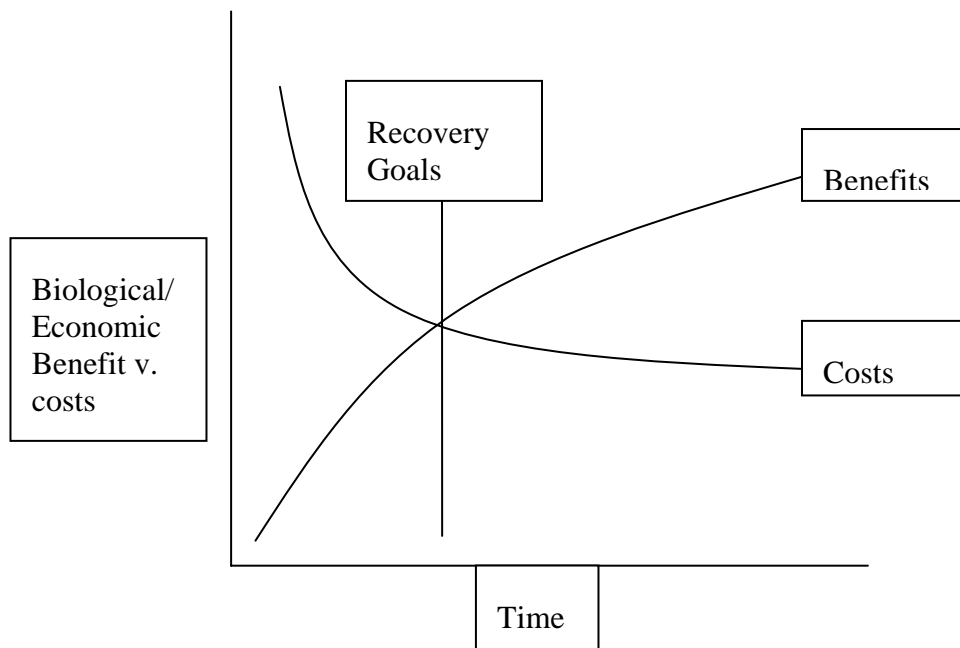


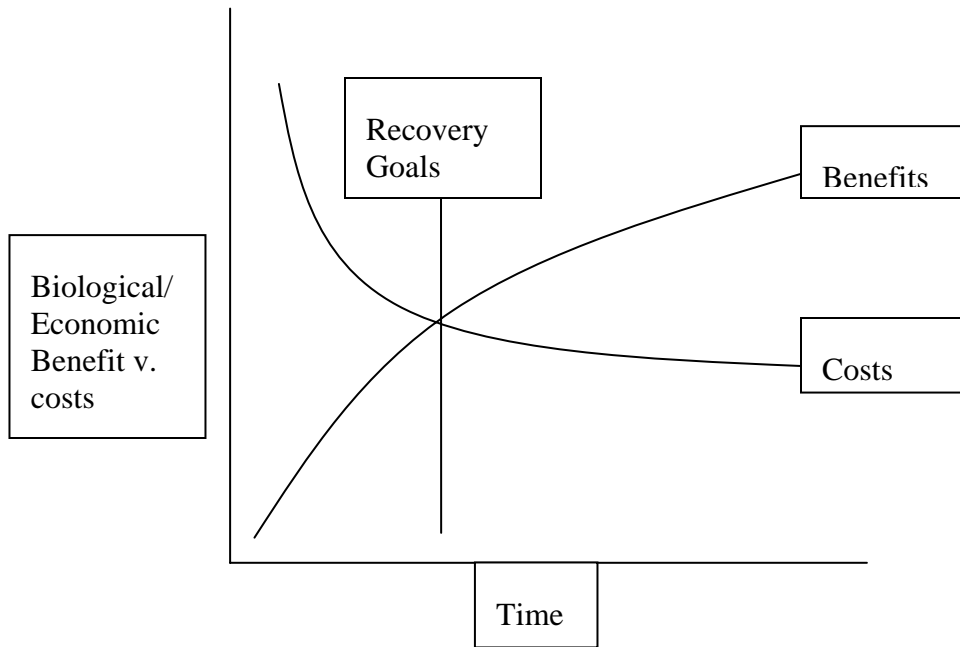
## Appendix K1

### Major and Representative Finding from Literature and Research on Economic Benefits to Restored Fisheries in the Pacific Northwest

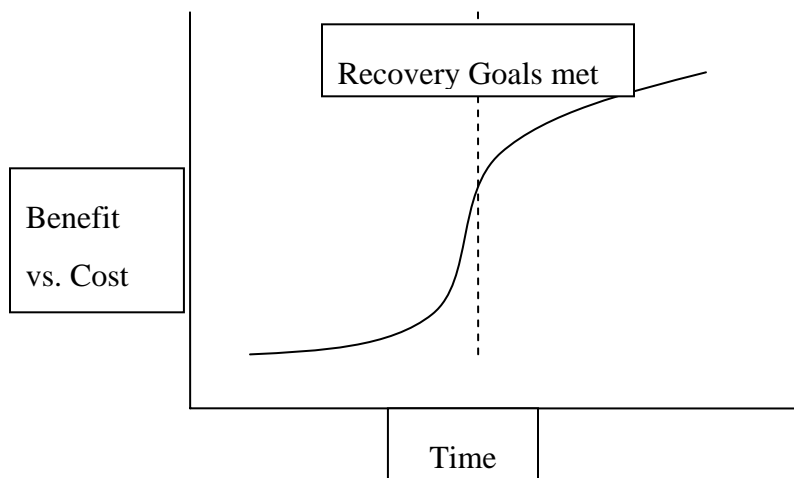


**Figure 1.** Benefits are amortized and describe how initial investments in salmon recovery's economic benefits accrue as initial recovery costs decline.

Appendix K1: Economic Benefits to Restored Fisheries



**Figure 2:** An informal benefit to cost ratio can be expressed in a simple graph showing how initially the benefit to cost ratio may be low (initial investment period) but as fish populations become stronger and recovery goals begin to be met, multiple benefits (beyond just “angling”) accrue to the economy and the species at a higher rate.



## Appendix K1: Economic Benefits to Restored Fisheries

The following sections on the economic benefits to recovery of a recreational salmon & steelhead fisheries in the Upper Columbia River basin has the primary objective of establishing best estimates of economic benefit based on available angler and landing data. Secondary objectives include highlights of significant research and a list of intangibles representing associated economic incentives and benefits to recreational salmon and steelhead fisheries recovery.

### Estimates of Economic Benefits of Restored Salmon & Steelhead Fishing – Washington & Idaho Comparison

In deriving the most current and accurate estimates of economic benefits of restored salmon and steelhead fishing in the Upper Columbia River, we have incorporated multiple approaches. The first is to determine the potential economic impact to Washington State from the results of the comparative work done by Don C. Reading, of Ben Johnson Associates, on the potential economic impact of restored salmon and steelhead fishing in Idaho. Secondly, we used angler information to determine the economic impact specifically to the Upper Columbia River basin. Finally, we compared these estimates on the economic importance of salmonids in the Snake River Salmon Recovery Region which estimates 57 million dollars contributed annually to the local economy from angling associated expenditures. The Snake River region is similar in size and geography to the Upper Columbia, and thus, we believe the comparisons are reasonable.

For instance, in 2001, Washington state ranked 8<sup>th</sup> in the nation and ranked first in the Northwest in spending by sports anglers derived from 938,000 sports anglers fishing 12.8 million days, contributing **\$854 million** that year to the state economy (USDI, 2003). This comports with estimates over multiple years from across the United States and corresponds with methods used and reported in pertinent literature and with the literature used and cited in this plan.

**Table 1.** Typical Expenditure Items: Angler Trip and Equipment Expenditures in the United States for 1996 (source: Texas Parks & Wildlife, 1996)

Expenditure Item	TOTAL
<b>TRIP EXPENDITURES</b>	
Food, Drink and Refreshments	\$4,255,842,791
Lodging	\$1,733,823,092

Appendix K1: Economic Benefits to Restored Fisheries

Public Transportation	\$559,029,278
Private Transportation	\$3,171,216,027
Boat Fuel	\$1,339,584,467
Guide Fees, Pack Trip or Package Fees	\$638,466,383
Public Land Use or Access Fees	\$140,258,431
Private Land Use or Access Fees	\$84,353,614
Boat Launching Fees	\$201,377,081
Boat Mooring, Storage, Maintenance and Insurance	\$1,398,154,895
Equipment Rental	\$331,308,320
Bait (live, cut, prepared)	\$1,084,661,194
Ice	\$319,258,420
Heating and Cooking Fuel	\$123,883,241
<b>FISHING EQUIPMENT EXPENDITURES</b>	
Rods, Reels, Poles and Rod Making Components	\$2,331,835,635
Lines and Leaders	\$490,917,008

Appendix K1: Economic Benefits to Restored Fisheries

Artificial Lures, Files, Baits and Dressing	\$880,910,433
Hooks, Sinkers, Swivels, etc.	\$376,671,950
Tackle Boxes	\$128,193,348
Creels, Stringers, Fish Bags, Landing Nets and Gaff Hooks	\$95,915,440
Minnow Traps, Seines and Bait Containers	\$66,220,786
Depth Finders, Fish Finders and Other Electronic Fishing Devices	\$395,926,970
Ice Fishing Equipment	\$97,557,372
Other Fishing Equipment	\$444,526,129
<b>AUXILIARY PURCHASES FOR FISHING</b>	
Camping Equipment	\$501,711,047
Binoculars, Field Glasses, Telescopes, etc.	\$46,757,879
Special Fishing Clothing, Foul Weather Gear, Boots, Waders, etc.	\$312,636,188
<b>SPECIAL EQUIPMENT PURCHASED FOR FISHING</b>	
Bass Boat	\$2,005,235,791
Other Motor Boat	\$3,220,523,391

Appendix K1: Economic Benefits to Restored Fisheries

Canoe or Other Non-Motor Boat	\$144,712,414
Boat Motor, Boat Trailer/Hitch or Other Boat Accessories	\$981,703,104
Pickup, Camper, Van, Travel or Tent Trailer, Motor Home, House Trailer	\$4,573,214,215
Cabin	\$27,394,985
Trail Bike, Dune Buggy, 4x4 Vehicle, 4-Wheeler, Snowmobile	\$1,129,232,231
Other Special Equipment Including Ice Chest	\$746,301,786
<b>OTHER EXPENDITURES</b>	
Fishing License Fees	\$519,060,780
Other Fees	\$60,691,571
Owned or Leased Property	\$2,340,344,488
Processing and Taxidermy Costs	\$62,019,727
Books and Magazines	\$169,546,449
Dues or Contributions to Organizations	\$152,447,837
Other Purchases	\$113,635,846
<b>UNITED STATES TOTAL</b>	<b><u>\$37,797,062,032</u></b>

**National Perspectives, local applicability**

The national annual spending in the U.S., in 2001, by 35.2 million adult anglers, with approximately 626 million fishing days reported, amounting to **\$37.8 billion** that year, with the average spending of about \$1,100 per person per year (Texas Parks & Wildlife, ASA 2002). This amount closely approximates the national total of 34.1 million anglers (USDI, 2003). We note that this does not include the angler numbers from the combined “fishing and hunting” category and therefore consider this a conservative estimate.

Focusing on the data specific to salmon & steelhead in Washington (listed species in the Upper Columbia), of the 938,000 total anglers—freshwater and saltwater combined, a total of 367,000 fished for salmon and/or steelhead. The data report 156,000 steelhead anglers, and 211,000 salmon non tribal sport anglers respectively (USDI, 2003). We note that these estimates do not include any estimates of economic benefit from tribal fisheries, which unquestionably contribute to the state and local economy.

Of the 938,000 Washington State salmon and steelhead total anglers, 659,000 spent approximately 5.4 million angling days and \$386 per trip with each trip lasting an average of 1.3 days (USDI 2003). However, total expenditures exceed \$2,000 per fish harvested by including direct and indirect expenditures. Finally, because expenditures are incurred even when fish are not harvested, angling *trips*, whether fish are harvested or not, is the most appropriate metric in the economic equation and the final measure of economic benefit used in this plan.

**Table 2.** Freshwater anglers and days of fishing in Washington and Idaho, by type of fish: 2001 (table modified from USDI, 2003). (Note: WA state 2001 survey also has additional # anglers and # days attributed to saltwater salmon fishing which we did not include in the comparison to Idaho).

	<b>WA</b>	<b>ID</b>
<b># Anglers – steelhead</b>	156,000	54,000
<b># Anglers – salmon</b>	211,000	61,000
<b>Total anglers</b>	<b><u>367,000</u></b>	<b><u>115,000</u></b>
<b># Days – steelhead</b>	2,483,000	475,000
<b># Days – salmon</b>	2,908,000	448,000
<b>Total Days</b>	<b><u>5,391,000</u></b>	<b><u>923,000</u></b>

Appendix K1: Economic Benefits to Restored Fisheries

**Table 3.** Summary of Freshwater Fishing Trip & Equipment Expenditures in Washington, including National Averages, by U.S. Residents: 2001

Expenditure Type	Amount (thousands of dollars)		Spenders (thousands)		Average per spender (dollars)		Average per angler (dollars)	
	<u>WA</u>	<u>ID</u>	<u>WA</u>	<u>ID</u>	<u>WA</u>	<u>ID</u>	<u>WA</u>	<u>ID</u>
<b>ALL FRESHWATER</b>								
<b>Total.....</b>	<b><u>310,668</u></b>	<b><u>164,261</u></b>	<b><u>668</u></b>	<b><u>398</u></b>	<b><u>465</u></b>	<b><u>412</u></b>	<b><u>463</u></b>	<b><u>391</u></b>
Food and lodging	83,020	53,463	516	325	161	165	126	129
Transportation	72,958	40,458	547	335	133	121	111	97
Other trip costs <sup>1</sup>	59,347	22,301	481	298	123	75	90	54
Equipment <sup>2</sup>	95,342	48,039	437	236	218	203	136	112

**Note:** These expenditures would be higher if additional expenditures from the “fishing and hunting” combined category and commercial non tribal and tribal fisheries were included.

<sup>1</sup> Other trip costs includes: Privilege and other fees (includes boat or equipment rental and fees for guides, pack trip (party and charter boats, etc.), public land use, and private land use; boating costs (includes boat launching, mooring, storage, maintenance, insurance, pump out fees and fuel); bait; Ice; and heating and cooking fuel.

<sup>2</sup> Equipment includes: Reels, rods, and rod making components; lines, hooks, sinkers, etc.; artificial lures & flies; creels, stringers, fish bags, landing nets, and gaff hooks; Minnow seines, traps, and bait containers; and other fishing equipment (includes electronic fishing devices; tackle boxes, ice fishing equipment, and others) modified from original USDI 2003 for Washington State.

**Estimates of Economic Benefits of Restored Salmon & Steelhead Fishing - Snake River Basin & Upper Columbia Basin Comparison**

To scale the potential economic benefit from national averages, to state and ultimately, to local assumptions, several economic analyses of salmon and steelhead fisheries for the Snake River Basin have been conducted in Idaho in recent years, and staff from the WDFW has reviewed these reports for use in estimating economic benefits for the Snake River Recovery Plan. We believe that these studies have reasonable applicability to the economics of fisheries in the Upper Columbia because of the similar geographical, river systems, size and comparable historic angler effort. The Idaho economic studies were paired with creel survey estimates of the amounts of angler effort and harvest in Idaho’s salmon and steelhead fisheries and information for the Upper Columbia (1981-1999) has been provided by WDFW for context and comparison. Finally, we note that salmon and



## Appendix K1: Economic Benefits to Restored Fisheries

steelhead fisheries in the Upper Columbia in 2000-2004 have been near historical high levels and likely exceed the 1981-1999 average.

Direct expenditures and total economic value of Idaho's steelhead fisheries in 1992-93 were estimated at approximately \$34.5 million and over \$90 million, respectively (Reading 1996). These fisheries were responsible for approximately 2,700 jobs in the state as nearly 44,000 steelhead were harvested (\$805 direct expenditures, \$2045 total economic value, per harvested steelhead). In 2001, spring/summer Chinook fishing in Idaho contributed \$46.1 million in direct expenditures and \$89.9 million in total economic value to that state's economy (Ben Johnson and Assoc. 2003), with a harvest of 43,300 adult Chinook from 540,800 angler hours of effort (\$887 direct expenditure, \$2,076 total economic value, per Chinook salmon harvested). Just over 50% of the economic benefits accrued to river communities, with the remaining economic impact distributed over much of the rest of Idaho.

In Riggins, a salmon river community of about 400 people, the salmon fishery brought in about \$10 million in total economic spending in two months and stimulated 23% of the town's annual sales. Riggins is similar in size to the towns of Riverside or Tonasket on the Okanogan River, Peshastin on the Wenatchee, the Entiat in total, Pateros on the mainstem Columbia River, and/or Winthrop on the Methow River. Direct expenditures alone accounted for 13% of Riggins annual sales, which compares to direct sales of 9.3% of the Riggins economy from agricultural and timber products (Ben Johnson and Assoc. 2003).

The most recent study in Idaho evaluated the potential economic benefits of salmon and steelhead fisheries if they were restored to sustainable, abundant and harvestable levels similar to those of the 1950s (Reading 2005). That study estimated that restored fisheries could contribute **\$544.2** million per year of total economic value.

Using this method as a basis for estimating benefits to Washington State yields **\$854 million per year of total economic value**. Localized estimates are reported below.

Appendix K1: Economic Benefits to Restored Fisheries

**Table 4. Detailed economic value estimates of harvested salmon from the Upper Columbia based on 1981-1999.** Estimates based on \$1,065/harvest spring/summer Chinook direct expenditures and \$2,076 per fish in total economic value from Idaho studies. (According to Reading 2005 these values could be increased by 3.9% to reflect 2004 dollars.

<b>Subbasin or River Reach</b>	<b>Year Reported</b>	<b>Landing Max/Min</b>	<b>Average # Salmon Landed</b>	<b>Direct Expenditures (\$1065/fish)</b>	<b>Total economic value (\$2076/fish)</b>
Chelan Lake	1990, 1993	22/12	17	\$18,105	<b>\$35,292</b>
Col. R. Upper		5678/4050	5107	\$,438,955	<b>\$10,602,132</b>
Entiat R.	1986, 1987	23/10	17	\$18,105	<b>\$35,292</b>
Icicle Cr.	1981-84	2063/35	699	\$744,435	<b>\$1,451,124</b>
Icicle R.	1996-1999	46	313	\$333,345	<b>\$649,788</b>
Lake Wenatchee	1984-85, 1987, 1990-93	6523/0	3426	\$3,648,690	<b>\$7,112,376</b>
McNary-Chief Joseph Dam	1981-1994	5916/414	3191	\$3,648,690	<b>\$6,624,516</b>
Methow R.	1987-88	0	0	\$0	<b>\$0</b>
Wenatchee R.	1984-86, 1988-94	1626/0	443	\$471,795	<b>\$919,668</b>

Appendix K1: Economic Benefits to Restored Fisheries

**Table 5. Estimated economic values of harvested steelhead from the Upper Columbia based on 1981-1997.** Estimates based on \$805/steelhead direct expenditures and \$2045 per fish in total economic value from Idaho studies (based on Reading's cost per fish estimates, 2005).

<b>Subbasin or River Reach</b>	<b>Year Reported</b>	<b>Salmon Landing Year Av. Max/Min</b>	<b>Average # Salmon Landed</b>	<b>Direct Expenditures (\$805/fish)</b>	<b>Total economic value (\$2045/fish)</b>
McNary to Hwy 12	1983-96	7099/107	2018	\$1,624,490	<b>\$4,126,810</b>
Hwy 12 to Priest Rapids - Col. R.	1983-96	5702/1510	3329	\$2,679,845	<b>\$6,807,805</b>
Above Priest Rapids Dam	1982-95	92/9	58	\$46,690	<b>\$118,610</b>
Priest Rapids Dam to Wanapum Dam	1996-97	21/12	17	\$13,685	<b>\$34,765</b>
Above Wanapum Dam	1982-95	337/0	94	\$75,670	<b>\$192,230</b>
Wanapum Dam to Rock Island Dam	1996-97	26/6	16	\$12,880	<b>\$32,720</b>
Above Rock Island Dam	1982-1995	1030/57	418	\$336,490	<b>\$854,810</b>
Rock Island Dam to Rocky Reach Dam	1996-97	308/78	193	\$155,365	<b>\$394,685</b>
Above Rocky Reach Dam	1982-95	882/47	275	\$221,375	<b>\$562,375</b>

## Appendix K1: Economic Benefits to Restored Fisheries

Rocky Reach Dam to Wells Dam	1996-97	417/97	257	\$205,885	<b>\$525,565</b>
Above Wells Dam	1982-95	4972/258	1759	\$1,415,995	<b>\$3,597,155</b>
Wells Dam to Chief Joseph Dam	1996-97	798/231	515	\$414,575	<b>\$1,053,175</b>
Above Bonneville	1980-81	4808/3478	4143	\$3,335,115	<b>\$8,472,435</b>
Above McNary to Priest Rapids	1982		4669	\$3,758,545	<b>\$9,548,105</b>
Entiat River	1980-97	183/0	81	\$65,205	<b>\$165,645</b>
Methow River	1980-97	5824/166	1764	\$1,420,020	<b>\$3,607,380</b>
Okanagan River	1980-97	1193/2	265	\$213,325	<b>\$541,925</b>
Similkameen River	1980-97	746/0	167	\$134,435	<b>\$341,515</b>
Icicle Creek	1980-97	62/0	11	\$8,855	<b>\$22,495</b>
Wenatchee River	1980-97	1661/95	591	\$475,755	<b>\$1,208,595</b>

### **List of Intangible Benefits from Recovery of Listed Species:**

In addition to the annual direct revenue and expenditures anticipated under a recovered Upper Columbia future, intangible benefits including:

1. **Intrinsic Quality of Life:** People like living and working in a healthy environment over a degraded one. For example, high value development occurs near parks, rivers, view-scapes etc. and property values in wilderness areas are higher than in areas with urban blight, industrial parks, denuded riparian areas etc.

## Appendix K1: Economic Benefits to Restored Fisheries

2. **Reduced Regulatory Environment:** In addition to the quantified cost savings from reduced environmental review, permitting, assessments etc, absent ESA people and local governments can devote valuable time to other priorities such as improving public school systems, parks, public safety etc.
3. **Public and Civic Pride:** Numerous examples across the world, County and here in Washington state, exist. Take the City of Tonasket for example. The entire City Counsel from the mayor to the police administrator view salmon recovery as a source of pride and accomplishment. A ribbon cutting ceremony is scheduled for September 2005 to inaugurate a “Salmon Viewing and Information Platform” on the Okanogan River. The City estimates 500-600 people will attend.
4. **Visitors and Conventions:** In addition to the quantified benefits from increased tourism directly attributed to fishing etc., multidisciplinary and non-related conferences, conventions and overall visitation is higher of (and reported as a higher quality experience) when held in areas with high quality natural resources. Compare Detroit Michigan to Aspen Colorado as a destination for conference-goers, tourists etc.
5. **Public/Private Partnerships:** The City of Wenatchee and East Wenatchee is a good example. The relationships formed between the public and say, the PUDs for example often converge around natural resources, their preservation and their celebration with parks, nature trails etc.
6. **Ecological Context:** Healthy fish populations have a direct linkage to other species and to the ecological integrity of river systems. A recent study shows that 137 species of birds, mammals, amphibians and reptiles are scavengers or predators of salmon, or have other attributes of their life cycle linked to the presence of salmon and/or steelhead populations (e.g., bear, cougar, birds, including certain river clam species) (Cederholm et al. 2000).

### USDI 2001 Survey Highlights:

- 34.1 million U.S. residents 16 years and older fished.
- Sportspeople spent a total of \$36 billion on fishing, and \$14 billion on items used for both hunting and fishing.
- In 2001, 16% of the U.S. population 16 years old and older spent an average of 16 days fishing.
- Comparing results of the 2001 Survey and the 1996 Survey reveals that the number of all anglers declined 3% and overall fishing expenditures fell 17% - a 16% drop in trip and a 22% drop in equipment expenditures.
- From 1991 to 2001, the number of all anglers declined 4% and expenditures increased 14%.

## Appendix K1: Economic Benefits to Restored Fisheries

- Activities in Idaho by U.S. residents: 416,000 anglers, 4 million days of fishing, Total expenditures \$310,872,000. Activities in Oregon by U.S. residents: 687,000 anglers, 8.7 million days of fishing, total expenditures \$601,780,000.

### **American Sportfishing Association, December 2002, Demographics & Economic Impact report:**

- Sportfishing in 2001 accounted for \$116 billion in the country's economy
- The data is derived from the U.S. Census Bureau survey of 30,000 American sportspersons, performed every 5 years since 1955
- The direct and indirect economic impacts demonstrated in the Pacific Northwest show that estimated economic impacts for Washington State exceed those estimated for either states of Idaho or Oregon.

### **WDFW, December 2002:**

- The Columbia River spring Chinook fishery, alone, is estimated to generate a \$15.4 million economic impact, according to the Northwest Sportfishing Association.

### **Don C. Reading 2005:**

- This study utilized data on angling effort and fish abundance from the 1950s and early 2000s. Fisheries in the 1950s were exclusively derived from wild populations, whereas fisheries in the 2000s were made up of both wild and hatchery stocks.
- Total angler trips of 458,000, consist of an estimated 177,000 steelhead trips, 271,000 spring/summer Chinook, and 10,000 for fall Chinook (based on 2001 and 2002-2003 numbers multiplied by a 14% increase in effort).
- From the 1992-93 steelhead survey, anglers averaged 2 days per trip.
- According to Reading, under current Idaho regulations only salmon and steelhead of hatchery origin may be harvested. However, both wild and hatchery fish contribute numbers that influence angling effort and success.

### **Steven Edwards, November 1990, An Economics guide to Allocation of Fish Stocks between Commercial and Recreational Fisheries:**

- To optimize the economic value of fish used for food and sport is one of the primary objectives of the Magnuson Fishery Conservation and Management Act.
- In the sport fishing sector, net economic value derived from direct effects "spread across primary and intermediate inputs from the entire economy, including labor, capital, and privately owned natural resources such as land and caught-fish. Also, often when recreational fishing is being evaluated, consumption of goods and services which are unrelated to fishing trips, such as meals and souvenirs, are

## Appendix K1: Economic Benefits to Restored Fisheries

“direct” effects even when recreational fishing comprises only part of a vacation or trip.

- “Indirect” effects arise only after increased revenues and income are represented in the economy. Some examples include labor, boats, tackle, gasoline, rentals, ice, and other equipment.
- “Attributing all consumer surplus of sport fishing to the sport-caught fish would overestimate the value of sport-caught fish to anglers because other factors, including being outdoors and camaraderie, are also part of the fishing experience (Dawson & Wilkins 1981)

## Appendix K1: Economic Benefits to Restored Fisheries

**Table 6.** Adapted from: Demographics & Economic Impact, American Sportfish Association, December 2002

	Retail Sales	Output	Wages & Salaries	Jobs	Sales/Fuel Taxes	State Income Tax	Federal Income Tax
<b>Washington – Freshwater fishing</b>	<b>\$561,058,124</b>	<b>\$994,368,756</b>	<b>\$252,259,180</b>	<b>9536</b>	<b>\$42,094,299</b>	<b>\$0</b>	<b>\$42,433,449</b>
Idaho – Freshwater fishing	\$396,364,348	\$657,461,318	\$151,598,738	7,504	\$22,697,010	\$6,581,745	\$15,254,668
Oregon – Freshwater fishing	\$561,850,608	\$991,779,210	\$227,163,400	9,758	\$15,339,886	\$17,685,218	\$34,902,374
National Total	\$41,528,003,337	\$116,064,518,700	\$30,108,800,941	1,068,046	\$1,913,373,871	\$470,239,851	\$4,885,011,975
WA – Saltwater fishing	\$348,172,741	\$617,214,306	\$154,429,160	6,102	\$25,074,428	\$0	\$25,229,231
Oregon – Saltwater fishing	\$160,015,148	\$289,176,767	\$66,003,208	2,842	\$1,970,044	\$5136,583	\$10,121,780
National Total	\$11,318,249,621	\$31,085,904,333	\$8,138,400,181	296,898	\$493,262,762	\$85,456,389	\$1,357,945,118
WA – All fishing	\$932,431,598	\$1,656,548,494	\$417,164,967	15,965	\$67,185,935	\$0	\$69,620,399
OR – All fishing	\$733,412,813	\$1,304,519,242	\$298,749,523	12,776	\$17,309,930	\$23,274,649	\$46,063,809
Idaho – All fishing	\$409,453,451	\$681,065,982	\$157,402,757	7,773	\$22,889,647	\$6,846,807	\$15,856,844
National – All fishing	\$41,528,003,337	\$116,064,518,700	\$30,108,800,941	1,068,046	\$1,913,373,871	\$470,239,851	\$4,885,011,975
<p>Note: The U.S. total does not equal the sum of state data as economic activity across state borders are not included in the state totals, in addition to other factors.</p> <p>Note: The expenditures reported are greater than those by the U.S. Fish and Wildlife Service. Sportsmen often attributed purchases to both fishing and hunting (especially vehicles and big-ticket items). These items were not included in the Service's fishing expenditure estimates. Such items were included above by prorating each item's cost based on each respondent's total days of hunting and fishing activity.</p> <p>Analysis performed by Southwick Associates.</p> <p>Note: The original tables have been modified to show only a summary of data pertinent to WA, OR, ID, and national estimates.</p> <p>Dollar amounts will be adjusted using a consumer price index to 2005 \$ estimates.</p>							