

# **The Relative Economic Contributions of U.S. Recreational and Commercial Fisheries**

**April 10, 2006**

**Prepared by:**



**For the:**

**Theodore Roosevelt Conservation Partnership**

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## Executive Summary

This report assesses the U.S. economic impacts of marine commercial and marine recreational fisheries. In addition, the sources of seafood for U.S. consumption and the relevance of aquaculture is discussed. The purpose of this report is to help readers understand the relative economic returns from recreational and commercial fisheries. Unless otherwise noted, all data presented is the most recent available (2004) at the time this report was prepared (March 2006). Presented within are the detailed results along with discussions of methods and limitations.

### Economic Impacts:

In 2004, approximately 82 million marine recreational fishing trips were taken by 14 million anglers. These anglers spent over \$16 billion, which in turn generated over \$34 billion in total economic activity, supporting nearly 360,000 full and part time jobs, and billions in tax revenues and income (salaries, wages and business profits). Table E-1 presents details. See inside the report for greater details.

Table E-1: Marine Recreational Fishing Impacts

State	Angler Expenditures	Sales Impacts	Income	Jobs	Federal Tax Revenues	State Tax Revenues
Alabama	\$604,343,007	\$523,216,038	\$208,878,951	8,869	\$53,402,530	\$37,712,311
California	\$1,339,233,957	\$1,591,997,434	\$712,775,270	18,379	\$179,175,322	\$98,316,699
Connecticut	\$298,727,310	\$203,953,751	\$92,361,120	2,370	\$28,469,383	\$21,720,185
Delaware	\$182,167,310	\$128,298,991	\$50,050,868	1,682	\$14,261,166	\$11,436,841
Florida	\$7,745,740,445	\$7,175,891,860	\$3,003,421,827	100,899	\$830,833,480	\$515,183,100
Georgia	\$218,729,456	\$281,296,192	\$115,594,547	4,199	\$30,511,862	\$20,945,730
Louisiana	\$1,530,349,049	\$1,377,306,264	\$524,808,181	19,674	\$121,363,339	\$94,444,652
Maine	\$83,668,979	\$64,695,471	\$27,228,130	1,092	\$7,132,475	\$6,731,194
Maryland	\$461,213,196	\$372,063,673	\$158,937,028	4,922	\$43,719,586	\$34,818,748
Massachusetts	\$753,835,438	\$561,973,061	\$247,108,557	7,266	\$78,029,518	\$61,153,020
Mississippi	\$253,482,396	\$182,922,395	\$73,902,824	3,018	\$17,857,696	\$15,830,718
New Hampshire	\$69,426,405	\$57,146,884	\$24,866,954	774	\$6,946,471	\$4,733,212
New Jersey	\$864,864,195	\$841,045,986	\$341,116,412	9,583	\$98,527,666	\$68,422,155
New York	\$610,114,755	\$458,411,993	\$192,380,198	5,494	\$51,973,137	\$47,065,506
North Carolina	\$1,985,719,275	\$1,776,718,793	\$707,977,518	28,409	\$191,624,184	\$141,432,036
Oregon	\$106,809,773	\$115,415,147	\$50,660,303	1,567	\$12,120,517	\$6,790,007
Rhode Island	\$143,845,018	\$93,189,234	\$39,505,198	1,411	\$11,715,892	\$9,504,044
South Carolina	\$532,786,802	\$460,225,852	\$183,824,727	7,323	\$9,492,243	\$7,612,639
Virginia	\$479,100,912	\$364,164,892	\$148,313,216	5,110	\$42,647,225	\$31,617,363
Washington	\$126,467,237	\$134,518,340	\$59,974,784	1,654	\$15,589,848	\$6,790,887
U.S.	\$16,557,185,016	\$34,633,867,338	\$13,569,529,752	359,813	\$3,484,221,396	\$5,493,034,794

In 2004, commercial fishermen landed \$1.7 billion in finfish (dock side value). After going through wholesalers, processors, distributors and retail points, the total resulting economic activity totaled nearly \$9.9 billion and supported 126,477 jobs. Table E-2 presents details. See inside the report for greater details.

Table E-2: Commercial Fishing Impacts:

<b>Finfish Only</b>				
<b>State</b>	<b>Landings Value</b>	<b>Sales Impacts</b>	<b>Income</b>	<b>Jobs</b>
Alabama	\$5,936,874	\$17,361,858	\$10,235,775	237
Alaska	\$1,006,576,407	\$2,943,642,898	\$1,735,440,244	40,175
California	\$78,969,717	\$230,939,892	\$136,151,835	3,152
Connecticut	\$5,858,614	\$17,132,994	\$10,100,847	234
Delaware	\$1,192,738	\$3,488,056	\$2,056,402	48
Florida	\$75,800,421	\$221,671,569	\$130,687,646	3,025
Georgia	\$1,150,612	\$3,364,862	\$1,983,772	46
Hawaii	\$57,079,048	\$166,922,583	\$98,410,092	2,278
Louisiana	\$31,011,432	\$90,690,166	\$53,466,867	1,238
Maine	\$44,727,909	\$130,802,779	\$77,115,471	1,785
Maryland	\$4,601,682	\$13,457,208	\$7,933,768	184
Massachusetts	\$110,931,826	\$324,410,228	\$191,257,766	4,428
Mississippi	\$970,907	\$2,839,331	\$1,673,943	39
New Hampshire	\$6,427,645	\$18,797,074	\$11,081,915	257
New Jersey	\$29,068,914	\$85,009,446	\$50,117,768	1,160
New York	\$22,075,297	\$64,557,237	\$38,060,060	881
North Carolina	\$34,921,139	\$102,123,755	\$60,207,600	1,394
Oregon	\$49,638,434	\$145,163,172	\$85,581,716	1,981
Rhode Island	\$44,910,696	\$131,337,324	\$77,430,614	1,792
South Carolina	\$5,047,700	\$14,761,548	\$8,702,749	201
Texas	\$10,724,331	\$31,362,349	\$18,489,839	428
Virginia	\$20,069,254	\$58,690,743	\$34,601,438	801
Washington	\$55,212,302	\$161,463,451	\$95,191,632	2,204
At-Sea Process, Pac.	\$14,355,348	n/a	n/a	n/a
<b>U.S.</b>	<b>\$1,717,259,247</b>	<b>\$9,883,630,575</b>	<b>\$6,015,492,003</b>	<b>126,477</b>

### Comparing Marine Recreational and Commercial Finfish Impacts:

The economic impacts of marine recreational and commercial finfish fisheries can be compared by examining the impacts created by each fishery, including the impacts from seafood processing and other value-added sectors. Table E-3 presents the impacts per state and nationally created by each fishery. The commercial finfish impacts include landings for all finfish (except industrial menhaden), including species seldom targeted by anglers such as

hake, eel, anchovies, and more. Exclusion of these numbers would be expected to reduce the impacts from commercial landings for most states.

Table E-3: Comparative Economic Impacts from Marine Recreational and Commercial Finfish Fisheries, 2004

State	Recreational Fisheries			Commercial Fisheries			Commercial Impacts are X% of Recreational Impacts
	Sales Impacts	Income	Jobs	Sales Impacts	Salaries	Jobs	
Alabama	\$523,216,038	\$208,878,951	8,869	\$17,361,858	\$10,235,775	237	3.32%
Alaska	n/a	n/a	n/a	\$2,943,642,898	\$1,735,440,244	40,175	n/a
California	\$1,591,997,434	\$712,775,270	18,379	\$230,939,892	\$136,151,835	3,152	14.51%
Connecticut	\$203,953,751	\$92,361,120	2,370	\$17,132,994	\$10,100,847	234	8.40%
Delaware	\$128,298,991	\$50,050,868	1,682	\$3,488,056	\$2,056,402	48	2.72%
Florida	\$7,175,891,860	\$3,003,421,827	100,899	\$221,671,569	\$130,687,646	3,025	3.09%
Georgia	\$281,296,192	\$115,594,547	4,199	\$3,364,862	\$1,983,772	46	1.20%
Hawaii	n/a	n/a	n/a	\$166,922,583	\$98,410,092	2,278	n/a
Louisiana	\$1,377,306,264	\$524,808,181	19,674	\$90,690,166	\$53,466,867	1,238	6.58%
Maine	\$64,695,471	\$27,228,130	1,092	\$130,802,779	\$77,115,471	1,785	202.18%
Maryland	\$372,063,673	\$158,937,028	4,922	\$13,457,208	\$7,933,768	184	3.62%
Massachusetts	\$561,973,061	\$247,108,557	7,266	\$324,410,228	\$191,257,766	4,428	57.73%
Mississippi	\$182,922,395	\$73,902,824	3,018	\$2,839,331	\$1,673,943	39	1.55%
New Hampshire	\$57,146,884	\$24,866,954	774	\$18,797,074	\$11,081,915	257	32.89%
New Jersey	\$841,045,986	\$341,116,412	9,583	\$85,009,446	\$50,117,768	1,160	10.11%
New York	\$458,411,993	\$192,380,198	5,494	\$64,557,237	\$38,060,060	881	14.08%
North Carolina	\$1,776,718,793	\$707,977,518	28,409	\$102,123,755	\$60,207,600	1,394	5.75%
Oregon	\$115,415,147	\$50,660,303	1,567	\$145,163,172	\$85,581,716	1,981	125.77%
Rhode Island	\$93,189,234	\$39,505,198	1,411	\$131,337,324	\$77,430,614	1,792	140.94%
South Carolina	\$460,225,852	\$183,824,727	7,323	\$14,761,548	\$8,702,749	201	3.21%
Texas	n/a	n/a	N/a	\$31,362,349	\$18,489,839	428	n/a
Virginia	\$364,164,892	\$148,313,216	5,110	\$58,690,743	\$34,601,438	801	16.12%
Washington	\$134,518,340	\$59,974,784	1,654	\$161,463,451	\$95,191,632	2,204	120.03%
<b>U.S.</b>	<b>\$34,633,867,338</b>	<b>\$13,569,529,752</b>	<b>359,813</b>	<b>\$9,883,630,575</b>	<b>\$6,015,492,003</b>	<b>126,477</b>	<b>28.54%</b>

The results show that the total national economic impact from commercial finfish fisheries is 28.54 percent of the impact created by marine recreational fisheries. Of the 23 coastal states, only four receive greater economic benefits from commercial finfish fisheries: Maine, Oregon, Rhode Island and Washington. Of the three states without available marine recreational fisheries impact estimates, Alaska is expected to receive greater benefits from commercial fisheries, Texas is expected to have larger impacts from marine recreational fisheries, and Hawaii is unknown. Excluding Hawaii, approximately 18 of 22 states receive greater economic impacts from recreational fisheries. Please note that the commercial fisheries reported above include significant fisheries such as hake, pollock and other offshore fisheries not targeted by recreational anglers.

## Economic Values:

A full economic examination of any fishery should include economic values, when possible. Economic values essentially measure the increases in quality of life as a result of an action or activity. This concept is often considered a better measure of the true economic benefits produced by fisheries for the American public. However, no information could be located that provided comparisons between U.S. commercial and recreational fisheries. Should resources come available, it is recommended that comprehensive, peer-reviewed economic valuation investigations be conducted, preferably by a neutral body such as NOAA Fisheries or other similar entity.

## U.S. Domestic Seafood Demand And Supply Sources

Consumption of seafood products in the United States is steadily increasing over the past 25 years, with Americans consuming an average of 16.6 pounds per year in 2004 (the most recent year with statistics). Finfish products constitute roughly 65%-70% of this consumption.

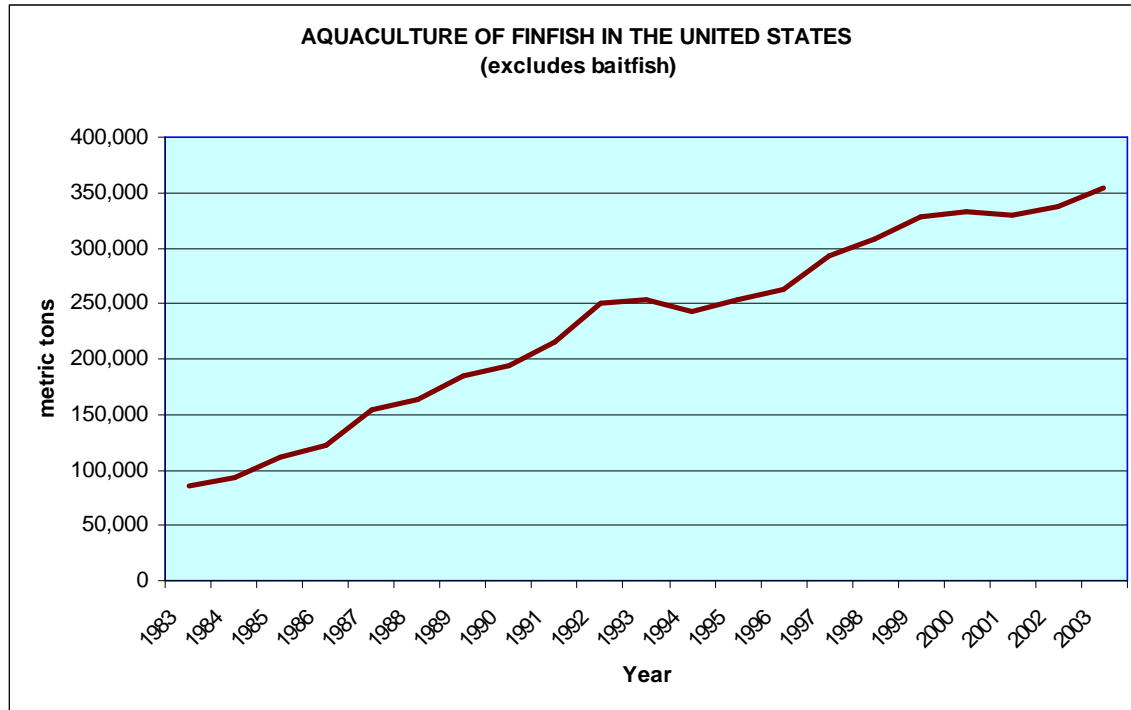
Table E-4: Annual Per-Capita Fish Consumption

Annual Fish Consumption  
in the U.S.

<u>Year</u>	<u>lbs/person</u>
1980	12.5
1990	15.0
2000	15.2
2001	14.8
2002	15.6
2003	16.3
2004	16.6
2001	14.8
2002	15.6
2003	16.3
2004	16.6

Concurrent with this increased consumption, aquaculture production of finfish has also increased. In the 20 year time span between 1983 and 2003, finfish aquaculture in the United States increased over 300%, now totaling more than 350 thousand metric tons (or nearly 780 million pounds, see Figure E-1).

Figure E-1: Aquaculture Finfish Production Trend



Despite the rise in aquaculture, the quantity of finfish produced in the U.S. still only amounts to approximately 10% of the amount of edible finfish that are provided through wild harvests (net of the amount exported) plus imported edible finfish products. Table E-5 presents the net sources of edible finfish products available to the U.S. market.

Table E-5: Sources of Edible Finfish for the U.S. Market

	U.S. Supply Of Commercial Edible Finfish (metric tons, round weight)			
	Domestic Landings	Imports	Exports	Net Total Available For U.S. Consumption
1997	2,707,453	2,091,764	1,736,630	3,062,588
1998	2,692,082	2,223,215	1,530,709	3,384,587
1999	2,490,446	2,422,634	1,664,982	3,248,098
2000	2,557,024	2,435,352	1,850,767	3,141,609
2001	2,795,007	2,343,977	2,387,279	2,751,705
2002	2,727,231	2,611,227	2,327,945	3,010,513
2003	2,897,553	2,825,390	2,294,680	3,428,262
2004	3,009,821	2,865,964	2,757,253	3,118,532

See the report's contents for greater details on U.S. fish production and consumption trends, plus information on the benefits and potential issues associated with aquaculture production.



## **1.0 Introduction**

This report assesses the relative economic impacts of U.S. commercial and recreational fisheries and the growing role of aquaculture as a partial substitute for wild fish. The purpose is to help readers understand the relative difference in economic activity resulting from recreational and commercial fisheries. This report is based on data from existing scientific publications, reports and other data sources, using the latest information available at the time of preparation. Data limitations encountered are described in this report.

This report reviews economic impacts. Economic impacts typically report financial measures such as jobs, expenditures, tax revenues, etc. Another economic measure is commonly used know as 'economic valuation.' This approach essentially measures quality of life changes, or changes in consumer and producer's surplus. Both approaches are valid and have a role in fisheries management decisions. Many economists prefer economic value measures because economic impacts do not reflect the full intrinsic and financial values individuals receive from either catching fish recreationally or consuming fish purchased at a seafood store or restaurant. However, it is important to recognize the contributions fisheries make to equipment dealers, seafood processors, coastal communities and others who are personally impacted by fishery management decisions. While economic valuation has a role in fisheries management, valuation studies that allowed for comparisons between U.S. commercial and recreational fisheries could not be located. Therefore, valuation comparisons are not provided for in this study. Should resources come available, it is recommended that comprehensive, peer-reviewed economic valuation investigations be conducted, preferably by a neutral body such as NOAA Fisheries or other similar entity.

## 2.0 Economic Impacts

### 2.1 Recreational Fisheries

In 2004, approximately 82 million marine recreational fishing trips were taken by 14 million anglers. Table 1 presents the number of anglers by state. Angler numbers for California, Oregon and Washington were not available for 2004. Angler numbers for these states were estimated by comparing the number of anglers reported per state and nationally by NOAA Fisheries in an earlier 1998-2000 expenditure studies. These data are presented in Appendix B, Table B-1.

Table 1: Estimated Number of Marine Anglers by State, 2004\*

(All numbers are x1,000. Source: *Fisheries of the United States, 2004*. CA, OR & WA numbers were estimated using additional NOAA Fisheries resources)

State	Non-Resident Anglers	Total Residents	Total Trips
Alabama	398	408	2,048
California	313	2,327	4,449
Connecticut	65	304	1,579
Delaware	239	115	1,163
Florida	3,291	3,243	27,204
Georgia	54	222	929
Louisiana	207	895	4,810
Maine	155	132	760
Maryland	336	485	2,668
Massachusetts	344	673	4,569
Mississippi	54	224	1,109
New Hampshire	71	93	361
New Jersey	374	746	6,580
New York	75	602	4,743
North Carolina	1,152	903	7,025
Oregon	114	447	223
Rhode Island	227	124	1,444
South Carolina	335	327	2,236
Virginia	423	573	3,558
Washington	66	705	198
*States in grey were estimated using data from NOAA Fisheries marine angler expenditure reports			
NOTE: State numbers should not be added as a person may fish in more than one state.			

Sources for marine recreational fishing impact data by state were sought. The most thorough and comprehensive source of marine recreational fishing impact data is available from NOAA Fisheries. This report, titled The Economic Importance of Marine Angler Expenditures in the United States (Steinback et al, 2004), presents detailed impacts for all coastal states except Texas, Hawaii and Alaska.<sup>1</sup> The reported impacts were for 1998 to 2000, depending on the state. These are presented in Appendix B, Table B-2.

<sup>1</sup> These states declined to participate in the annual NOAA Fisheries survey that provided the data for the economic impact estimates.

The numbers can be considered conservative to an extent as marine fishing impacts for several states are not included. Texas declined to participate in the annual survey that collects the data necessary to calculate the economic impacts, and is therefore excluded from these results.<sup>2</sup> Data are not collected for Hawaii and Alaska, both of which have well-known marine fisheries contributing to their economies.

The 1998-2000 economic impacts were converted to 2004 levels using several steps:

Fishing activity - adjustments for changes in fishing activities were made using the change in the number of annual marine recreational fishing trips as reported by NOAA Fisheries' annual *Fisheries of the United States* publications, versions 1998, 2000 and 2004. These sources provided estimated number of fishing trips annually per state. The percentage change in fishing trips between the reported years (1998-2000) and 2004 were applied to the 1998 estimates to account for changes in fishing pressure. The trips and percentage change estimates are presented in Appendix B, Table B-3.

Inflation – changes in prices were accounted for by applying the change in the Bureau of Labor Statistics Consumer Price Index from 1998-2000 (depending on the state) to 2004. Therefore, all estimates were adjusted by the change in prices up to 2004, with the exception of the jobs estimate. For jobs, the standard wage and salary is expected to keep abreast with inflation over the long run, thus eliminating the need to adjust job figures for inflation.

The final estimated impacts for marine recreational fishing in 2004 are presented in Table 2.

Table 2. Economic Impacts of Marine Recreational Fishing, 2004

State	Angler Expenditures	Sales Impacts*	Income**	Jobs	Federal Tax Revenues	State Tax Revenues
Alabama	\$604,343,007	\$523,216,038	\$208,878,951	8,869	\$53,402,530	\$37,712,311
California	\$1,339,233,957	\$1,591,997,434	\$712,775,270	18,379	\$179,175,322	\$98,316,699
Connecticut	\$298,727,310	\$203,953,751	\$92,361,120	2,370	\$28,469,383	\$21,720,185
Delaware	\$182,167,310	\$128,298,991	\$50,050,868	1,682	\$14,261,166	\$11,436,841
Florida	\$7,745,740,445	\$7,175,891,860	\$3,003,421,827	100,899	\$830,833,480	\$515,183,100
Georgia	\$218,729,456	\$281,296,192	\$115,594,547	4,199	\$30,511,862	\$20,945,730
Louisiana	\$1,530,349,049	\$1,377,306,264	\$524,808,181	19,674	\$121,363,339	\$94,444,652
Maine	\$83,668,979	\$64,695,471	\$27,228,130	1,092	\$7,132,475	\$6,731,194
Maryland	\$461,213,196	\$372,063,673	\$158,937,028	4,922	\$43,719,586	\$34,818,748
Massachusetts	\$753,835,438	\$561,973,061	\$247,108,557	7,266	\$78,029,518	\$61,153,020
Mississippi	\$253,482,396	\$182,922,395	\$73,902,824	3,018	\$17,857,696	\$15,830,718
New Hampshire	\$69,426,405	\$57,146,884	\$24,866,954	774	\$6,946,471	\$4,733,212
New Jersey	\$864,864,195	\$841,045,986	\$341,116,412	9,583	\$98,527,666	\$68,422,155
New York	\$610,114,755	\$458,411,993	\$192,380,198	5,494	\$51,973,137	\$47,065,506
North Carolina	\$1,985,719,275	\$1,776,718,793	\$707,977,518	28,409	\$191,624,184	\$141,432,036
Oregon	\$106,809,773	\$115,415,147	\$50,660,303	1,567	\$12,120,517	\$6,790,007

<sup>2</sup> The data source is NOAA Fisheries' Marine Recreational Fisheries Statistics Survey (MRFSS), which is a combination intercept and phone survey conducted at the state level annually.

Table 2 (continued)

<b>State</b>	<b>Angler Expenditures</b>	<b>Sales Impacts*</b>	<b>Income**</b>	<b>Jobs</b>	<b>Federal Tax Revenues</b>	<b>State Tax Revenues</b>
Rhode Island	\$143,845,018	\$93,189,234	\$39,505,198	1,411	\$11,715,892	\$9,504,044
South Carolina	\$532,786,802	\$460,225,852	\$183,824,727	7,323	\$9,492,243	\$7,612,639
Virginia	\$479,100,912	\$364,164,892	\$148,313,216	5,110	\$42,647,225	\$31,617,363
Washington	\$126,467,237	\$134,518,340	\$59,974,784	1,654	\$15,589,848	\$6,790,887
U.S.	\$16,557,185,016	\$34,633,867,338	\$13,569,529,752	359,813	\$3,484,221,396	\$5,493,034,794

\* Sales impacts report the rounds of spending that occur in the state or national economy as a result of anglers' purchases.

\*\* Income reports the total salaries, wages, and business profits generated by the rounds of spending and jobs reports the total full- and part-time jobs supported by the rounds of spending.

## 2.2 Commercial Fisheries

The methods used to generate the economic impact estimates for commercial fisheries are separated into two stages:

- Step 1) Obtain NOAA Fisheries data regarding the value of fish landed in each state and for the coast as a whole, and
- Step 2) Combine landings value data, also known as dockside prices, with economic multipliers that describe the economic activity stimulated as seafood is processed, distributed and ultimately consumed.

### *Step 1: Commercial Landings Value Data*

Data regarding 2004 commercial fishery landings were obtained from NOAA Fisheries' online database ([http://www.st.nmfs.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.gov/st1/commercial/landings/annual_landings.html)). The data reported dollars received by harvesters for the sale of their catch. The commercial harvest data are presented in Table 3. Column #2 presents the total tons of all landings per state. Column #3 presents the dock-side value of all landings, which is the amount received by harvestors for their catch. These figures include all fisheries, including finfish, shellfish and all other types reported to NOAA Fisheries, but exclude aquaculture harvests except for clams, oysters and mussels.

Recognizing that many commercial fisheries catch species not sought by recreational anglers, some of these extraneous values are removed to facilitate discussions that better compare recreational and commercial fisheries. Specifically, all shellfish and industrial fish (menhaden) are removed. These finfish dockside values are presented in Table 3, column #4. The landings values for many other fish species not typically sought by anglers, such as herring, hake and eels, remain in column #4 based on the difficulty in determining which species receive very low or no recreational pressure. Many freshwater commercial landings are included as well (except Florida), but these represent a very small portion of the overall results and do not impact the results to any significant degree. Column #5 of Table 3 reports the percentage of each state's overall commercial landings attributable to finfish.

Table 3. Commercial Landings for All Commercial Fisheries, 2004.

<b>State</b>	<b>Column #2 Metric Tons</b>	<b>Column #3 All Fisheries</b>	<b>Column #4 Finfish Only</b>	<b>Column #5 % of Landings Value from Finfish</b>
Alabama	12,046.90	\$37,035,271	\$5,936,874	16.0%
Alaska	2,429,139.70	\$1,171,976,054	\$1,006,576,407	85.9%
California	171,808.40	\$139,921,933	\$78,969,717	56.4%
Connecticut	8,251.60	\$33,399,341	\$5,858,614	17.5%
Delaware	1,944.80	\$5,418,902	\$1,192,738	22.0%
Florida	\$51,080	\$186,929,972	\$75,800,421	40.6%
Georgia	3,022.60	\$12,013,208	\$1,150,612	9.6%
Hawaii	11,006.40	\$57,202,409	\$57,079,048	99.8%

Table 3 (continued)

State	Column #2 Metric Tons	Column #3 All Fisheries	Column #4 Finfish Only	Column #5 % of Landings Value from Finfish
Louisiana	497,406.20	\$275,065,335	\$31,011,432	11.3%
Maine	103,572.30	\$367,042,142	\$44,727,909	12.2%
Maryland	22,462.70	\$49,211,129	\$4,601,682	9.4%
Massachusetts	153,244.10	\$327,130,947	\$110,931,826	33.9%
Mississippi	83,353.80	\$43,790,554	\$970,907	2.2%
New Hampshire	10,000.80	\$8,812,768	\$6,427,645	72.9%
New Jersey	84,925.50	\$145,812,136	\$29,068,914	19.9%
New York	15,351.50	\$46,488,641	\$22,075,297	47.5%
North Carolina	61,894.00	\$77,142,163	\$34,921,139	45.3%
Oregon	133,698.70	\$101,081,003	\$49,638,434	49.1%
Rhode Island	46,137.70	\$71,492,994	\$44,910,696	62.8%
South Carolina	5,642.10	\$18,541,887	\$5,047,700	27.2%
Texas	38,808.40	\$166,208,228	\$10,724,331	6.5%
Virginia	218,432.20	\$160,283,147	\$20,069,254	12.5%
Washington	86,581.40	\$164,224,903	\$55,212,302	33.6%
At-Sea Process, Pac.	120,253.90	\$14,355,348	\$14,355,348	100.0%
TOTAL:	4,370,065.90	\$3,680,580,415	\$1,717,259,247	46.7%

### *Step 2: Commercial Fisheries Economic Multipliers and Analysis*

After searching for sources of multiplier data for Atlantic commercial finfish harvests, only a few sources were found:

1. Economic Contributions of Virginia's Commercial Seafood and Recreational Fishing Industries: A User's Manual for Assessing Economic Impacts (Kirkley et al, 2005).
2. The Economic Contribution of the Sport Fishing, Commercial Fishing and Seafood Industries to New York State (TechLaw, 2001).
3. Economic Activity Associated With Fishery Products In the United States (Kearney Centaur, 1989).

Other studies were identified, but only examined the impacts from specific sectors such as the harvest, or fishermen's, sector. Multipliers were required that estimate the impact of all sectors including the harvestors, processors, wholesalers, distribution and retail/restaurants.

The TechLaw report does not separate the impacts of New York-landed seafood from imported product (domestic and overseas). Plus, the results are for 1999, which is five years older than the Kirkley report. The Kirkley report provides detailed impacts for all state fisheries. The Kirkley report also reports impacts specific to finfish landed in state. Therefore, recognizing the lack of better data, this study adapts the Kirkley data to develop multipliers for use in estimating the impacts in all other coastal states.

The only other source of national impact multipliers was from a 1986 study produced by Kearney Centaur on behalf of the National Fisheries Education and Research Foundation and the National Marine Fisheries Service. The study provides detailed impact data by state, but is based on 1980 data. Since the development of the Kearney Centaur report, the nature of commercial fisheries and their supporting sectors (processing, distribution, etc.) has certainly changed. New technologies, emerging and diminishing fisheries, changing consumer tastes and preferences, changing fuel and other costs, etc., have all combined to change the impacts generated for each pound of seafood landed over the past 25 years. Even though it is the only national model available, using the Kearney Centaur model is not regarded as reliable as applying the newer Virginia results across all coastal states.

Recognizing the lack of detailed, reliable economic impact models and multipliers for all sectors associated with commercial fisheries, the authors strongly encourage the development of publicly-available commercial fishing economic models that support state, national and species-specific analyses.

The Kirkley multipliers consider the expenditures and impacts generated as commercial product moves through the processing, distribution and retail/food service levels. These data are comparable to the recreational fishing impact data reported in Section 2.1. The commercial and recreational figures in this study do not consider the impacts created by fishing activities occurring in other states. Such impacts could include the jobs and income created by recreational equipment manufacturers and wholesalers who ship to one state, and processors and retail outlets handling seafood landed out-of-state. The impacts and multipliers used to calculate the state-level figures in this report take into account the export of commercial fishery products and angler dollars out-of-state.

Adjustments were made to the Kirkley data to best estimate national economic impacts:

Leakages: the Kirkley study address state-level impacts. For national-level numbers, impacts generated by handling seafood landed in other states need to be considered. The Kirkley study allows for this adjustment by providing impact figures for all seafood industry activities in Virginia. These account for all seafood business in the state, including business supported by imported product. By using multipliers based on these data for all states, and summing the results per state, interstate trade is largely accounted for. Considering both imports and exports of seafood between states would cause double counting once the state-specific impacts were summed. The leakage adjustment likely overestimates the economic impacts stimulated by U.S. seafood landings to an unknown degree as it allows for impacts created by seafood imported into the U.S.

National Level Multipliers: The multipliers derived from the Kirkley report only reported the economic effects at the state level. However, some of the processing, distribution and final sale of seafood landed in one state occur in other states. These additional economic impacts are intentionally left out of any state-level economic study as they report economic activity in other states.

For example, the impacts of a shopping cart of groceries sold may only include the mark-up charged by the retailer and by wholesalers and processors within the state. At the national level, most of the processing, manufacturing and farmer's earnings can be included, thus increasing the economic impact of the grocery sale.

To adapt the Virginia data for use in estimating impacts at the U.S. level, the multipliers were inflated by differences seen in a previous study of striped bass fisheries (Southwick 2005) that examined impacts at the state and national levels. The U.S. level multipliers used to report overall economic activity (output) created by fisheries landings were increased 47%, the jobs multiplier upped 37%, and the income multiplier adjusted upward by 51%.

The commercial fishery multipliers used in this study, and the adaptations made to these multipliers, are presented in Appendix C. Please note that all adjustments were made in a manner where any possible error was directed towards the favor of the commercial sector. The results reported herein likely represent the higher range of potential impacts due to the possible inclusion of seafood product imported into the U.S.

### Applying the Multipliers

The multipliers explain the relationship between the value of commercial landings and their cumulative economic impacts. In this study, for every \$1 of fish landed, the multipliers report the level of economic activity created (sales impacts), the number of jobs supported, and income (salaries, wages, and business profits) produced. To determine the economic impacts for commercial fisheries landings, the total dock-side value of all 2004 landings per state were applied to the appropriate multipliers. Landings value per state and the resulting economic impact estimates are reported in Table 4 for all U.S. commercial fisheries, with the exceptions of finfish aquaculture. Table 5 presents the estimated impacts for finfish only.

Table 4: Estimated Economic Impacts From All U.S. Commercial Fisheries, 2004.

<b>All Fisheries</b>				
<b>State</b>	<b>Landings Value</b>	<b>Sales Impacts</b>	<b>Income</b>	<b>Jobs</b>
Alabama	\$37,035,271	\$105,950,252	\$62,075,267	1,019
Alaska	\$1,171,976,054	\$3,352,781,153	\$1,964,363,291	32,240
California	\$139,921,933	\$400,287,718	\$234,524,850	3,849
Connecticut	\$33,399,341	\$95,548,608	\$55,981,041	919
Delaware	\$5,418,902	\$15,502,358	\$9,082,687	149
Florida	\$186,929,972	\$534,767,997	\$313,315,595	5,142
Georgia	\$12,013,208	\$34,367,304	\$20,135,484	330
Hawaii	\$57,202,409	\$163,644,264	\$95,877,652	1,574
Louisiana	\$275,065,335	\$786,905,046	\$461,040,347	7,567
Maine	\$367,042,142	\$1,050,031,673	\$615,203,790	10,097
Maryland	\$49,211,129	\$140,782,864	\$82,483,371	1,354
Massachusetts	\$327,130,947	\$935,853,996	\$548,308,151	8,999



Table 4 (continued)

Landings Value	Landings Value	Landings Value	Landings Value	Landings Value
Mississippi	\$43,790,554	\$125,275,720	\$73,397,879	1,205
New Hampshire	\$8,812,768	\$25,211,507	\$14,771,187	242
New Jersey	\$145,812,136	\$417,138,371	\$244,397,491	4,011
New York	\$46,488,641	\$132,994,389	\$77,920,176	1,279
North Carolina	\$77,142,163	\$220,687,777	\$129,298,916	2,122
Oregon	\$101,081,003	\$289,171,848	\$169,423,096	2,781
Rhode Island	\$71,492,994	\$204,526,673	\$119,830,275	1,967
South Carolina	\$18,541,887	\$53,044,505	\$31,078,282	510
Texas	\$166,208,228	\$475,487,372	\$278,583,629	4,572
Virginia	\$160,283,147	\$458,536,941	\$268,652,528	4,409
Washington	\$164,224,903	\$469,813,490	\$275,259,354	4,518
At-Sea Process, Pac.	\$14,355,348	n/a	n/a	n/a
<b>U.S.</b>	<b>\$3,680,580,415</b>	<b>\$20,722,638,134</b>	<b>\$12,534,059,588</b>	<b>186,836</b>

Table 5: Estimated Economic Impacts From Finfish Fisheries, 2004.

<b>Finfish Only</b>				
State	Landings Value	Sales Impacts	Income	Jobs
Alabama	\$5,936,874	\$17,361,858	\$10,235,775	237
Alaska	\$1,006,576,407	\$2,943,642,898	\$1,735,440,244	40,175
California	\$78,969,717	\$230,939,892	\$136,151,835	3,152
Connecticut	\$5,858,614	\$17,132,994	\$10,100,847	234
Delaware	\$1,192,738	\$3,488,056	\$2,056,402	48
Florida	\$75,800,421	\$221,671,569	\$130,687,646	3,025
Georgia	\$1,150,612	\$3,364,862	\$1,983,772	46
Hawaii	\$57,079,048	\$166,922,583	\$98,410,092	2,278
Louisiana	\$31,011,432	\$90,690,166	\$53,466,867	1,238
Maine	\$44,727,909	\$130,802,779	\$77,115,471	1,785
Maryland	\$4,601,682	\$13,457,208	\$7,933,768	184
Massachusetts	\$110,931,826	\$324,410,228	\$191,257,766	4,428
Mississippi	\$970,907	\$2,839,331	\$1,673,943	39
New Hampshire	\$6,427,645	\$18,797,074	\$11,081,915	257
New Jersey	\$29,068,914	\$85,009,446	\$50,117,768	1,160
New York	\$22,075,297	\$64,557,237	\$38,060,060	881
North Carolina	\$34,921,139	\$102,123,755	\$60,207,600	1,394
Oregon	\$49,638,434	\$145,163,172	\$85,581,716	1,981
Rhode Island	\$44,910,696	\$131,337,324	\$77,430,614	1,792
South Carolina	\$5,047,700	\$14,761,548	\$8,702,749	201
Texas	\$10,724,331	\$31,362,349	\$18,489,839	428
Virginia	\$20,069,254	\$58,690,743	\$34,601,438	801
Washington	\$55,212,302	\$161,463,451	\$95,191,632	2,204
At-Sea Process, Pac.	\$14,355,348	n/a	n/a	n/a
<b>U.S.</b>	<b>\$1,717,259,247</b>	<b>\$9,883,630,575</b>	<b>\$6,015,492,003</b>	<b>126,477</b>

### 3.0 Discussion

The economic impacts of recreational and commercial fisheries can be best compared by examining the sales impacts, income and jobs created by each fishery. Matching angler expenditures to dockside value is not an accurate comparison as many of the impacts from commercial fisheries are generated as fisheries product go through a valued-added process on their way to the final consumer. Table 6 presents the impacts per state and nationally created by each fishery. To provide better comparisons, impacts from commercial finfish fisheries are used as the other fisheries, composed of shellfish and industrial fish harvests, are not pursued by recreational fisherman. The commercial finfish impacts include landings for all finfish (except industrial menhaden), including species seldom targeted by anglers such as pollock, eel, anchovies, and more. Exclusion of these numbers would be expected to reduce the impacts from commercial landings in most states.

Table 6: Comparative Economic Impacts from Recreational and Commercial Finfish Fisheries, 2004

State	Recreational Fisheries			Commercial Fisheries			Commercial Impacts are X% of Recreational Impacts
	Sales Impacts	Income	Jobs	Sales Impacts	Salaries	Jobs	
Alabama	\$523,216,038	\$208,878,951	8,869	\$17,361,858	\$10,235,775	237	3.32%
Alaska	n/a	n/a	n/a	\$2,943,642,898	\$1,735,440,244	40,175	n/a
California	\$1,591,997,434	\$712,775,270	18,379	\$230,939,892	\$136,151,835	3,152	14.51%
Connecticut	\$203,953,751	\$92,361,120	2,370	\$17,132,994	\$10,100,847	234	8.40%
Delaware	\$128,298,991	\$50,050,868	1,682	\$3,488,056	\$2,056,402	48	2.72%
Florida	\$7,175,891,860	\$3,003,421,827	100,899	\$221,671,569	\$130,687,646	3,025	3.09%
Georgia	\$281,296,192	\$115,594,547	4,199	\$3,364,862	\$1,983,772	46	1.20%
Hawaii	n/a	n/a	n/a	\$166,922,583	\$98,410,092	2,278	n/a
Louisiana	\$1,377,306,264	\$524,808,181	19,674	\$90,690,166	\$53,466,867	1,238	6.58%
Maine	\$64,695,471	\$27,228,130	1,092	\$130,802,779	\$77,115,471	1,785	202.18%
Maryland	\$372,063,673	\$158,937,028	4,922	\$13,457,208	\$7,933,768	184	3.62%
Massachusetts	\$561,973,061	\$247,108,557	7,266	\$324,410,228	\$191,257,766	4,428	57.73%
Mississippi	\$182,922,395	\$73,902,824	3,018	\$2,839,331	\$1,673,943	39	1.55%
New Hampshire	\$57,146,884	\$24,866,954	774	\$18,797,074	\$11,081,915	257	32.89%
New Jersey	\$841,045,986	\$341,116,412	9,583	\$85,009,446	\$50,117,768	1,160	10.11%
New York	\$458,411,993	\$192,380,198	5,494	\$64,557,237	\$38,060,060	881	14.08%
North Carolina	\$1,776,718,793	\$707,977,518	28,409	\$102,123,755	\$60,207,600	1,394	5.75%
Oregon	\$115,415,147	\$50,660,303	1,567	\$145,163,172	\$85,581,716	1,981	125.77%
Rhode Island	\$93,189,234	\$39,505,198	1,411	\$131,337,324	\$77,430,614	1,792	140.94%
South Carolina	\$460,225,852	\$183,824,727	7,323	\$14,761,548	\$8,702,749	201	3.21%
Texas	n/a	n/a	N/a	\$31,362,349	\$18,489,839	428	n/a
Virginia	\$364,164,892	\$148,313,216	5,110	\$58,690,743	\$34,601,438	801	16.12%
Washington	\$134,518,340	\$59,974,784	1,654	\$161,463,451	\$95,191,632	2,204	120.03%
<b>U.S.</b>	<b>\$34,633,867,338</b>	<b>\$13,569,529,752</b>	<b>359,813</b>	<b>\$9,883,630,575</b>	<b>\$6,015,492,003</b>	<b>126,477</b>	<b>28.54%</b>

The data in Table 6 are subject to error rates normal to NOAA Fisheries survey and data collection processes. An unknown additional level of error is expected in the economic modeling process. Additional investments into proper commercial fisheries economic models and improved data collection processes would increase overall accuracy, but overall results are regarded as relatively fair.

The results show that, of 23 coastal states, four receive greater economic benefits from commercial finfish fisheries: Maine, Oregon, Rhode Island and Washington. Of the three states without available recreational fisheries impact estimates, Alaska is expected to receive greater benefits from commercial fisheries, Texas is expected to have larger impacts from recreational fisheries, and Hawaii is unknown. Excluding Hawaii, approximately 18 of 22 states receive greater economic impacts from recreational fisheries.

## 4.0 A Snapshot Of U.S. Domestic Seafood Demand And Supply Sources

### *THE FACTS*

Consumption of seafood products in the United States is steadily increasing during the past 25 years, with Americans consuming an average of 16.6 pounds per year in 2004 (the most recent year with statistics). Finfish products constitute roughly 65%-70% of this consumption.

Table 7: Annual Fish Consumption

Annual Fish Consumption  
in the U.S.

<u>Year</u>	<u>lbs/person</u>
1980	12.5
1981	12.7
1982	12.5
1983	13.4
1984	14.2
1985	15.1
1986	15.5
1987	16.2
1988	15.2
1989	15.6
1990	15.0
1991	14.9
1992	14.8
1993	15.0
1994	15.2
1995	15.0
1996	14.8
1997	14.6
1998	14.9
1999	15.4
2000	15.2
2001	14.8
2002	15.6
2003	16.3
2004	16.6
2001	14.8
2002	15.6
2003	16.3
2004	16.6

Concurrent with this increased consumption, aquaculture of finfish has also increased. In the 20 year time span between 1983 and 2003, finfish aquaculture in the United States increased over 300%, now totaling more than 350 thousand metric tons (or nearly 780 million pounds).

Figure 1: Aquaculture Trends

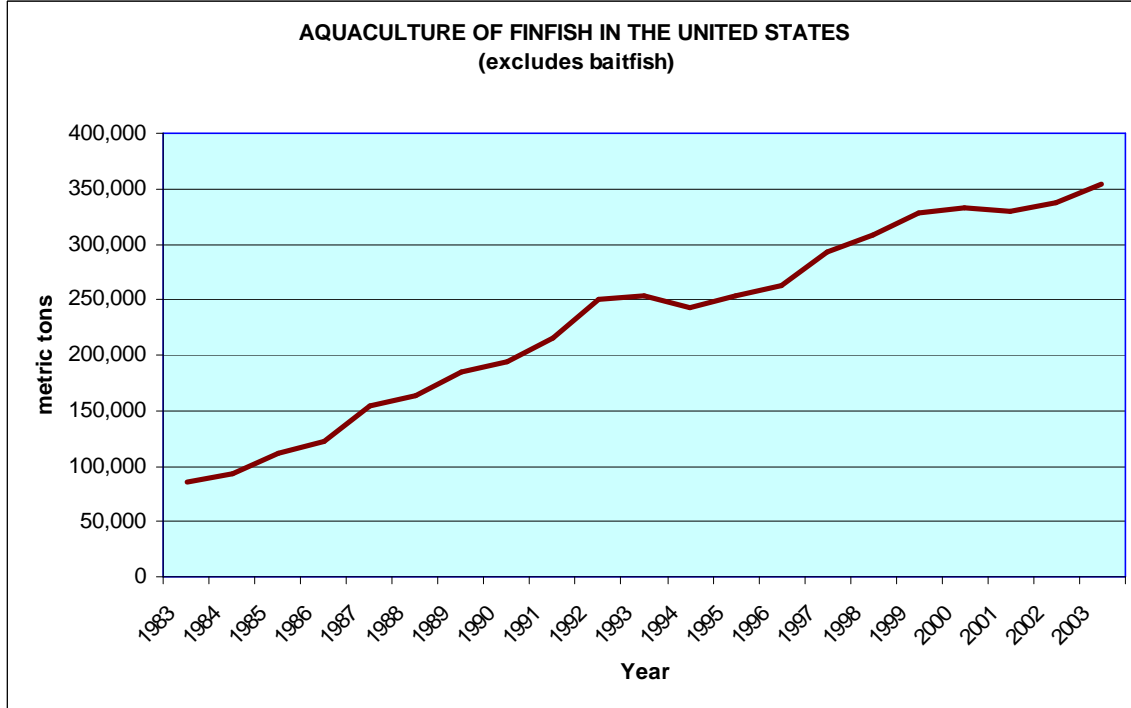


Table 8: Annual Aquaculture Production

Aquaculture Of Finfish In The United States (excluding baitfish)			
	<u>Thousand pounds</u>	<u>Metric tons</u>	<u>Thousand dollars</u>
1983	187,486	85,043	\$136,408
1984	206,870	93,836	\$164,748
1985	246,137	111,647	\$199,541
1986	267,644	121,402	\$202,973
1987	341,172	154,754	\$239,178
1988	358,798	162,750	\$305,857
1989	406,952	184,592	\$331,098
1990	427,910	194,099	\$367,681
1991	474,295	215,139	\$361,273
1992	550,618	249,758	\$421,167
1993	557,384	252,827	\$477,994
1994	536,663	243,429	\$494,019
1995	557,525	252,891	\$532,429
1996	580,215	263,185	\$527,160
1997	646,664	293,324	\$549,050
1998	679,051	308,016	\$592,913
1999	723,509	328,181	\$629,220
2000	733,376	332,658	\$668,330
2001	728,306	330,357	\$581,350
2002	743,456	337,230	\$507,766
2003	779,475	353,568	\$562,494

Includes catfish, trout, salmon, tilapia, striped bass.  
Weights and values represent the final sales of products to processors and dealers.

Despite the rise in aquaculture, the quantity of finfish produced in the U.S. still only amounts to approximately 10% of the amount of edible finfish that are provided through domestically-caught wild stocks (net of the amount exported) plus imported edible finfish products available in the U.S. marketplace for consumption.

Figure 2: Import Trends and Percentages of Finfish Sales in the U.S.

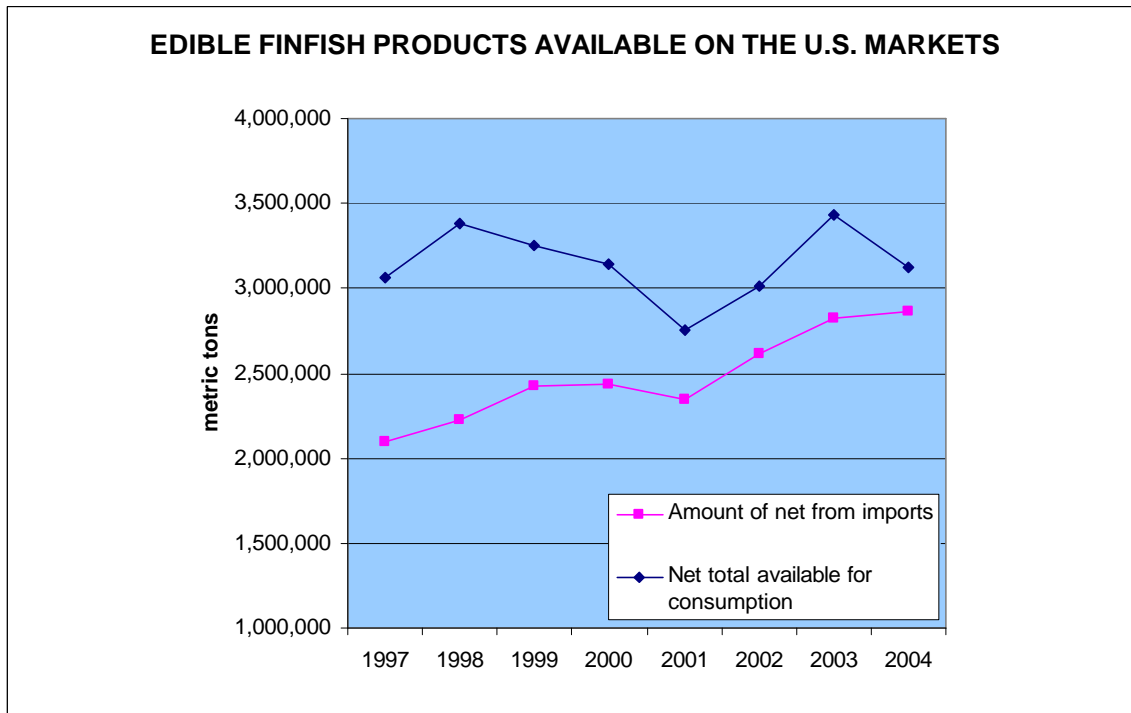


Table 9: Sources of Edible Finfish in the U.S. Market

	U.S. Supply Of Commercial Edible Finfish (metric tons, round weight)			
	Domestic Landings	Imports	Exports	Net Total Available For U.S. Consumption
1997	2,707,453	2,091,764	1,736,630	3,062,588
1998	2,692,082	2,223,215	1,530,709	3,384,587
1999	2,490,446	2,422,634	1,664,982	3,248,098
2000	2,557,024	2,435,352	1,850,767	3,141,609
2001	2,795,007	2,343,977	2,387,279	2,751,705
2002	2,727,231	2,611,227	2,327,945	3,010,513
2003	2,897,553	2,825,390	2,294,680	3,428,262
2004	3,009,821	2,865,964	2,757,253	3,118,532

Globally, according to the United Nations Food and Agricultural Organization, production from aquaculture (finfish and shellfish) is increasing by about 11 percent per year and is, “the world's fastest growing food producing sector.” Fish and shellfish produced from aquaculture now account for nearly 40 percent of all seafood that is consumed.

The National Fisheries Institute, a major trade association of the commercial fishing and production industry, actively promotes the benefits of aquaculture products, including among its “seafood facts” items such as:

- Farmed products allow increasing numbers of Americans to enjoy healthy fish meals.
- Farmed seafood provides the same health benefits as wild caught fish. In fact, according to the U.S. Department of Agriculture, farmed Atlantic salmon and wild chinook are nearly identical in the amount of omega-3 fatty acids in a 3-ounce portion.
- Consumers might be surprised to know that farmed-raised seafood is the fastest growing segment of agriculture in the United States.
- Because our domestic fisheries cannot meet Americans' demands for seafood, we import a significant amount of farmed fish. We will need to grow about 40-45 percent of our fish to meet consumer demand while protecting wild harvests.
- Aquaculture gives Americans access to a greater variety of fish and seafood at lower prices. Five of the top 10 types of fish Americans like to eat are at least partially farmed. This list includes farmed shrimp, salmon, catfish, tilapia and clams.
- Seafood which is farmed-raised is a sustainable source of food that helps retailers meet the ever-growing demand for seafood across our nation and around the world.

Source: National Fisheries Institute ([www.nfi.org](http://www.nfi.org), March 23, 2006).

While there are many benefits associated with aquaculture products, the practice of aquaculture does not come without its costs. Environmental concerns emanating from aquaculture practices include the potential for increased nutrient input and its deleterious impacts (particularly with near-shore aquaculture), the potential for introducing “genetic pollution” and disease into wild stocks of fish from aquaculture species, and the inadvertent introduction of undesired non-native species into natural environments. Additionally, a myriad of laws and regulations from various state and federal agencies can make aquaculture operations difficult and the near-lack of legal guidelines governing offshore aquaculture can result in unwanted impacts on the environment. These and many other issues were identified by the U.S. Commission on Ocean Policy in their 2004 report entitled “An Ocean Blueprint For The 21st Century.” While aquaculture both in the United States and throughout the world will play an important role in meeting future protein demands of society, it must be conducted in ways that do not actually harm the environment or wild stocks of fish that support recreational and commercial fisheries, or impede recreational fishing activity.

### *RELATIONSHIP TO MARINE RECREATIONAL FISHERIES*

According to derivations of NOAA Fisheries statistics, the only marine recreational fish species that is both produced in significant numbers in U.S. aquaculture operations and is a major target



(top 10, based on weight landed) of recreational anglers is striped bass. The only other saltwater gamefish that is domestically raised in aquaculture operations in significant amounts, salmon, does not rank as a top ten gamefish based on landings.

Table 10: Top Recreational Species

Top 10 Recreational Species Based On Total Weight Landed		
Species	Recreational Landings (mt)	Commercial Landings (mt)
Striped Bass	12,079	2,864
Red Drum	7,178	n/a
Bluefish	7,176	3,729
Dolphinfish (mahi)	6,895	**
Spotted Sea Trout	6,104	113
Summer Flounder	4,983	8,068
Atlantic Croaker	4,103	11,581
Sheephead	3,603	1,003
King Mackerel	3,291	**
Yellowfin Tuna	2,326	4,389
Source: Fisheries of the United States. Domestic landings only. Recreational landings do not include Alaska and Texas.		
**: information not comparable		
n/a: not landed commercially		

However, the absence of direct competition between commercial and recreational fisheries for wild species that are, or could be, raised in aquaculture operations does not infer that commercial fisheries don't impact recreational activity in major fisheries. For example, bycatch of finfish in wild shrimp fisheries can substantially impact important recreational species including red drum, weakfish, and others, a fact that is not captured in the table above.

#### *SOURCES OF INFORMATION*

Information contained within the seafood consumption and aquaculture discussion was derived primarily from annual *Fisheries of the United States* reports produced by the U.S. Department of Commerce, NOAA Fisheries, supplemented with information from the National Fisheries Institute.

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## Appendix A: Definitions

**Recreational** fishing includes all types of fishing, including catch-and-release fishing, that ultimately involves people pursuing fish as a recreational activity. This includes fishing guides, charterboats and party boats (head boats) that exist for the purpose of taking people fishing as a recreational activity. All measures of recreational fishing in this report include guide and charterboats. **Commercial** fishing includes all type of harvests made for the primary purpose of selling fish as a means of income.

Economic impacts measure the changes within an economy, and are usually expressed in jobs, income, retail sales (expenditures) and tax revenues. Economic impacts, for the purpose of economic modeling, can be divided into three standard components: direct, indirect and induced impacts. Each of these is considered by most economic models when estimating the overall impacts of any activity on the economy. A **direct impact** is defined as the economic result impact of the initial purchase made by the consumer. For example, when a person buys fishing tackle or a fish to eat for \$10, and assuming that \$10 remains in the regional economy under study, there is a direct impact for the retailer, and the economy, of \$10. **Indirect impacts** measure how sales in one industry affect the various other industries providing supplies and support. For example, the retailer must purchase additional rods or fish, plus pay costs such as power, rent, etc.; the tackle manufacturer must purchase more plastics; plastics manufacturers must buy resins; fish retailers must buy more fish; wholesalers must buy more products and supplies; and so on. Therefore, the original expenditure of \$10 benefits many other industries. An **induced impact** results from the wages and salaries paid by the directly and indirectly impacted industries. The employees of these industries then spend their incomes. These expenditures are induced impacts which, in turn, create a continual cycle of indirect and induced effects.

The sum of the direct, indirect and induced effects is the **total economic impact**. As the original retail purchase (direct impact) goes through round after round of indirect and induced effects, the economic impact of the original purchase is multiplied, benefiting many industries and individuals. Likewise, the reverse is true. If a particular item or industry is removed, the economic loss is greater than the original retail sale. Once the original retail purchase is made, each successive round of spending is smaller than the previous round. When the economic benefits are no longer measurable, the economic examination ends.

## Appendix B: Recreational Impacts Data

Table B-1: Number of Anglers Per State

(sources:

Northeast states: Marine Angler Expenditures in the Northeast Region, 1998 (Steinback and Gentner, 2001)

Southeast states: Marine Angler Expenditures in the Southeast Region, 1999 (Gentner et al, 2001)

Pacific states: Marine Angler Expenditures in the Pacific Coast Region, 2000 (Gentner et al, 2001)

State	Year	Resident Anglers	Non-Resident Anglers	Total*
Connecticut	1998	290,105	72,993	363,098
Delaware	1998	102,851	188,258	291,109
Maine	1998	118,871	115,196	234,067
Maryland	1998	452,486	306,886	759,372
Massachusetts	1998	407,004	227,729	634,733
New Hampshire	1998	64,666	58,195	122,861
New Jersey	1998	428,519	357,368	785,887
New York	1998	433,226	42,494	475,720
Rhode Island	1998	95,670	187,217	282,887
Virginia	1998	339,802	291,138	630,940
Alabama	1999 and 2000	223,255	143,374	366,629
Florida	1999 and 2000	2,153,620	2,282,298	4,435,918
Georgia	1999 and 2000	91,050	20,142	111,192
Louisiana	1999 and 2000	442,290	90,648	532,938
Mississippi	1999 and 2000	101,748	74,891	176,639
North Carolina	1999 and 2000	488,489	804,561	1,293,050
South Carolina	1999 and 2000	192,912	220,908	413,820
California	2000	1,485,159	220,044	1,705,203
Oregon	2000	285,606	79,810	365,416
Washington	2000	449,912	46,547	496,459

\*Adding the numbers across states may overcount the true number of anglers as a person can fish in more than one state.

Table B-2. Economic Impacts of Marine Recreational Fishing, 1998-2000

(extracted from Steinback et al, 2004)

State	Year	Angler Expenditures	Sales Impacts	Income	Jobs	Federal Tax Revenues	State Tax Revenues
Alabama	1999	\$305,535,000	\$264,520,000	\$105,602,000	4,484	\$26,998,479	\$19,066,045
California	2000	\$1,627,966,000	\$1,935,224,000	\$866,446,000	22,342	\$217,804,612	\$119,513,280
Connecticut	1998	\$210,879,000	\$143,976,000	\$65,200,000	1,941	\$20,097,242	\$15,332,816
Delaware	1998	\$122,878,000	\$86,542,000	\$33,761,000	1,316	\$9,619,638	\$7,714,535
Florida	1999	\$4,911,180,000	\$4,549,868,000	\$1,904,317,000	63,975	\$526,789,246	\$326,651,397
Georgia	1999	\$98,554,000	\$126,745,000	\$52,084,000	1,892	\$13,747,879	\$9,437,620
Louisiana	1999	\$737,962,000	\$664,162,000	\$253,072,000	9,487	\$58,523,598	\$45,542,920
Maine	1998	\$63,492,000	\$49,094,000	\$20,662,000	961	\$5,412,461	\$5,107,950

Maryland	1998	\$418,312,000	\$337,455,000	\$144,153,000	5,178	\$39,652,871	\$31,579,973
Massachusetts	1998	\$486,718,000	\$362,841,000	\$159,547,000	5,442	\$50,380,188	\$39,483,784
Mississippi	1999	\$163,032,000	\$117,650,000	\$47,532,000	1,941	\$11,485,515	\$10,181,826
New Hampshire	1998	\$45,095,000	\$37,119,000	\$16,152,000	583	\$4,511,988	\$3,074,395
New Jersey	1998	\$482,356,000	\$469,072,000	\$190,249,000	6,200	\$54,951,299	\$38,160,716
New York	1998	\$378,031,000	\$284,035,000	\$119,200,000	3,949	\$32,202,888	\$29,162,088
North Carolina	1999	\$1,072,875,000	\$959,953,000	\$382,517,000	15,349	\$103,533,666	\$76,415,079
Oregon	2000	\$392,318,000	\$423,926,000	\$186,078,000	5,755	\$44,519,305	\$24,940,060
Rhode Island	1998	\$93,862,000	\$60,808,000	\$25,778,000	1,068	\$7,644,874	\$6,201,595
South Carolina	1999	\$349,824,000	\$302,181,000	\$120,698,000	4,808	\$6,232,539	\$4,998,404
Virginia	1998	\$340,351,000	\$258,701,000	\$105,361,000	4,211	\$30,296,385	\$22,460,824
Washington	2000	\$944,730,000	\$1,004,873,000	\$448,021,000	12,357	\$116,458,599	\$50,728,984
US	2000	\$14,604,629,000	\$30,549,564,000	\$11,969,302,000	349,119	\$3,073,334,072	\$4,845,252,087

Table B-3: Changes in Fishing Activity, Measured in Total Annual Fishing Trips

(All numbers are x1,000)

(Sources: Fisheries of the United States, 1998

Fisheries of the United States, 2004

By NOAA Fisheries)

State	Reporting Year	Number of Trips in Reporting Year	2004 Trips	% Change in Trips: '98 to '04:
Alabama	1999	927	2,048	75.0%
California	2000	4,905	4,449	-25.2%
Connecticut	1998	1,293	1,579	22.1%
Delaware	1998	910	1,163	27.8%
Florida	1999	21,314	27,204	39.6%
Georgia	1999	558	929	96.4%
Louisiana	1999	2,629	4,810	83.5%
Maine	1998	669	760	13.6%
Maryland	1998	2,807	2,668	-5.0%
Massachusetts	1998	3,422	4,569	33.5%
Mississippi	1999	801	1,109	37.6%
New Hampshire	1998	272	361	32.7%
New Jersey	1998	4,257	6,580	54.6%
New York	1998	3,409	4,743	39.1%
North Carolina	1999	4,289	7,025	63.8%
Oregon	2000	649	223	-75.2%
Rhode Island	1998	1,093	1,444	32.1%
South Carolina	1999	1,659	2,236	34.8%
Virginia	1998	2,932	3,558	21.4%
Washington	2000	1,463	198	-87.8%
U.S.	2000	75,348	77656	3.1%

\*States in grey were estimated using data from NOAA Fisheries marine angler expenditure reports

## Appendix C: Commercial Fishery Multipliers

**All data is obtained from Kirkley (2005) unless otherwise stated:**

<b>State Multipliers:</b>	All Commercial Fisheries (including aquaculture shellfish):				
	<u>Landings Value</u>	<u>Output</u>	<u>Salaries/Wages</u>	<u>Jobs (FTE)</u>	
	\$142,608,000	\$407,972,000	\$239,027,000	3923	
		<b>2.860793223</b>	<b>1.67611</b>	<b>0.00002751</b>	<b>==&gt; State-level multipliers for all commercial landings</b>
	All Finfish Fisheries (except menhaden and aquaculture):				
	<u>Landings Value*</u>	<u>Output</u>	<u>Salaries/Wages</u>	<u>Jobs (FTE)</u>	
	\$20,069,000	\$58,690,000	\$34,601,000	801.00000000	
	* From NMFS online	<b>2.924410783</b>	<b>1.72410</b>	<b>0.00003991</b>	<b>==&gt; State-level multipliers for finfish landings</b>
<b>U.S. Multipliers:</b>					
	<u>Landings Value</u>	<u>Output</u>	<u>Salaries/Wages</u>	<u>Jobs (FTE)</u>	
Impact data:*	\$142,608,000	\$545,100,000	\$321,900,000	5,292	
* These data are based on multipliers that include interstate commerce.					
U.S. multipliers are x% greater than state multipliers by:		47.30%	50.87%	36.79%	
Estimated U.S. Level Multipliers:		<b>5.63026</b>	<b>3.40546</b>	<b>0.00005</b>	<b>==&gt; U.S. level multipliers for all commercial landings</b>
Estimated U.S. Multipliers for Finfish:*		<b>5.75546796</b>	<b>3.502960903</b>	<b>0.00007</b>	<b>==&gt; U.S. multipliers for finfish landings</b>
* Finfish multipliers are derived by taking the difference between the multipliers seen in VA for all landings and finfish, and applying the difference to the U.S. multipliers for "all commercial landings."					

The multipliers used here were derived from Kirkley, et al (December 2005). The basis of the multipliers were Virginia's 2004 landings value divided into the total output, income and jobs figures produced in the Kirkley report. Several key adjustments were made to adapt the results to this study and are presented in the table above.

The multipliers derived from Kirkley et al (2000) only reported the economic effects at the state level. However, some of the processing, distribution and final sale of seafood products occur outside of the state, and many of the in-state companies handling seafood buy supplies and services from out-of-state businesses. These additional economic impacts are intentionally left out of any state-level economic study as they report economic activity in other states. To adapt the Virginia multipliers for use in estimating impacts at the U.S. level, they were inflated by percentages seen in other studies that examined impacts at the state and national levels. The U.S.-level multipliers used to report overall economic activity (output) created by seafood landings were increased 47%, the jobs multiplier upped 37%, and the income multiplier adjusted upward by 51%.

## **Appendix D: Facts About Marine Recreational Fisheries**

1. The economic activity stimulated by marine recreational fisheries (\$34.6 billion) is greater than the Gross State Product of Vermont, Alaska or Montana.
2. The number of marine recreational anglers (14 million) is comparable to the combined populations of Washington state, Utah and Arizona.
3. Marine anglers outnumber the residents of these states (not comined):
  - Illinois
  - Michigan
  - Pennsylvania
  - Ohio
  - ...and many more.
4. The federal tax revenues created by marine recreational fishing (\$3.48 billion) could pay the average salaries (\$63,200) for 55,859 federal employees.
5. Expenditures made by marine anglers over three times more jobs than employed by Exxon Mobil, the U.S.'s most profitable corporation. (Exxon Mobil employees = 106,100).