

# Economic Analysis of International Billfish Markets: Executive Summary

Brad Gentner  
President  
Gentner Consulting Group  
9007 Eton Road  
Silver Spring , MD 20901  
[www.GentnerGroup.com](http://www.GentnerGroup.com)

Prepared July 16, 2007



In general, billfish are pelagic apex predators which roam the tropical oceans worldwide providing unique challenges for management. Because of their highly migratory nature, their range crosses international boundaries, making management subject to negotiated actions across many nations. Worldwide, stocks are poorly understood, as very little information exists about stock structures, life histories or habitat requirements, making stock assessment difficult and uncertain. Where adequate stock assessments are in place, stocks appear imperiled. All international fishery management organizations (IFMOs) are calling for more attention to the harvest of these stocks and are working toward collecting better data on billfish biology.

### **Billfish Harvest**

Worldwide, the majority of the billfish harvest is driven by the industrial longline and purse seine fisheries for tuna, with billfish caught as a by-product of the tuna production process. A smaller, but rapidly growing portion of the catch is from artisanal longline and drift gillnet fleets which target billfish or catch billfish as bycatch for local consumption. Because billfish is a byproduct of the industrial and artisanal tuna fisheries, billfish harvest will not respond to typical price signals and other market signals. Compounding these problems is considerable uncertainty regarding the total mortality of billfish species. Catch data is also poor, as many fisheries only report landed billfish at the point of first sale. Fish discarded at sea, alive or dead, and fish not otherwise entered into commerce are not reported consistently. The United Nation's Food and Agriculture Organization (FAO) consolidates landings data from the various IFMOs. According to FAO harvest data from 2004, the top three species harvested are:

- 26,765 metric tons (mt) of blue marlin
- 25,722mt of Indo-Pacific sailfish
- 23,658mt of billfish not elsewhere included (NEI)

Landing data also appears to be subject to manipulation to avoid regulations, as evidenced by the high level of unclassified, or NEI, harvest reported. In 1999, after new International Commission for Conservation of Atlantic Tunas (ICCAT) regulations aimed at reducing blue and white marlin landings were enacted, the reporting of unclassified/unidentified billfish spiked, while the blue and white marlin landings declined. Prior to 1997, unclassified billfish landings showed a slight upward trend but stayed below 5% of total harvest. After the regulations were implemented, unclassified billfish landings increased steadily to a peak of 33% in 2003. In 2004, that number had dropped to 11% in the ICCAT data and 26% in the FAO data. Additionally, all IFMOs recognize that illegal, unregulated and unreported billfish harvesting is occurring, but very little is known about this activity.

According to FAO data, the top five billfish harvesting countries, as measured by weight landed and averaged over 2000 -2004 are:

- Taiwan Province of China - 22,777mt/year
- Sri Lanka - 11,542mt/year
- Japan - 11,306mt/year
- Philippines - 8,010mt/year
- Iran - 5,970mt/year

## Billfish Trade

Trade data is also lacking. Of the three sources of domestic trade data examined here, Urner Barry Waterborne Shipment, FAO, and United States (US) Food and Drug Administration (FDA), it is unknown which is most accurate or whether the FDA data, with the highest volume, includes the other two data sources. It is likely that while FAO data is the most complete at the international level, this data still represents an underestimate of total importation due to mislabeling of product or problems with reporting. As with most fisheries, there is no ability to track billfish from the harvester to the consumer once the product leaves the first landing or port of importation. The National Marine Fisheries Service (NMFS) does not track billfish trade.

The following rankings based on FAO data may be misleading as trade information is poorly reported to the FAO. When looking at FDA data, the quantity of imports into the US were 6.5 times higher and the value of imports reported were 9.6 times higher than those reported to the FAO. It is likely that import and export activity is far higher than the FAO data shows and, if better data were available, it is likely that the import and export rankings would change. The top five exporters of billfish, ranked by average annual quantity exported over the period 2001-2005 in the FAO data, are (value in US dollars):

- Taiwan Province of China – 8,169mt/year and \$12,652,600
- South Africa – 407mt/year and \$498,800
- Maldives – 176mt/year and \$238,400
- Costa Rica – 213mt/year and \$193,200
- El Salvador – 25mt/year and \$36,600

The top five importers of billfish, listed by average annual quantity imported over the period 2001-2005 in the FAO data, are (value in US dollars):

- United States – 166mt/year and \$535,624
- Sri Lanka – 95mt/year and \$98,998
- Japan – 40mt/year and \$57,453
- Singapore – 36mt/year and \$58,104
- France – 32mt/year and \$69,304

These rankings would change if the importing countries were ranked by value as France and Singapore are buying higher priced products than Japan. It is also noteworthy that the United States is buying a relatively high value product, usually fresh or fresh frozen billfish products. Additionally, from the FDA, the US imports 1,260mt annually averaged over the period 2003-2006, again highlighting the underreporting inherent in the FAO data.

## Executive Summary

---

From FDA customs clearance forms, the top five exporters of billfish to the US, listed by average annual quantity over the period 2003-2006, are (value in US dollars):

- Costa Rica – 342mt/year and \$1,348,512
- Ecuador – 245mt/year and \$946,835
- Vietnam – 221mt/year and \$830,036
- Republic of South Korea – 132mt/year and \$723,783
- Philippines – 121mt/year and \$374,296

The above ranking underscores the underreporting in the FAO data as the FDA has Costa Rica exporting an average of 342mt to the US alone while the FAO shows Costa Rica exporting only 213mt. It is also interesting that of the top five exporters to the US, the largest, Costa Rica, has access to both Atlantic and Pacific Coasts.

According to FAO, the top five consumers of billfish, listed by average annual quantity harvested, plus imports and minus exports, averaged over the period 2001-2005, are:

- Taiwan Province of China – 14,630mt/year
- Sri Lanka – 11,637mt/year
- Japan – 11,346mt/year
- Philippines – 8,010mt/year
- Iran – 5,970mt/year

In the case of consumption, the amount of imports and exports are small relative to a country's harvest and therefore the rankings are not likely to change with improved reporting.

In the United States, it is illegal to harvest any billfish, other than swordfish, from the Atlantic Ocean for commercial sale. According to highly migratory species (HMS) regulations 50 CFR part 635, a billfish Certification of Eligibility (COE) is required to remain in association with any billfish product throughout the chain of custody up to, but not including, the consumer to certify that billfish product was not caught in the Atlantic. The first purchaser of a billfish product is required to complete the COE. Unfortunately, there is no requirement for this form to be submitted to NMFS, any other government body or otherwise retained by dealers. The COE accompanies the product to consumption and dealers are free to dispose of the form as they see fit. If this form were to be collected and recorded by NMFS, this would be a way to track the trade patterns of billfish and billfish products once they enter the United States. Currently, there is no way to track fisheries products from the country of origin to the consumers' plates for any species. Additionally, customs officials have no responsibility to check the COE for products coming into this country.

Perhaps this small legal trade window encourages a black market for Atlantic caught billfish. There are many nations harvesting Atlantic billfish, but, since the COE is not tracked or

enforced, the author suspected that illegal trade would not show up in the trade data. However, several shipments identified in the FDA imports database originated from countries with no Pacific coast access (Table 6). It is unlikely that these shipments were transshipments of product sourced from the Pacific. Without any ability to track the COE in the FDA data it is impossible to know if these were transshipments. It is also impossible to determine whether Atlantic products are being transshipped through Pacific nations to avoid this regulation. Several countries, which have both Atlantic and Pacific coasts, ship billfish products to the United States, further compounding this traceability problem (Table 7). If Atlantic products from the countries in Tables 6 and 7 were either intentionally or mistakenly mislabeled as Pacific caught product on the COE, under current regulations, it would be impossible to trace.

**Table 6. Billfish Imports from Countries with No Access to the Pacific Ocean.**

Year	Origin	Product	Volume in kg	Value (US Dollars)
2003	Dominican Republic	Raw, Fresh, Refrigerated	132	\$475
2003	Guatemala	Raw, Fresh, Refrigerated	360	\$1,291
2003	Italy	NEC	44	\$158
2003	Martinique	Raw - Fresh, Frozen, Natural State	460	\$1,651
2003	Trinidad & Tobago	Raw, Fresh, Refrigerated	3,450	\$12,384
2004	Dominican Republic	Packaged Food	2,449	\$6,596
2004	Dominican Republic	Raw, Fresh, Refrigerated	103	\$279
2004	France	Cultured/Cured	55	\$147
2005	France	Cultured/Cured	90	\$533
2005	Spain	Packaged Food	39	\$228
2006	France	Cultured/Cured	43	\$166
2006	Trinidad & Tobago	Raw, Fresh, Refrigerated	*	*

\* A shipment was reported, but no quantity information available

Transshipment, in general, deserves closer scrutiny. For example, the Maldives has no harvest of billfish, as reported to FAO, yet it exported, on average, 235mt annually between 2001 and 2005. El Salvador and Nicaragua also export annually, on average, 25mt and 1mt of billfish respectively without any reported harvest of billfish. Additionally, South Africa, while it harvests 78mt on average per year, exports 407mt per year for a total potential transshipment per year of 391mt. There is no way to determine whether these export values represent underreported harvests or transshipments and, if transshipments, where the billfish was caught. These problems reflect the difficulty that exists in tracking imports back to their origin. Domestic trade is even more difficult, as there are no reporting requirements past the point of first purchase. No Atlantic billfish show up in the domestic landings data. However, without data on billfish consumption at the consumer level, total imports and total domestic production from the Pacific, it is impossible to tell if Atlantic sport caught or domestic commercial bycatch enters the market place. None of these data sets are currently available.

**Table 7. Billfish Shipments from Countries with Access to Atlantic and Pacific Oceans.**

<b>Year</b>	<b>Origin</b>	<b>Product</b>	<b>Volume in kg</b>	<b>Value (US Dollars)</b>
2003	Canada	Raw, Fresh, Refrigerated	108	\$389
2003	Costa Rica	Cultured/Cured	7,653	\$27,467
2003	Costa Rica	Packaged Food	200,221	\$718,593
2003	Costa Rica	Raw - Fresh, Frozen, Natural State	20,703	\$74,303
2003	Costa Rica	Raw, Fresh, Refrigerated	291,338	\$1,045,611
2003	Costa Rica	Raw, Fresh, Refrigerated	2,814	\$6,831
2003	Mexico	Raw, Fresh, Refrigerated	0	\$1
2003	Nicaragua	Packaged Food	5,777	\$20,733
2003	Nicaragua	Raw, Fresh, Refrigerated	2,411	\$8,653
2003	South Africa	Raw - Fresh, Frozen, Natural State	13,722	\$49,248
2003	South Africa	Raw, Fresh, Refrigerated	11,222	\$40,276
2004	Colombia	Raw, Fresh, Refrigerated	865	\$2,331
2004	Costa Rica	Cultured/Cured	17,234	\$46,411
2004	Costa Rica	Packaged Food	131,012	\$352,816
2004	Costa Rica	Raw - Fresh, Frozen, Natural State	10,496	\$28,266
2004	Costa Rica	Raw - Fresh, Frozen, Natural State	100	\$30
2004	Costa Rica	Raw, Fresh, Refrigerated	151,735	\$408,621
2004	Costa Rica	Raw, Fresh, Refrigerated	6,844	\$24,029
2004	Nicaragua	Packaged Food	807	\$2,174
2004	Nicaragua	Raw, Fresh, Refrigerated	693	\$1,865
2004	Nicaragua	Raw, Fresh, Refrigerated	309	\$1,320
2004	Panama	Packaged Food	317	\$854
2004	Panama	Raw - Fresh, Frozen, Natural State	7,649	\$20,599
2004	Panama	Raw, Fresh, Refrigerated	1,586	\$4,272
2004	South Africa	Raw - Fresh, Frozen, Natural State	8,589	\$23,130
2005	Colombia	Raw, Fresh, Refrigerated	1,926	\$11,396
2005	Costa Rica	Cultured/Cured	4,703	\$27,828
2005	Costa Rica	Packaged Food	175,521	\$1,038,558
2005	Costa Rica	Packaged Food	388	\$1,699
2005	Costa Rica	Raw - Fresh, Frozen, Natural State	13,462	\$79,655
2005	Costa Rica	Raw, Fresh, Refrigerated	108,783	\$643,670
2005	Costa Rica	Raw, Fresh, Refrigerated	814	\$3,150
2005	Guatemala	Packaged Food	61	\$360
2005	Nicaragua	Packaged Food	776	\$4,592
2005	Nicaragua	Packaged Food	118	\$393
2005	Nicaragua	Raw - Fresh, Frozen, Natural State	4,352	\$25,751
2005	Panama	Raw, Fresh, Refrigerated	459	\$2,713
2006	Colombia	Packaged Food	475	\$1,837
2006	Colombia	Raw, Fresh, Refrigerated	248	\$959
2006	Costa Rica	Packaged Food	136,441	\$527,635
2006	Costa Rica	Raw - Fresh, Frozen, Natural State	10,821	\$41,846
2006	Costa Rica	Raw, Fresh, Refrigerated	76,810	\$297,033
2006	Guatemala	Packaged Food	180	\$695
2006	Guatemala	Raw, Fresh, Refrigerated	261	\$1,010
2006	Nicaragua	Packaged Food	57	\$220
2006	Panama	Raw - Fresh, Frozen, Natural State	39,710	\$153,563
2006	Panama	Raw, Fresh, Refrigerated	675	\$2,610
2006	South Africa	Raw, Fresh, Refrigerated	1,314	\$5,082

The 2007 Magnuson Stevens Reauthorization Act (MSRA) includes provisions to address bycatch and illegal, unregulated and unreported (IUU) fishing by penalizing nations that engage in those practices. Section 607 of MSRA requires the Secretary of Commerce to identify and biennially list nations whose fishing vessels have: been engaged in IUU or bycatch fishing during any portion of the previous two years and the relevant IFMO has failed to implement effective measures to end IUU fishing and bycatch by vessels of that nation; the nation does not belong to an IFMO; or no IFMO exists to regulate said fishing. Identification for this provision is equivalent to the provisions of the High Seas Driftnet Fisheries Enforcement Act (HSDFEA) of 1992. Under the HSDFEA, The Secretary of Commerce is responsible for identifying nations engaged in the use of the gear and engaging those nations in consultations within 30 days of identification. Under the new MSRA provisions, if the offending nation is taking action to reduce IUU and/or bycatch, a positive certification is given to that nation, but if no action is being taken, a negative certification is issued. Vessels identified as participating in IUU and/or bycatch will be immediately denied entry into US ports and US navigable waters. A failure to certify or a negative certification triggers provision in the Pelly Amendment of 1995 (PA).

Under the PA, if an agreement is not reached terminating IUU or bycatch within 90 days, the offending nation will face trade sanctions, including the prohibition on the import into the United States of that nation's fish, fish products or sportfishing equipment. The PA connects the fishery management sector with the General Agreement on Tariffs and Trade administered by the World Trade Organization. The PA outlines procedures for the certification and upon that certification the President can impose trade sanctions. The advanced notice of proposed rulemaking for these new MSRA provisions were published in the federal register on Monday June 11, 2007 (Volume 72, Number 111, page 32052). These provisions may provide a method to reduce billfish landings, effectively making it illegal to import billfish without making importation expressly illegal, as long as billfish is recognized as a protected living marine resource.

### **Billfish Economics**

No data exists on consumer purchases of billfish, precluding the estimation of demand models at the consumer level. It is this author's opinion that it would be impossible to estimate an aggregated demand model using ex-vessel billfish data, except perhaps in Hawaii. Hawaii harvested 2,550mt of billfish with a value of \$2.7 million in 2006. Black marlin commanded the highest price at \$4.96/kg but striped marlin was the most valuable species due to quantity landed at \$1.4 million. Striped marlin has been the most valuable billfish fishery in Hawaii in recent times with the exception of 1995 when black marlin was the highest. In 2006, the United States imported 1,335mt of billfish with a value of \$5.2 million, based on FDA customs clearances. Prices are not available from the FDA customs data, so Hawaii ex-vessel prices were used to estimate value in the remainder of this analysis on the domestic billfish import market.

## Executive Summary

---

All of the documented domestic harvest of billfish comes from Hawaii. The economic impacts of harvesting, processing, wholesaling, distribution and consumer sales of billfish in Hawaii for 2005 are:

- 346 jobs supported in Hawaii
- \$12.5 million in income/value added generated in Hawaii
- \$25 million in output

The FDA data was used for the economic impact analysis of US imports in this report. The economic impacts of importation, wholesaling, distribution and consumer sales of billfish into the United States market for 2005 are:

- 328 jobs supported on the mainland United States
- \$11 million in income/value added on the mainland United States
- \$19 million in output on the mainland United States

The total United States economic impacts of Hawaii harvesting and the mainland importation of billfish in 2005 are:

- 675 jobs supported nationwide
- \$23.5 million in income/value added nationwide
- \$44 million in output nationwide

To put these estimates in perspective, the \$23.5 million in value added generated nationwide represents only 0.071% of \$32.9 billion; the value added generated by all seafood industry activities in the United States for 2005.

Finally, a review of the seafood demand literature suggests that the demand for most fish species is highly elastic, although no billfish specific elasticity estimates exist. This suggests that a ban on the importation of billfish would have little consumer welfare impact and whatever welfare impact that was generated would fade quickly. Additionally, the literature found that consumers elasticity is affected by health warnings, as well as “green” or sustainability certifications, which suggests that an informational campaign related to the health impacts of eating an apex predator with high mercury levels or the inability to sustain the harvest of billfish, like the dolphin safe tuna campaign, may be an effective means to drive down consumer demand. Additionally, elastic demand means that the economic impacts of any policy that reduces billfish importation would likely be short lived if felt in the economy at all. However, because billfish are a byproduct of the tuna harvesting process, banning imports or reducing domestic demand may not reduce billfish mortality.