

**An Economic Feasibility Analysis of the Proposed
Gulf Coast Fisheries Hatchery and Enhancement Center
For the Commercial Production of Red Drum
at Pensacola, Florida**

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Overview: A Two Fold Issue

Recreational Fisheries

Florida is considered the “Fishing capital of the World” with more world record fish catches than any other state or country. From an economic perspective, Florida also leads all states in economic impacts for marine recreational fishing and has one of the top commercial fisheries in the country. According to the U.S. Fish and Wildlife Service’s National Survey of Hunting, Fishing and Wildlife Viewing in 2006 Florida’s recreational saltwater fishery produced an economic impact estimated at \$5.7 billion and supported more than 54,000 jobs.

The proposed Gulf Coast Hatchery and Enhancement Center at Pensacola, Florida will initially propagate Red drum (*Sciaenops ocellatus*) for domestic use for recreational fishing. While the Florida Fish and Wildlife Conservation Commission (FWC) recently increased the bag limit for this popular sport fish, the species are still regulated. Additionally, Florida does not have a commercial red drum fishery.

Commercial Fisheries: Aquaculture

Aquaculture serves many purposes and seafood production is paramount among them. Aquaculture has helped improve nutrition and food security in many parts of the world. Increasing global population coupled with increased per capita seafood consumption reached 143 million metric tons in 2009, which is an increase of more than 20 million tons in ten years (NOAA Office of Science and Technology, 2009).

According to the United Nations Food and Aquaculture Organization, “With capture fisheries production stagnating, major increases in fish food production are forecast to come from aquaculture. Taking into account the population forecast, an additional 27 million tones of production will be needed to maintain the present level of per capita consumption by 2030.

However, direct U.S. marine aquaculture production is quite small relative to overall U.S. and world production. Only about 20 % of U.S. aquaculture production is marine species. The \$1 billion value of total U.S. aquaculture production (freshwater and marine) pales in comparison to the \$100 billion value of world aquaculture production (NOAA Fisheries Service, 2012).

According to the NOAA Office of Aquaculture, a compelling case can be made for growing more seafood in the United States. Currently, the United States is a major consumer of aquaculture and fisheries products as we import 86 % of our seafood, yet we are a minor producer. Driven by U.S. demand for seafood products, our seafood trade deficit has grown to over \$10.4 billion annually (NOAA, Office of Science and Technology, 2012). In essence, the United States is exporting billions of dollars in labor income and valued added overseas with much of this going to China, while increased domestic seafood production would retain more of the economic benefits at home in the United States.

Background:

The proposed hatchery can be designed to produce over 10 million post-larval (Phase I) fish annually. Production would consist of 5 million reared fish for release to domestic waters to enhance fish stocks and recreational fishing. An additional 5 million post-larval (Phase I) fish will be produced for sale to a commercial grow-out fish farming enterprise. A conservative estimate at \$1 per fish would produce \$5 million in sales to the private sector for hatchery operations (expert judgment approach, Hubbs Sea World Research Institute).

Framing the Problem:

As with all economic impact analysis the goal is to identify the production of goods and services which meet a specified demand. The economic analyst must secure estimated sales data for all industrial categories associated with the economic analysis. These sales data are then used as input variables to the economic models to estimate the direct, indirect and induced (total effects) of a demand change in an economic region. The overall goal of the economic analysis is to provide an estimate of employment (jobs), labor income, indirect business tax, value added and output based on these demand changes.

Objectives:

There are two primary objectives of this economic analysis:

1. Estimate the economic effects to the Metropolitan Statistical Area (MSA) of Escambia and Santa Rosa Counties of Florida for the production and commercial sales of 5 million post-larval Red Drum to a commercial private sector fish farming enterprise. The economic effects would include: employment (jobs), labor income, indirect business tax, value added and output.
2. Estimate the economic effects to the State of Florida for the commercial sales of 5 million post-larval Red Drum for a developing commercial fish farming enterprise. The economic analysis will include: hatchery production, seafood processing and distribution, seafood wholesalers, retail sector (grocery stores and supermarkets), and retail sector (restaurants) as a measure of employment (jobs), labor income, indirect business tax, value added and output.

Metropolitan Statistical Areas (MSA)

Economists are interested in economic areas that are bound together by trade links 0 the buying and selling of raw materials, industrial and consumer goods and services and labor. An appropriate method of identifying a functional economic area is by use of Metropolitan Statistical Areas (MSA). The MSA for this economic analysis includes Escambia and Santa Rosa Counties of Florida and the economic analysis will include these two counties.

Figure 1



Model Description: IMPLAN

The economic analysis for this report utilized version 3.0 of IMPLAN (Impact Analysis for Planning) and data files specific for each county in Florida. Economic models constructed using IMPLAN are input-output (I/O) models and embody all the standard I/O) assumptions such as constant return to scale, no supply constraints, a fixed commodity input structure and homogenous sector outputs. Input/output models provide a rigorous mathematical expression of the economic relationships among sectors of the economy and between businesses and consumers within a region, capturing each sector's purchases from other sectors of the economy in order to produce a dollar's worth of goods and services. Models are demand driven and ideally suited to estimate the direct, indirect, and induced effects of changes in final demand of any given sector.

Data Acquisition:

Data acquisition is a crucial step in developing economic models for this report. By data acquisition, we are concerned with quantified dollar values to use as input variables to the economic models and the various industrial sectors. For objective #1 of this report data acquisition was rather straightforward. Using an expert judgment approach (in the absence of any other available data) the economic analyst applied the estimated \$5 million of production sales to private sector fish farming enterprises. This analysis provided an estimate of the employment, labor income, indirect business tax, value added and output for the MSA of Escambia and Santa Rosa counties.

However, data acquisition for objective #2 was more problematic. In order to provide an estimate of the economic contributions statewide from the fish farming enterprise that included estimates from hatchery production to the table, industrial sectors had to be identified and quantified. Using tables provided by NOAA Fisheries: Office of Science and Technology, Fisheries Economics of the U.S., 2009, quantification of the industrial sectors were calculated to provide monetized economic values used as input variables to the economic model. There were several steps requiring mathematical computations and assumptions to adjust the 2009 Fisheries Economics of the U.S. table to where it could provide utility for estimating the input variables for the economic model. These steps are provided below. All mathematical computations are considered linear in nature. Commercial harvester data are not affected by these computations.

Table I
Baseline Table: Fisheries Economics of the U.S., 2009
Data Specific to Florida

| Sector Description | Sales |
|---|-----------------|
| Commercial Harvesters | \$312,239,000 |
| Seafood Processors and Dealers | \$606,528,000 |
| Importers | \$9,488,366 |
| Seafood Wholesalers and Distributors | \$949,957,000 |
| Retail Sector (Grocery Stores and Restaurants)* | \$1,631,289,000 |

* Within the economic model, the retail sector of grocery stores and restaurants are divided into two separate categories as they represent different multiplier effects for these industries.

Step 1:

1. Importers represent 3% of total sales data.
2. Factor out importers and adjust the table.

Table 2 (Adjusted Table Minus Imports)

| Sector Description | Estimated Sales |
|--|------------------------|
| Commercial Harvesters | \$312,239,000 |
| Seafood Processors and Dealers | \$588,332,160 |
| Seafood Wholesalers and Distributors | \$921,459,000 |
| Retail Sector (Grocery Stores and Restaurants) | \$1,582,351,000 |

Step 2:

1. Continue to use the 2009 Commercial NMFS data to estimate what percentage of landings revenue exist within the high and low range of finfish. This calculation is used because Red Drum is not represented in the database.
2. There are only two finfish represented in the NMFS 2009 landings data and these are Red Grouper and Red Snapper.
3. Red Grouper represents 9% of the 2009 landings revenue and Red Snapper represents 2.5% of the 2009 landings data.
4. A conclusions drawn from the analysis produces a range of landings value for finfish between 2.5 % and 9 % of total landings revenue data for 2009.
5. Choosing to be very conservative, a 1.5 % share of market will be used to estimate the adjusted table for seafood processors and dealers, seafood wholesalers and distributors and the retail market of grocery stores and restaurants.
6. Since grocery stores and restaurants are two different markets and continuing to use the linear assumption model, grocery stores and restaurants will each receive (one half or 0.75%) of the estimated market share of 1.5 % for this category.
7. The adjusted Table # 3 below will substitute the estimated \$5,000,000 of sales to a commercial fish farming enterprise for the \$312,239,000 identified as the baseline in the NMFS 2009 data.
8. Commercial harvesters are not affected by this analysis.

Table 3 – Estimated Share of Market

| Sector Description | Estimated Sales |
|---|------------------------|
| Commercial Harvesters (Hatchery Production) | \$5,000,000 |
| Seafood Processors and Dealers | \$8,824,982 |
| Seafood Wholesalers and Distributors | \$13,821,885 |
| Retail Sector (Grocery Stores) | \$11,867,632 |
| Retail Sector (Restaurants) | \$11,867,632 |

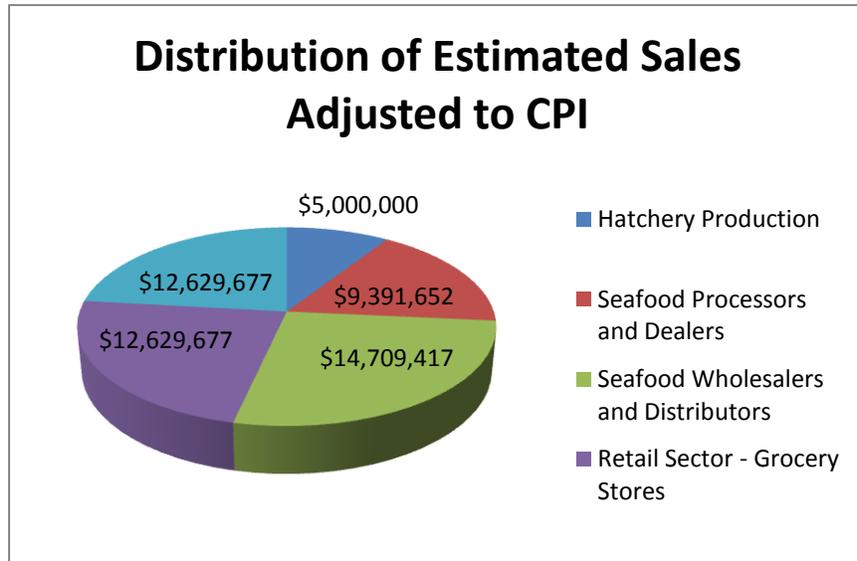
Step 4:

1. Adjust the estimated sales data in table 3 to the Consumer Price Index through December 2012 (most recent data available at the time of this report).
2. Hold the estimated \$5,000,000 in sales to commercial fishing farming static.
3. Extrapolate the adjusted sales data (adjusted to the Consumer Price Index) and insert in to the economic model as input variables for the various sectors described in this report.
4. Provide an estimate of the economic contributions (statewide) from hatchery production of Red Drum at the proposed Gulf Coast Fisheries Hatchery and Enhancement Center to a commercial fish farming enterprise.

Table 4
Estimated Sales Data Adjusted to the Consumer Price Index

| Sector Description | Estimated Sales |
|--------------------------------------|-----------------|
| Hatchery Production | \$5,000,000 |
| Seafood Processors and Dealers | \$9,391,652 |
| Seafood Wholesalers and Distributors | \$14,709,417 |
| Retail Sector (Grocery Stores) | \$12,629,677 |
| Retail Sector (Restaurants) | \$12,629,677 |

Figure 2
Estimated Sales Adjusted to the CPI



Process:

The key components of an economic assessment are estimates of sales allocated into sectors of the economy through a bridge table and processed through an input/output model. The following is the bridging scheme for the estimated economic contributions associated with this report.

Table 5
IMPLAN Bridge Table

| Sector Description | NAICS Sector | IMPLAN Sector |
|--------------------------------------|---------------------|--|
| Fish Farming and Fish Hatcheries | 112512 | Hatchery Production Finfish (14) |
| Seafood Processors and Dealers | 311710 | Seafood Product Preparation and Packaging (61) |
| Seafood Wholesalers and Distributors | 424460 | Wholesale Trade Business (319) |
| Retail Grocery Stores | 445110 | Retail Stores Food and Beverage (324) |
| Retail Restaurants | 722511 | Food Services and Drinking Places (413) |

NAICS – North American Industry Classification System

Results – Objective #1

1. Estimate the economic effects to the Metropolitan Statistical Area (MSA) of Escambia and Santa Rosa Counties of Florida for the production and commercial sales of 5 million post-larval Red Drum to a commercial private sector fish farming enterprise. The economic effects would include: employment (jobs), labor income, indirect business tax, value added and output.

Regional Economy: The Metropolitan Statistical Area of Escambia and Santa Rosa Counties of Florida.

Method: Input/Output Trade Flow Model

Value of the Dollar – 2012

Shannon-Weaver Diversity Index – 0.68901

Table 6
Results for Escambia and Santa Rosa Counties

| Impact Type | Employment | Labor Income | Value Added | Output |
|--------------------|-------------------|---------------------|--------------------|---------------|
| Direct | 108 | \$277,308 | \$2,424,588 | \$5,053,914 |
| Indirect | 17 | \$483,128 | \$818,041 | \$1,554,095 |
| Induced | 6 | \$216,276 | \$379,529 | \$623,957 |
| Total | 131 | \$976,712 | \$3,622,159 | \$7,231,966 |

Table 7
Top Five Industries Affected

| Sector | Description | Employment | Labor Income | Value Added | Output |
|---------------|------------------------------------|-------------------|---------------------|--------------------|---------------|
| 14 | Hatchery Production (Finfish) | 108 | \$277,308 | \$2,424,588 | \$5,053,914 |
| 19 | Support Activities for Aquaculture | 7 | \$178,977 | \$154,453 | \$192,526 |
| 10 | All Other Farming | 1 | \$29,767 | \$90,267 | \$258,026 |
| 360 | Real Estate Establishments | 1 | \$18,406 | \$137,473 | \$189,745 |
| 319 | Wholesale Trade | 1 | \$62,983 | \$108,670 | \$150,226 |

Table 8
Tax Results

| Description | Indirect Business Tax |
|--------------------|------------------------------|
| Property Tax | \$155,755 |
| Motor Vehicle | \$692 |
| Other Taxes | \$9,752 |
| Total | \$166,199 |

Table 9
Multipliers

| Sector | Description | Total Effects |
|---------------|---|----------------------|
| 14 | Hatchery Production | 1.440036 |
| 61 | Seafood Product Preparation | 1.690063 |
| 319 | Wholesale Trade Business | 1.752413 |
| 324 | Retail Food and Beverage (Grocery Stores) | 1.641154 |
| 413 | Food Services and Drinking Places (Restaurants) | 1.769400 |

Objective - #2

2. Estimate the economic effects to the State of Florida for the commercial sales of 5 million post-larval Red Drum for a developing commercial fish farming enterprise. This economic model would include an analysis from hatchery production to the table. The economic analysis would include: hatchery production, seafood processing and distribution, seafood wholesalers, retail sector (grocery stores and supermarkets), and retail sector (restaurants) as a measure of employment (jobs), labor income, indirect business tax, value added and output.

Regional Economy: Statewide

Method: Input/output Econometric Model

Value of the Dollar: 2012

Shannon-Weaver Diversity Index: 0.72484

Table 10
Results Statewide

| Impact Type | Employment | Labor Income | Value Added | Output |
|--------------------|-------------------|---------------------|---------------------|---------------------|
| Direct | 448 | \$10,114,002 | \$15,856,906 | \$33,120,810 |
| Indirect | 80 | \$3,686,914 | \$6,300,903 | \$10,876,221 |
| Induced | 97 | \$4,088,321 | \$7,370,716 | \$12,057,617 |
| Total | 625 | \$17,889,238 | \$29,528,525 | \$56,054,648 |

Table 11
Top Five Industries Affected

| Sector | Description | Employment | Labor Income | Value Added | Output |
|---------------|---|-------------------|---------------------|--------------------|---------------|
| 413 | Food Services and Drinking Places (Restaurants) | 197 | \$5,045,874 | \$7,102,375 | \$13,137,865 |
| 14 | Hatchery Production (Finfish) | 162 | \$861,189 | \$2,514,968 | \$5,254,321 |
| 324 | Retail Food and Beverage (Grocery Stores) | 68 | \$2,102,110 | \$3,401,191 | \$3,886,586 |
| 61 | Seafood Product Preparation | 29 | \$1,405,462 | \$1,527,851 | \$9,532,782 |
| 319 | Wholesale Trade Business | 27 | \$2,043,266 | \$3,533,030 | \$4,832,014 |

Table 12
Tax Results

| Description | Indirect Business Tax |
|--------------------|------------------------------|
| Sales Tax | \$673,787 |
| Property Tax | \$1,865,507 |
| Motor Vehicle Tax | \$8,293 |
| Other Taxes | \$116,796 |
| Total | \$2,664,383 |

Table 13
Multipliers

| Sector | Description | Total Effects |
|---------------|--|----------------------|
| 14 | Hatchery Production (Finfish) | 1.440036 |
| 61 | Seafood Product Preparation | 1.690063 |
| 319 | Wholesale Trade Business | 1.752413 |
| 324 | Retail Food and Beverage (Grocery Stores) | 1.641154 |
| 413 | Food Services and Drinking Places (Restaurants) | 1.769400 |

Glossary of Terms

Direct Effects: This is a series of production changes or expenditures made by producers as a result of an activity.

Indirect Effects: The impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all the money leaks from the local economy, either through imports or by payments to value added.

Induced Effects: The response by the local economy to an initial change (direct effect) that occurs through re-spending of income received by a component of value added. The economic model (default multiplier) recognizes that labor income (employee compensation and proprietor income components of value added) is not a leakage to the economy. The money is recirculated through the household spending patterns causing further local economic effects.

Consumer Price Index (CPI): The Consumer Price Index is a measure of the average change over time of the prices of consumer items – goods and services that people buy over time. The CPI is a complex construct that combines economic theory with sampling and other statistical techniques and uses data from several surveys to produce a timely and precise measure of average price change for the consumption sector of the American economy (Bureau of Labor Statistics).

Labor Income: All forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income.

Output: Total value of all goods and services. This economic indicator *does not* subtract the value of intermediate goods used in production.

Value Added: The difference between an industry's total output and the cost of its intermediate inputs. *Value Added is the most appropriate economic indicator to a region's economy because output represents the total value of sales by producing industries in an accounting period before subtracting the value of intermediate goods used in production.*

Value Added consists of four components:

1. **Employee Compensation** is the wage and salary payments as well as benefits including health and life insurance, retirement payments, and any other non-cash compensation. It includes all income to workers paid by employers.
2. **Proprietary Income** consists of payments received by self-employed individuals as income.
3. **Other Property Type Income** consists of payments from interest, rents, royalties, dividends, and profits. This includes payments to individuals in the form of rents received on property, royalties from contracts, and dividends paid from corporations.
- 4 **Indirect Business Taxes** consists primarily of excise and sale taxes paid by individuals to businesses. This section does not include taxes on profit or income.

IMPLAN (Impact Analysis for Planning) is a computerized regional input-output modeling system that provides economic analysis associated with 440 industries. The IMPLAN model draws upon data collected by the Minnesota IMPLAN Group from multiple federal and state sources including the Bureau of Economic Analysis, Bureau of Labor Statistics and the U.S. Census Bureau. All data files for the IMPLAN model are specific to Florida and include all 67 counties.

Shannon-Weaver Diversity Index: This index measures the diversity of an economic region and ranges from 0 to 1. The closer the index is to 1, the more diverse the economy. The closer the index is to 0 reflects a lack of diversity within the economy.