings System (RIMS II) System (RIMS III). Regional Economic Analysis Division, Bureau of Economic Analysis.

were created in business services. In total there are 39 industries listed, and of that total, 22 benefited from the sale of alligators.

Earnings (Profits) Impacts

Earnings multipliers represent the profits generated by specific industries because of alligator sales and can be defined as the monies retained after financial obligations are met. Earnings that the 39 primary state industries receive from revenues generated by alligator sales are given in Table 7.

The earnings estimated for each industry are not to be regarded as exact, but should be seen as the best possible estimate according to available data.

Total earnings from economic activity associated with the alligator industry were estimated to be almost \$5.7 million during 1989. The industry category, agricultural products and agricultural, forestry, and fishery services, was estimated to received over \$2.3 million in earnings. Other industries that received over \$2 million in earnings indirectly from alligator sales are wholesale trade, retail trade, transportation, health services, business services, and food and kindred products and tobacco.

Alligators raised on farms accounted for 45 percent of the state's total earnings in 1989, while wild-caught alligators accounted for the remaining 55 percent. This suggests that farmers earned over \$1 million dollars raising alligators in 1989. With approximately 70 farmers selling alligators in 1989, the average farmer would have generated \$14,286 in earnings.

SUMMARY

The production of farm-raised alligators increased from 2,886 in 1984 to 66,500 in 1989. Wild alligator production, by comparison, increased from 17,389 in 1984 to 24,953 in 1989. Estimates indicate that annual farm production is expected to reach the 150,000 alligators in 1990 (Joanen 1990).

In addition to production, the number of alligator farms in Louisiana has steadily increased over the past six years, growing from seven in 1984 to 70

Table 6. Impacts on Employment in Louisiana From 1989 Alligator Industry Sales.

Industry	Source		
	Farm	Wild	Total
Ag. products and ag., forestry, and fishery services	103	128	231
Forestry and fishery products	0	0	0
Coal mining	0	0	0
Crude petroleum and natural gas	1	1	2
Miscellaneous mining	0	0	0
New construction	0	0	0
Maintenance and repair construction	4	4	8
Food and kindred products and tobacco	4	5	9
Textile mill products	0	0	0
Apparel	1	1	2
Paper and allied products	0	0	0
Printing and publishing	1	1	2
Chemicals and petroleum refining	1	1	2
Rubber and leather products	0	0	0
Lumber and wood products and furniture	0	0	0
Stone, clay, and glass products	0	0	0
Primary metal products	0	0	0
Fabricated metal products	0	0	0
Machinery, except electrical	0	0	0
Electric and electronic equipment	0	0	0
Motor vehicles and equipment	0	0	0
Transportation equip., except motor vehicles	0	0	0
Instruments and related products	0	0	0
Miscellaneous manufacturing industries	0	0	0
Transportation	7	9	16
Communication	1	1	2
Electric, gas, water, and sanitary services	1	1	2
Wholesale trade	11	13	24
Retail trade	12	15	27
Finance	4	4	8
Insurance	2	2	4
Real estate	4	5	9
Hotels and lodging places and amusements	2	2	4
Personal services	2	2	4
Business services	4	5	9
Eating and drinking places	6	8	14
Health services	5	7	12
Miscellaneous services	4	4	8
Households	2	2	4
Total	182	221	403

Source: Calculated from alligator survey data and Regional Input-Output Modelings System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

in 1989. Over 125 were in business by the end of 1990. Future increases in the number of farms could occur, thus increasing the economic impact.

Costs associated with starting an alligator farm were calculated for three sizes of alligator farms. The start-up costs for all alligator farms in business during 1989 were estimated at \$13.8 million. The construction of buildings used to house alligators accounted for \$5.2 million of the

total cost of starting the farms, by far the largest component of start-up costs.

Small farms cost more, on a per-alligator capacity basis, to start than the other two sizes. Small, medium, and large farms spent \$115, \$91, and \$52 per alligator capacity, respectively, in start-up costs. However, overall start-up costs were \$281,527 for large farms, \$124,975 for medium farms, and \$59,862 for small farms.

Annual operating expenses were estimated to be \$7.1 million for Louisiana alligator farms in 1989. Like start-up costs, operating expenses were calculated for three sizes of alligator farms. Medium alligator farms spent \$42 in operating expenses for each alligator during 1989. Small and large farms spent \$27 and \$26 per alligator in operating expenses, respectively. Management was thought to be the major reason that medium farms had higher operating costs than small or large alligator farms.

Revenues generated by alligator farms from alligator skin and meat sales in 1989 were approximately \$9.7 million. Sales of skins and meat from wild-caught alligator in 1989 were over \$12.0 million. In each case, revenues have shown a pattern of increase over recent years.

As farm record-keeping improves and allows for crop-by-crop analysis, the financial information will also improve. Although the purpose of the study did not include estimating financial performance, the costs and revenues indicate that alligator farming was profitable in 1989. However, increased demand for alligator eggs and hatchlings may lead to higher costs. Along with increased demand for inputs (eggs and hatchlings), the supply of skins and meat may be expanding too

rapidly for the market to continue paying the relatively high historical prices such as those observed in 1989. This possible excess supply may then exert downward pressure on prices paid for raw alligator skins. The result could be a cost-price squeeze evolving at the same time that problems seem to be arising with increased incidence of diseases. Other problems confronting Louisiana alligator farmers are a lack of in-state tanning

Table 7. Impacts on Earnings in Louisiana From 1989 Alligator Industry Sales.

Industry	Source		
	Farm	Wild	Total
Ag. products and ag., forestry, and fishery services	\$1,040,250	\$1,286,960	\$2,327,210
Forestry and	0	0	0
Crude petroleum and natural gas	13,337	16,499	29,836
Miscellaneous mining	2,667	3,300	5,967
New construction	0	0	0
Maintenance and repair construction	72,906	90,197	163,103
Food and kindred products and tobacco	101,358	125,396	226,754
Textile mill products	889	1,100	1,989
Apparel	9,780	12,100	21,880
Paper and allied products	7,113	8,800	15,913
Printing and publishing	10,669	13,200	23,869
Chemicals and petroleum refining	44,455	54,998	99,453
Rubber and leather products	1,778	2,200	3,978
Lumber and wood products and furniture	2,667	3,300	5,967
Stone, clay, and glass products	3,556	4,400	7,956
Primary metal products	889	1,100	1,989
Fabricated metal products	5,335	6,600	11,935
Machinery, except electrical	10,669	13,200	23,869
Electric and electronic equipment	3,556	4,400	7,956
Motor vehicles and equipment	3,556	4,400	7,956
Transportation equip., except motor vehicles	2,667	3,300	5,967
Instruments and related products	0	0	0
Miscellaneous manufacturing industries	1,778	2,200	3,978
Transportation	180,488	223,293	403,781
Communication	30,229	37,399	67,628
Electric, gas, water, and sanitary services	27,562	34,099	61,661
Wholesale trade	261,396	323,390	584,786
Retail trade	160,928	199,094	360,022
Finance	74,685	92,397	167,082
Insurance	49,790	61,598	111,388
Real estate	20,449	25,299	45,748
Hotels and lodging places and amusements	16,893	20,899	37,792
Personal services	22,228	27,499	49,727
Business services	100,469	124,296	224,765
Eating and drinking places	49,790	61,598	111,388
Health services	126,253	156,195	282,448
Miscellaneous services	66,683	82,497	149,180
Households	9,780	\$12,100	21,880
Total	\$2,540,165	\$3,142,603	\$5,682,768

Source: Calculated from alligator survey data and Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

capacity and regulations regarding waste water treatment. These points should be considered by prudent business people before entering the alligator farming business in Louisiana.

Alligator farming in Louisiana has generated an impact of approximately \$17 million in output, and \$2.5 million in earnings, and created about 182 jobs for Louisiana. When wild-caught alligators are included, the numbers increase to \$38 million in

output, \$5.7 million in earnings, and 403 full-time jobs. These numbers are large because the alligator industry brings in new dollars from out-of-state sales. However, more impact could be realized by achieving more value-added processing within Louisiana, and by following production practices that permit more alligators to be raised to larger sizes, e.g., the interest that was expressed in the surveys regarding the use of grow-out ponds.

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APPENDIX
Estimated Costs For Raising Alligators in Controlled Environments

(1) Hatchling Cost	(2) Per Alligator Starting Costs (\$52.15 Per Alligator, Dispersed Over 10 yr. Period = \$5.22 Per Alligator Annual Cost)	(3) Per Alligator Operating Expenses (\$19.05 Per Alligator Per Year) Does Not Include Feed Costs	(4) Per Alligator Feed Costs	(5) Return to the Wild Minimum Cost to Farmer
\$12.20	\$4.18 - Time Factor (0.8 yr.)	\$15.24 (0.8 yr.)	\$8.25	29.6% Return - \$11.80
\$12.20	\$6.53 - Time Factor (1.25 yr.)	\$23.81 (1.25 yr.)	\$15.63	17% Return - \$9.90
\$12.20	\$9.92 - Time Factor 2.40 - Space Factor \$12.32 - (1.9 yr.)	\$36.20 (1.9 yr.)	\$35.47	9.8% Return - \$9.43
\$12.20	\$13.05 - Time Factor 3.60 - Space Factor \$16.65 - (2.5 yr.)	\$47.63 (2.5 yr.)	\$52.98	17% Return at 4' - \$9.90
\$12.20	\$15.66 - Time Factor 4.80 - Space Factor \$20.46 - (3.0 yr.)	\$57.15 (3.0 yr.)	\$90.10	17% Return at 4' - \$9.90

(6) Total Cost to Harvest At:	(7) Per Alligator Revenue: (Skin and Meat)	(8) Profit	(9) Per Year Profit
3' (10#) - \$51.67	@ \$15/ft. - \$45.00 12.00 \$57.00	\$5.33	\$5.33 - 3'
4' (19#) - \$68.07	@ \$20/ft. - \$80.00 20.00 \$100.00	\$31.93	\$25.54 - 4'
5' (43#) - \$105.62	@ \$25/ft. - \$125.00 40.00 \$165.00	\$59.38	\$31.25 - 4'
6' (55#) - \$139.36	@ \$30/ft. - \$180.00 50.00 \$230.00	\$90.64	\$36.26 - 6'
7' (83#) - \$189.81	@ \$40/ft. - \$280.00 90.00 \$370.00	\$180.19	\$60.06 - 7'

Table prepared by Ted Joanen and Larry McNease, Louisiana Department of Wildlife and Fisheries, Rockefeller Refuge.

Cols. 1, 2, 3 - Costs for these columns derived from the preceding text.

Col. 5 - Current percentages of various size alligators that must be restocked in an area from which eggs were harvested. This cost would not occur for people using their own brood stock.

Col. 7 - Meat revenue estimated assuming \$5.00/pound alligator filet, less \$10.00 for deboning, processing, packaging, etc.

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