

Potential Economics Contributions of Spring and Summer Chinook Had SAFE For Salmon Been In Effect

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SAFE for Salmon Coalition

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This report has been produced by Southwick Associates, Inc. of Fernandina Beach, FL. (www.SouthwickAssociates.com). Southwick Associates, founded in 1990, specializes in fisheries and wildlife economics and business research. Recent fisheries economic projects have been complete in locations from Alaska to Florida to Central America. Rob Southwick was the principal author. This report was commissioned by the SAFE for Salmon Coalition with funding from the Fish America Foundation. The author would like to thank the many people who assisted, included Jimmy Watts of the Oregon Department of Fish and Wildlife who provided information on historic harvests and recreational trips, and Robin Ehlke of the Washington Department of Fisheries who assisted with mark rates data. The author would also like to thank Shannon Davis of The Research Group (TRG) of Corvallis, OR who was consulted about commercial and recreational fisheries data' and economic modeling information for use in this report. TRG is retained for an ongoing study sponsored by the ODFW that describes the economic impacts from all Oregon commercial and marine recreational fisheries. Regardless of the input and reviews from many, the author is responsible for all content in this report.

Table of Contents

	<u>Page:</u>
Acknowledgements	2
Executive Summary	4
Introduction and Background	8
Methodology and Data Sources	9
Data Sources	9
Analysis	10
Assumptions and study limitations	10
Spring chinook	12
Summer chinook	15
Spring and summer chinook combined	19
Discussion	21
Bibliography	22
Appendix A: Expected Additional Spring Chinook Trips if Mainstem Commercial Fish were Assigned as Recreational Fish	24
Appendix B: Recreational Trips and Harvest	26
Appendix C: Expenditure and Economic Contributions Data	27
Appendix D: Commercial Landings and Value	28

Executive Summary

Commercial and recreational salmon fishing in the mainstem of the Columbia River has long been the focus of public policy debates. The Chinook fishery takes place through three major seasons: the spring, summer and fall chinook runs. Each season fishing is permitted until a quota has been harvested. For spring and fall chinook, this number is generated by the allowed mortality percentage of wild fish listed under the Endangered Species Act (ESA). Once this percentage has been reached, all non-tribal fisheries are closed.

The gillnet fishery takes a large portion of each season's harvested wild fish. By moving gillnets off the mainstem into bays and side channel areas known as Select Areas Fisheries Enhancement (SAFE) areas where most harvested fish originate from hatcheries, most species of wild salmon and steelhead would face lower catch and mortality rates. This would allow for extended recreational seasons on the lower Columbia's mainstem and reduce the impacts of hatchery fish on wild populations. Increased recreational fishing would boost the dollars spent in the region's economy and raise the levels of jobs, tax revenues and overall economic impacts generated by anglers. Gillnet fisheries would be expected to benefit as their impacts on wild fish would be reduced, and they would be fishing on congregated hatchery fish. The economic contribution of the commercial fisheries under SAFE for Salmon would be expected to be at least equal as the status quo.

This analysis looks back to estimate how many spring recreational chinook fishing trips would have occurred and the economic effects they would have generated if SAFE for Salmon was in effect from 2001 through 2008, and for summer Chinook for 2007 and 2008. It was not possible to project changes in fall chinook trips, the largest of the three seasonal chinook fisheries in numbers of trips, nor coho trips. Summer Chinook trips only could have changed for 2007 and 2008 as the seasons in previous years were fully subscribed. The region under consideration includes the Columbia River's length from the mouth upstream to Bonneville Dam. The increased number of spring chinook fishing trips that would have occurred if SAFE for Salmon was in effect were estimated by the Oregon Department of Fish and Wildlife and provided to the SAFE for Salmon organization. Then, based on commercial landings data, recreational trips and 'catch per unit of effort' data, the additional summer chinook trips that would have occurred in a

selective fishery were estimated. By matching trip data with per-trip expenditure and economics impact data from NOAA Fisheries, the overall economic effects from SAFE for Salmon were estimated. See Table E-1 and E-2 for trips and economic results, respectively. See the contents for descriptions of all data sources, project limitations and assumptions used in the analyses.

Table E-1: Total Trips Associated with SAFE for Salmon Spring and Summer Chinook Recreational Fishing

<u>Year</u>	<u>Trips</u>		
	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>
2001	172,312	121,433	293,745
2002	175,052	39,831	214,883
2003	160,765	162,599	323,364
2004	156,101	55,275	211,376
2005	124,695	64,162	188,857
2006	86,835	44,585	131,420
2007	106,742	42,270	149,012
2008	127,957	96,774	224,731
Average	138,807	78,366	217,174
TOTAL:	1,061,742	593,379	1,655,121

* Summer chinook are included only in 2007 and 2008.

Table E-2. Summary of the Economic Contributions from SAFE for Salmon, If Implemented 2001-2008.

<u>Year</u>	<u>Expenditures (millions)</u>			<u>Economic Impact (reported as personal income, in millions)</u>			<u>Jobs</u>			<u>State & Local Taxes</u>		
	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>
2001	\$19.8	\$14.0	\$33.8	\$8.1	\$5.7	\$13.8	306	216	521	\$815,475	\$574,688	\$1,390,163
2002	\$20.2	\$4.6	\$24.7	\$8.2	\$1.9	\$10.1	311	71	381	\$828,442	\$188,502	\$1,016,944
2003	\$18.5	\$18.7	\$37.2	\$7.5	\$7.6	\$15.2	285	289	574	\$760,828	\$769,508	\$1,530,336
2004	\$18.0	\$6.4	\$24.3	\$7.3	\$2.6	\$9.9	277	98	375	\$738,756	\$261,592	\$1,000,347
2005	\$14.4	\$7.4	\$21.8	\$5.8	\$3.0	\$8.8	221	114	335	\$590,125	\$303,650	\$893,775
2006	\$10.0	\$5.1	\$15.1	\$4.1	\$2.1	\$6.2	154	79	233	\$410,951	\$211,001	\$621,952
2007	\$12.3	\$4.9	\$17.2	\$5.0	\$2.0	\$7.0	189	75	264	\$505,162	\$200,045	\$705,207
2008	\$14.7	\$11.1	\$25.9	\$6.0	\$4.5	\$10.5	227	172	399	\$605,563	\$457,989	\$1,063,552
Average	\$16.7	\$11.6	\$27.0	\$6.8	\$4.7	\$11.0	258	179	416	\$687,869	\$476,198	\$1,109,604
TOTAL:	\$127.9	\$72.2	\$200.1	\$52.0	\$29.4	\$81.4	258	179	416	\$5,255,302	\$2,966,974	\$8,222,276

In Table E-1, the actual number of spring and summer chinook recreational trips as determined by ODFW creel surveys are reported. Please note there is an unknown level of error in the summer trips as some of the trips, though reported as primarily targeting chinook, may have also targeted steelhead to a degree. The 'Additional' trips are the extra trips that are expected to have occurred had the commercial mainstem fish been moved to the recreational allotment. The 'Predict' numbers are the sum of the Actual and Additional columns. Overall, SAFE for Salmon would have been expected to increase recreational trips by 55.9 percent from 2001 to 2008.

Anglers would have spent an estimated additional \$72.2 million if SAFE for Salmon was in effect from 2001 through 2008. This would represent an increase of 56.5 percent over the level of expenditures that actually occurred. Each year, anglers would have spent approximately \$11.6 million more, with a range from \$4.6 million up to \$18.7 million annually depending on a number of factors. Anglers' expenditures then stimulate rounds of economic effects. As a result of the additional angler expenditures, 179 additional jobs would have been supported each year, along with \$3.0 million in additional state and local tax revenues. Income, which is a measure of increased household income from paychecks and other sources, would also have increased 56.5 percent, providing an additional \$29.4 million for families and individuals in the region. Each year, families and individuals would have received approximately \$4.7 million more if SAFE for Salmon had been in effect. Additional license sales revenues would have been possible, too. Please note these impacts would have accrued to Oregon and Washington, but without information on where angler trips originate, only combined results can be reported.

Please note that equipment expenses such as boats, rods and reels, tackle, etc., are not included. These types of durable goods are the primary source of income for many Oregon businesses. It is not known how much fishing-related equipment sales would increase for each additional day of fishing. Some anglers would use their same equipment, while others would be expected to invest in more and higher-priced equipment if they knew the equipment would be used more often. But, how much sales would increase is not known. Therefore, only travel-related expenditures such as food, fuel, lodging, etc., are included in this analysis. To the degree that equipment sales would increase, the results reported here are an underestimate and can be considered conservative.

In addition, it was not possible to backcast coho and fall chinook trips. If SAFE for Salmon was implemented for these fisheries, additional economic effects would likely be expected. Just

considering fall chinook, in the past five years, the average number of trips each year has been considerably larger (131,400) than the number of spring (114,961) and summer trips (39,982).¹ The exclusion of fall fishing as well as coho helps maintain a conservative nature to these results.

Please note this report only addresses economic contributions, or impacts, associated with recreational chinook fishing. These types of measures relate to the dollars spent by anglers and their resulting effects on economic activity including income, jobs and tax revenues. Another measure often preferred by economists is known as 'net economic value' which measures the surplus benefits accruing to commercial and recreational participants. For recreational anglers, this measure refers to the personal benefits held by the user after all expenses and personal costs are covered. Net economic value for anglers is typically measured by their net willingness to pay to fish beyond their actual out-of-pocket expenses. For commercial fishermen, net economic value is the net profit once all expenses are paid. While these measures are important for fisheries allocation decisions, this report focuses on economic contributions.

¹ Effort and catch data are from personal communication with Jimmy Watts, ODFW, March 3, 2009.

Introduction and Background

According to the SAFE for Salmon organization, “SAFE for Salmon” is a proposal to relocate non-tribal commercial gill nets away from the lower Columbia River mainstem into designated off-channel, terminal fishing areas known as SAFE (Select Area Fisheries Enhancement) areas. Hatchery fish are released in these locations after acclimating in net pens. Adult salmon then return to these locations where harvesting can occur with minimized impacts on listed salmonid species and reduced bycatch of other species such as sturgeon and steelhead. Listed species remain in the mainstem on their way to upstream spawning areas. By relocating the gill net fishery to SAFE areas, the impact on threatened and endangered fish species on the main stem of the Columbia River would be reduced. With reduced impacts on threatened and endangered fish, Oregon and Washington can then maximize sport fishing opportunities on the Columbia providing full and regular salmon seasons and greater economic impact. Additional benefits include reduced bycatch of sturgeon and endangered and threatened fish species such as wild steelhead, chinook, sockeye and coho, allowing increased flexibility for management of the fisheries, and more.” Please visit www.safeforsalmon.com for more details.

The purpose of this study is to quantify the economic impacts from spring and summer chinook angling that could have accrued to the regional economy had SAFE for Salmon been fully implemented from 2001 through 2008. The primary data sources are fishing participation data from the Oregon Department of Fish and Wildlife and economic information from NOAA Fisheries. All data sources used in this report are credited, and all major steps and assumptions are documented.

Methodology and Data Sources

Data Sources:

Several primary data sources were instrumental in this analysis:

Estimates of additional trips: At the request of SAFE for Salmon, the Oregon Department of Fish and Wildlife (ODFW) provided an estimate of the number of recreational fishing trips that would have occurred had commercially harvested spring chinook been moved to the recreational fishery. Detailed results are presented in Appendix A. Table 1 below presents a summary of the actual recreational spring chinook trips that occurred from 2001 to 2008, and the estimated trips that would have occurred if mainstem commercial spring chinook were moved to the recreational fishery.

Table 1. Angler Trips: Actual and Estimated

<u>Angler Trips*</u>			
<u>Year</u>	<u>Trips</u>		
	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>
2001	172,312	121,433	293,745
2002	175,052	39,831	214,883
2003	160,765	162,599	323,364
2004	156,101	55,275	211,376
2005	124,695	64,162	188,857
2006	86,835	44,585	131,420
2007	106,742	42,270	149,012
2008	127,957	96,774	224,731
Average	138,807	78,366	217,174
TOTAL:	1,110,459	626,929	1,737,388

* Summer chinook are included only in 2007 and 2008.

Actual summer chinook trips were obtained from the ODFW and presented in Appendix B,² but changes in trips that would have occurred had SAFE for Salmon been in place were not available. The number of actual trips was analyzed in combination with harvest rate data and commercial landings data also from the ODFW to project the number of additional summer chinook trips. This is explained further in the Analysis section.

Angler expenditures and economic contributions per trip: Detailed estimates on the amount spent by anglers were available from the U.S. Department of Commerce's NOAA Fisheries.³ Expenditures and economic impacts were reported for 2006. All estimates in this report are left in 2006 terms. Appendix C presents the expenditures and economic effects data used in this analysis and their corresponding adjustments.

Numbers of mainstem commercial spring & summer chinook: Data regarding chinook harvests from the mainstem by the commercial fleet were obtained from the ODFW and PacFIN fish ticket data.⁴ These data were used to estimate the potential increase in recreational activity if mainstem commercial fish were moved to the recreational sector. Detailed information on commercial landings are provided in Appendix D.

Analysis:

Assumptions and Study Limitations:

There are some assumptions inherent in the results:

- A) The economic data are reported in terms of days and trips. It can be assumed that a recreational trip is the same as a recreational day.
- B) All expenditures and impact estimates are based on 2006 data obtained from NOAA Fisheries. All results are standardized to 2006 levels.
- C) The impacts are based on the average impacts for trips made by charter boats and private boats, two of the primary modes for chinook fishing. Not knowing how many chinook trips occurred by each method, the assumption is made that the percentage of chinook trips by each mode reflects all marine fishing trips in Oregon as reported

² Source: ODFW. Personal communications with D. Watts. March, 2009.

³ Source: Gentner, Brad and Scott Steinback, The Economic Contribution of Marine Angler Expenditures in the United States, 2006. NOAA Fisheries, Technical Memorandum NMFS-F/SPO-94. December 2008.

⁴ ODFW. Personal communication. March, 2009, and PacFIN fish ticket data, March 2008 extractions.

by NOAA Fisheries. NOAA Fisheries also reports bank/shore fishing trips, but considering bank fishing for chinook only account for a moderate number of lower Columbia trips, and that the dollars associated with bank and boat fishing days are similar, these data were excluded.

- D) The economic contribution data obtained from NOAA Fisheries reported data for all types of marine sport fishing combined. The assumption is made that the impacts from a chinook trip is the same as the average marine fishing trip in Oregon.
- E) The assumption is made that hatchery operations will be able to support the SAFE program.
- F) The assumption is made that all commercial fish harvested in the mainstem would have been simply and fully available to the recreational sector and caught.

Study limitations and characteristics include:

- A) The trips presented here take place in both Oregon and Washington. The data do not report the percentage of trips that originated in either state. Therefore, the economic impacts reported here occur to some degree in Washington as well as Oregon. Considering the major populations centers closest to the Columbia are in Oregon, and majority of the impacts are expected to occur in Oregon, though how much is not known. The tax rates used in this report are based on Oregon rates, which differ from those in effect in Washington.
- B) For years, salmon allocations have been disputed. The total fish available for harvest each year depends on the expected number of returning wild fish. Recreational and commercial allocations depend on a number of factors including expected size of each year's run, potential release mortality, and more. The ESA, which directs recovery plans for many salmon species, helps set mortality thresholds for wild many salmonids. Numbers of hatchery fish have been strong, but the mixing of hatchery and wild fish places limits on hatchery fish harvests to minimize mortality of wild fish. Decisions to limit hatchery fish harvests to help protect listed salmonids becomes an economic and social decision making process. This report intends not to criticize or refute past decisions or actions, but instead intends to provide additional information to assist in the fisheries management process.
- C) There are no regular or ongoing economic monitoring efforts for commercial or recreational salmon fisheries in the lower Columbia river. Therefore, existing economic data sources were adapted for use in this report.

- D) Based on the lack of data about the number of recreational fishing trips by non-residents, this report is unable to distinguish between economic contributions, which explain all spending by residents and non-residents, and true economic impact which are the benefits created by new dollars brought into a regional economy. Spending by residents living within a certain distance of the study site may not represent new impacts as these dollars may have been simply spent on other local activities if the residents could not fish. There would not be a loss to the local economy. To the extent that anglers visit fishing communities from further locations and leave behind dollars that otherwise would not be in the area, new economic impacts are created. Data were not available permitting a distinction between economic impacts from new dollars versus local dollars.
- E) The economic information presented here only consider the positive impacts arising from increased recreational fishing trips. Potential negative costs not considered include any increased costs to the commercial fishery, increased hatchery costs, and increased fisheries management and/or enforcement costs. Also, any impacts to upriver fisheries need to be considered. Before final decisions can be made by fisheries managers, such costs need to be considered.
- F) Please note the economic impacts reported here are for 2006 and do not consider the run up in fuel prices and their corresponding effects on expenditures per trip that would have occurred in 2008.
- G) Finally, the results presented here report the economics of what could have happened in the past had a specific scenario been in place. Variations of the SAFE concept may be implemented in the future. Models and methods specific to those variations would be needed to accurately project potential future economic responses.

Spring Chinook:

Spring chinook impacts were calculated by matching NOAA Fisheries' per-trip expenditure and economic impact estimates with the number of spring chinook trips provided by the ODFW, both the actual trips and trips that would likely have occurred had SAFE for Salmon been in effect.

Economic impact data primarily came from NOAA Fisheries.⁵ This source reported the economic effects from all marine sport fishing activity in Oregon. From this source, the number of jobs supported for every million dollars spent by anglers, as well as the level of personal income per million dollars spent, was derived. These multipliers were then applied to the total dollars expected from the additional and predicted chinook trips. Tax revenues for all years are based on rates as they existed in fiscal year 2005-06. The tax rate is based on a ratio of all state and local tax revenues divided by personal income.⁶ The result, 10.1 percent, reports that for every dollar of personal income, 10.1 cents is generated in state and local tax revenues. State and local taxes include personal and corporate income taxes, property taxes, and selective sales taxes. General revenue from fees, special charges, and government enterprises are not included. Table 3 presents the economic results for spring chinook.

⁵ Gentner, Brad and Scott Steinback, *The Economic Contribution of Marine Angler Expenditures in the United States, 2006*. NOAA Fisheries, Technical Memorandum NMFS-F/SPO-94. December 2008.

⁶ Data from the Oregon Legislative Revenue Office, *2009 Oregon Public Finance: Basic Facts*, Research Report #1-09, January 2009. Via Internet: http://www.leg.state.or.us/comm/lro/2009_pub_finance.pdf.

Table 3. Trips, Expenditures and Economic Impacts Associated with Spring Chinook Fishing and SAFE for Salmon

Year	Trips			Expenditures (millions)			Economic Impact (reported as personal income, in millions)			Jobs			State & Local Taxes		
	Actual	Movement	Predict	Actual	Additional	Predict	Actual	Additional	Predict	Actual	Additional	Predict	Actual	Additional	Predict
2001	172,312	121,433	293,745	\$19.8	\$14.0	\$33.8	\$8.1	\$5.7	\$13.8	306	216	521	\$815,475	\$574,688	\$1,390,163
2002	175,052	39,831	214,883	\$20.2	\$4.6	\$24.7	\$8.2	\$1.9	\$10.1	311	71	381	\$828,442	\$188,502	\$1,016,944
2003	160,765	162,599	323,364	\$18.5	\$18.7	\$37.2	\$7.5	\$7.6	\$15.2	285	289	574	\$760,828	\$769,508	\$1,530,336
2004	156,101	55,275	211,376	\$18.0	\$6.4	\$24.3	\$7.3	\$2.6	\$9.9	277	98	375	\$738,756	\$261,592	\$1,000,347
2005	124,695	64,162	188,857	\$14.4	\$7.4	\$21.8	\$5.8	\$3.0	\$8.8	221	114	335	\$590,125	\$303,650	\$893,775
2006	86,835	44,585	131,420	\$10.0	\$5.1	\$15.1	\$4.1	\$2.1	\$6.2	154	79	233	\$410,951	\$211,001	\$621,952
2007	83,010	33,166	116,176	\$9.6	\$3.8	\$13.4	\$3.9	\$1.6	\$5.4	147	59	206	\$392,849	\$156,960	\$549,809
2008	102,972	72,328	175,300	\$11.9	\$8.3	\$20.2	\$4.8	\$3.4	\$8.2	183	128	311	\$487,320	\$342,296	\$829,616
Average	132,718	74,172	206,890	\$16.4	\$11.3	\$26.4	\$6.7	\$4.6	\$10.7	253	174	406	\$673,641	\$464,675	\$1,083,317
TOTAL:	1,061,742	593,379	1,655,121	\$122.3	\$68.3	\$190.6	\$49.7	\$27.8	\$77.6	253	174	406	\$5,024,746	\$2,808,195	\$7,832,941

In the “Trips” section in Table 3, the column marked “Actual” reports the recreational spring chinook trips that occurred from 2001 through 2008. The “Movement” section reflects the additional trips the ODFW estimated would have occurred if SAFE for Salmon was in effect. “Predict” is the total of the Actual plus Movement trips, or the total spring chinook trips that would have occurred had SAFE for Salmon been in place. On average, each year nearly 54,000 trips would have occurred, representing a 51.3 percent boost in spring chinook trips. The Economic Impacts and Expenditures sections of Table 3 report the economic effects of the additional spring chinook trips. The totals in the Movement columns represent the additional contributions to the regional economy from recreational spring chinook fishing if SAFE for Salmon was in effect.

Summer chinook:

Estimates of the additional recreational summer chinook trips that would have occurred if SAFE for Salmon was in effect were not available and had to be estimated as part of this reporting effort. Since the seasons were open for the maximum possible time available prior to 2007, additional trips cannot be estimated for these years. Increased trips based on the movement of fish from the commercial mainstem fishery can only be estimated for 2007 and 2008 when the season was ended early once the permitted number of fish were harvested. The number of actual summer chinook trips and the number of fish caught were provided by the ODFW.⁷ See Table 4. The assumption is made that the number of annual trips that could be taken annually is a function of the number of fish available to be caught, given that the fishery is closed when a specific number of fish have been harvested. The assumption is made that recreational demand was great enough in 2007 and 2008 that, if the fisheries were not closed but had been allowed to remain open, additional fishing trips would have occurred at the rate they occurred before the actual closing date.

⁷ Effort and catch data are from personal communication with Jimmy Watts, ODFW, April 20, 2009.

Table 4. Estimating Summer Chinook Trips

Year	Actual Recreational Trips			Mainstem Commercial Landings			Total Recreational Trips Based on Selective Harvests			
	# Trips	Harvest	Trips/Fish	lb/Fish	lbs Landed	# Fish Moved:	Mark Rates	Mortality	New Trips	Predicted
2007	23,732	2,214	10.72	19.52	10,514	539	59%	37	9,104	32,836
2008	24,985	2,051	12.18	18.06	22,986	1,272	59%	88	24,446	49,431
2009*	22,672	1,980	11.45	19.57	62,613	3,200	59%	222	57,788	80,460
Average (2007 & 2008 only)	24,359	2,133	11.45	18.79	16,750	905.48	59%	63	16,775	41,134
TOTAL (2007 & 2008 only)	48,717				33,500	1,811	118%	126	33,550	82,267

In the first box in Table 4, the numbers of actual summer chinook trips are listed. Also listed are the numbers of trips required to catch a fish each year. Using total pounds landed and pounds per fish data,⁸ the second box calculates the number of summer chinook harvested in the mainstem commercial fishery each year. These represent the number of fish that, if SAFE for Salmon were implemented, would have been assigned to the recreational fishery. The third box reports the additional trips that would have been required in each year to catch the additional allotment. This calculation takes into account 10 percent mortality of released fish and counts these fish towards the new fish assigned to the sport sector. This calculation also recognizes that gillnetting is not selective. To retain the 539 chinook moved to the sport sector in 2007, for example, a greater number of fish would have to be caught with only 59 percent kept. Allowing for a 10 percent mortality rate for released fish (37 fish), and considering 10.47 trips were needed for each caught salmon, this translate to 9,104 additional sport trips. This approach also recognizes SAFE for Salmon is calling for mark selective fishing on hatchery fish, with wild fish to be released.

It is a simple assumption to think that all fish moved from the mainstem commercial fishery would be caught by anglers. It does not recognize many factors combine to determine the actual number of trips required to reach the limit, including weather, substitute species, timing of the peak runs (weekends versus weekdays, etc.), water levels, and much more. Data regarding

⁸ ODFW (personal communication, March 2009) and PacFIN fish ticket data, March and November 2008 extractions.

these many variables were not available along with a scientific understanding of how these many variables interact. Attempts were made to statistically model the number of trips that would have occurred if “X” amount of additional fish were allowed to be harvested, but the attempts were unable to capture all of the complex variables that drive fishing trips, given the resources available for study. Therefore, the assumption is made that all reassigned fish would be caught.

The expenditures and economic impacts generated from summer chinook were then estimated by multiplying the number of trips by the typical expenditures and impact per trip (Table 5). All the assumptions and steps described earlier for spring chinook economic impacts apply here.

Projections are provided in Table 4 for 2009 SAFE harvests and trips to assist fisheries management discussions occurring at the time of this report’s release. Expected 2009 summer chinook harvest data were obtained from the ODFW.⁹ Recreational trips were expected to take 2,200 fish and 3,200 by the commercial mainstem gillnet fishery. Including all the assumptions presented earlier for the 2001 – 2008 analyses, the 3,200 are transferred to the recreational fishery for the sake of this analysis. Using the average weight per commercially harvested species in 2007 and 2008, and the average number of recreational trips per kept fish, it is estimated that the transfer of 3,200 fish would generate an extra 57,788 sport trips, \$6.7 million in additional angler expenditures, \$2.7 in additional personal income from sport chinook fishing, 103 jobs, and \$273,000 in additional tax revenues.

⁹ Personal communications. Tony Nigro, Oregon Department of Fisheries and Wildlife. March 11, 2009.

Table 5. Expenditures and Economic Impacts of Recreational Summer Chinook Fishing

	Expenditures (millions)			Economic Impact (reported as personal income, in millions)			Jobs			State & Local Taxes (in thousands)		
	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>
2007	\$2.7	\$1.0	\$3.8	\$1.1	\$0.4	\$1.5	42	16	58	\$112,313	\$43,085	\$155,398
2008	\$2.9	\$2.8	\$5.7	\$1.2	\$1.1	\$2.3	44	43	88	\$118,243	\$115,694	\$233,936
2009*	\$2.6	\$6.7	\$9.3	\$1.1	\$2.7	\$3.8	40	103	143	\$107,296	\$273,487	\$380,783
Average (2007 & 2008 only)	\$2.8	\$1.9	\$4.7	\$1.1	\$0.8	\$1.9	43	30	73	\$115,278	\$79,389	\$194,667
TOTAL (2007 & 2008 only)	\$5.6	\$3.9	\$9.5	\$2.3	\$1.6	\$3.9	86	60	146	\$230,556	\$158,779	\$389,334

Spring + summer chinook combined

The total expenditures and economic effects of implementing SAFE for Salmon is a simple summation of the Spring and Summer Impacts. These are presented in Table 6.

Table 6. Actual, Additional and Total Trips

<u>Year</u>	<u>Trips</u>		
	<u>Actual</u>	<u>Additional</u>	<u>Predict</u>
2001	172,312	121,433	293,745
2002	175,052	39,831	214,883
2003	160,765	162,599	323,364
2004	156,101	55,275	211,376
2005	124,695	64,162	188,857
2006	86,835	44,585	131,420
2007	106,742	42,270	149,012
2008	127,957	96,774	224,731
Average	138,807	78,366	217,174
TOTAL:	1,061,742	593,379	1,655,121

Table 7. Expenditures and Economic Effects of SAFE for Salmon, Spring and Summer Chinook Recreational Fishing.

Year	Expenditures (millions)			Economic Impact (reported as personal income, in millions)			Jobs			State & Local Taxes		
	Actual	Additional	Predict	Actual	Additional	Predict	Actual	Additional	Predict	Actual	Additional	Predict
2001	\$19.8	\$14.0	\$33.8	\$8.1	\$5.7	\$13.8	306	216	521	\$815,475	\$574,688	\$1,390,163
2002	\$20.2	\$4.6	\$24.7	\$8.2	\$1.9	\$10.1	311	71	381	\$828,442	\$188,502	\$1,016,944
2003	\$18.5	\$18.7	\$37.2	\$7.5	\$7.6	\$15.2	285	289	574	\$760,828	\$769,508	\$1,530,336
2004	\$18.0	\$6.4	\$24.3	\$7.3	\$2.6	\$9.9	277	98	375	\$738,756	\$261,592	\$1,000,347
2005	\$14.4	\$7.4	\$21.8	\$5.8	\$3.0	\$8.8	221	114	335	\$590,125	\$303,650	\$893,775
2006	\$10.0	\$5.1	\$15.1	\$4.1	\$2.1	\$6.2	154	79	233	\$410,951	\$211,001	\$621,952
2007	\$12.3	\$4.9	\$17.2	\$5.0	\$2.0	\$7.0	189	75	264	\$505,162	\$200,045	\$705,207
2008	\$14.7	\$11.1	\$25.9	\$6.0	\$4.5	\$10.5	227	172	399	\$605,563	\$457,989	\$1,063,552
Average	\$16.7	\$11.6	\$27.0	\$6.8	\$4.7	\$11.0	258	179	416	\$687,869	\$476,198	\$1,109,604
TOTAL:	\$127.9	\$72.2	\$200.1	\$52.0	\$29.4	\$81.4	258	179	416	\$5,255,302	\$2,966,974	\$8,222,276

Discussion

It is estimated that anglers would have spent an additional \$72.2 million if SAFE for Salmon was in effect from 2001 through 2008. This would represent an increase of 56.5 percent over the level of expenditures that actually occurred. Each year, anglers would have spent approximately \$11.6 million more, with a range from \$4.6 million up to \$18.7 million annually depending on the size of the run and other factors. Anglers' expenditures then stimulate rounds of economic effects. As a result of the additional angler expenditures, 179 additional jobs would have been supported each year, along with \$3.0 million in additional state and local tax revenues. Income, which is a measure of increased household income from paychecks and other sources, would also have increased 56.5 percent, providing an additional \$29.4 million for families and individuals in the region. Each year, families and individuals would have received approximately \$4.7 million more if SAFE for Salmon had been in effect.

A projection is offered about the potential benefits if SAFE for Salmon was in effect for the summer 2009 chinook fishery. 5,400 salmon were projected prior to the season to be harvested by the sport and commercial mainstem fisheries combined. Using all the assumption reported earlier, SAFE for Salmon would have resulted in an additional \$6.7 million in angler expenditures, \$2.7 million in personal income, 103 additional jobs from sport fishing, and \$273,000 in additional state and local tax revenues.

It is important to note that equipment expenses such as boats, rods and reels, tackle, etc., are not included. These items are very important to many Oregon businesses. It is not known how much fishing-related equipment sales would increase for each additional day of fishing. Some anglers would use their same equipment, while others would be expected to invest in more and higher-priced equipment if they knew the equipment would be used more often. But, how much sales would increase is not known. Therefore, only travel-related expenditures such as food, fuel, lodging, etc., are included in this analysis. To the degree that equipment sales would increase, the results reported here are an underestimate and can be considered conservative.

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Appendix A:

Expected Additional Spring Chinook Trips if Mainstem Commercial Fish were Assigned as Recreational Fish

Source: Oregon Department of Fish and Wildlife

Hypothetical Lower Columbia River Spring Chinook Angler Trips by Month, 2001-2008. 1/

	March	April	May	June 1-15	Total	Proportion of Effort by Month				comments	run size
						March	April	May	June 1-15		
2001	44,356	205,000	33,300	11,089	293,745	0.151	0.698	0.113	0.038	early	538,600
2002	35,629	115,615	54,732	8,907	214,883	0.166	0.538	0.255	0.041	Late	481,100
2003	65,841	197,523	45,000	15,000	323,364	0.204	0.611	0.139	0.046	early	405,900
2004	44,576	122,000	33,600	11,200	211,376	0.211	0.577	0.159	0.053		421,500
2005	36,865	110,000	31,500	10,492	188,857	0.195	0.582	0.167	0.056	Late	192,200
2006	27,949	67,500	25,000	10,971	131,420	0.213	0.514	0.190	0.083	no target above I-5	223,900
2007	27,949	70,000	10,989	7,238	116,176	0.241	0.603	0.095	0.062	no target above I-5	150,973
2008	47,300	96,000	24,000	8,000	175,300	0.270	0.548	0.137	0.046	limited fishery below Willamette	230,000
AVG	41308.125	122954.75	32265.125	10362.125	206890.13	0.206	0.584	0.157	0.053		

1/ Italicized numbers are hypothetical based on partial effort or effort in a previous month **and do not consider other limiting factors such as impacts to upriver spring chinook.**

2/ The effort profile was developed by staff based on the proportion of catch by month, relative catch rate, and other intangible factors.

Year	Actual Season Dates	Hindcasted Season Dates
2001	<ul style="list-style-type: none"> • Open 1/1-4/17 and 4/25-4/29 below I-5 • Open 3/12-4/17 and 4/25-4/29 above I-5 • 172,312 trips 	<ul style="list-style-type: none"> • Open 1/1 - 5/2 and 5/24-5/31 below I-5 • Open 3/12-5/2 and 5/24-5/31 above I-5 • 239,563 trips
2002	<ul style="list-style-type: none"> • Open 1/1-4/28 and 5/5-5/15 below I-5 • Open 3/16-4/28 and 5/5-5/15 above I-5 • 175,052 trips 	<ul style="list-style-type: none"> • Open 1/1-5/31 below I-5 • Open 3/16-5/31 above I-5 • 216,919 trips
2003	<ul style="list-style-type: none"> • Open 1/1-4/5 and 3d per week 4/9-5/15 below I-5 • Open 2/15-4/5 above I-5 • 160,765 trips 	<ul style="list-style-type: none"> • Open 1/1-4/20, 4/24-4/27, and 5/22-5/31 below I-5 • Open 2/15-4/20, 4/24-4/27, and 5/22-5/31 above I-5 • 237,566 trips
2004	<ul style="list-style-type: none"> • Open 1/1-4/30 below I-5 • Open 3/16-4/21 above I-5 • 156,281 trips 	<ul style="list-style-type: none"> • Open 1/1-5/14 below I-5 • Open 3/16-5/14 above I-5 • 197,529 trips
2005	<ul style="list-style-type: none"> • Open 1/1-4/20 and 6/4-6/15 below I-5 • Open 3/16-4/20 and 6/4-6/15 above I-5 (Rooster Rock rules) • 124,695 trips 	<ul style="list-style-type: none"> • Open 1/1-5/5 and 6/3-6/15 below I-5 • Open 3/16-5/5 and 6/3-6/15 above I-5 (Rooster Rock rules) • 143,950 trips
2006	<ul style="list-style-type: none"> • Open 1/1-4/13 and 5/16-6/15 below I-5 • Open 5/16-6/15 above I-5 • 86,835 trips 	<ul style="list-style-type: none"> • Open 1/1-5/1 and 5/12-6/15 below I-5 • Open 5/16-6/15 above I-5 • 122,814 trips
2007	<ul style="list-style-type: none"> • Open 1/1-4/15 and 5/16-6/15 below I-5 • Open 6/6-6/15 above I-5 • 83,018 trips 	<ul style="list-style-type: none"> • Open 1/1-5/13 and 6/5-6/15 below I-5 • Open 6/6-6/15 above I-5 • 110,798 trips
2008	<ul style="list-style-type: none"> • Open 1/1-2/24 and 3/24-4/4 below I-5 • Open 3/16-4/20 above I-5 • One fish bags • 102,972 trips 	<ul style="list-style-type: none"> • Open 1/1-2/24 and 3/24-4/4 below I-5 • Open 3/16-5/6 above I-5 • One fish bags • 140,591 trips

Appendix B: Recreational Trips & Harvest

Year	Season Dates	Angler Trips	Summer Chinook			Summer Steelhead		Additional Regulations
			Adults		Jacks Kept	Kept	Released	
			Kept	Released				
2002	June 28-July 31	40,920	1,352	945	77	4,506	2,554	Fin-clipped summer Chinook only
2003	June 16-July 31	39,167	1,854	1,671	200	3,513	2,001	Fin-clipped summer Chinook only
2004	June 16-July 31	39,804	1,119	1,266	169	5,117	2,269	Fin-clipped summer Chinook only
2005	June 16-July 31	38,505	1,571	500	39	3,718	2,011	Fin-clipped summer Chinook only during June 16-30
2006	June 16-July 31	43,802	4,924	16	64	3,935	1,549	None
2007	June 16-30	23,732	2,214	0	149	1,475	221	None
2008	June 21-28	24,985	2,051	9	219	1,667	436	None
Ave CPUE	10.06845141	92,519	9,189					

1/ This table includes estimates of trips, kept catch, and released catch during periods open for summer Chinook retention only. Beginning in 2005, the summer Chinook run was reclassified from June 1-July 31 to June 16-July 31. The summer Chinook fishery is closed below the Rocky Point/Tongue Point Line. Prior to 2002, the summer Chinook fishery had been closed to adult retention since 1973.

Source: personal communications, Jimmy Watts, ODFW, 4-20-09

Appendix C

Expenditure and Economic Contributions Data

Oregon, 2006

Expenditures

	Res	Non-Res	TOTAL:
Charter	\$7,280,000	\$4,036,000	\$11,316,000
Private	\$25,879,000	\$12,907,000	\$38,786,000
TOTAL	\$33,159,000	\$16,943,000	\$50,102,000

	Res & Non-Res	=====>>	Per Trip:
Trips Charter	56,000	12.9%	\$202
Private	379,000	87.1%	\$102
	435,000	weighted =	\$115
		average	

Jobs

Charter	228		
Private	544		
TOTAL	772	=> Per \$1M =	15.4

Personal Income*

% of Each Expenditure Dollar:

Charter	54.1%
Private	38.7%
Weighted Average:	40.68%

Taxes**

% of Personal Income = **10.1%**

Source: Gentner, Brad and Scott Steinback, The Economic Contribution of Marine Angler Expenditures in the United States, 2006. NOAA Fisheries, Technical Memorandum NMFS-F/SPO-94. December 2008.

* Personal income is on net earnings data from: U.S. Bureau of Economic Analysis, Regional Economic Information System, Table SA04, September 2008.

** The tax rate is based on a ratio of all state and local tax revenues divided by personal income. Data Source: Oregon Legislative Revenue Office, 2009 Oregon Public Finance: Basic Facts, Research Report #1-09, January 2009. Via Internet: http://www.leg.state.or.us/comm/lro/2009_pub_finance.pdf.

Appendix D: Commercial Landings and Value

Lower Columbia River Commercial Salmon Landings in 2004 to 2008																		
	Round Pounds						Ex-Vessel Value (nominal)						Price (nominal)					
	2004	2005	2006	2007	2008	Average	2004	2005	2006	2007	2008	Average	2004	2005	2006	2007	2008	Avg.
Mainstem																		
Spring																		
Chinook	196,629	94,681	63,894	59,825	80,176	99,041	764,100	411,092	354,128	350,836	585,723	493,176	3.89	4.34	5.54	5.86	7.31	4.98
Summer																		
Chinook	1,537	34,253	105,283	10,514	22,986	34,915	2,772	37,931	266,701	2,371	70,149	75,985	1.80	1.11	2.53	0.23	3.05	2.18
Fall																		
Chinook	726,414	494,981	492,565	208,270	490,871	482,620	898,925	649,708	877,036	435,156	1,062,518	784,669	1.24	1.31	1.78	2.09	2.16	1.63
Tule	75,969	70,036	58,802	27,596	70,448	60,570	14,602	17,002	16,298	1,256	37,263	17,284	0.19	0.24	0.28	0.05	0.53	0.29
Bright	650,445	424,945	433,763	180,674	420,846	422,135	884,324	632,707	860,737	433,899	1,003,242	762,982	1.36	1.49	1.98	2.40	2.38	1.81
Coho	707,476	328,658	324,182	271,252	207,191	367,752	652,682	351,176	432,505	452,777	266,370	431,102	0.92	1.07	1.33	1.67	1.29	1.17
Steelhead	0	0	0	0	0	0	0	0	0	0	0	0						
Sockeye	1,880	0	0	0	1,008	578	2,988	0	0	0	1,539	905	1.59				1.53	1.57
Chum	478	105	40	563	0	237	118	55	9	574	0	151	0.25	0.52	0.23	1.02		0.64
Pink	0	9	0	0	0	2	0	1.9	0	0	0	0		0.21				0.21
Total	1,634,414	952,686	985,964	550,424	768,577	978,413	2,321,584	1,449,963	1,930,379	1,241,714	1,986,299	1,785,988	1.42	1.52	1.96	2.26	2.58	1.83
Off-channel																		
Sp.																		
Chinook	137,652	29,941	68,187	90,997	38,923	73,140	517,889	97,794	351,358	444,637	271,301	336,596	3.76	3.27	5.15	4.89	6.97	4.60
Su.																		
Chinook	8,708	4,434	14,673	7,907	19,842	11,113	11,812	9,351	49,001	25,967	72,370	33,700	1.36	2.11	3.34	3.28	3.65	3.03
Fall																		
Chinook	245,125	133,352	58,184	45,544	189,322	134,305	148,366	128,770	114,888	125,222	451,565	193,762	0.61	0.97	1.97	2.75	2.39	1.44
Tule	148,343	61,663	5,895	2,182	41,496	51,916	35,520	16,632	1,652	72	26,510	16,077	0.24	0.27	0.28	0.03	0.64	0.31
Bright	96,782	71,689	52,289	43,362	147,826	82,390	112,846	112,138	113,236	125,150	425,055	177,685	1.17	1.56	2.17	2.89	2.88	2.16
Coho	416,951	640,125	353,682	73,641	440,343	384,948	374,665	678,564	462,683	108,773	577,624	440,462	0.90	1.06	1.31	1.48	1.31	1.14
Steelhead	0	0	8	0	0	2	0	0	0	0	0	0			0.00			0.00
Sockeye	0	0	0	0	0	0	0	0	0	0	0	0						
Chum	6	0	0	0	9	3	1	0	0	0	5	1	0.20				0.56	0.41
Pink	0	0	0	0	0	0	0	0	0	0	0	0						
Total	808,442	807,852	494,734	218,089	688,439	603,511	1,052,734	914,479	977,930	704,599	1,372,865	1,004,521	1.30	1.13	1.98	3.23	1.99	1.66
Total																		
Sp.																		
Chinook	334,281	124,622	132,081	150,822	119,099	172,181	1,281,989	508,886	705,486	795,473	857,024	829,772	3.84	4.08	5.34	5.27	7.20	4.82
Su.																		
Chinook	10,245	38,687	119,957	18,422	42,828	46,027	14,584	47,282	315,702	28,337	142,519	109,685	1.42	1.22	2.63	1.54	3.33	2.38
Fall																		
Chinook	971,539	628,333	550,749	253,814	680,193	616,926	1,047,291	778,479	991,924	560,378	1,514,083	978,431	1.08	1.24	1.80	2.21	2.23	1.59
Tule	224,312	131,699	64,697	29,778	111,944	112,486	50,122	33,634	17,950	1,328	63,773	33,361	0.22	0.26	0.28	0.04	0.57	0.30
Bright	747,227	496,634	486,052	224,036	568,672	504,524	997,169	744,845	973,974	559,050	1,428,297	940,667	1.33	1.50	2.00	2.50	2.51	1.86
Coho	1,124,427	968,783	677,864	344,893	647,534	752,700	1,027,347	1,029,739	895,187	561,550	843,994	871,563	0.91	1.06	1.32	1.63	1.30	1.16
Steelhead	0	0	8	0	0	2	0	0	0	0	0	0			0.00			0.00

Sockeye	1,880	0	0	0	1,008	578	2,988	0	0	0	1,539	905	1.59					1.53	1.57
Chum	484	105	40	563	9	240	119	55	9	574	5	152	0.25	0.52	0.23	1.02	0.56	0.63	
Pink	0	9	0	0	0	2	0	2	0	0	0	0		0.21					0.21
Total	2,442,856	1,760,538	1,480,698	768,513	1,457,016	1,581,924	3,374,318	2,364,442	2,908,309	1,946,313	3,359,164	2,790,509	1.38	1.34	1.96	2.53	2.31	1.76	

- Notes: 1. Year 2008 is complete through September for PacFIN, and December for ODFW. Washington side is expanded proportionally to estimate full year.
2. Value and price are nominal.
3. Off-channel harvests include about 17% from other local or upriver stocks. SAFE introduced stocks contribute about 3, 7 percent spring Chinook, 7, 15 percent coho, and 8, 17 percent SAB to mainstem recreational, commercial fishing.
4. Spring Chinook season ends on June 15. The landings for June 1 through 15 are estimated using one-quarter of March and the residual for the actual landings in June is included in the summer fishery. Summer Chinook season ends July 31.

Source: ODFW (personal communication, March 2009) and PacFIN fish ticket data, March and November 2008 extractions.