THE ECONOMIC IMPORTANCE OF THE BRISTOL BAY SALMON INDUSTRY

Briefing for EPA Staff
March 19, 2013

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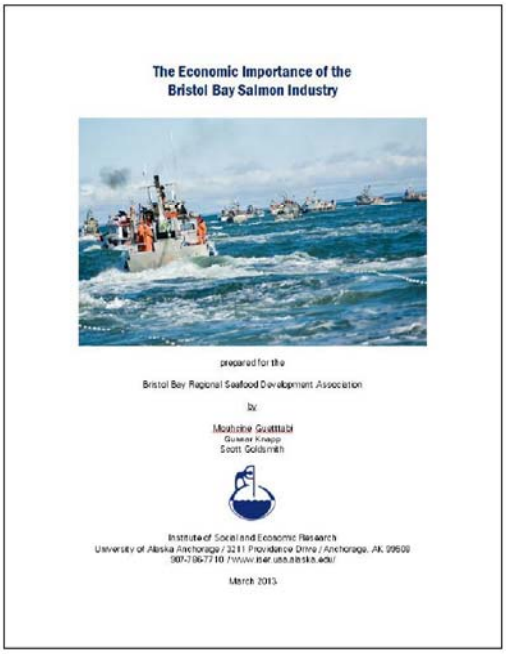
- I have been studying the Alaska salmon industry for 25 years.
- I prepared part of the economic analysis for the EPA Bristol Bay study
- Together with colleagues at the University of Alaska Institute of Social and Economic Research (ISER), I recently completed a report for the Bristol Bay Regional Seafood Development Association on the economic importance of the Bristol Bay salmon industry
- This presentation:
  - Compares the economic analyses in the two studies
  - Summarizes the analysis in the new ISER study



The Economic Importance of the Bristol Bay Salmon Industry

prepared for the

Bristol Bay Regional Seafood Development Association

by

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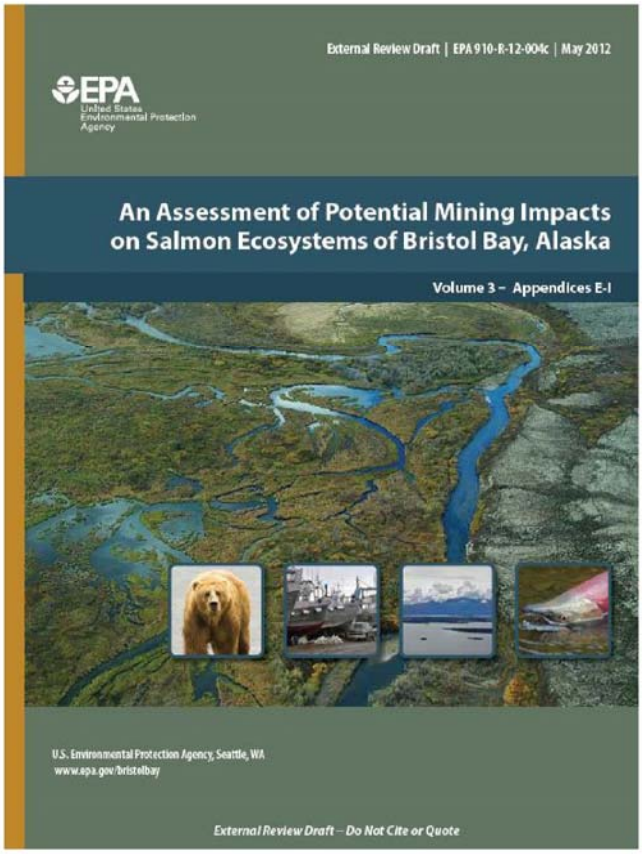
To understand what we did in our new report, it's helpful to compare and contrast it with the economic analysis in the EPA study.



Differences in the types of economic analysis done in the EPA Study and the ISER study of Economic Importance of the Bristol Bay Salmon Industry
Introduction for my section of the analysis for the EPA study

	EPA study	ISER study
What the studies looked at:	Commercial fishery Subsistence fisheries Sport fisheries Other ecosystem values	Commercial fishery
Economic measures of the commercial fishery	Economic impacts Net economic value	Economic impacts
Economic impacts estimated	Direct impacts in Bristol Bay Multiplier impacts in Alaska	Direct impacts in Bristol Bay Direct "downstream" impacts Multiplier impacts nationally and in Alaska, Washington, Oregon, California
Year for which impacts were estimated	2009	2010

My analysis for the EPA study was limited to an economic description of the Bristol Bay commercial fishery in Alaska.

I did not study downstream impacts, multiplier impacts, or net economic value.

I was not involved in other parts of the economic analysis or the design of the overall analysis.

Knapp sections of EPA study analysis

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Introduction for my section of the analysis for the EPA study

3.0 Bristol Bay Commercial Fisheries

3.1 Introduction

This section provides an economic overview of Alaska's Bristol Bay commercial salmon industry. The report begins with a brief overview of the industry. Subsequent sections discuss harvests, products and markets, prices, harvest and wholesale value, fishermen, processors, employment, taxes, the regional distribution of permit holders, fishery earnings and processing employment, and the role of the industry in the Bristol Bay regional economy. The final section discusses selected economic measures of the Bristol Bay salmon industry.

Summary of economic measures I calculated for my analysis for the EPA study

Table 48. Selected Economic Measures of the Bristol Bay Salmon Industry, 2000-2010.

Selected Economic Measures of the Bristol Bay Salmon Industry, 2000-2010

Measure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Avg.	Range
Sockeye Salmon Havests													
Millions of fish	21	14	11	15	26	25	28	30	28	31	29	23	11 - 31
Millions of pounds	125	96	65	93	152	155	165	173	160	183	170	140	65 - 183
Bristol Bay harvest volume as a share of:													
Alaska sockeye salmon	61%	56%	48%	50%	59%	58%	69%	62%	71%	71%	74%	62%	48% - 74%
World sockeye salmon	45%	40%	28%	38%	47%	47%	49%	47%	52%	55%		45%	28% - 55%
Alaska wild salmon (all species)	18%	12%	10%	13%	19%	16%	22%	18%	23%	25%		18%	10% - 25%
World wild salmon (all species)	7%	5%	4%	5%	8%	7%	8%	7%	9%	7%		7%	4% - 9%
World wild & farmed salmon (all species)	3%	2%	1%	2%	3%	3%	3%	3%	3%	3%		2%	1% - 3%
Gross Value ($ millions)													
Ex-vessel value	80	40	32	48	76	95	109	116	117	144	181	94	32 - 181
First wholesale value	175	115	100	114	176	220	237	249	262	293	390	212	100 - 390
Total value of US exports of Bristol Bay salmon products	150	137	97	111	172	193	173	183	206	230	254	173	97 - 254
Workers													
Peak (July) fishing employment		7,098	5,514	6,465	6,513	6,750	6,936	6,891	6,969	6,768		6,656	5,514 - 7,098
Number of fish processing workers		2,862	2,273	2,484	3,474	3,272	2,940	3,512	3,952	4,522		3,255	2,273 - 4,522
Total		9,960	7,787	8,949	9,987	10,022	9,876	10,403	10,921	11,290		9,911	7,787 - 11,290
Estimated annual average employment													
Fishing		1,179	888	1,063	1,089	1,098	1,140	1,110	1,129	1,143		1,093	888 - 1,179
Fish processing		475	366	409	581	532	483	566	640	764		535	366 - 764
Total		1,654	1,254	1,472	1,669	1,631	1,623	1,675	1,769	1,907		1,628	1,254 - 1,907
Average permit price ($ 000)													
Drift gillnet fishery	81	35	20	29	37	51	75	79	90	78	102	62	20 - 102
Set gillnet fishery	32	25	12	13	15	15	22	24	27	28	29	22	12 - 32
Estimated total permit value ($ millions)													
Drift gillnet fishery	149.6	64.6	36.7	54.5	68.7	95.2	139.4	147.8	167.3	145.9	190.2	114.5	36.7 - 190.2
Set gillnet fishery	32.6	25.5	11.9	12.6	14.5	14.9	22.1	23.6	26.8	27.7	28.2	21.9	11.9 - 32.6
Total	182.2	90.1	48.6	67.1	83.2	110.1	161.5	171.4	194.1	173.6	218.4	136.4	48.6 - 218.4

My ISER colleague Tobias Schwoerer prepared economic significance estimates for the EPA study using an Alaska input-output model. His analysis looked only at economic impacts in Alaska.

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Schwoerer sections of EPA study analysis

". . . The analysis shows the contributions to the regional economy of Bristol Bay and the rest of Alaska but excludes the contributions occurring in other states of the U.S. . . ." (page 173)

Summary of Schwoerer economic impact estimates

Multiplier impacts were estimated only for Alaska

Table 64. Estimated Economic Significance of Bristol Bay Ecosystems

	Total	Residents Non-local	Residents Local	Residents Total	Non-Residents
Direct jobs					
Peak	**14,227**	4,365	2,273	6,639	7,587
Commercial fish	***11,572***	*3,251*	*1,089*	*4,341*	*7,231*
Recreation	***2,655***	*1,114*	*1,184*	*2,298*	*356*
Subsistence	***non-mkt.***	*non-mkt.*	*non-mkt.*	*non-mkt.*	*non-mkt.*
Annual average	**2,811**	914	585	1,499	1,313
Commercial fish	***1,897***	*530*	*177*	*707*	*1,190*
Recreation	*914*	*384*	*408*	*792*	*123*
Subsistence	***non-mkt.***	*non-mkt.*	*non-mkt.*	*non-mkt.*	*non-mkt.*
Multiplier Jobs	**3,455**	2,008	1,447	3,455	-
Total jobs (annual average)	**6,266**	2,922	2,032	4,954	1,313
Direct wages ($000)	**$166,632**	$40,149	$31,048	$66,199	$100,435
Commercial fish	***$134,539***	*$22,698*	*$17,608*	*$40,307*	*$94,233*
Recreation	***$32,093***	*$12,451*	*$13,440*	*$25,892*	*$6,202*
Subsistence	***non-mkt.***	*non-mkt.*	*non-mkt.*	*non-mkt.*	*non-mkt.*
Multiplier wages	**$115,976**	$69,250	$46,724	$115,976	-
Total wages	**$282,608**	$104,399	$77,772	$182,175	$100,435

Note, estimates based on ISER Input-Output Model (Goldsmith, 2000). All direct jobs are in the Bristol Bay region.

Schwoerer economic impact estimates for the commercial fishery

These are the only economic impact estimates which are directly comparable between the EPA study and the ISER study

Table 57. Estimated Economic Significance of Commercial Fishing

	Total	Non-local	Residents Local	Total	Non-Residents
Direct jobs					
Peak	**11,572**	3,251	1,089	4,341	7,231
Harvesting	*7,050*	*2,694*	*1,013*	*3,708*	*3,342*
Processing	*4,522*	*557*	*76*	*633*	*3,889*
Annual average	**1,897**	530	177	707	1,190
Harvesting	*1,143*	*437*	*164*	*601*	*542*
Processing	*754*	*93*	*13*	*106*	*648*
Multiplier Jobs	**1,586**	832	754	1,586	-
Total jobs (annual average)	**3,483**	1,362	931	2,293	1,190
Direct wages ($000)	**$134,539**	$22,698	$17,608	$40,307	$94,233
Harvesting	*$103,354*	*$19,645*	*$16,609*	*$36,255*	*$67,100*
Processing	*$31,185*	*$3,053*	*$999*	*$4,052*	*$27,133*
Multiplier wages	**$54,705**	$28,101	$26,604	$54,705	-
Total wages	**$189,244**	$50,799	$44,212	$95,012	$94,233

Note, estimates based on ISER Input-Output Model (Goldsmith, 2000).

The economic impacts analyzed by the EPA study represented only about one-fourth of the total economic impacts of the Bristol Bay fishery in the United States.

The impacts estimated for Alaska (for different years) were comparable between the two studies.

Comparison of Bristol Bay Salmon Industry Annual Average Employment Impact Estimates in ISER & EPA Studies

		ISER study estimates for 2010			Schowerer estimates in EPA study for 2009		
Impact Driver	Type of impact	Total US	AK	United States	Total US	AK	United States
Fishing and primary processing in Bristol Bay	Direct impacts	1,987	728	1,259	1,897	707	1,190
	Multiplier impacts	5,852	1,338	4,514	Not estimated	1,586	Not estimated
	Total impacts	**7,839**	**2,066**	**5,772**		**2,293**	
Shipping to other states and secondary processing	Direct impacts	191					
	Multiplier impacts	563					
	Total impacts	**754**					
Total impacts		**8,592**					
Nationwide distribution and retailing	Direct activity	787					
	Multiplier activity	425					
	Total activity	**1,212**					
Total impacts & activity		**9,804**					

Overview of findings of the new ISER study . . .

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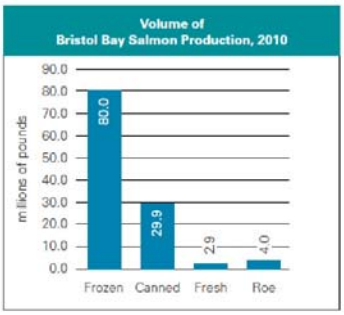
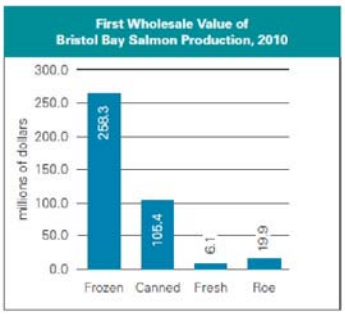
Economic importance of the Bristol Bay salmon industry in 2010

- Harvested 29 million sockeye salmon
- Harvest value of $165 million
  - 35% of total Alaska salmon harvest value
  - More than total value of fish harvests in 41 states
- First wholesale value after processing of $390 million
- Supported 12,000 summer fishing and processing jobs in Bristol Bay
- Including "downstream" handling beyond Bristol Bay and "multiplier" effects in other industries, created:
  - The equivalent of almost 10,000 year-round American jobs
  - $500 million in income for Americans
  - **$1.5 billion in output value across the United States**

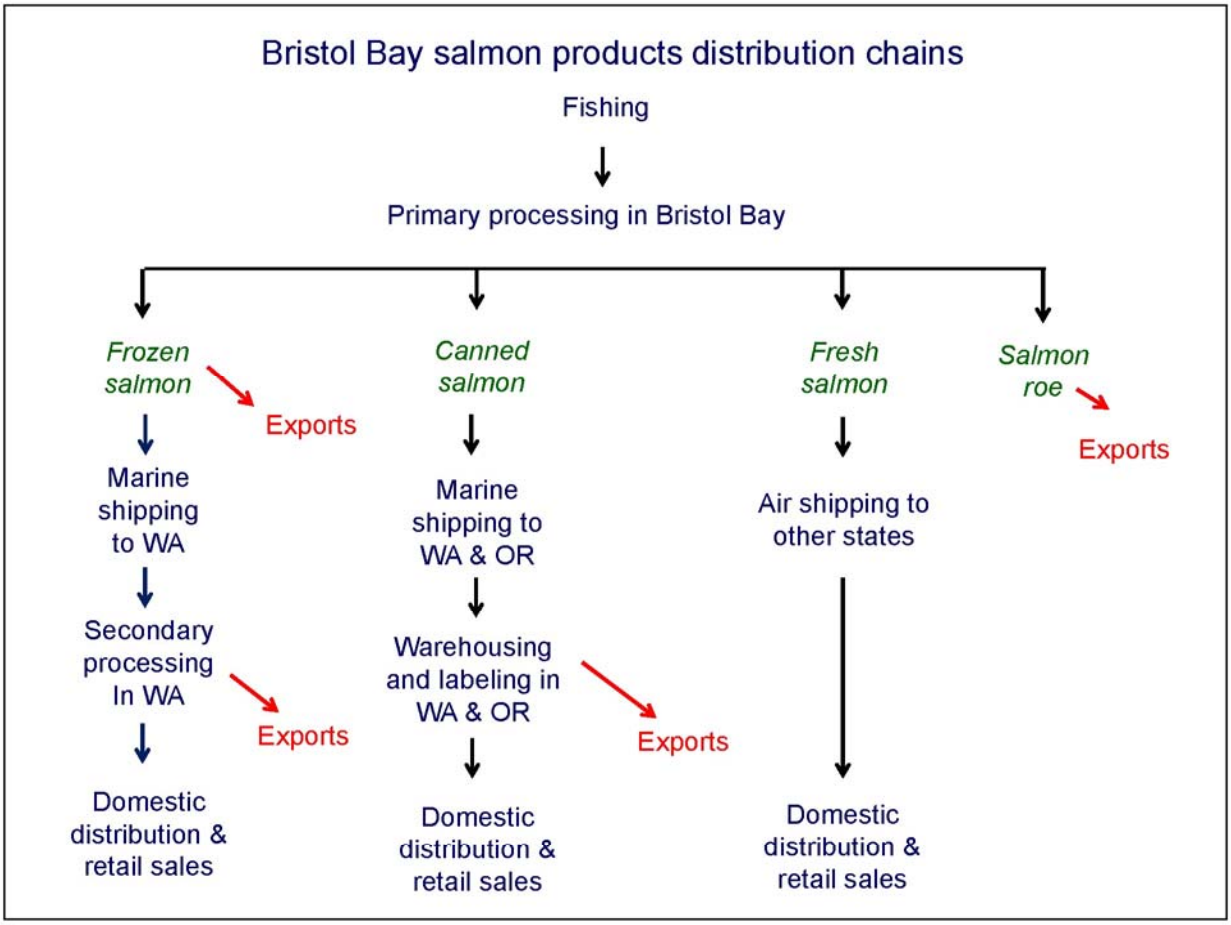
In Bristol Bay, salmon are processed into four major *primary products:* frozen salmon, canned salmon, fresh salmon, and roe. Most primary production is frozen or canned.





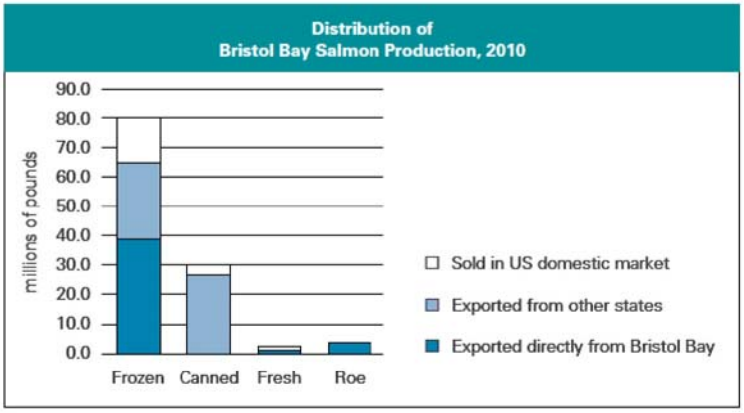
Frozen headed & gutted (H&G) salmon

Canned salmon


Bristol Bay salmon products distribution chains
Fishing
Primary processing in Bristol Bay
Frozen salmon
Exports
Marine shipping to WA
Secondary processing In WA
Exports
Domestic distribution & retail sales
Canned salmon
Marine shipping to WA & OR
Warehousing and labeling in WA & OR
Exports
Domestic distribution & retail sales
Fresh salmon
Air shipping to other states
Domestic distribution & retail sales
Salmon roe
Exports

A large share of Bristol Bay salmon is exported

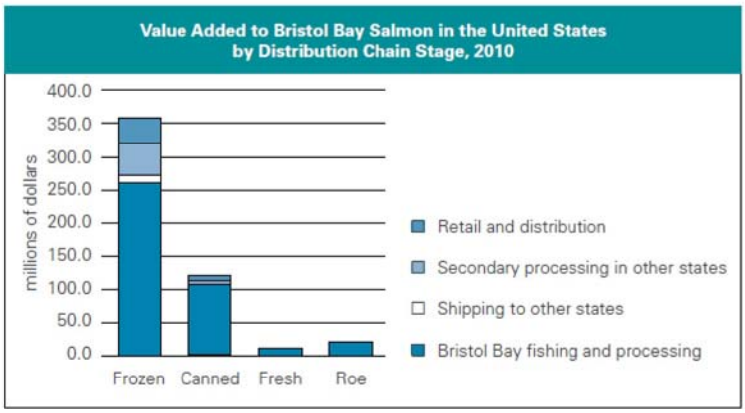
- In 2010, Bristol Bay salmon product exports were about $370 million—about **one-tenth of the total value of all US seafood exports**.
- Most frozen salmon exports are to Japan, China and the EU
- Most canned salmon exports are to the UK and Canada
- About half of frozen salmon is exported directly from Bristol Bay
- Some frozen salmon and almost all canned salmon is shipped to other states prior to export.



Value is added to Bristol Bay salmon at each stage of the US distribution chains.

Because a large share is exported, most of the value added in the United States is in Bristol Bay fishing and processing.

About one-fifth of the value is added in later stages of the distribution chain.



US industries based on Bristol Bay salmon

- *Industries in Bristol Bay*:
  - Bristol Bay fishing industry
  - Bristol Bay processing industry

- *Downstream industries* outside Bristol Bay which add value to Bristol Bay salmon:
  - Marine transportation
  - Air transportation
  - Frozen salmon secondary processing in other states
  - Canned salmon warehousing and labeling in other states
  - Nationwide distribution and retailing

Economic impacts of the Bristol Bay salmon industry: jobs, income, and output value that would not exist without Bristol Bay salmon

- *Direct economic impacts*: Jobs, income and output value in businesses directly involved in harvesting, processing, transporting and retailing Bristol Bay salmon

- *Multiplier economic impacts*: Jobs, income and output value created in other industries:
  - As fishermen, processors and downstream industries purchase supplies and services
  - As employees and business owners spend their income

Types of economic impacts we estimated for this report

Impact driver	Types of Impacts & Activity	United States	Alaska	Washington	Oregon	California	Other states
Fishing and processing in Bristol Bay	Direct impacts	X	X	X	X	X	X
	Multiplier impacts	X	X	X	X	X	X
	Total impacts	X	X	X	X	X	X
Shipping to and secondary processing in Washington & Oregon	Direct impacts	X		X	X		
	Multiplier impacts	X		X	X		
	Total impacts	X		X	X		
Nationwide distribution and retailing	Direct activity	X					
	Multiplier impacts	X					
	Total activity	X					
Total	Direct activity	X					
	Multiplier impacts	X					
	Total activity	X					

To estimate economic impacts we used IMPLAN input-output modeling software

- IMPLAN is commonly used for estimating economic impacts of many different industries
- The software traces the ripple effects of payments between industries
  - At the national level
  - Within individual states

Overview of nationwide economic impacts of the Bristol Bay salmon industry in 2010

Economic Impacts of the Bristol Bay Salmon Industry in 2010

Annual average employment: 9,800 jobs	Output value: $1.5 billion	Income: $500 million
Fishing & processing in Bristol Bay		
12,000 seasonal jobs (=2,000 annual jobs)	$390 million	$140 million
Shipping, secondary processing & retailing after Bristol Bay		
1,000 jobs	$110 million	$40 million
Multiplier impacts in other industries		
6,800 jobs	$970 million	$320 million

Summary of estimated employment impacts

Employment Impacts of the Bristol Bay Salmon Industry, 2010 (annual average employment)							
Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts*	1,987	728	538	357	92	272
	Multiplier impacts	5,852	1,338	2,237	163	249	1,865
	Total impacts	**7,839**	**2,066**	**2,775**	**520**	**341**	**2,137**
Shipping to other states and secondary processing	Direct impacts	191		156	15		
	Multiplier impacts	563		229	24		
	Total impacts	**754**		**385**	**39**		
Total impacts		**8,592**		**3,160**	**559**		
Nationwide distribution and retailing**	Direct activity	787					
	Multiplier activity	425					
	Total activity	**1,212**					
Totat impacts & activity		**9,804**					

Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. *Direct employment impacts of fishing and processing in Bristol Bay were calculated by dividing seasonal employment by 6. ** Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.

Summary of estimated income impacts

Income Impacts of the Bristol Bay Salmon Industry, 2010 (millions of dollars)							
Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts	144	50	48	8	19	18
	Multiplier impacts	268	62	98	7	12	90
	Total impacts	**412**	**112**	**146**	**15**	**31**	**108**
Shipping to other states and secondary processing	Direct impacts	13		11	1		
	Multiplier impacts	30		12	1		
	Total impacts	**43**		**23**	**2**		
Total impacts		**455**		**169**	**17**		
Nationwide distribution and retailing*	Direct activity	23	Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. * Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.				
	Multiplier activity	20					
	Total activity	**42**					
Totat impacts & activity		**497**					

Summary of estimated output value impacts

Output Value Impacts of the Bristol Bay Salmon Industry, 2010 (millions of dollars)							
Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts	390	127	198	13	19	30
	Multiplier impacts	801	161	288	19	37	297
	Total impacts	**1,191**	**288**	**486**	**32**	**56**	**327**
Shipping to other states and secondary processing in WA & OR	Direct impacts	68		56	4		
	Multiplier impacts	111		37	3		
	Total impacts	**179**		**93**	**6**		
Total impacts		**1,370**		**580**	**38**		
Nationwide distribution and retailing*	Direct activity	46	Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. Output value allocated among states based on the residency of fishing and processing workers and business locations. * Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.				
	Multiplier activity	61					
	Total activity	**106**					
Totat impacts & activity		**1,476**					

Overview of selected economic analysis for Washington . . .

- 656 Washington residents fished Bristol Bay permits in 2010
- They had gross earnings of $59.5 million

Number of Permit Holders Who Fished, 2010

	Drift gillnet	Set gillnet	Total
Total	1510	816	2326
Washington	538	118	656
Washington %	36%	14%	28%

Gross Earnings, 2010 (millions of dollars)

	Drift gillnet	Set gillnet	Total
Total	134.1	31.0	165.2
Washington	55.3	4.2	59.5
Washington %	41%	13%	36%

Bristol Bay salmon fishing and processing created more than 3,000 *seasonal jobs* for Washington residents in 2010.

Seasonal Jobs in the Bristol Bay Salmon Industry in 2010						
	Total US	Alaska	Washington	Oregon	California	Other States
Fishing	7,035	3,734	1,948	362	345	646
Processing	4,886	635	1,279	1,781	208	983
Total	11,921	4,369	3,227	2,143	553	1,629

Almost all major Bristol Bay processing companies are based in Washington.

Large Bristol Bay Salmon Processors and Buyers, 2010

Type of processor	Name of Company or Operator	Home Office Location	Products Produced in Bristol Bay				Shipping*	
			Canned	Frozen	Fresh	Cured	Air	Sea
Major processors with both canning and freezing capacity	Peter Pan Seafoods, Inc.	Seattle, WA	X	X	X	X	X	X
	Icicle Seafoods, Inc.	Seattle, WA	X	X	X		X	X
	Ocean Beauty Seafoods, Inc.	Seattle, WA	X	X	X		X	X
	Trident Seafoods	Seattle, WA	X	X	X		X	X
	Yard Arm Knot Fisheries, LLC	Seattle, WA	X	X				X
	Alaska General Seafoods	Kenmore, WA	X	X	X		X	
Other large processors	Leader Creek Fisheries, LLC	Seattle, WA		X				X
	Snopac Products, Inc.	Seattle, WA		X	X		X	X
	Pederson Point	Seattle, WA		X				X
	Togiak Fisheries	Seattle, WA		X				X
	Ekuk Fisheries	Seattle, WA		X	X		X	X

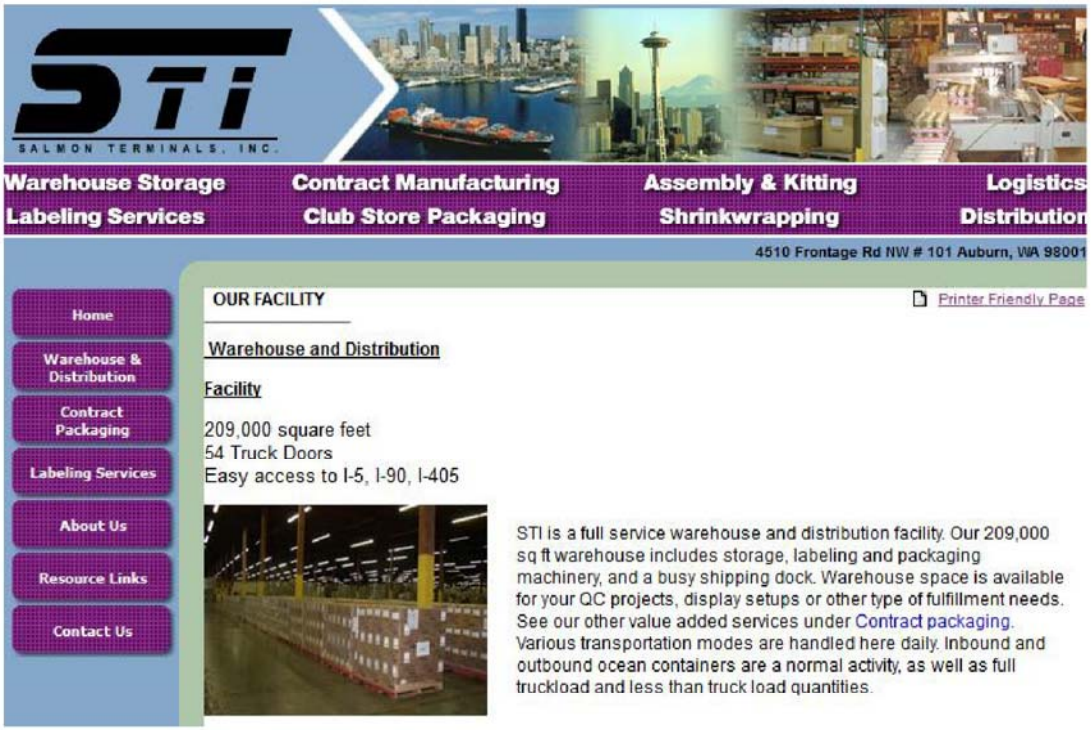
Source: Alaska Department of Fish and Game, Bristol Bay Annual Management Report 2010, Table 25

* How processors/buyers shipped products from Bristol Bay

Most of the supplies and services used in Bristol Bay fishing and processing are purchased in Washington.

About two-fifths of frozen Bristol Bay salmon
is shipped to Washington for further packaging and/or processing.

About half of Bristol Bay canned salmon is warehoused and labeled in Washington, prior to shipment to customers around the world.



Most of the thousands of Bristol Bay fishing boats were built in Washington.

KVICHAK MARINE INDUSTRIES

Main Facility, Seattle, WA

Kvichak's main facility is located along the Lake Washington Ship Canal in the heart of Seattle's maritime community, which provides a large pool of skilled workers and a superior local network of reliable and established vendors and sub-contractors.

- Two acres of property
- 300' of water access
- Primary construction bay: 15,500 sq.ft.
- Secondary production bay: 12,000 sq.ft.
- Fabric shell enclosure: 5,000 sq.ft
- Removable end walls for vessel roll out and launch via barge cranes
- Climate controlled environment

Including downstream and multiplier impacts, the Bristol Bay salmon industry created *annual average employment* of more than three thousand jobs for Washington residents in 2010.

Employment Impacts of the Bristol Bay Salmon Industry, 2010 (annual average employment)

Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts*	1,987	728	538	357	92	272
	Multiplier impacts	5,852	1,338	2,237	163	249	1,865
	Total impacts	**7,839**	**2,066**	**2,775**	**520**	**341**	**2,137**
Shipping to other states and secondary processing	Direct impacts	191		156	15		
	Multiplier impacts	563		229	24		
	Total impacts	**754**		**385**	**39**		
Total impacts		**8,592**		**3,160**	**559**		
Nationwide distribution and retailing**	Direct activity	787					
	Multiplier activity	425					
	Total activity	**1,212**					
Totat impacts & activity		**9,804**					

Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. *Direct employment impacts of fishing and processing in Bristol Bay were calculated by dividing seasonal employment by 6. ** Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.

The Bristol Bay salmon industry created about $170 million in income for Washington residents in 2010

Income Impacts of the Bristol Bay Salmon Industry, 2010 (millions of dollars)							
Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts	144	50	48	8	19	18
	Multiplier impacts	268	62	98	7	12	90
	Total impacts	**412**	**112**	**146**	**15**	**31**	**108**
Shipping to other states and secondary processing	Direct impacts	13		11	1		
	Multiplier impacts	30		12	1		
	Total impacts	**43**		**23**	**2**		
Total impacts		**455**		**169**	**17**		
Nationwide distribution and retailing*	Direct activity	23	Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. * Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.				
	Multiplier activity	20					
	Total activity	**42**					
Totat impacts & activity		**497**					

The Bristol Bay salmon industry created more than one-half billion dollars in output value in Washington in 2010.

Output Value Impacts of the Bristol Bay Salmon Industry, 2010 (millions of dollars)							
Impact Driver		Total US	AK	WA	OR	CA	Other States
Fishing and primary processing in Bristol Bay	Direct impacts	390	127	198	13	19	30
	Multiplier impacts	801	161	288	19	37	297
	Total impacts	**1,191**	**288**	**486**	**32**	**56**	**327**
Shipping to other states and secondary processing in WA & OR	Direct impacts	68		56	4		
	Multiplier impacts	111		37	3		
	Total impacts	**179**		**93**	**6**		
Total impacts		**1,370**		**580**	**38**		
Nationwide distribution and retailing*	Direct activity	46	Note: Total US may exceed sum of estimates shown for individual states; see report for technical explanation. Output value allocated among states based on the residency of fishing and processing workers and business locations. * Based on conservative assumption that distribution and retailing adds 50% to value. Data on actual markup not available.				
	Multiplier activity	61					
	Total activity	**106**					
Totat impacts & activity		**1,476**					

For more information about this study
or about the Bristol Bay salmon industry,
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