Appendix D

Establishing Wild, Domestic Shrimp as a Premium Choice in the American Marketplace With a Verifiable, Quality Management System

Prepared by

Michael G. Haby[1], Russell J. Miget[2], Lawrence L. Falconer[3], and Gary L. Graham[4]

September, 2003

1. Extension Economist – Seafood, Department of Agricultural Economics, Texas Cooperative Extension, Sea Grant College Program, Texas A&M University. Mailing address: Texas A&M University Agricultural Research and Extension Center, 10345 Agnes St., Corpus Christi, Tx 78406-1412. Tel: 361/265-9203, Fax: 361/265-9434, E-mail: m-haby@tamu.edu.

2. Extension Specialist – Environmental Quality, Department of Wildlife and Fisheries Sciences, Texas Cooperative Extension, Sea Grant College Program, Texas A&M University. Mailing address: Texas A&M University – Corpus Christi, Natural Resources Center – Suite 2800, 6300 Ocean Dr., Corpus Christi, Tx 78412. Tel: 361/825-3460, Fax 361/825-3465, E-mail: rmiget@falcon.tamucc.edu

3. Extension Economist – Management, Department of Agricultural Economics, Texas Cooperative Extension, Texas A&M University. Mailing address: Texas A&M University Agricultural Research and Extension Center, 10345 Agnes St., Corpus Christi, Tx 78406-1412. Tel: 361/265-9203, Fax: 361/265-9434, E-mail: l-falconer@tamu.edu.

4. Extension Specialist – Marine Fisheries, Department of Wildlife and Fisheries Sciences, Texas Cooperative Extension, Sea Grant College Program, Texas A&M University. Mailing address: P.O. Box 710, Palacios, Tx 77465. Tel: 361/972-3654, Fax: 361/972-6539, E-mail: taex-grahamg@wcnet.net.

Foreword: A Retrospective on the Current Crisis and a Review of Work Undertaken on Behalf of Industry

Roots of the crisis.

The current economic crisis faced by the domestic shrimp industry is unprecedented – in scope, magnitude, and duration. Over the last three years, four unrelated conditions combined to create a *"perfect, economic storm"* that has engulfed shrimp fishermen and their suppliers, as well as those processors and marketers who rely on local shrimp harvests.

Growing supplies of cultured shrimp coincided with a global economic slowdown that began in the second half of 2000. This set the stage for a general softening of prices that has affected every member of the worldwide shrimp industry. Additional downward pressure on U.S. ex-vessel and wholesale prices resulted from three other contributing factors. First, aggressive enforcement by the European Union (EU) for banned antibiotics prevented non-compliant imports from entering that trading block. This preemption resulted in additional quantities being rerouted to the U.S. Second, a sharply-higher tariff rate imposed by the EU on shrimp imported from certain Asian countries in December 2001 made those shrimp less expensive in competing markets like the U.S. Third, until recently, the dollar was quite strong against other currencies which also made imports less expensive in the American market. These four conditions have resulted in record imports to the U.S. market since 2001. This onslaught of lower-priced imports has dramatically reduced ex-vessel shrimp prices, and this condition persists today. Likewise, processors who packed and inventoried shrimp in 2001 and the first half of 2002 literally watched their expected revenue stream vaporize as market prices dropped below the sum of product acquisition costs, processing fees, and accrued, monthly storage expenses.

Answering industry's call for help.

This debacle in the shrimp industry and the conditions that contributed to it have been well documented, and this unprecedented crisis is being addressed in ways that are equally unprecedented. For example, Congress appropriated a $35 million disaster assistance package to be used for direct payments to all licensed Gulf and South Atlantic shrimp fishermen. This type of assistance has never been provided to shrimp fishermen. Additionally, the shrimp industries in the Gulf and South Atlantic states have organized and funded the Southern Shrimp Alliance, a regional trade association that seeks to ensure a level, competitive playing field in the American shrimp market that is dominated by imports. In March, Sea Grant programs in the southeastern region hosted an international summit that focused on the steps necessary to sustain the shrimp industries in both the U.S. and Mexico. Recently, the U.S. Food and Drug Administration adopted the worldwide standard for residual chloramphenicol in shrimp tissue of 0.3 parts per billion, so differences in this particular food safety standard are beginning to fade among the major shrimp-importing countries. This is a positive signal that should help level the worldwide *"playing field."*

Another forward-looking activity currently underway is the creation of a *"business plan"* for the domestic shrimp industry. In August of 2002, Dr. William Hogarth, the head of NOAA Fisheries, expressed his interest in having such a plan developed. The goal of developing this business plan is to enumerate a series of initiatives and activities which, when implemented, will help domestic producers, processors, and marketers regain a competitive position in our domestic market. Several meetings were conducted to solicit the thoughts of industry in designing this plan. A number of issues were brought forth at these meetings including (a) effort measurement and management, (b) vessel buy-back programs, (c) control of imports, (d) regulatory relief for fishermen, (e) the need for affordable insurance, (f) the use of electronic logbooks and other automated vessel-based data collection and management systems, and (g) ways to reduce the inherent business risk of shrimp fishing. These issues are a sample of the suggestions made at the industry meetings. Yet even from this abbreviated list, it is clear that there are numerous issues that some believe must be addressed if the domestic shrimp production, processing, and marketing industry is to meet future challenges and take advantage of unfolding opportunities.

One additional concern voiced at each industry meeting was the desire to establish domestic, wild-harvested shrimp as a premium, higher-priced product in the American marketplace. Working toward this goal could have a significant, positive impact on prices received by domestic fishermen. It is also one of the few considerations that the domestic shrimp industry alone can address. This report argues why industry should consider such an approach and outlines a procedure for doing so.

Establishing Wild, Domestic Shrimp as a Premium Choice in the American Marketplace With a Verifiable, Quality Management System

Introduction

Today the domestic shrimp production, processing, and marketing complex is in the throes of some of its darkest economic days, and industry leaders, trade association executives, agency heads, and elected officials are all pondering what steps should be taken to help the industry move forward. This report is one component of a multifaceted industry-wide recovery plan. As the title suggests, this report examines the course of action necessary to establish domestic, wild-harvested shrimp as a premium product in the American marketplace which – most importantly – would generate a higher price that ripples back through the entire supply chain. While a case can be made for such a program, it is essential to point out that individual producers, processors, and marketers will ultimately determine whether this course of action is workable and worthwhile.

Undoubtedly, creating such a program and proving its worth to targeted wholesale, retail, and consuming interests will take time, and require the steadfast commitment of interested, cooperating producers, processors, and marketers. Furthermore, such a directed effort to (a) create a premium shrimp product from the Gulf and South Atlantic fisheries, (b) carve a niche out of the billion pound American shrimp market, and (c) supply it with relatively high-priced product is an ambitious goal with mostly long-term benefits. However, it is important to consider two inescapable facts. First, the U.S. is the high-cost producer and processor of tropical shrimp in the world, making it difficult to sell wild, domestic shrimp in the broader, domestic commodity market at price levels necessary for profitability. Second, participants in other commodity markets have realized long-run success with a similar approach, so this idea is not without precedent.[5]

Approach

This report begins by examining the composition of supplies to the U.S. shrimp market between 1997 and 2001. Initially, the classification criteria of source (e.g., U.S. landings or imports) and production method (e.g., wild-harvested or farm-raised) are used to subdivide the domestic shrimp market into three primary components: (a) wild-harvested, domestic landings, (b) wild-harvested imports, and (c) farm-raised imports. This particular assessment quantifies the specific contribution to supplies made by each component and pinpoints the sources of growth in the American shrimp market. Subsequent analysis focuses strictly on the imported fraction of the U.S. shrimp supply and examines the volume of imports by (a) shrimp-exporting country and (b) the various market forms commonly exported to the U.S. Understanding the sources of growth in the U.S. shrimp market, and identifying the major shrimp-exporting countries as well as the specific products entering the market should provide a clear assessment of the competitive conditions present in the marketplace. Simply

5. Certain ranchers are receiving a minimum premium of 4 to 5 percent per hundredweight if they raise cattle according to a strict set of procedures originally created by retail interests and maintain records that document their compliance [1]. The Vidalia onion program in Georgia is a shining example of how a unique, mild-flavored product coupled with industry-wide adherence to quality assurance requirements, legislation to protect the brand, and applied research to extend the marketing window has become successful at generating higher prices that are realized through the entire supply chain [2].

stated, this analysis identifies the various competitive elements that vie for the American consumer's shrimp dollar. Following the review of the domestic shrimp market, this report offers a plan that committed harvesters, processors, and marketers should consider that will (a) capitalize on an attribute inherent in wild shrimp that cannot be duplicated in a cultured product; notably, a consistent, superior flavor over farm-raised cohorts, and (b) ensure that these wild, domestic shrimp are packed in a manner competitive with high-grade, farm-raised imports.

Understanding the Sources, Production Methods, Countries, and Market Forms that Supply the U.S. Shrimp Market

Sources and uses of data.

Three different data sources are used to assess the U.S. shrimp market. Domestic shrimp landings were taken from *Fisheries of the United States*, a report annually prepared by NOAA Fisheries [3]. Import data are continuously collected by the Bureau of the Census, and are available on-line from the International Trade Commission (ITC) [4].[6] Finally, the annual fraction of each shrimp-exporting country's production attributable to either wild-harvests or farming systems was derived from data maintained by the Food and Agriculture Organization of the United Nations [5].

The quantities presented in this report diverge slightly from those published in *Fisheries of the United States*. Part of the difference can be explained by the market forms chosen. When domestic landings are referenced in this report, they are expressed as shell-on, headless weights. This is consistent with values for domestic landings found in the table "U.S. Supply of All Forms of Shrimp" within *Fisheries of the United States.* The point of departure occurs when reviewing the contribution imports make to U.S. shrimp supplies. All discussions of imports in this report use actual product weights, so no transformation to a shell-on, headless equivalent weight occurs.[7] Actual product weights provide a more precise measure of import volumes as well as a more conservative basis for comparison.[8] Actual product weights are also used by various fee-based market news services including Urner Barry Publications and the *LMR Shrimp Market Report*. The remaining difference between volumes expressed in this report and information presented in *Fisheries of The United States* can be explained by our decision to omit shrimp exports from the discussion of the relative contribution made by domestic landings, wild-harvested imports, and farm-raised imports to U.S. shrimp supplies. Several considerations guided the decision to omit exports.

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6. The shrimp import data used in this review reflect *"imports for consumption"*. Thus, both actual, physical entries into the U.S. and withdrawals from stocks in Customs-bonded warehouses are included in these values.

7. To transform actual weights of imported product forms into a shell-on, headless equivalent, the weight of each unique market form is multiplied by one of the following conversion factors: (a) 0.63 for breaded shrimp, (b) 1.28 for raw peeled product, (c) 2.52 for canned shrimp, (d) and 2.40 for "other" market forms which includes cooked peeled items.

8. The specific task typically drives the selection of market form (e.g., live weight, shell-on, headless, etc.), so the issue becomes one of using the most appropriate market form for the task at hand. For example, *Fisheries of The United States* expresses commercial shrimp landings using two different market forms: round, or live, weight and shell-on, headless weight. Round weight is the common basis used to compare the biomass of different commercial species, but shell-on, headless weight – the customary market form packed by primary processors – is the more appropriate market form to use when computing the contribution shrimp landings make to U.S. shrimp supplies. In the foreign trade segment of *Fisheries of The United States*, shrimp imports are expressed as actual product weights, but when reporting the contribution imports make to U.S. shrimp supplies, the actual product weights of imports are converted to a shell-on, headless equivalent basis.

Subtracting exports from the sum of landings and imports creates the "net" supply of shrimp available for domestic consumption. Because the contributors to U.S. shrimp supplies are subdivided into three categories (domestic landings, wild-harvested imports, and farm-raised imports), we would expect to deduct the exports derived from each of those categories from the initial value in each corresponding category so the "net" contribution can be shown. Unfortunately, this type of computation is not possible with the shrimp export data file because the country of origin is not part of the record structure. In addition, what actually comprises an export or re-export is subject to some interpretation.[9] Finally, shrimp exports represent a relatively minor component of total utilization, accounting for somewhere between 3.8 and 5.8 percent of landings and imports depending on the market form used in the calculation, so we felt that nothing material was lost if the export data were omitted.

The contribution made by source and production method to the U.S. shrimp market.

Between 1997 and 2001, the supply of shrimp available for utilization in the U.S. market grew by 31 percent or 257 million pounds (expressed as actual product weight, not shell-on, headless equivalent weight) (Table 1, Figure 1).[10] Over this five-year period, domestic landings increased by 22 million pounds, wild-harvested imports increased by 38 million pounds, and farm-raised imports increased by 197 million pounds.[11] In 1997, farm-raised imports accounted for 61.7 percent of the total U.S. beginning supplies (511 million pounds) while domestic landings and wild-harvested imports respectively contributed 21.6 percent (179 million pounds) and 16.7 percent (138 million pounds).[12] By 2001, cultured imports represented 65.2 percent of the beginning annual supply (708 million pounds), with domestic landings and wild-harvested imports respectively accounting for 18.6 percent (201 million pounds) and 16.2 percent (176 million pounds) of total beginning supplies. Imported, farm-raised shrimp have accounted for roughly 80 percent of total shrimp imports over the five-year time series.

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9. Aside from the obvious situation where a domestic product has been shipped out of the country, shrimp exports can also include foreign merchandise which has been changed from the imported market form, or has been enhanced in value by further manufacture in the U.S. Re-exports, a component of total exports, can include foreign commodities that, at the time of re-export, were in substantially the same condition as when imported. Also, items imported for sale in the U.S. but later sold oversees are recorded as exports of domestic goods rather than as re-exports.

10. Monthly import data for calendar 2002 are available from the International Trade Commission (ITC), and shrimp imports in 2002 (947,828,331 pounds, expressed as actual product weight) were 7.2 percent above 2001 levels (884,038,244 pounds). However, to estimate each country's imported fraction attributable to either wild-harvests or farming systems, FishStat – a database maintained by the United Nations' Food and Agriculture Organization (FAO) – was used and the most current information available from that source was calendar 2001.

11. The increase in the wild-harvested component of beginning supplies experienced some variation between 1997 and 2001. For domestic landings, 1998 landings were about 6 million pounds below the previous year while the calendar 2001 harvest was about 17 million pounds below the 2000 harvest. Wild-harvested imports dropped by about 6 million pounds in 1999 but rebounded in both 2000 and 2001. On the other hand, farm-raised imports have steadily increased each year.

12. The FishStat data facilitate precise estimates of the fraction of shrimp each country produces through capture or culture. However, no data exist about which production method is used for shrimp actually exported to the U.S. Therefore, the assumption is made that a country's shrimp exports to the U.S. parallel the computed capture/culture fraction.

Table 1. Sources of Shrimp Available for the U.S. Market Contributed from Domestic Landings, Wild-harvested Imports, and Farm-raised Imports

Year	Landings (shell-on, hdls. wt.)	Imports (actual product wt.) Wild-harvested	Farm-raised	Available Supplies	The Contribution of Farm-raised Shrimp to: Total Imports	Beginning Supplies
1997	179,084,000	138,332,748	510,636,951	828,053,699	78.7%	61.7%
1998	173,304,000	139,976,804	556,231,212	869,512,016	79.9%	64.0%
1999	189,112,000	133,704,146	598,609,008	921,425,154	81.7%	65.0%
2000	218,542,000	152,658,192	609,553,902	980,754,094	80.0%	62.2%
2001	201,428,000	176,223,677	707,814,567	1,085,466,244	80.1%	65.2%

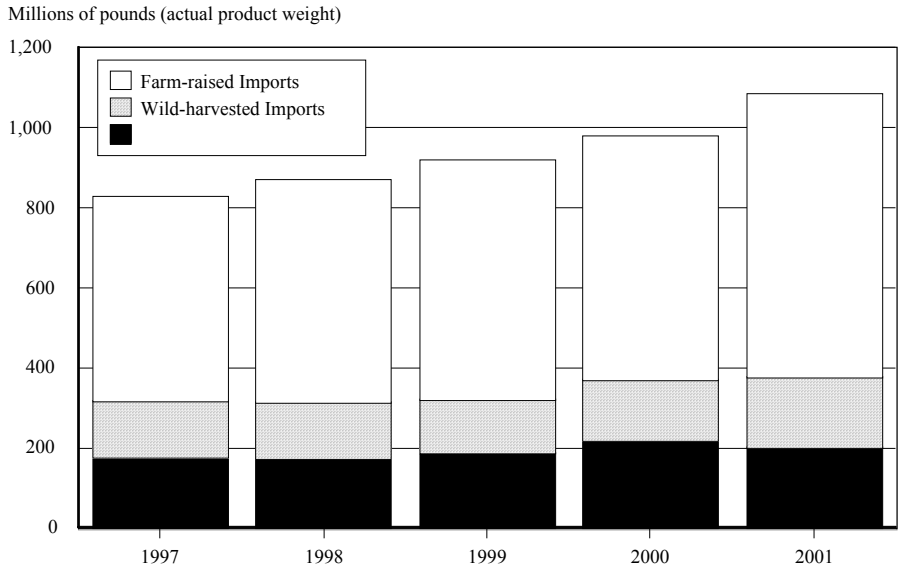

Figure 1. Sources of Shrimp Available for the U.S. Shrimp Market Contributed from Domestic Landings, Wild-harvested Imports, and Farm-raised Imports

Deeper understanding of the sources for continued growth in the U.S. shrimp market can be found by computing the average, annual growth rate for the three sources of supply: domestic landings, wild-harvested imports, and farm-raised imports. Between 1997 and 2001, domestic landings increased, on average, by 8.9 million pounds per year (shell-on, headless weight), wild-harvested imports increased by some 8.8 million pounds per year (actual product weight basis), and farm-raised imports increased by roughly 45 million pounds per year (actual product weight basis) (Table 2, Figure 2). Imported, farm-raised shrimp accounted for 71 percent of the total annual growth in beginning shrimp supplies. Wild-harvested shrimp, from both domestic and imported sources, contributed to 28.5 percent of annual growth in beginning U.S. shrimp supplies.

Table 2. Average, Annual Growth Rates of Shrimp Supplies Contributed from Domestic Landings, Wild-harvested Imports, and Farm-raised Imports

Production Method	Computed, Average Annual Growth Rate (product weight)	Percent Contribution to Growth in Annual Beginning Supplies
Domestic Landings	8,992,600	14.36%
Imported Wild-harvests	8,846,325	14.13%
Imported Farm-raised	44,767,792	71.51%
Total Imports	53,564,117	85.64%
Total Beginning U. S. Supplies	62,606,717	100.00%

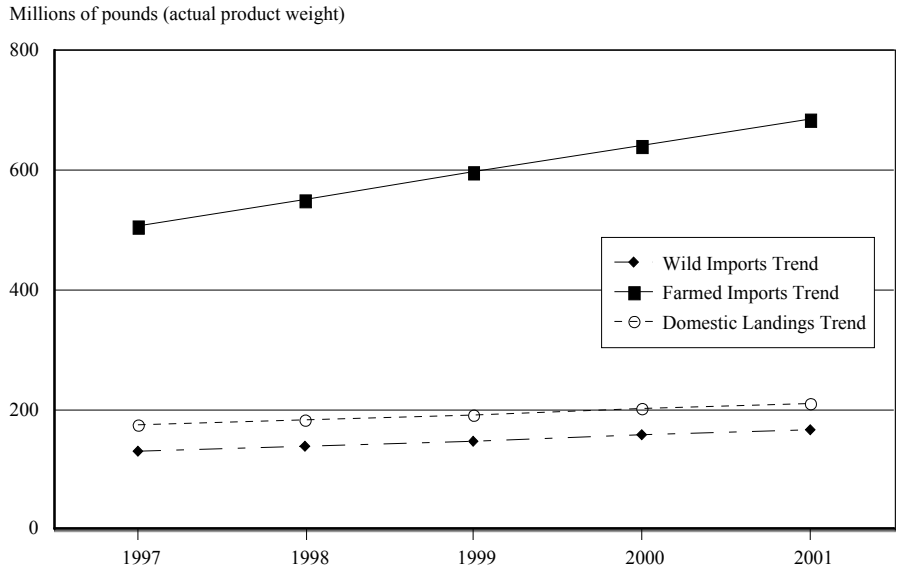

Figure 2. Average, Annual Growth Rates of Shrimp Supplies Contributed from Domestic Landings, Wild-harvested Imports, and Farm-raised Imports

The contribution made by shrimp-exporting country to the U.S. shrimp market.

According to import data maintained by the ITC, in any year about 100 countries export shrimp to the U.S. In 2001, 83 percent of total imports or roughly 737 million pounds (actual product weight basis) originated from just ten countries, with the remaining countries collectively exporting about 147 million pounds to the U.S. (Table 3, Figure 3). Slightly more than half of total shrimp imports originate from just three countries: Thailand, Viet Nam, and India (Table 3, Column 7). Thailand is the largest shrimp exporter to the U.S. In 2001, Thai shrimp accounted for 34 percent of total imports (roughly 300.3 million pounds) and 28 percent of total beginning supplies. Nine of the top-ten shrimp exporting countries generate at least two-thirds of their production from farming systems (Table 3, column 5). Collectively, farm-raised shrimp comprises 87 percent of all shrimp imported to the U.S. by the top-ten shrimp-exporting countries (615 million farm-raised pounds out of 737 million total pounds). Among the other shrimp-exporting countries, farm-raised shrimp accounts for a smaller fraction of their total exports to the U.S. (63 percent).

Table 3. 2001 Shrimp Import Volumes from both the Top Ten and Remaining Shrimp-exporting Countries Delineated by Production Method

Country	Farm-raised	Wild-harvested	Total Imports	Farmed / Wild Pct.	Cumulative Total Imports		Cumulative Farm-raised Imports	
	pounds (actual product weight)				Pounds	Pct.	Pounds	Pct.
Thailand	288,556,574	11,710,412	300,266,986	96 / 04	300,266,986	34.0%	288,556,574	40.8%
Viet Nam	56,704,216	16,699,300	73,403,516	77 / 23	373,670,502	42.3%	345,260,790	48.8%
India	48,563,155	24,092,672	72,655,827	67 / 33	446,326,329	50.5%	393,823,944	55.6%
Mexico	55,435,504	10,764,047	66,199,551	84 / 16	512,525,880	58.0%	449,259,448	63.5%
China	41,441,804	20,643,295	62,085,099	67 / 33	574,610,979	65.0%	490,701,252	69.3%
Ecuador	58,544,647	460,238	59,004,885	99 / 01	633,615,864	71.7%	549,245,899	77.6%
Indonesia	26,700,743	8,243,300	34,944,043	76 / 24	668,559,907	75.6%	575,946,642	81.4%
Guyana	458,807	25,316,889	25,775,696	02 / 98	694,335,603	78.5%	576,405,450	81.4%
Brazil	18,322,373	3,327,601	21,649,974	85 / 15	715,985,577	81.0%	594,727,823	84.0%
Honduras	20,526,162	828,563	21,354,725	96 / 04	737,340,302	83.4%	615,253,984	86.9%
All Other Countries	92,560,583	54,137,359	146,697,942	63 / 37	884,038,244	100.0%	707,814,567	100.0%

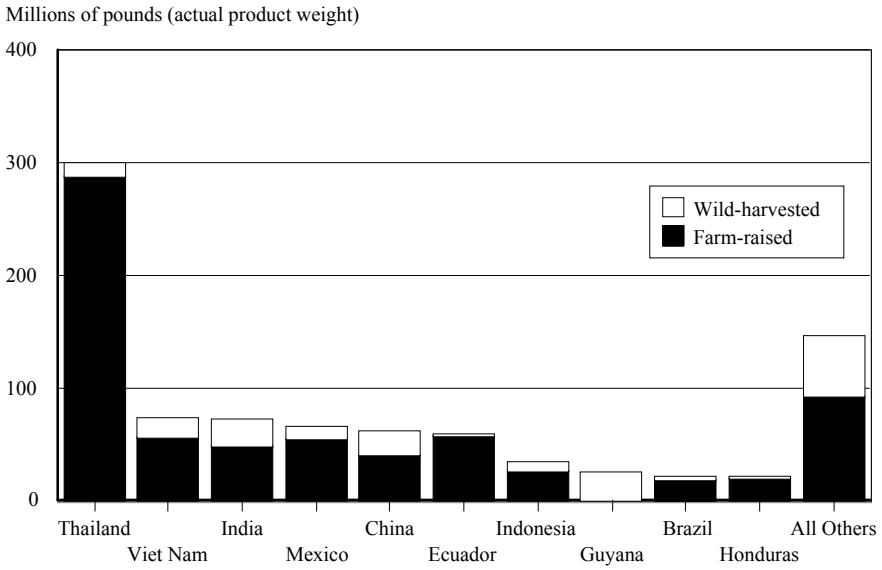

Figure 3. 2001 Import Volumes from Both the Top Ten and the Remaining Shrimp-exporting Countries Delineated by Production Method

The contribution made by market form to the U.S. shrimp market.

Understanding the market forms imported to the American marketplace is important as the domestic industry addresses how best to tailor wild, domestic shrimp products to specific segments of the U.S. market. The market forms of shrimp that enter the U.S. span the continuum of convenience; from raw, frozen, shell-on, headless product to hand-peeled, cooked shrimp that, once thawed, are ready-to-eat.[13] For reporting purposes, the spectrum of shrimp products is generally collapsed into four primary forms. These include (a) shell-on, headless product, (b) raw peeled shrimp, (c) canned or breaded shrimp, and (d) "other" preparations which mostly consists of cooked, peeled product. Of the four categories listed above, the last three represent the value-added products.

Between 1997 and 2001, total annual shrimp imports were about equally split between the various sizes of shell-on, headless product and all of the value-added market forms combined (e.g., peeled, canned or breaded, and "other"). Over that five-year interval, total imports grew by 36 percent. Within this same time frame, shell-on, headless volumes increased by 25 percent (98 million product weight pounds) while the value-added component increased by 45 percent (137.1 million product weight pounds) (Table 4, Figure 4).

Table 4. Market Form Composition of Imported Shrimp: 1997 – 2001

Year	Shell-on, headless	Peeled	Canned or Breaded	Other	Total, All Market Forms	Total, Value-added	Percent Value-added
	pounds (actual product weight)						
1997	343,704,554	235,592,263	4,072,027	65,600,855	648,969,699	305,265,145	47.0%
1998	341,956,637	264,426,404	4,024,368	85,800,607	696,208,016	354,251,379	50.9%
1999	344,962,926	275,587,569	5,233,648	106,602,103	732,386,246	387,423,320	52.9%
2000	338,798,460	285,815,207	7,887,444	129,740,299	762,241,410	423,442,950	55.6%
2001	441,658,079	276,567,415	11,376,135	154,436,615	884,038,244	442,380,165	50.0%

13. Shrimp import data available from the International Trade Commission are categorized by Harmonized Tariff Schedule (HTS) numbers, a code that is used worldwide to track products that enter into international commerce. Some 18 HTS numbers are used to describe the mix of shrimp products commonly imported to the U.S. Nine HTS numbers enumerate various count sizes of frozen, shell-on, headless shrimp (e.g., < 15, 15/20, 21/25, 26/30, 31/40, 41/50, 51/60 61/70, and > 70). A single HTS number corresponds to one unsized shell-on product class that is not frozen, but may be fresh, dried, salted or packed in brine. Interestingly, one HTS number that designates unsized, frozen, shell-on, headless product does not correspond to a single entry between 1996 and the present day, suggesting that all frozen, shell-on, headless shrimp imported to the U.S. are first sized. The remaining seven HTS numbers reflect different types of value-added products including (a) raw, peeled shrimp, (b) canned shrimp, (c) breaded shrimp, and (d) a variety of "other" shrimp products including cooked, peeled varieties and other convenience-oriented items that are ready-to-eat once thawed. Specifically, two HTS numbers correspond to peeled shrimp; one number for frozen, peeled product, and another code that reflects peeled shrimp that are imported either fresh, dried, salted, or packed in brine. Two separate HTS codes exist for shrimp that are either breaded or canned. Finally, three HTS codes represent shrimp that are (a) frozen in airtight containers, (b) used in other preparations then frozen, or (c) used in other preparations but are not frozen.

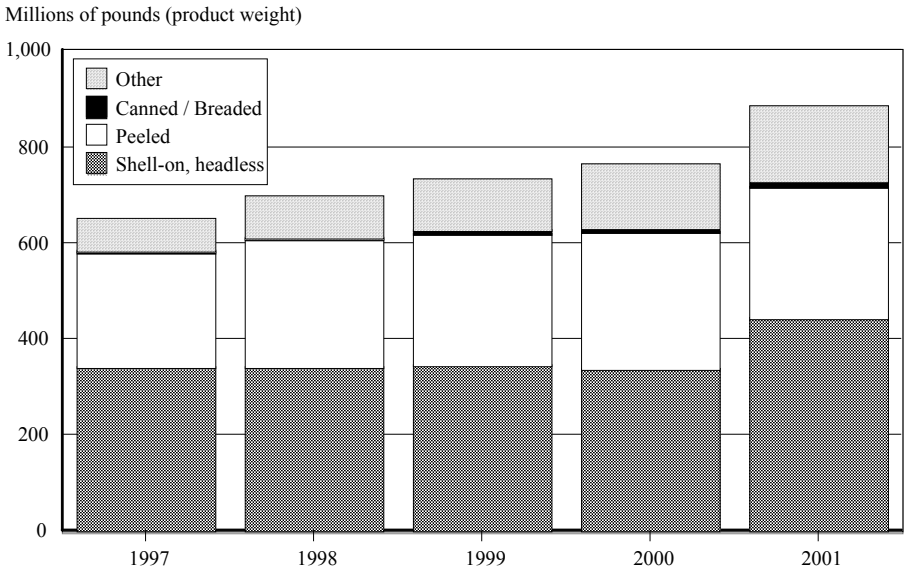

Figure 4. Market Form Composition of Imported Shrimp: 1997 – 2001

Computing and examining growth trends among each of the four major market forms imported over the five-year interval illustrates two important points: (a) there is no statistically significant trend in the growth of shell-on, headless shrimp imports and (b) within the value-added complex, the two categories of raw, peeled and "other" exhibit statistically significant trends, with average, annual increases of 10.3 million pounds and 22.1 million pounds respectively. Closer inspection of the ITC shrimp import database illustrates a highly significant trend in the growth of both the peeled and "other" categories among the top-ten countries, with peeled shrimp estimated to have grown, on average, by 16 million pounds each year while "other" preparations have grown by 19.7 million pounds each year. Among the other shrimp-exporting countries, there is no statistically significant trend for raw, peeled shrimp, but within the "other" category the average, annual growth rate is 2.5 million pounds.

Conclusions from a review of the American shrimp market.

Continued dependence upon imported, farm-raised shrimp. In each year between 1997 and 2001 imported, farmed shrimp accounted for at least 62 percent of the shrimp available for domestic utilization and roughly 80 percent of all shrimp imports (Table 1). In addition, imported, farmed shrimp were responsible for approximately 71 percent of the average, annual growth that occurred in beginning U.S. shrimp supplies between 1997 and 2001 (Table 2). Expectations are that further growth in the American market will continue to be fueled by farm-raised imports for two reasons: (a) wild-harvested, tropical shrimp resources – both domestically and around the globe – are fully utilized, and there do not appear to be any new, untapped supplies and (b) shrimp farming continues to grow in selected regions around the world.[14]

Major shrimp-exporting countries. In 2001, 84 percent of total shrimp imports were supplied by just ten countries. Between 1997 and 2001, the volume of exports to the U.S. by the top ten countries grew, on average, by 49 million pounds per year. Exports to the U.S. are becoming more geographically concentrated, even among the top ten countries, with exports from Thailand, Viet Nam, and India accounting for slightly more than 50 percent of total imports. Exports from Thailand alone account for almost the same volume that is collectively exported to the U.S. by those countries that occupy the second through the sixth places within the top ten – Viet Nam, India, Mexico, China, and Ecuador (Table 3). All but one of the countries within the top ten – Guyana – rely on shrimp farming for at least two-thirds of their total shrimp production. Finally, each of the top ten countries is attempting to improve their national infrastructure and provide employment, in part, by exporting locally-grown and processed foods.

Growth in the value-added fraction of imported shrimp. Value-added shrimp products – peeled, canned or breaded, and "other" items (mostly cooked, peeled shrimp) – accounted for roughly 50 percent of total imports each year between 1997 and 2001 (Table 4). The average, annual growth rate for the value-added fraction is computed to be 34.3 million pounds. Growth in the value-added fraction accounts for 64 percent of the annual growth of total shrimp imports. Virtually all of the increase in the value-added fraction has occurred within two categories: (a) raw, peeled product and (b) cooked, peeled preparations.

A growing, value-added fraction of total shrimp imports should come as no surprise. First, several of the top ten countries (e.g., Thailand, Viet Nam, and India) have a growing supply of raw materials and the available labor resources to add convenience (value) to the product. Second, this convenience can be added at a relatively low cost because wage rates in most shrimp-exporting countries are much lower than those in the U.S.[15] Third, shrimp can be grown to a predetermined count size that meshes with menu requirements and advertising plans. Thus, the value-added market

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14. There are several different reasons why shrimp farming continues to grow in many developing countries. Technological advances include better hatchery management regimens that have improved the survival rates of post-larval shrimp in grow-out facilities and feed formulation that seeks to replace a larger fraction of fish meal with cereal or grain-based protein thereby reducing feed cost; a major production expense. Some shrimp-farming countries have the capacity to develop farms in upland areas since species like Pacific white shrimp (*Litopenaeus vannamei*) can be grown in fresh water. Culturing and processing shrimp for the export trade is still perceived as an important means of improving both the national infrastructure (through acquisition of "hard" currency) and local economic conditions through employment in processing facilities.

15. For example, the reported wage rate for Thai food, beverage, and tobacco workers in 1999 was 78¢ an hour, while hourly wage rates for U.S. employees in similar occupations were reported to average roughly $12 per hour [6].

forms from the top-ten countries appear to target the specific, convenience requirements of the largest food service operators. For most of the casual dining establishments around the country, purchasing the precise market form required for a particular shrimp preparation enables the operator to minimize on-site preparation time and concentrate on those specialized in-store functions that support retail success.

Implications for the domestic industry. In the future, the American marketplace will increase its dependence on imported, farm-raised shrimp products. A larger fraction of these farm-raised imports will likely come from fewer countries such as Thailand, Viet Nam, and India. In addition, it is clear that the major shrimp-exporting countries will continue to increase the percentage of value-added shrimp products destined for the U.S. Continued growth within the imported, cultured shrimp category is a logical conclusion drawn from being both the low-cost producer and processor within a large, world-traded commodity.

Attempting to compete "head-to-head" along general commodity lines (i.e., shell-on, headless, and various value-added products like raw, peeled shrimp) is not a sustainable approach for the domestic industry because production and processing costs are higher in the U.S., and practically two-thirds of the market is comprised of farm-raised imports from the developing world. Therefore, it appears that the only product-oriented approach for regaining a competitive position in the American marketplace is to set the domestic harvest apart from the cultured fraction, and service those niche markets that understand and prefer the unique attributes found in wild, domestic shrimp.

Can a Premium Product be Created From The Gulf and South Atlantic Shrimp Fishery?

Quality is a complex, multifaceted concept that can be defined from numerous vantage points. One traditional definition of quality is manufacturing-based whereby the level of quality is determined by how closely the product conforms to predetermined specifications. Of course a product can be manufactured to meet preset specifications, but the question then becomes whether that particular manufacturing standard is important to the ultimate purchaser. Using quality as a competitive weapon in the marketplace suggests that quality initially must be defined from the customer's side, (i.e., what attributes are most important to the end user of the product) [7]. In practice, this consumer-based definition of quality then gets translated into a set of manufacturing-based criteria so predefined expectations can consistently be met.

Understanding the importance of various product attributes.

Conformance to specifications or standards is the attribute set first used to define overall shrimp quality. Two primary "conformance-to-specifications" elements are considered in evaluating the quality of shell-on, headless shrimp: pack-style and product condition. Pack-style attributes include (a) accurate net weights and counts, (b) count uniformity, (c) presence/absence of damaged tails or pieces which, in most food service applications, are considered unuseable elements, (d) the fraction of black-spotted shrimp, (e) soft-shelled product, etc. Product condition parameters include those elements that have bearing on edibility and enjoyment such as (a) dehydration, (b) texture, and (c) mild, "fresh-caught" odor, etc.

Because there are many buyers and sellers of shrimp, "conformance-to-specifications" criteria are particularly important as a screening mechanism throughout the supply chain. In other words, products that do not conform to predetermined specifications are immediately eliminated from consideration, regardless of other attributes. "Conformance-to-specifications" criteria drive purchase decisions because they represent the cost-side of non-compliant quality for the purchaser. For instance, a sample of shell-on, headless shrimp that is non-compliant across pack-style criteria (e.g., incorrect average count size, or the presence of pieces or damaged tails) implies a higher cost per serving compared with a pack that does not contain these defects. Similarly, product condition defects (e.g., strong off-odor, mushy texture, etc.) impact upon customer enjoyment, and no retailer wants to make a habit of refunds because of a problem the supplier should have addressed.

Importantly, wild shrimp also contain some inherent, or so-called "built-in" attributes. These attributes exist in the organism as is swims in the offshore environment and as a harvested product once it is landed by the trawler. The most obvious inherent attribute of wild shrimp is its consistent, superior flavor over farm-raised product [8]. "*This* [superior flavor] *is thought to be due primarily to the increased abundance of free amino acids which the animals utilize to counteract the large osmotic gradient which exists in salty offshore waters. Conversely, pond-raised shrimp are most efficiently raised during the rainy season when pond salinities may drop to one-tenth that of open ocean water. There is also speculation that the unique flavor of wild shrimp is due in part to their diet of high-protein, natural foods versus the cereal, grain-based feeds required to grow shrimp at high densities in ponds"* [9].

Therefore, the quality of wild shrimp is comprised of both acquired and "built-in" attributes. The acquired attributes refer to the manufacturing-based or "conformance-to-specifications" criteria of pack style and product condition while the primary, "built-in" attribute is consistent, more intense flavor. It is important to realize that regardless of any "built-in" attribute, products that cannot conform to the specifications or standards set by the buyer will be passed over in deference to those that can meet those criteria. The reasons are simple. First, the cost of poor quality is quite high, both in unuseable product and the opportunity for diminution in the facility's reputation. Second, if one packer or supplier cannot meet the "conformance- to-specifications" criteria, there are others who can.

The "conformance-to-specifications" dimensions pull the products through the marketing channel, while the additional "built-in" quality dimensions afforded by wild-harvested shrimp create the opportunity to cultivate new customers with a unique product (i.e., identify and serve a niche). To serve the commodity-driven segment of the shrimp market, only "conformance-to-specifications" dimensions are required. However these conformance attributes are even more important within niche markets that prefer uniquely flavored, wild-harvested, shrimp. Both pack style and product condition must be consistent, and competitive with the standards set by the larger, high-grade suppliers to the broader commodity market. The reason for this is clear: at a higher price anticipated for "niche" products, the cost of non-compliant quality for the purchaser (i.e., the wholesaler or retailer) becomes even higher.

First steps for the domestic shrimp industry.

A fraction of the annual domestic shrimp harvest currently enjoys "premium" status. This classification has been earned by a handful of innovators who have implemented a strategic quality management system as a competitive weapon in the marketplace. The first step in this process was to determine which product and process attributes were most important to their existing and prospective customers. Armed with a clear signal from their customers, these innovators converted those expectations into a set of standards that could be used to judge the products they harvested, purchased, processed, and sold. However, translating a set of standards from target market expectations was not the final step. To meet the predefined standard on a consistent basis, producers and processors needed to know precisely what steps, protocols, etc. were necessary to meet the standard, so these innovators created a set of policies, procedures, and practices that cooperating producers and processors could implement. The final element for these innovators was enforcement and administration of their quality system. These innovators and their employees scrutinize incoming raw materials and packed product for compliance with preset standards.

The cost of compliance. These same strategic quality management principles can be used by others within the domestic industry who believe this approach has long-term benefits. However, when the decision is made to ramp up to a larger base of cooperating producers and processors, or in a larger geographic area, ensuring compliance with preset standards must be done by an independent third party. This third party, from the private or public sector, will have the sole responsibility to classify both raw materials and packed product as either compliant with the predetermined standards and therefore worthy of receiving the seal or logo that signifies the premium nature of package contents, or non-compliant in which case the product would have to be sold separately from the premium fraction.

Particularly in the early stages, the cost of the third-party assessors will be a relatively high proportion of total program costs because these individuals will be in cooperating processing facilities on a continuous basis for the entire season. Over time, the expense related to continuous oversight can drop as plant managers meet specific accountability milestones and show proficiency with a HACCP-based quality management system.

Funding required to reinvent domestic shrimp as a premium product. If serious industry support is garnered for a quality system that guarantees compliance with the "conformance-to-specifications" criteria for pack- style and product condition, funds will be needed to (a) conduct an applied marketing research study to pinpoint the product- and process-oriented expectations of wholesale and retail interests, (b) explore, re-confirm, and specify on-board handling procedures and processing plant operations that will ensure product condition and pack style competitive with current standards, and (c) cover the cost of necessary staff to monitor compliance. Completely funding a pilot project via the public sector is essential for two reasons. First, with three consecutive years of historically low prices, there are no discretionary funds in the industry to establish such a program. Second, the program itself must stand the test of time before benefits – in the form of higher prices – begin to accrue to cooperating producers and processors. At this stage in the history of the domestic shrimp industry, an immediate charge for a possible, future return is probably not financially feasible.

Subsequent considerations in niche marketing.

Understanding and building a program to meet current "conformance-to-standards" criteria for pack-style and product condition is just a first step in creating a niche out of the billion pound U.S. market. This particular issue will undoubtedly be the most difficult to address because it represents an approach that many have seen *"come and go"* in the Gulf and South Atlantic shrimp fishery. However, the spirit of innovation and creativity found in this industry suggests that there are many other elements that, over time, could be added to the attribute list of wild, domestic shrimp if the will exists to pursue them.

Concluding Remarks

Farm-raised imports account for roughly two-thirds of shrimp in the American marketplace. Eighty-four percent of all shrimp imports originate from developing countries that are exporting locally grown, processed products as a way to improve their national infrastructure and provide employment opportunities. Some of the costs like wage rates for processing plant workers in these shrimp-exporting countries are a small fraction of U.S. wages for comparable jobs. Along commodity lines at least, the high-cost domestic industry is attempting to compete against the world of low-cost producers and processors for a share of the American shrimp dollar.

This report argued that creating a premium product that meets the expectations of a market niche interested in a wild-harvested product is one of the few approaches that could boost the value of domestic shrimp. To create a premium product, the domestic industry will have to meet current world standards for pack-style and product condition. The limit is not technology or science. Meeting competitive standards is a function of the desire to do so, and the commitment to build a set of policies, procedures, and practices that ensure pack-style and product condition meet predetermined standards. Thus, participation in this program must be voluntary.

Enforcing compliance with preset product condition and pack style standards is necessary as the program ramps up across the fishery. Verification will have to be accomplished by a third party from the private or public sector that can objectively sort product into compliant or non-compliant categories. With a critical mass of compliant product – properly labeled as meeting the preset, "premium" standard – the industry can begin increasing the value of an ever-greater fraction of the annual Gulf and South Atlantic shrimp harvest.

Innovation and creativity are the hallmarks of the domestic shrimp industry. Wild shrimp have a recognized flavor that cannot be duplicated in traditional culture systems. With such a unique, inherent attribute, it seems unfortunate to capitulate on product condition and pack style, and relegate the 200 million pound annual wild, domestic shrimp harvest to commodity status. To meet the higher expectations of a more sophisticated niche market, interested producers, processors, and marketers need to design new procedures and practices (or adapt existing ones) that can supply wild products which command higher prices because they are competitively packed and provide the extra benefit of a consistent, superior flavor.

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