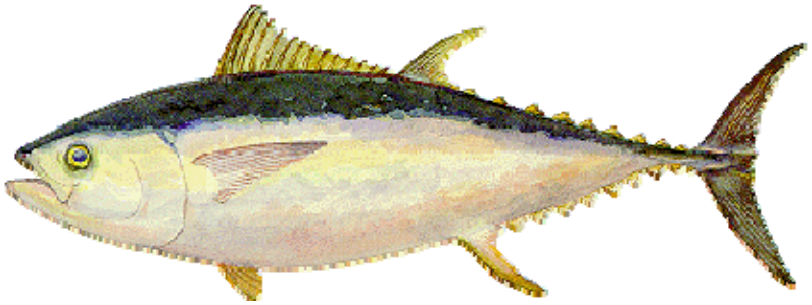
Domestic Economic Impacts of a CITES Appendix I Listing for Bluefin Tuna



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Executive Summary

Bluefin tuna stocks in both the Western and Eastern Atlantic are in trouble.

- Years of exceeding mortality quotas and lack of management action to blame.
- Current ICCAT quotas set 1.5 to 2.5 times higher than recommended by ICCAT scientists.
- Quota in Eastern Atlantic regularly exceeded by as much as 240 percent.
- Illegal fishing rampant in Eastern Atlantic.
- Management labeled an "international disgrace."
- Species in danger of extinction in the near future and qualifies for a CITES Appendix I listing.
- A CITES Appendix I listing has been proposed by Monaco.
- Appendix I listing would put an end to any international trade for primarily commercial purposes.
- Focus of this report is to examine the economic impacts of a CITES Appendix I listing on domestic industry.

Status of U.S. bluefin tuna industry

- In 2008, U.S. fleet landed only 25 percent of its quota.
- Western Atlantic stock is overfished and undergoing overfishing.
- 35,568 Atlantic tuna permit holders in 2008.
- 4,338 of those permit holders were commercial fishermen.
- 395 permitted dealers in 2008.
- 250 permitted international dealers in 2008.
- In 2008, 587,133 pounds with a value of $5.2 million were landed by commercial fishermen.
- In 2008, the United States exported 323,277 pounds with a value of $3.3 million.
- Higher-quality/higher-value bluefin are typically exported.
- In 2008, the United States imported 801,200 pounds with a value of $12.2 million.
- In 2008, the United States re-exported 37,082 pounds with a value of $445,094.
- Landings, exports, imports and re-exports have been falling over the past five years.

- In 2008, the United States imported 23.9 percent more bluefin than it produced domestically, representing the lowest percentage imports in the past five years.
- Total U.S. consumption is also down over the past five years.
- A CITES Appendix I listing would reduce the total supply of bluefin in the United States.

Demand analysis

- The United States is a net importer of bluefin.
- A reduction in supply would result in higher prices.
- A search of the seafood-demand literature found demand elasticities that were slightly elastic to slightly inelastic.
- Estimates from literature predict price increases of 4.46 percent to 39.5 percent.

U.S. baseline economic impacts of current bluefin trade

- U.S. total (not including recreational fishing):

  Total output = $97.9 million.
  Value added = $70.4 million.
  Jobs = 1,486.

- Landings (includes entire chain to consumer):

  Total output = $61.3 million.
  Value added = $ $44.3 million.
  Jobs = 945.
  Dominated by retail trade (50.7 percent of all impact).

- Exports (landing accounted for above):

  Total output = $7.2 million.
  Value added = $3.8 million.
  Jobs = 50.

- Imports and re-exports:

  Total output = $29.4 million.
  Value added = $22.4 million.
  Jobs = 491.

- Recreational fishing:

  Total output = $41.6 million.
  Value added = $21.6 million.
  Jobs = 332.

Economic impacts post-CITES Appendix I listing

- Prices would rise due to decreased supply, increasing fishermen and primary processing-sector revenue.
- Imports, exports and re-exports would cease and all economic impact for that activity would cease.
- U.S. total after listing:

  Total output = $71.2 million to $95.0 million.
  Value added = $50.0 million to $66.6 million.
  Jobs = 1,034 to 1,380.

- Reflects a loss of economic impact of $2.9 million to $26.7 million in total output.
  - The majority of the loss accrues to the restaurant and retail sectors (83.7 percent).
  - It is likely that retail stores and restaurants would supply substitute products, producing very few actual negative economic impacts.
- Fishermen and primary processor/dealer sectors benefit.

  Total output = $875,000 to $8.6 million increase.
  Value added = $506,000 to $5.0 million increase.
  Jobs = 9 to 85 increase.

- Analysis assumes that U.S. fishermen cannot increase landings in the near term.
- If landings did increase, positive impacts would go up.
- There will be no negative impacts on the recreational fishery.

Introduction

This report examines what the economic impact would be on U.S. seafood markets, from fishermen to retailers, if bluefin tuna were listed among the most threatened creatures by the Convention on International Trade of Endangered Species (CITES). It explores the current market for bluefin in the United States, including landings, exports, imports and re-exports. The data come from the National Marine Fisheries Service (NMFS) Bluefin Statistical Document (BSD). This reporting system was mandated by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and is far more rigorous than the catch documentation schemes for any other U.S. domestically landed species. The economic impact for the current level of bluefin landings and trade are calculated along with forecasts of the economic impacts on domestic bluefin fishing activities if CITES regulations were imposed.

Bluefin fishing began more than 2,000 years ago with the ancient Phoenicians; in the United States, however, it wasn't until 100 years ago that sportsmen began to target the giant bluefin. Then, no commercial market existed for the bluefin, which can grow to more than 900 kilograms (almost 2,000 pounds) (Safina and Klinger 2008). Tournaments for this species were very popular until the 1960s, when abundance began to decline. Before 1970, bluefin fetched less than 50 cents a pound; but after Japan became a market for these giants, prices skyrocketed to more than $10 a pound. This led to rapid expansion of the bluefin fishery. To underscore how valuable the fish can be, a 444-pound specimen sold in 2001 for $173,600—$391 a pound—at Tokyo's Tsukiji fish market (Associated Press 2001). Although not every bluefin at Tsukiji commands such a high price, the species' value has risen significantly.

Atlantic bluefin tuna are in trouble in the Western and Eastern Atlantic Ocean. The Western Atlantic stock is in particular danger (Safina and Klinger 2008). Years of exceeding quotas and lax management have driven the species to near commercial extinction. Scientists recommended recently a worldwide total allowable catch (TAC) of 8,500 to 15,000 metric tons to recover the stock, but ICCAT set the catch at 22,000 metric tons (Safina and Klinger 2008). In addition to ICCAT's TAC, which many believe is too high, landings in the Eastern Atlantic continue to exceed their assigned TACs by as much as 240 percent (Safina and Klinger 2008). On top of the TAC overages, a high amount of illegal fishing of Eastern Atlantic stock is occurring, further jeopardizing the bluefin's recovery.

Although the Eastern and Western stocks differ, significant mixing occurs (Safina and Klinger 2008). Catch quotas for the Eastern bluefin are higher because its capacity is greater. Still, landings in the Eastern Atlantic regularly exceed quotas. Furthermore, the Eastern landing of Western fish could be quite high. As a result, 2003 was the last year the U.S. tuna fleet landed its full quota; in 2008, the fleet landed just 25 percent of its quota. The activities in the Eastern Atlantic are hurting recreational and commercial fishermen in the United States, as well as processors, wholesalers and retailers.

An ICCAT-initiated independent review of the organization's management of bluefin tuna termed it an "international disgrace" (Hurry, Hayashi and Maguire, 2008 p. 2). The incredible value of this species creates an extraordinary incentive to ignore quotas, fish illegally and pressure politicians to disregard scientific recommendations. Additionally, ICCAT lacks the political will to make the tough choices necessary for this species to recover. As a result, Monaco said it intends to submit a proposal to include Atlantic bluefin tuna on CITES's Appendix I list. That motion is to be considered at CITES's Conference of the Parties meeting in 2010 (American Free Press 2009).

Current Domestic Bluefin Tuna Fishery

Current assessment shows that both Western Atlantic and Eastern Atlantic stocks are overfished and that the overfishing continues (NMFS 2008). Although these stocks are managed separately, significant mixing of the two occurs. The degree of mixing difficult to determine, but Western landings of large bluefin contain few Eastern fish, while the Western catch of school bluefin contains as much as 62 percent Eastern fish (NMFS 2008).

Fishing mortality is falling in the West because U.S. fishermen have taken less than their TAC for several years. There are two basic hypotheses regarding the inability of the U.S. fleet to land its quota: abnormally low availability and substantially smaller Western stocks. Recent research suggests that availability is lower than average because the spawning stock biomass has shrunk significantly. However there is significant uncertainty in the spawning stock biomass projections, because the 2008 assessment does not incorporate uncertainty about stock mixing, recruitment and the assumed growth curve (NMFS 2008). NMFS manages bluefin landings using quotas, seasonal restrictions, gear restrictions, and trip and size limits. Although there is some early indication that the U.S. take of bluefin will increase in 2009, it may be just an anomaly.

For more than 10 years, bluefin landings and trade were tracked using ICCAT's BSD. In 2007, ICCAT recommended a more stringent program to track the fish from capture to farming to landing and trade. NMFS implemented its Bluefin Tuna Catch Document (BCD) program in July 2008 (NMFS 2008). The intent of the more-stringent BSD is to be able to account for all bluefins in the landings-to-market supply chain. A BCD is generated by every landing, including those on the high seas, and all landed bluefin must get a tag that stays with the fish until it is processed for consumption. The BCD must accompany every bluefin, whether imported or exported.

Data analyzed in this report came either from the BSD program (pre-2008) or the new BCD program, including landings, exports, imports and re-exports. Because raw data from these programs are confidential, the information was summarized enough to allow state-level analysis but still protect confidentiality (NMFS 2009a). Landings as reported here are net recreational landings. Dollar values are in nominal dollars unless otherwise stated.

The total number of Atlantic tuna permit holders was 35,568 in 2008. The majority of these permits were for angling (private recreational fishing, with 26,933 permits) and charter boats (4,297 permits). Most of the growth in permits has been driven by these two categories. Longline permits are also up, but harpoon, general and purse seine permits have fallen. Additionally, dealers who handle bluefins must have permits. As of August 2008, there were 395 permitted dealers, the majority of them in Massachusetts. At the same time, 205 dealers held international trade permits, with the majority of them in California followed by Florida.

Table 1 details the volume and value of 2008 domestic bluefin landings, summarized by state. A small portion is caught in the Northeast Distant Area (NED), landed in Newfoundland, Canada, and transported by truck to the United States (NMFS 2009a). Massachusetts landed the most bluefin by far, with 54.6 percent of the volume and 52.3 percent of the value. North Carolina had the second-highest landings by volume (17.7 percent) and value (27.4. percent). The landings in North Carolina fetch the highest price of any state, $13.77 a pound.

Table 1. Volume and Value of 2008 Bluefin Landings by State (2008 dollars)

State	Weight (kilograms)	Weight (pounds)	Value	Price per Pound
Florida	9,665	21,308	$129,144	$6.06
Louisiana	18,727	41,286	$177,845	$4.31
Massachusetts	145,390	320,530	$2,722,498	$8.49
Maryland	1,582	3,488	$19,309	$5.54
Maine	15,092	33,272	$261,496	$7.86
North Carolina	47,064	103,758	$1,429,230	$13.77
New Hampshire	7,152	15,767	$155,908	$9.89
New Jersey	8,246	18,179	$132,479	$7.29
Newfoundland, Canada	2,554	5,631	$26,942	$4.78
New York	4,777	10,531	$81,120	$7.70
Puerto Rico	3,001	6,616	$46,172	$6.98

Rhode Island	2,225	4,905	$20,082	$4.09
South Carolina	844	1,861	$7,134	$3.83
Total	**266,319**	**587,133**	**$5,209,359**	**$8.87**

Table 1a lists the volume and value of landings from the high seas, areas outside the U.S. exclusive economic zone (EEZ). NMFS's BSD/BCD database includes information by statistical areas that do not adhere to the EEZ boundary, except for the NED, which includes the Grand Banks and Flemish Cap. Because ICCAT has a special interest in the NED, NMFS tracks all landings in the NED which is wholly outside the EEZ. Landings in Newfoundland can be identified without violating confidentiality, but reporting the remaining high seas landings of U.S. states would violate the rule of three. As a result, those landings can be reported only at the regional level (NMFS 2009a). For the purpose of this economic impact analysis, high seas bluefin landings in New England are attributed to Massachusetts.

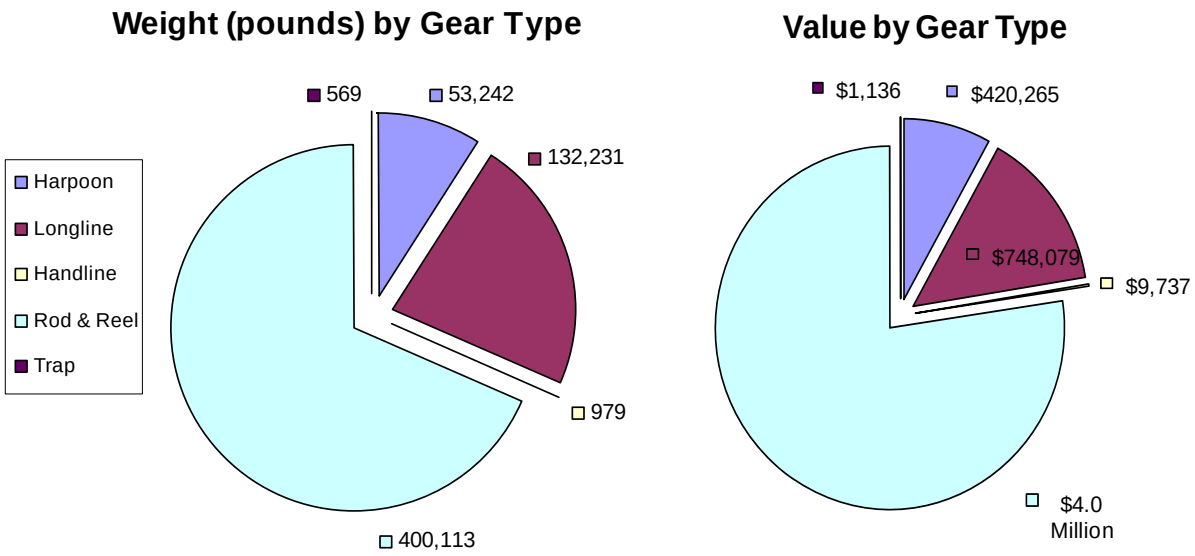
Table 1a. Volume and Value of 2008 High Seas Bluefin Landings by Region (2008 dollars)

Region	Weight (kilograms)	Weight (pounds)	Value	Price per Pound
Newfoundland	2,554	5,631	$26,942	$4.78
New England	773	1,704	$ 9,771	$5.73

All bluefin reported in Table 1a are landed with longline gear. It is possible that other longline fishermen in the South Atlantic and the Gulf of Mexico catch fish outside the EEZ. Unfortunately, no data isolate those bluefin. NMFS assumes that the amount of bluefin landed outside the EEZ and outside the NED is negligible (NMFS 2009a).

Figure 1 details the volume and value of landings by gear type. While it is illegal to target bluefin with longline gear in the Gulf of Mexico, the only known spawning area for Western bluefin, the second-largest landings (22.5 percent of the total volume and 14.4 percent of the value) by any gear is strictly bycatch in the Gulf longline fishery. In fact, bluefin are not a target of longline fishermen anywhere in the United States. Because the longline value proportion is less than the longline volume proportion, longline product is relatively low-value compared with the landings using other gear types. The gear type that brings in the highest-priced bluefin is rod and reel, with a 2008 average price of $10.07 a pound, followed by handline at $9.95 and harpoon at $7.89. In previous years, the purse seine was a significant contributor to bluefin landings; however, that gear type did not land any of the fish in 2008.

Figure 1. Volume and Value of 2008 Landings by Gear Type (2008 dollars)



Bluefin prices have shown no consistent trend since 2000 (NMFS 2008), and since 2002 they have been flat in all regions. But during this period, prices have varied by gear types. In the North and Mid-Atlantic, handgear (rod and reel, harpoon and handline) consistently have brought higher prices.

Total revenue within the current highly migratory species (HMS) fleet is increasing, mostly due to yellowfin tuna landings (NMFS 2008). When focusing strictly on bluefin, fleet revenue is declining. In 2000, bluefin revenue reached $18.7 million; in 2008, it had fallen to $5.2 million (Table 1). Price per pound, dressed weight, paid by dealers has dropped from a nationwide average of $9.66 a pound in 2000 to $8.87 in 2008 (NMFS 2008). At the same time, landings fell 67.1 percent over the same period. As a result, revenue in this fishery is down.

HMS exports are dominated by tuna. All values for trade are quoted as “free alongside ship,” which includes the cost of getting the product to port but does not include costs of transportation beyond that point. Most bluefin is a very high-value product that is transported by air. The fish are exported fresh and dressed, and shipped individually to foreign buyers. Table 2 details the volume and value of bluefin exports, by exporting state, in 2008. Exports have been falling since 1999 (NMFS 2008), attributable to a drop in landings and an increase in domestic demand for high-grade, sushi-quality bluefin. On its public Web site, NMFS publishes bluefin export data from U.S. Customs and Border Protection, and NMFS estimates are always higher than BSD/BCD estimates. This is attributable to higher quality control with the BSD/BCD program, better control on species (no Southern bluefin in BSD/BSD data), and BSD/BCD data on net of re-exports.

Table 2. Volume and Value of Bluefin Exports in 2008 by State (2008 dollars)

State	Weight (kilograms)	Weight (pounds)	Value	Price per pound
Massachusetts	62,190	137,105	$1,194,337	$8.71
Virginia	4,352	9,593	$141,808	$14.78
New York	44,121	97,270	$817,471	$8.40
North Carolina	34,480	76,015	$1,141,790	$15.02
Unknown	1,494	3,294	$26,870	$8.16
Total	**146,636**	**323,277**	**$3,322,277**	**$10.28**

Imports tell a similar story when comparing the BSD/BCD and CBP data. On the import side, the differences are due mainly to a lack of compliance with the BCD, particularly with importers on the Pacific coast. Table 3 summarizes the volume and value of bluefin imports by state of importation and processing level. The majority of the product entering the United States is minimally processed. For the purpose of this analysis, all imports labeled dressed, headed and gutted, gilled and gutted, and other are assumed to be minimally processed; fillets and steaks are assumed to be processed. In 2008, the nationwide average import price for minimally processed product was $15.22 a pound, compared with the landed price of $8.87 and an export price of $10.28. The 2008 price for processed bluefin was $32.92 a pound. Within the BSD/BCD program, country of origin data were not always entered correctly on the form. As a result, the only country of origin available in the data received from NMFS was Canada. In 2008, 41.6 percent of the volume and 28.2 percent of the value came from bluefin imported from Canada.

Table 4 summarizes the volume and value of re-exports by state in 2008. The weights are the totals of the reported individual fish weights from the NMFS dealer biweekly report and therefore roughly correspond to the data supplied to ICCAT. Type and processing stage information is from the ICCAT data. Re-exports are bluefin that were imported for consumption but then re-exported with or without value added in the United States. Re-exports reached a high in 2006 of 691 metric tons, which exceeded regular exports that year. In 2008, only 16 metric tons were re-exported. From the price-per-pound figures in Table 4, both products are similar to regular exports (Massachusetts, $9.97 a pound), and higher-value product (New Jersey, $34.60, and New York, $41.07) were re-exported.

Table 3. Volume and Value of Bluefin Imports in 2008 by State (2008 dollars)

State	Processing Stage	Weight (kilograms)	Weight (pounds)	Value	Price per pound
California	Minimal	138,423	305,170	$4,891,477	$16.03
Georgia	Minimal	230	507	$1,014	$2.00
Hawaii	Processed	98	216	$8,640	$39.99
Illinois	Minimal	408	899	$0	$0.00
Louisiana	Minimal	300	661	$661	$1.00
Massachusetts	Minimal	95,479	210,495	$1,830,479	$8.70
Montana	Minimal	450	992	$992	$1.00
New Jersey	Minimal	32,059	70,678	$2,075,467	$29.37
	Processed	251	553	$16,692	$30.16
New York	Minimal	89,644	197,631	$3,307,628	$16.74
Rhode Island	Minimal	3,648	8,042	$45,231	$5.62
Texas	Minimal	2173	4,791	$23,153	$4.83
Washington	Minimal	604	1,332	$16,574	$12.45
Totals	**Processed**	**349**	**769**	**$25,332**	**$32.92**
	Minimal	**363,418**	**801,200**	**$12,192,676**	**$15.22**

Without data on actual consumer purchases of bluefin, actual total consumption cannot be determined. Instead, the concept of "total disappearance" is used. U.S. total disappearance (hereinafter called total consumption) equals landings minus exports plus imports minus re-exports. If little bluefin is held in one year for consumption in the next year, total disappearance will be very close to actual consumption. Figure 2 details total consumption by volume in kilograms, and Figure 3 details total consumption by value from 2004 through 2008.

Table 4. Volume and Value of Bluefin Re-Exports in 2008 by State (2008 dollars)

State	Weight (kilograms)	Weight (pounds)	Value	Price per pound
Massachusetts	15,465	34,094	$339,753	$9.97
New Jersey	1,216	2,681	$92,756	$34.60
New York	139	306	$12,586	$41.07
Total	**16,820**	**37,082**	**$445,094**	**$12.00**

From Figure 2, it is clear that the United States is a net importer of bluefin tuna. By volume, Americans are consuming less. By value (Figure 3), the trend is still downward but much more flat, suggesting that the United States was consuming less of a higher-valued product in the past five years. Exports have tracked landings exactly, with landings down over this five-year period but increasing the past two years.

Figure 2. Total U.S. Consumption by Volume, 2004–2008

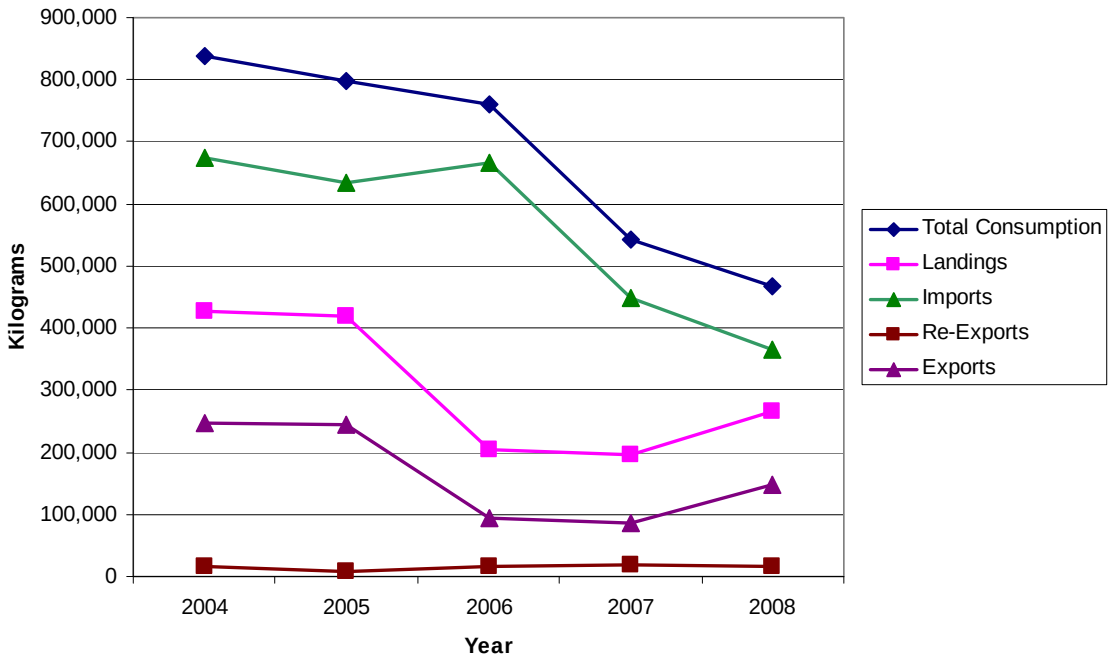


Figure 4 details prices by trade type over the past five years in 2008 dollars. Total consumption prices tracked with import prices, while landed and export prices remained relatively flat in the past three

years. Interestingly, import prices skyrocketed in 2007. This probably has less to do with quality changes than it does with shrinking global supply of bluefin. Total U.S. consumption is falling and the price is rising, further bolstering the conclusion that U.S. and global supplies of bluefin are falling.

Most processing is undertaken on the vessels that catch the bluefin. This is particularly true for export-quality fish, which are quickly bled, gutted and chilled. Once landed, the fish are immediately graded and prepared for the domestic or export market. If headed for export, the fish is refrigerated or packed in insulated crates filled with ice or ice packs for air transport. Domestic product is cut into pieces and sold to restaurants or other retail outlets. Imports usually are minimally processed by the wholesaler/importer before the fish is sold to retail outlets. Often the retailer does the final processing.

The recreational bluefin fishery is monitored through NMFS's Large Pelagic Survey. The LPS is an intercept-based catch-and-effort survey conducted on the Atlantic Coast from North Carolina north. Table 5 details the directed effort by fishing mode for bluefin in 2007 and 2008 by two widely accepted definitions of directed effort: targeted only and caught and/or targeted (NMFS 2009b). The first definition only counts trips where anglers expressed a post-trip targeting choice for bluefin, while the second includes anyone who caught and/or targeted the fish. In 2008, private boats took more bluefin trips (27,035 to 29,483 trips) than in 2007 (24,936 to 27,030 trips) while charter mode effort dipped slightly. The estimates presented in Table 5 should be viewed only as lower-bound estimates, because there are no effort estimates for most of the South Atlantic or the entire Gulf of Mexico. Additionally, there were 257 HMS tournaments in the United States in 2008 (NMFS 2008). Of those, 31.1 percent awarded points for landing bluefin. Unfortunately, very little is known about the economic profile of tournaments and their associated economic impacts. As a result, this report makes no estimate of the economic impacts of tournament activities.

Figure 3. Total U.S. Consumption by Value, 2004–2008

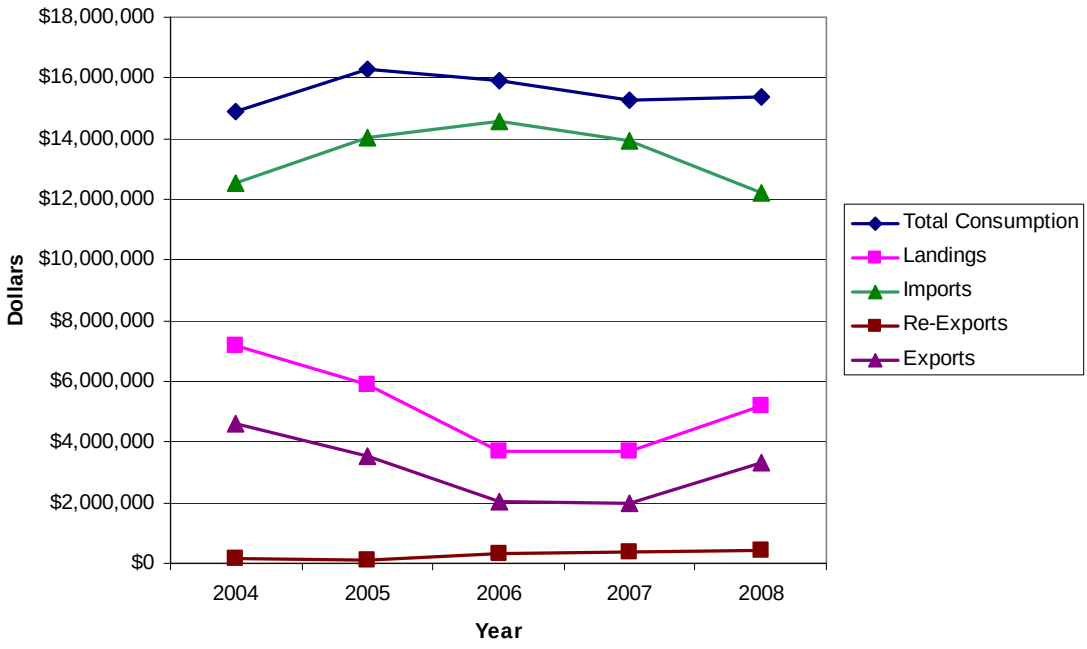


Figure 4. U.S. Bluefin Prices by Trade Type, 2004–2008 (2008 dollars)

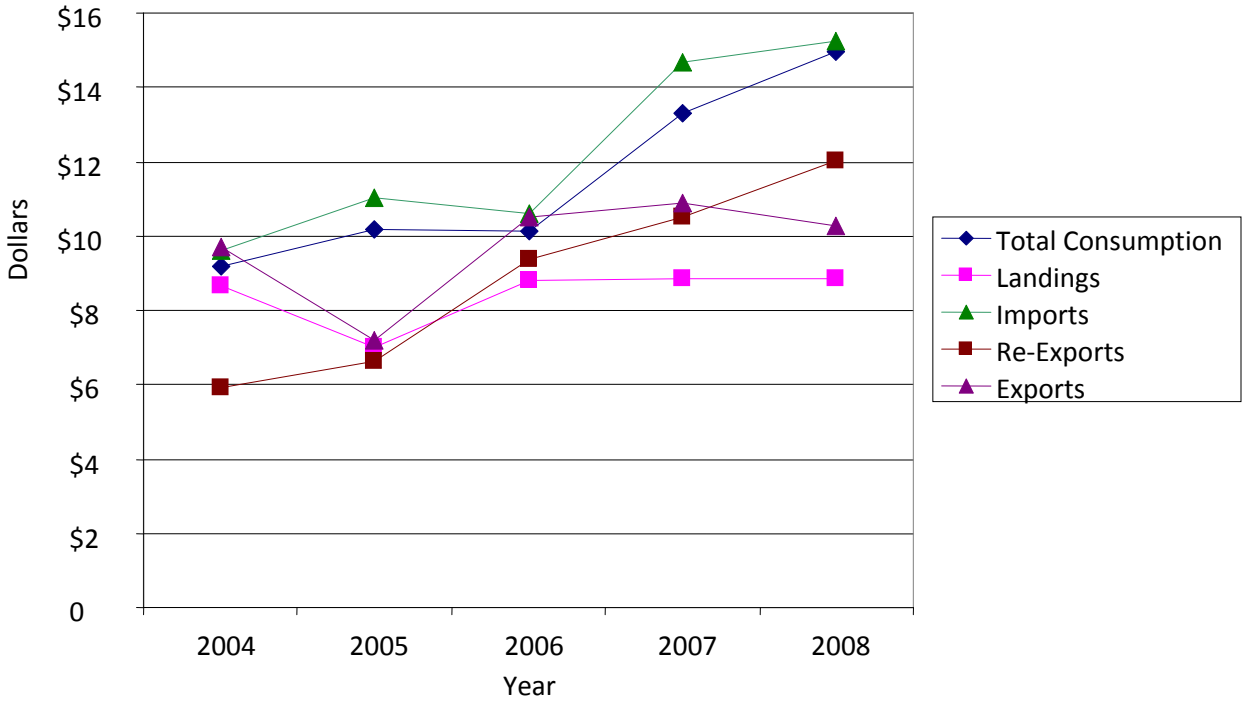


Table 5. Recreational Bluefin Trips by Mode, 2007 and 2008

Year	Effort Method	Mode	Bluefin Effort (day trips)
2007	Targeted	Private	24,936
	Caught/Targeted	Private	27,030
	Targeted	Charter	5,094
	Caught/Targeted	Charter	5,708
	Targeted	Total	30,030
	Caught/Targeted	Total	32,124
2008	Targeted	Private	27,035
	Caught/Targeted	Private	29,483
	Targeted	Charter	4,497
	Caught/Targeted	Charter	5,366
	Targeted	Total	31,532
	Caught/Targeted	Total	34,849

Review of Seafood-Demand Literature

In mid-2009, Monaco indicated its intent to propose an Appendix I CITES listing for bluefin, and Germany, France, Britain, the Netherlands and Sweden were reported to support such a listing (American Free Press 2009). An Appendix I listing is CITES's most stringent listing category: under Appendix I, all commercial trade is prohibited except under special circumstances, including scientific research (importation of sport-hunted fish would be allowed, with appropriate permits). This ban includes fish landed outside the U.S. EEZ by American vessels. To trade bluefin after a listing, both import and export permits are required. The import permit can be issued only for noncommercial uses and only if the trade will not be detrimental to the species. Export or re-export certificates are also required. An export permit will be issued only if the bluefin was legally obtained, trade won't be detrimental to the species and an import certificate has already been issued. A re-export certificate can

be issued only if the bluefin in question was imported under the above provisions. The CITES parties will meet in March 2010 in Qatar to decide on the listing.

It is an economic axiom that when supply of a normal good drops, its price will rise. Because the United States is a net importer of bluefin and it is unlikely that the U.S. fleet can increase landings in the near term, a CITES listing would reduce the supply of bluefin to U.S. consumers. Quantifying how prices respond to this reduction in quantity supplied is at the heart of determining how U.S. markets would respond to a CITES Appendix I cessation of trade.

More specifically, price elasticity of demand is a metric that describes price changes stemming from a change in quantity supplied and vice versa. Elasticities are estimated by calculating demand relationships, ideally using data on consumer purchases. Goods can have either elastic or inelastic demand functions. For an elastic good, quantity changes result in proportionally smaller price changes, and for inelastic goods, quantity changes result in proportionally larger price changes. Often in fisheries, consumer consumption data are difficult to obtain, and bluefin are no exception. Instead of estimating their elasticities directly, this study will utilize existing seafood-demand studies.

Although research on seafood demand has been increasing in recent years, the literature offers few demand models. This is particularly true for single-species demand models, and tuna demand models specifically. With the exception of Atlantic salmon, most such studies are conducted using highly aggregated species groups. This is driven by the lack of data on seafood consumption at the retail level, along with other factors limiting the specification of single-species demand models.

The majority of seafood demand studies suggest that seafood is price elastic (Asche, Bjorndal and Gordon 2005). Asche et al. (2005), in a survey of the literature, found that the higher the product's value, the more elastic the demand for it. Also, fresh product tends to be more elastic. In addition, the higher the own-price elasticity for a product, the higher the number of substitutes it will have. The closer one seafood product is in character to another, the more likely there will be substitutes.

Even though tuna are very important and high-value species, only two studies have looked directly at demand for it. Contrary to most other species, demand for tuna has been shown to be slightly inelastic. Wessells and Wilen (1994) looked at Japanese consumer demand for all tuna and estimated an own-price elasticity of –0.93. Johnson, Durham and Wessells (1998) also found an own-price elasticity of –0.85 using consumer purchase data from Japan. An elasticity of –1.0 is an elastic demand, so the two studies that focus on tuna found demand to be slightly inelastic. This means that the bluefin tuna supply reductions that would follow a CITES Appendix I listing would bring proportionally larger price changes. Specifically, a 1 percent decrease in bluefin supply would generate an increase in price of between 1.08 percent (Wessells and Wilen 1994) to 1.18 percent (Johnson et al. 1998). The fewer substitutes a good has, the more likely that good is to be inelastic, which makes intuitive sense for bluefin and helps explain the slight inelasticity. These results support the assumption that a reduction in bluefin import supply would result in higher domestic prices because the United States is a net importer and, if there are

indeed few substitutes for bluefin from domestic supply or imports, retained exports would be consumed domestically.

There are even fewer studies that examine the interactions between domestic supply and imports, and the substitution possibilities between domestic production and imports. Lopez and Pagaloutos (2002) estimated substitution elasticities for 40 consumer goods by four-digit standard industrial classification (SIC) codes. In general, the higher the elasticity, the higher the domestic bias in consumption, meaning that consumers would rather buy domestic products. The closer the elasticity is to 1.0, the more the international market is like the domestic market, with little domestic differentiation or home bias. If the value is higher than 1.0, domestic consumers prefer domestic product; if it is less than 1.0, consumers prefer imported product. For very large values of elasticity, import restrictions tend to cause large changes in consumption patterns. In their study, Lopez and Pagaloutos estimated the substitution elasticity for prepared fresh or frozen seafood (SIC 2092), the category bluefin imports would fall into, at 0.882. Although this is a highly aggregated category that includes all fresh and frozen seafood, it is the closest such estimate in the literature.

While the Lopez and Pagaloutos estimate is less than 1.0, it is higher than that for other protein sources such as meatpacking plants (0.803), sausage and other prepared meats (0.421) and poultry slaughtering and processing (0.706), and is lower than for canned and cured seafood products (2.025). Their result suggests that U.S. consumers are almost indifferent to whether their seafood is domestic or is imported fresh or frozen. For a 1 percentage point increase in the ratio of domestic price to foreign price, the elasticity of prepared fresh and frozen seafood suggests that the ratio of domestic consumption to foreign consumption would fall 0.882. percentage point. The corollary is that if the ratio of foreign consumption to domestic consumption fell by 1 percentage point, the ratio of domestic price to foreign price would increase by 1.13. percentage point. In the case of a CITES Appendix I listing, consumption of imported product would fall to zero, suggesting a price increase for domestic product.

The main focus of Lopez and Pagaloutos, however, was how businesses can influence consumer behavior expressed in these elasticities either to improve penetration of foreign markets or to protect domestic producers. Their results show that domestic industries can influence consumers to buy more domestic product by increasing the directed marketing of those goods for final consumption and increasing the level of advertising for domestic products. This suggests that domestic producers could increase consumption when imports are shut off by a CITES Appendix I listing.

Gentner (2008) estimated simple demand functions for both domestic and imported tuna products. This study aggregated all tuna products produced in the United States or imported into the country, including canned tuna products. The analysis used publicly available landings data from NMFS and Customs and Border Protection data on imported product from 1989 through 2006. The analysis tried to adhere to conventional demand theory, but the data were limited so it was impossible to estimate the more appropriate system of demand equations. This simplistic analysis showed that domestic tuna and imported tuna had separate markets, indicating that when looking at all tuna products, the United States imports a different product than it produces. When all tuna products are included, the United

States imports 94 percent of what it consumes, mostly canned tuna products. The majority of the domestic production in this model is fresh product, so the finding that the markets are independent makes sense; the import market is primarily canned product; the domestic market is primarily fresh product. The market for bluefin is very different, with the United States importing only 23.9 of what it consumed in 2008. Although not listed in Gentner, a 100 percent reduction in tuna imports would increase domestic prices by 4.46 percent. While this is not the standard demand elasticity, it suggests that tuna demand is elastic and that the price increase would be proportionally smaller than the quantity decrease.

Economic Impact of CITES Appendix I Listing

Economic impact models are a representation of all the transactions in an economy and allow analysts to outline the relationships between the production of goods and their final consumption. This section will explore the economic impact of current bluefin tuna landings and trade, and create a baseline to help learn how those factors might change if a CITES Appendix I listing reduced the supply.

Economic impacts begin with a consumer purchase or final demand. Those initial purchases constitute the direct impact. From that initial expenditure, the store buys its inventory and labor, as do the supplier of those goods and services required by the store. When businesses and suppliers import goods from outside the economic zone (whose boundaries the analysis model defines), that “leakage” of funds leaves the economy and is not considered further. Tracking a business’s purchases of supplies and labor continues until the original purchase amount is exhausted by leakage. The sum of this activity is the indirect impact. The portion of a laborer’s income and a business owner’s profit from the indirect phase that is then reinvested in goods and services in the normal course of that consumer’s life is considered the induced impact. The sum of direct, indirect and induced impacts describes the total impact of consumer expenditures in an economy. These impacts can be denominated by the number of jobs supported, the value added or the contribution to gross domestic product, the total output of an economy. One nationally available model for analyzing economic impact is IMPLAN (Minnesota IMPLAN Group 1997).

As stated, economic impact models track an industry in a supply chain backward from the consumer. Unfortunately, retail data on consumer purchases of bluefin are not available, particularly from restaurants. Instead, this analysis has access only to purchases made at various places in the supply chain before the product reaches the consumer. As a result, a special economic impact model is needed to examine the typical economic linkages down the supply chain from fishermen as well as forward, to consumers.

To examine economic impact forward from fishermen, or price markups, for the sectors forward in the supply chain are used to determine the value entering the next industry link forward. For instance, the nationwide average processor markup is used to increase the landed price to the value the wholesaler would pay the processor. This procedure is repeated until the value paid by the consumer is estimated.

Commercial fisheries sectors are not described well in the standard IMPLAN industry model because the fishing industry is relatively small and standardized cost and earnings data on fisheries sectors are not available. Therefore, this analysis uses a mix of models and data sources where necessary to calculate economic impacts. The model developed by Kirkley, Duberg and Gentner (2004) was adapted for use backward across the fisheries wholesale sector. Data on consumption of bluefin in restaurants vs. other retail outlets, as well as margins for the retail sector, were taken from the value-added model in NMFS's Fisheries of the United States (FUS 2009) and from Fisheries Economics of the United States (NMFS 2006). Economic impacts of the retail sectors were calculated in IMPLAN using margined expenditures.

Baseline Economic Impacts

Table 6 shows the economic impact of the current landing and export of bluefin in the United States in 2008. Appendix 1 shows a breakdown of these impacts for landing/export states. This model assumes that exports leave from the primary dealer/processor and do not continue further up the supply chain before leaving the country. The majority of the bluefin leaving the country leaves via air freight, and the economic impacts of transportation have been included. Because most processing occurs on the vessel and anecdotal data suggest the primary dealer handles exportation, this assumption is considered to be solid. Care was taken not to double-count the fishing activity generated by exports by including only the markup attributable to the primary dealer/processing sector.

Table 6. U.S. Economic Impacts of Bluefin Landings and Exports, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$11,079	$6,957	142
Primary Dealers/Processors (landings)	$4,072	$2,157	28
Primary Dealers/Processors (exports)	$7,168	$3,798	50
Secondary Wholesalers/Distributors	$8,288	$5,828	66
Retail Stores	$3,200	$2,425	39
Restaurants	$34,696	$26,903	670
Total	**$68,503**	**$48,068**	**995**

*In thousands of U.S. dollars

Overall, bluefin fishing and trade in 2008 generated $68.5 million in output and $48.1 million in value added, and supported 995 jobs. The majority of this was driven by the restaurant sector (50.7 percent). Handling of exports generated $7.1 million in output and $3.8 million in value added, and supported 28 jobs. This portion of economic impact would be lost if bluefin trade were halted under a CITES Appendix I listing. New York and Virginia had more export activity than landings. For those states, fishing activities were credited to the state where the bluefin were landed, and only the export activity was included in the economic impacts.

Table 7 shows the economic impact estimates for bluefin imports and re-exports. It was assumed that minimally processed imports went to the secondary wholesale/distribution sector and that processed imports went directly into the restaurant and retail store sectors. It is likely that some minimally processed bluefin products (dressed, headed and gutted, gilled and gutted, and other) are imported directly to retailers that cut whole bluefin into portions for retail sale. No data exist to determine the extent of this practice. If any bluefin categorized as minimally processed for this analysis go straight to the retailer, the actual impact of imports would be lower. Therefore, the estimates in Table 7 can be considered the upper bounds of the actual economic impact.

Table 7. U.S. Economic Impact of Bluefin Imports and Re-Exports, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Secondary Wholesalers/Distributors	$5,552	$3,904	44
Retail Stores	$2,015	$1,527	25
Restaurants	$21,847	$16,928	422
Total	**$29,414**	**$22,359**	**491**

*In thousands of U.S. dollars

Additionally, it was assumed that all economic impacts of re-exports accrued to the secondary wholesaler/distributor sector. Overall, importation and re-exportation of bluefin generated $29.4 million in output and $22.4 million in value added in 2008, and supported 491 jobs. As with fishing, the vast majority of this impact (99.3 percent) was generated in the restaurant sector, attributable to the high markup for bluefin sold in restaurants. Although re-exports are not isolated in Table 7, they contribute relatively little to overall impacts, generating $388,000 in total output, $241,000 in value added, and supporting three jobs. Re-exports used to make up a much larger portion of trade activity, but because of increasing U.S. demand for bluefin products and shrinking global supply, more products that would have been re-exported are staying in the United States.

Table 8 details the total U.S. economic impacts of bluefin trade in the United States, the sum of Tables 6 and 7. While the overall bluefin trade generated $97.9 million in total output and $70.4 million in value added in 2008, and supported 1,486 jobs, it is important to note that restaurant sales and retail stores accounted for 63 percent of this economic impact. Imports, re-exports and exports accounted for 29.5 percent of bluefin-related economic impact in the United States. In comparison to the U.S. seafood industry as a whole, bluefin trade supports less than 0.1 percent of seafood-related employment and total output (NMFS 2006).

Table 8. U.S. Total Economic Impacts of Bluefin Trade, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$11,079	$6,957	142
Primary Dealers/Processors	$11,240	$5,955	78
Secondary Wholesalers/Distributors	$13,841	$9,732	110
Retail Stores	$5,215	$3,952	64
Restaurants	$56,542	$43,831	1,092
Total	**$97,917**	**$70,427**	**1,486**

*In thousand of U.S. dollars

Table 9 shows the trip expenditures and economic impacts stemming from recreational bluefin trips. Estimates of private boat recreational expenditures come from an NMFS survey in 2006. NMFS did not publish estimates for bluefin; they were estimated for this report following the methodology set out in Gentner and Steinback (2008). A survey was mailed to a sample of holders of highly migratory species permits. Of those, 2,076 surveys were returned, and 507 of those respondents reported that they had targeted bluefin tuna on their last trip. Using Gentner and Steinback (2008), fishermen spent an average of $458.82 per trip in 2008 dollars. The dominant expenditure for bluefin anglers was fuel, at $195.30 per person per trip, followed by tackle, at $49.54 per person per trip. Because the 2006 survey sampled HMS permit holders, charter trips were not included. Instead, this analysis used the average trip expenditure estimate from Ditton, Bohnsack and Stoll (1998) converted into 2008 prices using the consumer price index. The estimate by Ditton et al. was $747.18 per person per trip. Depending on the choice of directed effort measurement, recreational bluefin fishing in 2008 generated $41.6 million to $46.8 million in output and $21.6 million to $24.3 million in value added, and supported 332 to 374 jobs.

The 2006 HMS-expenditure survey included data on durable goods expenditures. Although it is impossible to estimate directed participation because a holder of an HMS permit could fish for other HMS and non-HMS species, each HMS permit holder spent $4,843.71 annually on fishing-related expenses. The Gentner and Steinback (2008) methodology includes only expenditures directly related to saltwater fishing and purchases of new equipment. Use of purchased equipment was included only if it was bought from a dealer or using a loan, and then only the debt service was included. This figure is driven by boating expenditures of $2,187.90 a year, including insurance, storage, maintenance, etc., with $1,072.73 a year attributable to boat payments. With 26,933 angling-category permits, HMS anglers spend $121.9 million a year on their hobby. This level of expenditures drives $349.7 million in total output impacts and $169.2 million in value added, and supports 2,164 jobs. Again, these are lower-bound estimates because there is no information on HMS fishing for states on the Atlantic coast south of North Carolina or the Gulf of Mexico. Additionally, the economic impact of HMS fishing tournaments is not included here.

Table 9. Private Recreational Bluefin Trip Expenditures, Economic Impacts by Mode, 2008

Effort Method	Mode	Total Expenditures	Value Added Output	Value Added	Jobs
Targeted	Private	$14,340,400	$33,669,955	$17,485,582	269
Caught/Targeted	Private	$15,923,241	$37,386,320	$19,415,576	298
Targeted	Charter	$3,360,678	$7,890,567	$4,097,753	63
Caught/Targeted	Charter	$4,010,263	$9,415,733	$4,889,807	75
Targeted	Total	$17,701,079	$41,560,522	$21,583,335	332
Caught/Targeted	Total	$19,933,504	$46,802,053	$24,305,383	374

Economic Impacts of CITES Appendix I Listing

Table 10 examines the amount of bluefin tuna that would have been lost to the U.S. economy as a result of a CITES listing in 2004. The United States is a net importer of bluefin. Across all imported species, the United States imports more than 86 percent of the seafood it consumes (Gentner 2008). Across all exported species, the United States exports more than 80 percent of its domestic landings. Bluefin is different from all other species. In 2008, the United States exported 55.1 percent of its domestic landings and imported 23.93 percent of its total consumption. Imports have been declining rapidly since

a peak in 2006, when the United States imported 66.35 percent of the bluefin it consumed. The data in Table 10 will be used to estimate potential price changes for bluefin after a CITES Appendix I listing. Table 10 also includes the known high seas landings of bluefin that would also be lost under a CITES listing. In 2008, only 1.6 percent of the deficit in Table 10, in terms of volume, would be lost due to the closure of the high seas to bluefin landings.

The remainder of this analysis assumes that U.S. fishermen cannot increase landings in the near term. That is, the same bluefin availability issues discussed above, which have plagued the industry in recent years, will continue, and the economic impact of a CITES Appendix I listing will be based solely on predictions regarding changes in bluefin prices after a listing. If a CITES listing allowed bluefin stocks to recover in the Western Atlantic, fishermen would be able to increase their landings, but recovery would take time. A parallel assumption necessary for this analysis is that landings will not fall from 2008 levels, at least in the near term.

The following analysis also assumes that the domestic industry can transform its product and/or change its marketing so that all domestic landings can be sold domestically. This assumption is supported by the findings in Lopez and Pagaloutos (2002) as long as domestic producers increase domestic marketing expenditures.

Table 10. Amount and Percentage of Bluefin Trade Deficit, 2004–2008 (Nominal Dollars)

Year	Weight (kilograms)	Weight (pounds)	Value	% of Total Consumption Not Available Under Listing
2004	–418,624	–922,908	–$7,800,050	–49.91%
2005	–386,302	–851,651	–$9,048,125	–46.06%
2006	–562,810	–1,240,783	–$11,240,901	–67.10%
2007	–350,319	–772,321	–$11,246,771	–41.77%
2008	–204,054	–449,862	–$9,697,689	–24.33%

Table 11 summarizes the potential price increase from a reduction in bluefin supply that would result after a CITES Appendix I listing. Five scenarios were investigated based on the review of the seafood-demand literature above. The lowest price increase, from Gentner (2008), assumes that demand for all tuna products in the United States is an adequate proxy for bluefin demand. The estimate from Gentner represents the only elastic demand function examined here. That is, price changes proportionally less than the change in quantity. This is probably a weak assumption because the total tuna demand was

driven by canned tuna, which is low value and has many substitutes. On the other hand, bluefin is high value and has few substitutes. Asche et al. (2005) indicate that these qualities typically lead to inelastic demands. Overall, this scenario represents a 4.46 percent increase in price. As a result, this scenario will be treated as the lower bound on the potential bluefin price increase.

The next-highest price scenario used Wessells and Wilen's elasticity estimate (1994), which predicts a 1.08 percent price increase for each percent of quantity lost. That estimate was formulated using all fresh tuna products purchased at the retail level in Japan. This estimate assumes that the U.S. market approximates Japan's. It is likely that the Japanese have different consumption patterns, but this study and one by Johnson et al. (1998) are the most similar in the literature. Overall, this scenario predicts a 26.3 percent increase in price.

Lopez and Pagaloutos (2002) is the next-highest price increase scenario. This estimate assumes that bluefin can be represented by demand for all prepared fresh and frozen fish. But bluefin is a higher-value product than most in this category, suggesting that the true elasticity would be more inelastic than this estimate. Overall, this scenario generates a 27.5 percent increase in price.

Johnson et al. (1998) offer the highest price increase estimate in this analysis, 1.18 percent for each 1 percent of supply reduction. Again, this figure is based on all tuna sold in Japanese retail markets and assumes that Japanese markets for all tuna are an adequate proxy for bluefin demand in the United States. Overall, this scenario generates a 28.7 percent increase in price.

The final, and highest, landed value increase scenario explored assumes that all current exports will be completely consumed domestically at current national average import prices for minimally processed product. This scenario represents an overall price increase of 39.6 percent This implies a very inelastic demand or represents the industry's potential ability to market product that matches what is currently being imported. U.S. fishermen typically export their highest-quality product, which is also the sort of product the United States is importing. This estimate is considered an upper bound because it is unlikely that product retained in the United States is as high-quality as the product imported, and this is supported by the price differential seen between landed product, particularly product landed by the longline fleet, and import prices. The difference between the two prices cannot be explained away simply by minimal additional processing or transportation costs.

The price increases detailed in Table 11 were applied to the landed pounds from Table 1, except for the upper-bound estimate, which applied the national average import prices for all currently exported products and the current landings price for all other consumption. Only the lower- and upper-bound fishermen revenue projections will be used for further analysis. The lower-bound price increase estimate generates landed value of $5.4 million, and the upper-bound technique produces a landed value estimate of $7.2 million

Table 11. Predicted Prices and Upper- and Lower-Bound Predicted Landed Value Increase, Post-CITES Appendix I (2008 dollars)

State	Predicted Price Increase				Predicted Value Increase	
	Gentner 2008	Wessells & Wilen 1994	Lopez & Pagoulatos 2002	Johnson et al. 1998	Lower Bound Gentner 2008	Upper Bound Exports Sold at Import Prices
Florida	$6.33	$7.65	$7.73	$7.80	$134,904	$237,819
Louisiana	$4.50	$5.44	$5.49	$5.54	$185,777	$428,656
Massachusetts	$8.87	$10.73	$10.83	$10.93	$2,843,921	$3,923,769
Maryland	$5.78	$6.99	$7.06	$7.13	$20,170	$38,114
Maine	$8.21	$9.92	$10.02	$10.12	$273,158	$397,927
North Carolina	$14.39	$17.39	$17.56	$17.73	$1,492,973	$1,513,476
New Hampshire	$10.33	$12.49	$12.61	$12.73	$162,862	$202,780
New Jersey	$7.61	$9.20	$9.29	$9.38	$138,388	$212,803
New York	$8.05	$9.73	$9.82	$9.91	$84,738	$125,221
Puerto Rico	$7.29	$8.81	$8.90	$8.98	$48,232	$76,540
Rhode Island	$4.28	$5.17	$5.22	$5.27	$20,978	$50,464
South Carolina	$4.01	$4.84	$4.89	$4.93	$7,452	$18,928
Totals	**$9.29**	**$11.23**	**$11.34**	**$11.45**	**$5,413,552**	**$7,222,158**

Table 12 details the total economic impact under the upper- and lower-bound scenarios. Substituting domestic landings for imports would increase economic impacts along the entire chain from the fisherman to the consumer. However, if a CITES Appendix I listing went forward, it would cause a loss of 24.3 percent of all consumption, as long as fishermen were unable to increase landings. So, any price increase would raise revenue to commercial fishermen and processors/dealers; however, it would take a very significant price increase to overcome the loss of the import trade to the other sectors. This is borne out by the estimates. Using the upper-bound estimates, a CITES Appendix I listing would generate

$95.0 million in output and $66.6 million in value added, and would support 1,380 jobs. Using the lower-bound estimates, the listing would generate $71.2 million in output and $50.0 million in value added, and support 1,034 jobs.

Table 12. Predicted Total U.S. Economic Impact of a CITES Appendix I Listing

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$11,513	$7,229	147	$15,360	$9,644	197
Primary Dealers/Processors	$11,680	$6,189	81	$15,583	$8,256	108
Secondary Wholesalers/Distributors	$8,613	$6,056	68	$11,491	$8,080	91
Retail Stores	$3,325	$2,520	41	$4,436	$3,362	55
Restaurants	$36,056	$27,958	697	$48,101	$37,298	929
Total	**$71,188**	**$49,952**	**1,034**	**$94,971**	**$66,641**	**1,380**

*In thousands of U.S. dollars

For U.S. fishermen and primary dealers/processors, a CITES Appendix I listing would be viewed as beneficial in terms of economic impacts. Table 13 compares the predicted changes in economic impacts to the current economic impact baseline presented in Table 8. Overall, the model predicts a loss of $2.9 million to $26.7 million in output, $3.8 million to $20.5 million in value added, and 106 to 452 jobs. Fishermen impacts would increase $240,907 to $1.8 million in revenue, $434,000 to $4.3 million in output, $273,000 to $2.7 million in value added, and 6 to 55 jobs. The processing sector would enjoy similar increases of $441,000 to $4.3 million in output, $233,000 to $2.3 million in value added, and 3 to 30 jobs. On the other hand, the biggest losses would accrue to the restaurant sector, which would lose $8.4 million to $20.5 million in output, $6.5 million to $15.9 million in value added, and 163 to 396 jobs. While this is significant, it is likely that restaurants would readily substitute other products, reducing the impacts.

Table 13. Predicted Changes in Economic Impacts Post-CITES Appendix I Listing

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$434	$273	6	$4,281	$2,688	55
Primary Dealers/Processors	$441	$233	3	$4,343	$2,301	30
Secondary Wholesalers/Distributors	–$5,228	–$3,676	–41	–$2,350	–$1,652	–19
Retail Stores	–$1,890	–$1,432	–23	-$779	–$590	–10
Restaurants	–$20,487	–$15,873	–396	–$8,441	–$6,533	–163
Total	**–$26,729**	**–$20,475**	**–452**	**–$2,946**	**–$3,787**	**–106**

Appendix 1 summarizes how these economic impacts would play out at the state level. Those with only import or export trade (California, Georgia, Hawaii, Illinois, Missouri, Texas and Virginia) would lose all of the economic impact listed that was attributable to primary dealers/processors and/or wholesalers/distributors, but not all retail trade. At the state level, the retail impact estimates do not include the effects of imports that pass through another state first, nor do they include the effects of bluefin tuna from another U.S. state. Those impacts are included only at the total U.S. level because no interstate trade information is available. As a result, even in these import- or export-only states, some portion of retail impact would still occur using domestic product. The state that would fare the worst is California, which has the most imports of any state. Total economic impact of import trade in California is $6.6 million in total output. Only $1.1 million, that portion attributable to secondary wholesalers/distributors, would be lost completely. Some portion of the retail impacts would be lost, but it is impossible to estimate that portion. On the other hand, landing states would do at least as well as before as long as they did not import more than was landed. New York and New Jersey fall into this category and would face gains in the fishing and primary-processing sectors but losses across all other sectors.

Recreational fisheries would have no negative impact from a CITES Appendix I listing and, indeed, recovery of the species could generate positive impacts. Domestic recreational fishermen could also benefit from a CITES Appendix I listing. Any foreign tourist with the required permits would still be able to land bluefin product and ship it home as long as the shipment was for their personal use. The upshot is that recreational angling would not be affected economically in the near term and would only benefit from a listing as the species recovered.

Discussion

Without increases in domestic landings of bluefin, a CITES Appendix I listing would reduce the amount of product available on the U.S. market, in lost imports and a small portion of lost high seas landings. Given the bluefin availability issues identified here, it is unlikely that domestic landings could increase much in the near term. A reduction in the quantity of bluefin available in domestic markets would increase prices for it. Any increase in domestic bluefin prices would mean a net increase in fishermen and primary-processor revenue and a net increase in total output, value added and jobs in those sectors. Fishermen and primary-processor sectors face increases of up to $8.6 million in output, $5.0 million in value added and 85 jobs.

An increase in domestic consumption at increased domestic prices would also increase the economic impacts in the wholesale/distribution, retail store and restaurant sectors. However, with a loss of high-value bluefin imports, as much as 24.3 percent in 2008 consumption, there would be a net loss of economic impacts across those sectors. On the low side, that loss could be $2.9 million in output, $3.8 million in value added and 106 jobs. On the high side, losses could be $26.7 million in output, $20.5 in value added and 452 jobs. The majority of these losses accrue to the restaurant sector (76.9 percent). It is very unlikely that the restaurant sector would experience any real loss. Restaurants rarely stake there business on a single fish species and would substitute other seafood or non-seafood product for the lost bluefin.

If U.S. fishermen were able to increase landings of bluefin in the near term, economic impacts resulting from a CITES Appendix I listing would be even more favorable. If landings could increase to eliminate the importation shortfall, prices would not rise from the loss of supply. Instead, the Lopez and Pagaloutos (2002) result showed that proper marketing, combined with protectionist trade measures, has the ability to enhance the domestic industry. If U.S. producers could market domestic bluefin in a way that allowed American producers to obtain import-quality prices for domestic product, economic impacts would go up significantly.

Much of this analysis, particularly the upper-bound estimates presented, hinge on the ability of domestic fishermen to market domestic product, particularly current exports, to domestic consumers to improve the prices paid to domestic producers. Lopez and Pagaloutos (2002) show that this is possible, particularly for goods with few substitutes. The results from Wessells and Wilen (1994) and Johnson et al. (1998) suggest that few substitutes exist for high-quality bluefin, further bolstering the conclusion that domestic producers could retain current consumers when prices rise. Overall, it is felt that bluefin producers are capable of achieving higher prices for their products.

Regarding high seas landings, longliners catch all of the high seas bluefin landed in a bycatch fishery. The majority of longline landings are lower-value fish that are landed in Newfoundland, New England or the Mid-Atlantic. Although it is unknown whether any additional bluefin are caught outside the EEZ and outside the NED, NMFS assumes that high seas landings outside the NED are very small. If that turns out to be false and highs seas landings are sufficiently higher than assumed outside the NED, consumer

prices would rise higher. Because it is unknown how much high seas bluefin is landed outside the NED, it is unknown whether the price increase would be high enough to offset fishermen losses.

This analysis did not take into account the temporal nature of domestic supply. Delivery of monthly landing data by state would have violated NMFS confidentiality requirements (NMFS 2009a). Fishermen in certain regions, New England in particular, land most of their fish in the late summer. There is concern that without the export market during these months, a temporary glut of bluefin could develop, requiring a switch from providing a fresh product for export to developing a frozen market.

With the elimination of importing under CITES, demand for domestic landings year-round would increase. Would the need for the domestic market to replace lost imports make up for the perceived seasonal excess supply created through the elimination of exports? Without temporally explicit data on landings, imports, exports, re-exports and consumer purchases, it is impossible to answer this question.

Still, the United States imported 96,633 pounds (12.0 percent) of frozen bluefin products, with a value of $3.1 million, in 2008. That represents a price of $31.82 a pound for frozen product. Some of the frozen product (less than 1 percent) was imported as fillets or steaks, and the remainder of frozen imports were marked “other” in the BSD/BCD data. In the same year, fresh bluefin in whole-product form were imported at an average price of $13.13 a pound. This suggests that at least some of the “other” product shape category of frozen imports was also processed from whole into another form (dressed, headed and gutted, and gilled and gutted). Some of this price difference then is attributable to additional processing potentially of the best parts of a whole fish, but it is also an indication that frozen bluefin commands a high price.

This suggests that bluefin freezes well enough to be marketed as sushi-quality product and indicates that creating a high-value domestic market for frozen product is possible. Producing high-quality frozen bluefin products is highly dependent on the quality of the freezing process. For quality product, quick freezing is essential, and for large bluefin, it would require processing the product into smaller portions before freezing. It is unlikely that equipment for this type of freezing is available in all regions, so additional investment may be necessary (NMFS 2009b).

In comparison to import prices, the 2008 national average landed price was $8.87 a pound, and the national average export price was $10.28 for fresh product forms. While individual harpoon or other handgear-landed fish may achieve much higher prices on an individual fish basis at Tokyo’s Tsukiji central fish market, on average, exported fish are selling for $1.39 a pound higher than the landed price. As a result, the gulf between the two markets, domestic and export, may not be as large as some believe.

This analysis does not address consumer or producer welfare, only economic impacts. It is clear that consumer welfare would fall if a CITES Appendix I listing decreased supply and increased prices (Lopez and Pagaloutos 2002, Gentner 2008). However, if producer input prices did not rise more than producer revenue, producer surplus would also go up. It is unclear whether the consumer losses will exceed the producer gains under a CITES Appendix I listing if domestic

fishermen were able to increase production of a similar quality product at a similar price, consumer losses would be negligible. Producer surplus would undoubtedly rise under policies that protect them from foreign competition as long as products that were formerly exported were consumed domestically at similar prices. If domestic producers could increase production, it is possible that CITES Appendix I would produce welfare gains for the United States.

While not discussed in detail in this analysis, domestic longline-caught bluefin tend to bring lower prices, while fish caught by rod and reel bring the highest prices. This difference is probably attributable to quality differences. Longline bluefin are bycatch in the Gulf of Mexico fishery because it is illegal to target them there with that gear type to protect spawning aggregations. If a CITES Appendix I listing encouraged producers to maximize the quality of bluefin brought to market, it could put pressure on the Gulf longliners to avoid bluefin-spawning areas. In the long term, this would benefit the bluefin stock and bring higher revenue for producers.

Overall, no negative economic impacts would be expected on recreational anglers in the near term after a CITES Appendix I listing. Recreational anglers could realize benefits fairly quickly. Currently, the Canadian fishery targets giant bluefin for export to Japan, and giant bluefin are a phenomenon unique to the Western Atlantic. Recreational anglers spend a lot of money targeting these giants, and a CITES Appendix I listing would essentially close the Canadian fishery overnight. This would provide direct and immediate positive economic impacts to the U.S. recreational and commercial fleets.

Across the harvesting and primary-processing sectors, a CITES Appendix I listing would increase bluefin prices and create positive economic impacts in those sectors in the near term. Recreational anglers would not be affected negatively and could see benefits accruing quickly. Finally, if the CITES Appendix I listing improved availability and moved the stock toward recovery, both the recreational and commercial sectors would reap positive benefits in the longer term.

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Appendix 1: State Impact Tables

Caution is warranted when using the state-level impacts. The sum of the state-level impacts, in any category, will be less than the U.S. total in Table 8. This is because of interstate import of inputs and export of outputs at different stages of the seafood supply chain. For instance, one state may import most of its fuel. At the state level, most of the fuel expenditures by all businesses in the supply chain must be imported; therefore, those expenditures do not have an impact at the state level. However, at the U.S. level, those expenditures do have an impact as the United States refines most of the fuel it uses.

Retail-sector (grocers and restaurants) impacts accruing to each state do not include total impacts to those sectors, but only the impacts accruing the bluefin imported or landed in each state. The model calculates the impacts of only landings or imports that are consumed within that state. The model cannot determine the final destination state of bluefin traded between states. Without retail-level consumption data by the states, it is impossible to estimate total retail-sector economic impacts on them. Fortunately, total economic impact accruing to the retail sectors is included in the U.S.-level estimates in Table 8.

State estimates a post-CITES Appendix I listing assume that current landing ports and export locations do not change from 2008 levels. Additionally, economic impacts in the retail sectors that accrued to import-only states are not completely lost (see note above).

California

Table A1. Economic Impacts of Bluefin Import and Re-Export in California, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$1,115	$875	9
Retail Stores	$448	$409	6
Restaurants	$5,054	$4,700	120
Total	**$6,617**	**$5,984**	**136**

*In thousands of 2008 U.S. dollars

Table A2. Total Economic Impacts of Bluefin Trade in California, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$1,115	$875	9

Retail Stores	$448	$409	6
Restaurants	$5,054	$4,700	120
Total	**$6,617**	**$5,984**	**136**

*In thousands of 2008 U.S. dollars

Florida

Table A3. Economic Impacts of Bluefin Landing and Export in Florida, 2008

Sector	Value		
	Output*	Added*	Jobs
Fishermen	$132	$98	2
Primary Dealers/Processors (landings)	$40	$31	0
Secondary Wholesalers/Distributors	$56	$45	1
Retail Stores	$24	$22	0
Restaurants	$271	$260	7
Total	**$521**	**$457**	**10**

*In thousands of 2008 U.S. dollars

Table A4. Total Economic Impacts of Bluefin Trade in Florida, 2008

Sector	Value		
	Output*	Added*	Jobs
Fishermen	$132	$98	2
Primary Dealers/Processors (landings)	$40	$31	0
Secondary Wholesalers/Distributors	$56	$45	1
Retail Stores	$24	$22	0
Restaurants	$271	$260	7

Total	**$521**	**$457**	**10**

*In thousands of 2008 U.S. dollars

Table A5. Economic Impacts of CITES Appendix I Listing on Florida, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$136	$102	2	$241	$179	4
Primary Dealers/Processors	$41	$33	0	$73	$57	1
Secondary Wholesalers/Distributors	$58	$47	1	$102	$83	1
Retail Stores	$25	$23	0	$44	$41	1
Restaurants	$281	$269	7	$495	$474	12
Total	**$541**	**$474**	**11**	**$953**	**$835**	**19**

*In thousands of 2008 U.S. dollars

Georgia

Table A6. Economic Impacts of Bluefin Import and Re-Export in Georgia, 2008

Sector	**Output***	**Value Added***	**Jobs**
Secondary Wholesalers/Distributors	$0.23	$0.18	0.0021
Retail Stores	$0.09	$0.08	0.0013
Restaurants	$1.01	$0.96	0.0251
Total	**$1.32**	**$1.23**	**0.0284**

*In thousands of 2008 U.S. dollars

Table A7. Total Economic Impacts of Bluefin Trade in Georgia, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$0.23	$0.18	0.0021
Retail Stores	$0.09	$0.08	0.0013
Restaurants	$1.01	$0.96	0.0251
Total	**$1.32**	**$1.23**	**0.0284**

*In thousands of 2008 U.S. dollars

Hawaii

Table A8. Economic Impacts of Bluefin Import and Re-Export in Hawaii, 2008

Sector	Output*	Value Added*	Jobs
Retail Stores	$0.18	$0.17	0.0028
Restaurants	$2.18	$2.18	0.0585
Total	**$2.36**	**$2.36**	**0.0612**

*In thousands of 2008 U.S. dollars

Table A9. Total Economic Impacts of Bluefin Trade in Hawaii, 2008

Sector	Output*	Value Added*	Jobs
Retail Stores	$0.18	$0.17	0.0028
Restaurants	$2.18	$2.18	0.0585
Total	**$2.36**	**$2.36**	**0.0612**

*In thousands of 2008 U.S. dollars

Illinois

Table A10. Economic Impacts of bluefin Import and Re-Export in Illinois, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$2.68	$2.22	0.0239
Retail Stores	$1.13	$1.10	0.0171
Restaurants	$12.39	$12.34	0.3278
Total	**$16.20**	**$15.66**	**0.3688**

*In thousands of 2008 U.S. dollars

Table A11. Total Economic Impacts of Bluefin Trade in Illinois, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$2.68	$2.22	0.0239
Retail Stores	$1.13	$1.10	0.0171
Restaurants	$12.39	$12.34	0.3278
Total	**$16.20**	**$15.66**	**0.3688**

*In thousands of 2008 U.S. dollars

Louisiana

Table A12. Economic Impacts of Bluefin Landing and Export in Louisiana, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$201	$158	5

Primary Dealers/Processors (landings)	$111	$58	1
Secondary Wholesalers/Distributors	$129	$106	1
Retail Stores	$54	$51	1
Restaurants	$612	$593	16
Total	**$1,107**	**$966**	**24**

*In thousands of 2008 U.S. dollars

Table A13. Economic Impacts of Bluefin Import and Re-Export in Louisiana, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$0.13	$0.10	0.0012
Retail Stores	$0.05	$0.05	0.0008
Restaurants	$0.60	$0.59	0.0156
Total	**$0.78**	**$0.74**	**0.0176**

*In thousands of 2008 U.S. dollars

Table A14. Total Economic Impacts of Bluefin Trade in Louisiana, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$201	$158	5
Primary Dealers/Processors	$111	$58	1
Secondary Wholesalers/Distributors	$130	$106	1
Retail Stores	$54	$52	1
Restaurants	$612	$593	16
Total	**$1,108**	**$967**	**24**

*In thousand of 2008 U.S. dollars

Table A15. Economic Impacts of CITES Appendix I Listing on Louisiana, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$208	$163	5	$479	$377	11
Primary Dealers/Processors	$115	$60	1	$265	$138	3
Secondary Wholesalers/Distributors	$134	$109	1	$309	$252	3
Retail Stores	$56	$53	1	$128	$123	2
Restaurants	$632	$613	16	$1,459	$1,414	38
Total	**$1,144**	**$999**	**24**	**$2,640**	**$2,304**	**56**

*In thousands of 2008 U.S. dollars

Maine

Table A16. Economic Impacts of Bluefin Landing and Export in Maine, 2008

Sector	**Output***	**Value Added***	**Jobs**
Fishermen	$179	$111	2
Primary Dealers/Processors (landings)	$71	$40	1
Secondary Wholesalers/Distributors	$96	$81	1
Retail Stores	$42	$41	1
Restaurants	$479	$472	13
Total	**$867**	**$745**	**17**

*In thousands of 2008 U.S. dollars

Table A17. Total Economic Impacts of Bluefin Trade in Maine, 2008.

Sector	Value Output*	Value Added*	Jobs
Fishermen	$179	$111	2
Primary Dealers/Processors (landings)	$71	$40	1
Secondary Wholesalers/Distributors	$96	$81	1
Retail Stores	$42	$41	1
Restaurants	$479	$472	13
Total	**$867**	**$745**	**17**

*In thousands of 2008 U.S. dollars

Table A18. Economic Impacts of CITES Appendix I Listing on Maine, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$186	$116	2	$270	$168	3
Primary Dealers/Processors	$74	$41	1	$108	$60	1
Secondary Wholesalers/Distributors	$100	$85	1	$145	$123	1
Retail Stores	$44	$42	1	$63	$62	1
Restaurants	$498	$490	13	$725	$715	19
Total	**$900**	**$774**	**18**	**$1,312**	**$1,127**	**26**

*In thousands of 2008 U.S. dollars

Maryland

Table A19. Economic Impacts of Bluefin Landing and Export in Maryland, 2008

Sector	Value Output*	Value Added*	Jobs
Fishermen	$37	$21	1
Primary Dealers/Processors (landings)	$12	$9	0
Secondary Wholesalers/Distributors	$14	$12	0
Retail Stores	$6	$6	0
Restaurants	$66	$65	2
Total	**$135**	**$113**	**3**

*In thousands of 2008 U.S. dollars

Table A20. Total Economic Impacts of Bluefin Trade in Maryland, 2008

Sector	Value Output*	Value Added*	Jobs
Fishermen	$37	$21	1
Primary Dealers/Processors (landings)	$12	$9	0
Secondary Wholesalers/Distributors	$14	$12	0
Retail Stores	$6	$6	0
Restaurants	$66	$65	2
Total	**$135**	**$113**	**3**

*In thousands of 2008 U.S. dollars

Table A21. Economic Impacts of CITES Appendix I Listing on Maryland, 2008

Sector	Lower Bound Post-CITES			Upper Bound Post-CITES		
	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$39	$22	1	$73	$42	2
Primary Dealers/Processors	$13	$9	0	$24	$17	0
Secondary Wholesalers/Distributors	$15	$12	0	$28	$23	0
Retail Stores	$6	$6	0	$12	$11	0
Restaurants	$68	$68	2	$128	$128	3
Total	**$140**	**$117**	**3**	**$265**	**$221**	**6**

*In thousands of 2008 U.S. dollars

Massachusetts

Table A22. Economic Impacts of Bluefin Landing and Export in Massachusetts, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$2,358	$1,455	18
Primary Dealers/Processors (landings)	$507	$327	4
Primary Dealers/Processors (exports)	$399	$258	3
Secondary Wholesalers/Distributors	$1,588	$1,276	13
Retail Stores	$611	$578	9
Restaurants	$7,011	$6,763	174
Total	**$12,473**	**$10,657**	**221**

*In thousands of 2008 U.S. dollars

Table A23. Economic Impacts of Bluefin Import and Re-Export in Massachusetts, 2008

Sector	Value Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$379	$305	3
Retail Stores	$110	$104	2
Restaurants	$1,259	$1,214	31
Total	**$1,748**	**$1,623**	**36**

*In thousands of 2008 U.S. dollars

Table A24. Total Economic Impacts of Bluefin Trade in Massachusetts, 2008

Sector	Value Output*	Value Added*	Jobs
Fishermen	$2,358	$1,455	18
Primary Dealers/Processors	$906	$585	7
Secondary Wholesalers/Distributors	$1,967	$1,580	17
Retail Stores	$721	$682	10
Restaurants	$8,270	$7,977	205
Total	**$14,221**	**$12,279**	**257**

*In thousand of 2008 U.S. dollars

Table A25. Economic Impacts of CITES Appendix I Listing on Massachusetts, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$2,450	$1,512	18	$3,380	$2,086	25

Primary Dealers/Processors	$941	$608	8	$1,298	$839	11
Secondary						
Wholesalers/Distributors	$1,649	$1,325	14	$2,276	$1,829	19
Retail Stores	$635	$601	9	$876	$829	13
Restaurants	$7,284	$7,026	181	$10,050	$9,694	249
Total	**$12,959**	**$11,072**	**230**	**$17,880**	**$15,275**	**317**

*In thousands of 2008 U.S. dollars

Missouri

Table A26. Economic Impacts of Bluefin Import and Re-Export in Missouri, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Secondary Wholesalers/Distributors	$0.15	$0.12	0.0013
Retail Stores	$0.06	$0.06	0.0009
Restaurants	$0.68	$0.66	0.0169
Total	**$0.90**	**$0.84**	**0.0191**

*In thousands of 2008 U.S. dollars

Table A27. Total Economic Impacts of Bluefin Trade in Missouri, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Secondary Wholesalers/Distributors	$0.15	$0.12	0.0013
Retail Stores	$0.06	$0.06	0.0009
Restaurants	$0.68	$0.66	0.0169

Total	**$0.90**	**$0.84**	**0.0191**

*In thousands of 2008 U.S. dollars

North Carolina

Table A28. Economic Impacts of Bluefin Landing and Export in North Carolina, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$1,314	$1,073	24
Primary Dealers/Processors (landings)	$177	$113	3
Primary Dealers/Processors (exports)	$712	$456	10
Secondary Wholesalers/Distributors	$1,055	$862	10
Retail Stores	$420	$399	6
Restaurants	$4,779	$4,602	142
Total	**$8,458**	**$7,506**	**195**

*In thousands of 2008 U.S. dollars

Table A29. Total Economic Impacts of Bluefin Trade in North Carolina, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$1,314	$1,073	24
Primary Dealers/Processors (landings)	$177	$113	3
Primary Dealers/Processors (exports)	$712	$456	10
Secondary Wholesalers/Distributors	$1,055	$862	10
Retail Stores	$420	$399	6
Restaurants	$4,779	$4,602	142

Total	**$8,458**	**$7,506**	**195**

*In thousands of 2008 U.S. dollars

Table A30. Economic Impacts of CITES Appendix I Listing on North Carolina, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$1,368	$1,117	25	$1,387	$1,133	26
Primary Dealers/Processors	$926	$592	14	$938	$601	14
Secondary Wholesalers/Distributors	$1,099	$898	10	$1,114	$910	10
Retail Stores	$437	$416	7	$443	$422	7
Restaurants	$4,975	$4,791	148	$5,044	$4,857	150
Total	**$8,805**	**$7,814**	**203**	**$8,926**	**$7,921**	**206**

*In thousands of 2008 U.S. dollars

New Hampshire

Table A31. Economic Impacts of Bluefin Landing and Export in New Hampshire, 2008

		Value	
Sector	**Output***	**Added***	**Jobs**
Fishermen	$294	$216	5
Primary Dealers/Processors (landings)	$93	$79	1
Secondary Wholesalers/Distributors	$113	$95	1
Retail Stores	$45	$45	1
Restaurants	$520	$514	14

Total	**$1,066**	**$949**	**22**

*In thousands of 2008 U.S. dollars

Table A32. Total Economic Impacts of Bluefin Trade in New Hampshire, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$294	$216	5
Primary Dealers/Processors (landings)	$93	$79	1
Secondary Wholesalers/Distributors	$113	$95	1
Retail Stores	$45	$45	1
Restaurants	$520	$514	14
Total	**$1,066**	**$949**	**22**

*In thousands of 2008 US dollars

Table A33. Economic Impacts of CITES Appendix I Listing on New Hampshire, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$306	$225	5	$381	$280	7
Primary Dealers/Processors	$97	$82	1	$121	$102	1
Secondary Wholesalers/Distributors	$118	$99	1	$147	$123	1
Retail Stores	$47	$46	1	$59	$58	1
Restaurants	$541	$534	14	$673	$665	18
Total	**$1,108**	**$987**	**22**	**$1,380**	**$1,229**	**28**

*In thousands of 2008 U.S. dollars

New Jersey

Table A34. Economic Impacts of Bluefin Landing and Export in New Jersey, 2008

Sector	Value Output*	Value Added*	Jobs
Fishermen	$148	$88	1
Primary Dealers/Processors (landings)	$44	$35	0
Secondary Wholesalers/Distributors	$57	$45	0
Retail Stores	$23	$22	0
Restaurants	$260	$251	7
Total	**$532**	**$441**	**9**

*In thousands of 2008 U.S. dollars

Table A35. Economic Impacts of Bluefin Import and Re-Export in New Jersey, 2008

Sector	Value Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$257	$204	2
Retail Stores	$97	$91	1
Restaurants	$1,091	$1,050	27
Total	**$1,446**	**$1,345**	**31**

*In thousands of 2008 U.S. dollars

Table A36. Total Economic Impacts of Bluefin Trade in New Jersey, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$148	$88	1
Primary Dealers/Processors	$44	$35	0
Secondary Wholesalers/Distributors	$314	$249	3
Retail Stores	$120	$113	2
Restaurants	$1,706	$1,302	34
Total	**$2,332**	**$1,787**	**40**

*In thousand of 2008 U.S. dollars

Table A37. Economic Impacts of CITES Appendix I Listing on New Jersey, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$154	$91	1	$237	$141	2
Primary Dealers/Processors	$45	$37	0	$69	$56	1
Secondary Wholesalers/Distributors	$59	$47	0	$91	$72	1
Retail Stores	$24	$23	0	$37	$35	1
Restaurants	$270	$261	7	$415	$401	10
Total	**$552**	**$458**	**10**	**$849**	**$705**	**15**

*In thousands of 2008 U.S. dollars

New York

Table A38. Economic Impacts of Bluefin Landing and Export in New York, 2008

Sector	Value Output*	Value Added*	Jobs
Fishermen	$159	$90	3
Primary Dealers/Processors (landings)	$27	$19	0
Primary Dealers/Processors (exports)	$275	$192	2
Secondary Wholesalers/Distributors	$32	$26	0
Retail Stores	$15	$14	0
Restaurants	$167	$158	5
Total	**$676**	**$498**	**11**

*In thousands of 2008 U.S. dollars

Table A39. Economic Impacts of Bluefin Import and Re-Export in New York, 2008

Sector	Value Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$351	$284	3
Retail Stores	$160	$149	2
Restaurants	$1,822	$1,722	52
Total	**$2,333**	**$2,155**	**57**

*In thousands of 2008 U.S. dollars

Table A40. Total Economic Impacts of Bluefin Trade in New York, 2008

Sector	Value Output*	Value Added*	Jobs

Fishermen	$159	$90	3
Primary Dealers/Processors	$302	$211	2
Secondary Wholesalers/Distributors	$383	$310	3
Retail Stores	$175	$162	2
Restaurants	$1,990	$1,880	56
Total	**$3,009**	**$2,653**	**67**

*In thousand of 2008 U.S. dollars

Table A41. Economic Impacts of CITES Appendix I Listing on New York, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$165	$93	3	$245	$138	5
Primary Dealers/Processors	$28	$20	0	$42	$29	0
Secondary Wholesalers/Distributors	$33	$27	0	$49	$40	0
Retail Stores	$15	$14	0	$23	$21	0
Restaurants	$174	$164	5	$257	$243	7
Total	**$416**	**$318**	**9**	**$615**	**$471**	**13**

*In thousands of 2008 U.S. dollars

Puerto Rico

Table A42. Economic Impacts of Bluefin Landing and Export in Puerto Rico, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$89	$44	2
Primary Dealers/Processors (landings)	$13	$11	0
Secondary Wholesalers/Distributors	$21	$18	0
Retail Stores	$9	$9	0
Restaurants	$113	$113	3
Total	**$245**	**$196**	**5**

*In thousands of 2008 U.S. dollars

Table A43. Total Economic Impacts of Bluefin Trade in Puerto Rico, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$89	$44	2
Primary Dealers/Processors (landings)	$13	$11	0
Secondary Wholesalers/Distributors	$21	$18	0
Retail Stores	$9	$9	0
Restaurants	$113	$113	3
Total	**$245**	**$196**	**5**

*In thousands of 2008 U.S. dollars

Table A44. Economic Impacts of CITES Appendix I Listing on Puerto Rico, 2008

Sector	Lower Bound Post-CITES			Upper Bound Post-CITES		
	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs
Fishermen	$92	$46	2	$146	$73	3
Primary Dealers/Processors	$13	$12	0	$21	$18	0
Secondary Wholesalers/Distributors	$22	$19	0	$35	$30	0
Retail Stores	$9	$9	0	$15	$15	0
Restaurants	$117	$117	3	$186	$186	5
Total	**$254**	**$203**	**6**	**$403**	**$323**	**9**

*In thousands of 2008 U.S. dollars

Rhode Island

Table A45. Economic Impacts of Bluefin Landing and Export in Rhode Island, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$32	$23	1
Primary Dealers/Processors (landings)	$6	$3	0
Secondary Wholesalers/Distributors	$7	$6	0
Retail Stores	$3	$3	0
Restaurants	$35	$35	1
Total	**$82**	**$69**	**2**

*In thousands of 2008 U.S. dollars

Table A46. Economic Impacts of Bluefin Import and Re-Export in Rhode Island, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$4	$3	0
Retail Stores	$2	$2	0
Restaurants	$21	$21	1
Total	**$26**	**$26**	**1**

*In thousands of 2008 U.S. dollars

Table A47. Total Economic Impacts of Bluefin Trade in Rhode Island, 2008

Sector	Output*	Value Added*	Jobs
Fishermen	$32	$23	1
Primary Dealers/Processors	$6	$3	0
Secondary Wholesalers/Distributors	$11	$9	0
Retail Stores	$5	$5	0
Restaurants	$56	$56	1
Total	**$109**	**$95**	**2**

*In thousands of 2008 U.S. dollars

Table A48. Economic Impacts of CITES Appendix I Listing on Rhode Island, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	Output*	Value Added*	Jobs	Output*	Value Added*	Jobs

Fishermen	$33	$23	1	$80	$56	1
Primary Dealers/Processors	$6	$3	0	$14	$8	0
Secondary						
Wholesalers/Distributors		$6	0	$16	$14	0
Retail Stores	$3	$3	0	$7	$7	0
Restaurants	$36	$36	1	$86	$86	2
Total	**$85**	**$72**	**2**	**$204**	**$172**	**4**

*In thousands of 2008 U.S. dollars

Texas

Table A49. Economic Impacts of Bluefin Import and Re-Export in Texas, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$5	$4	0.0456
Retail Stores	$2	$2	0.0301
Restaurants	$24	$22	0.6650
Total	**$31**	**$28**	**0.7407**

*In thousands of 2008 U.S. dollars

Table A50. Total Economic Impacts of Bluefin Trade in Texas, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$5	$4	0.0456
Retail Stores	$2	$2	0.0301

Restaurants	$24	$22	0.6650
Total	**$31**	**$28**	**0.7407**

*In thousands of 2008 U.S. dollars

South Carolina

Table A51. Economic Impacts of Bluefin Landing and Export in South Carolina, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$14	$9	0
Primary Dealers/Processors (landings)	$2	$1	0
Secondary Wholesalers/Distributors	$3	$2	0
Retail Stores	$1	$1	0
Restaurants	$13	$13	0
Total	**$34**	**$27**	**1**

*In thousands of 2008 U.S. dollars

Table A52. Total Economic Impacts of Bluefin Trade in South Carolina, 2008

	Value		
Sector	**Output***	**Added***	**Jobs**
Fishermen	$14	$9	0
Primary Dealers/Processors (landings)	$2	$1	0
Secondary Wholesalers/Distributors	$3	$2	0
Retail Stores	$1	$1	0

Restaurants	$13	$13	0
Total	**$34**	**$27**	**1**

*In thousands of 2008 U.S. dollars

Table A53. Economic Impacts of CITES Appendix I Listing on South Carolina, 2008

	Lower Bound Post-CITES			Upper Bound Post-CITES		
Sector	**Output***	**Value Added***	**Jobs**	**Output***	**Value Added***	**Jobs**
Fishermen	$15	$9	0	$37	$24	1
Primary Dealers/Processors	$2	$1	0	$6	$3	0
Secondary Wholesalers/Distributors	$3	$2	0	$7	$6	0
Retail Stores	$1	$1	0	$3	$3	0
Restaurants	$14	$13	0	$35	$34	1
Total	**$35**	**$28**	**1**	**$88**	**$70**	**2**

*In thousands of 2008 U.S. dollars

Virginia

Table A54. Economic Impacts of Bluefin Export in Virginia, 2008

		Value	
Sector	**Output***	**Added***	**Jobs**
Primary Dealers/Processors (exports)	$89	$74	1

*In thousands of 2008 U.S. dollars

Table A55. Total Economic Impacts of Bluefin Trade in Virginia, 2008

Sector	Output*	Value Added*	Jobs
Primary Dealers/Processors (exports)	$89	$74	1

*In thousands of 2008 U.S. dollars

Washington

Table A56. Economic Impacts of Bluefin Import and Re-Export in Washington, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$3	$3	0.0304
Retail Stores	$1	$1	0.0205
Restaurants	$16	$15	0.3932
Total	**$20**	**$19**	**0.4442**

*In thousands of 2008 U.S. dollars

Table A57. Total Economic Impacts of Bluefin Trade in Washington, 2008

Sector	Output*	Value Added*	Jobs
Secondary Wholesalers/Distributors	$3	$3	0.0304
Retail Stores	$1	$1	0.0205
Restaurants	$16	$15	0.3932
Total	**$20**	**$19**	**0.4442**

*In thousands of 2008 U.S. dollars