

**APPENDIX F:**  
**Socioeconomics Resource Report**

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# **Socioeconomic Analysis of Salmon Creek Rehabilitation PDEIS**

*Resource Report*

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*Resource Report*

**Prepared for**

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# Introduction

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## Background

The Colville Confederated Tribes (Tribes) have received funds from the Bonneville Power Administration’s Fish and Wildlife program to investigate the feasibility of restoring and rehabilitating Salmon Creek, located in Okanogan County, Washington. The goal of such restoration efforts is to enhance anadromous salmonid populations in Salmon Creek. A proposed action has been identified to examine alternatives for rehabilitation of Salmon Creek, and in particular to examine water supply options for creating flows favorable to salmon. The primary existing user of Salmon Creek water, and predominant affected party, is the Okanogan Irrigation District (OID), which claims water rights to a large portion of its natural flow. The formal examination of these action alternatives are presented in this Programmatic Draft Environmental Impact Statement (PDEIS).

The water supply alternatives include two options for substituting Okanogan River water in the OID for Salmon Creek water. The options reflect either the enhancement of an existing pump (the “Shellrock alternative”) or the construction of an entirely new pump system (the “Pump Exchange alternative”). A third water supply alternative involves the purchase and permanent use of a portion of the OID’s water rights. The water use alternatives reflect three separate enhancement options. The first would provide passage flows for steelhead. The second would provide passage flows for both steelhead and Chinook salmon. The third is called a rehabilitation option, and provides for year-round flows that benefit both passage and rearing of steelhead and Chinook.

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## Purpose and Scope

The purpose of the study is to conduct a socioeconomic analysis of the proposed action alternatives for rehabilitation of Salmon Creek and restoration of flows therein. The purpose of this report is to provide a resource and documentation of the analysis, and to serve as the information base for the socioeconomic sections of the PDEIS. The analysis examines various components of economic impacts distinctly, and includes the following elements:

- Determination of the effects of the proposed actions on the OID;
- Property value and tax base impacts;
- Regional and indirect impacts on the communities and Okanogan County; and
- Recreation impacts and nonmarket benefits associated with reoperation of reservoirs on Salmon Creek.

In addition, water rights and other related elements are presented in this report. They include:

- A description of the characteristics of the Okanogan Irrigation District;
- The construction of an agricultural impacts model of the OID; and
- A detailed examination of the water right purchase alternative, including transfer programs, case studies, and issues affecting implementation.

The scope of the analysis is limited to the action alternatives examined in the PDEIS, and the geographic region of Okanogan County.

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## Organization of the Report

The remainder of this report contains seven additional sections. They include a characterization of the OID, followed by a description of an agricultural impacts model constructed to determine impacts to OID. This includes a description of the agricultural land base under the No Action Alternative.

The next section provides an examination of the property tax system in Okanogan County and determination of the tax base impacts to be realized as a result of the proposed action alternatives. The section which follows contains a description of both the economic base for Okanogan County and the regional impacts model constructed for Okanogan County. Issues

associated with the water purchase alternative are presented in the next section. This includes a discussion of existing water transfer programs, case studies involving water purchases, and issues associated with Washington's water transfer rules.

The next to last section provides an analysis of the impacts of the proposed action alternatives. This includes the direct impacts on affected parties, with a particular focus on OID. An analysis is also provided of the regional and indirect impacts of the action alternatives. The final section provides an analysis of the recreation impacts of the water supply alternatives, with a particular focus on the reoperation of Conconully Reservoir and Salmon Lake. The economic effects associated with anticipated changes in recreation activity are discussed qualitatively as compared to the No Action Alternative. Finally, the section contains a discussion of the nonmarket benefits associated with improved flows as they affect Salmon Creek.

# Document Okanogan Irrigation District (Task 3230)

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## Okanogan Irrigation District Characteristics

The Okanogan Irrigation District (OID) in Okanogan County, Washington, was authorized in 1905 to serve 10,000 acres. Currently, OID consists of 5,032 assessed acres near the Okanogan River. Irrigation water is primarily supplied to the district through a diversion from Salmon Creek, a tributary to the Okanogan River. Two storage facilities, Conconully Reservoir and Salmon Lake, store Salmon Creek flows and are operated to meet downstream irrigation demand within the district. Supplemental water supplies are pumped directly from the Okanogan River at the Shellrock pumping station and from Duck Lake when Salmon Creek supplies are inadequate to meet irrigation demands.

The Salmon Creek diversion dam, located approximately 12 miles downstream from Conconully Reservoir, diverts water from Salmon Creek into the Main Canal. The Main Canal is 7.6 miles of open concrete lined canal that runs along the western border of the district. Water is diverted from the Main Canal into five laterals consisting of more than 44 miles of closed, pressurized pipeline. The maximum capacity of the Main Canal is estimated to be 80 cubic feet per second (cfs).

OID has more than 600 member accounts with assessable acres ranging from approximately 0.2 acres to 230 acres per account. The average assessed acreage per account in the district is 8.2 acres and the median is 3.5 acres. While the district supports a large number of full-time producers, part-time producers with primary sources of income other than farming manage much of the irrigated acreage. In addition, an increasing share of the district is being converted from commercial agricultural production to rural/residential uses with parcels smaller than five acres. According to OID crop reports, urban lands served by district water supplies increased from 115 acres in 1990 to approximately 550 acres in 1998. This trend toward smaller acreages within the district has continued in recent years. Currently, nearly

one-third of the district's annual assessment fees are paid by members with less than five acres served by district water supplies.

Crops in OID consist primarily of tree fruits and forage crops. Approximately half of the assessed acres in the district are planted to tree fruits. Apples are the most prevalent tree fruit in the district, followed by pears and cherries. In addition, more than 1,300 acres are planted to pasture and hay crops.

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## Financial Conditions and Repayment Obligations

The projected total 2003 assessment for OID is approximately \$650,000. Assessment charges vary according to the size of the account. Small acreages receiving OID service are generally assessed at a higher rate than larger acreages. In addition, small acreage accounts are charged a fixed fee that varies according to size category rather than a fixed per acre fee. In addition to the variable assessment fee, each account is charged a fixed fee of \$50 per acre. Table 1 shows how district charges vary with acreage. On average, each assessed acre is projected to pay approximately \$129 in 2003.

**Table 1**  
**Okanogan Irrigation District Assessment Schedule, 2003**

<b>Acres</b>	<b>Assessment</b>
0.01-1.00	\$142
1.01-1.50	\$213
1.51-2.40	\$284
Remaining Acres	\$120/acre

Source: Tom Sullivan, Okanogan Irrigation District.

In addition to assessments, OID receives revenue from a variety of sources including grants, interest, and charges to domestic well users benefiting from groundwater recharge at Duck Lake. Planned expenditures for 2003 include approximately \$500,000 for operations and maintenance, \$65,000 for debt repayment associated with the Shellrock facility, and nearly \$240,000 in rehabilitation and betterment bond payments. Debt obligations are projected to remain relatively constant at approximately \$60 per acre through 2013 but will decline to less than \$14 following repayment of the rehabilitation and betterment bond in 2014.

# Develop Agricultural Production Model for OID (Task 3231)

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## Current Crop Production and Markets

Agricultural production within OID consists primarily of orchard crops. Apples are the most commonly produced tree fruit and are planted to more acres than any other crop produced in the district. Common apple varieties found in the district include Red Delicious, Golden Delicious, Gala, and Braeburn, among others. Pears and cherries are other important crops but are grown on fewer acres than apples. Growers in the district have increased the acreage of pears substantially due to poor apple market conditions in recent years. Similarly, cherry acreage has doubled in OID during the last five years but still represents a relatively small amount of district acreage. Other, less hardy tree fruit has not increased in acreage substantially, however. Climate conditions within OID make the production of less winter hardy tree fruits more risky and tend to limit variety choice even among apples. Stone fruits, such as apricots and peaches, tend to be more susceptible to freeze damage and are not commonly grown within OID.

While orchard crops generate a major share of crop revenues within OID, forage crops are produced on a large portion of the district's irrigated acres. Hay and pasture production has generally been increasing over the last decade as orchard crops have been removed due to depressed prices and land has been subdivided and converted to small acreage rural/residential sites. Many of these rural/residential sites maintain small pastures or hay fields to support livestock on the property.

Table 2 provides the cropping history for OID from 1991 through 1998 as well as current estimates collected from parcel records maintained by the Okanogan County Assessor's Office. Currently, an estimated 3,907 acres (harvested acreage plus young trees) are irrigated compared to 4,317 acres in 1990. Although total apple acreage has declined by nearly 700

acres since 1990, total orchard acreage in production (including young trees) declined by only 315 acres over the same period as producers shifted from apples to other tree fruits.

**Table 2**  
**Crop Production in Okanogan Irrigation District, Selected Years, 1990-Present**

	1990	1991	1992	1994	1995	1996	1998	Current
<b>Harvested Acreage</b>								
Alfalfa/Other Hay	534	539	539	554	636	636	610	473
Pasture	828	808	808	876	805	805	800	870
All Apples	2,289	2,222	2,222	2,250	2,173	2,173	1,810	1,586
<i>Red Delicious</i>								660
<i>Golden Delicious</i>								287
<i>Other Varieties</i>								638
Apricots	3							4
Cherries	8	8	8	25	15	15	50	107
Peaches	31	31	31	25	17	17	10	5
Pears	458	456	456	450	260	260	260	436
Other Crops								30
Family Plots	106	113	113	24	127	127		
<b>Total Harvested Acreage</b>	<b>4,257</b>	<b>4,177</b>	<b>4,177</b>	<b>4,204</b>	<b>4,061</b>	<b>4,061</b>	<b>3,550</b>	<b>3,510</b>
<b>Acres Not Harvested</b>								
Cropland (young trees)	60	69	69	32	174	174	602	397
Fallow or Idle	470	571	571	365	301	96	76	321
Roads, ditches, drains	136	100	100	96	96	301	255	255
Urban/Suburban Lands	115	121	121	335	400	400	549	549
<b>Total Acres Not Harvested</b>	<b>781</b>	<b>861</b>	<b>861</b>	<b>828</b>	<b>971</b>	<b>971</b>	<b>1,482</b>	<b>1,522</b>
<b>Total Assessed Acreage</b>	<b>5,038</b>	<b>5,038</b>	<b>5,038</b>	<b>5,032</b>	<b>5,032</b>	<b>5,032</b>	<b>5,032</b>	<b>5,032</b>

Sources: Okanogan Irrigation District Crop Reports, 1990-1998. Okanogan County Assessor's Office.

Apple acreage by variety has not been historically collected and reported by OID.<sup>1</sup> Current apple variety information was obtained by reviewing Assessor field notes for each district parcel at the Okanogan County Assessor's Office. In total, 660 acres of Red Delicious, 287 acres of Golden Delicious, and 638 acres of other apple varieties remain in the district. This variety mix is consistent with a recent fruit survey of the Wenatchee District, which includes OID, conducted by the Washington Agricultural Statistics Service. The 2001 survey reported that of the 54,000 acres in the Wenatchee District, 41.5 percent were planted to Red

<sup>1</sup> Personal communication with Tom Sullivan, OID Manager, March 2003.

Delicious, 16.5 percent were planted to Golden Delicious, and 42 percent were planted to other apple varieties.<sup>2</sup> Since 1993, Red Delicious acreage has declined by more than 25 percent throughout Washington State, while Golden Delicious acreage has shown only a slight decline. Total Washington State apple acreage was estimated at 192,000 acres in 2001, compared to 172,000 acres in 1993. Current estimates place Washington's total apple crop at 175,000 acres.<sup>3</sup>

Orchardists have pulled a significant portion of the older varieties of apple trees in Okanogan County, and throughout the state. One local expert estimates that growers have removed the trees on 15 percent of the apple acreage in Okanogan County, primarily consisting of Red and Golden Delicious. Some of this acreage has not yet been replanted to trees or other crops and remains fallow. This trend is more dramatic in the northern fruit growing areas of the county including OID, where there tends to be colder sites that are less attractive for fruit production than other available land in the region.<sup>4</sup> Within OID, approximately 25 to 30 percent of the apple acreage with older, less marketable varieties has been pulled in recent years, with nearly half of the acreage currently not replanted to tree crops.

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## Crop Value

The estimated market value of agricultural products sold in the county in 1997 was \$133.5 million, primarily from crop production. An estimated 568 farms contain nearly 30,000 acres of orchard crops in Okanogan County.<sup>5</sup> In comparison, Washington State reported more than 300,000 acres in orchards. Washington State is the leading U.S. producer of apples and pears, producing approximately 50 percent of total U.S. apple and pear crops.<sup>6</sup> Orchard crops are labor and input intensive relative to many other irrigated crops. As a result, a large portion of the regional economy is comprised of industries that directly support orchard production with labor and input supply, as well as industries that process, package, and market the harvested fruit.

The total value of crops grown in OID in 2002 is estimated to be \$12,152,039 (see Table 3). This estimate is based on 2002 crop prices and current crop information collected at the Okanogan County Assessor's Office and supplemented with historic crop reports provided by

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<sup>2</sup> Washington Agricultural Statistics Service, "Washington Fruit Survey 2001."

<sup>3</sup> Tom Schotzko, "Apple Outlook, 2002 Crop," Washington State University Cooperative Extension.

<sup>4</sup> Personal communication with Dan McCarthy, Okanogan County Pest Control, April 30, 2003.

<sup>5</sup> USDA, "1997 Census of Agriculture."

<sup>6</sup> Northwest Horticultural Council, May 2003.

OID to account for parcels without crop information provided. Value per acre is based on the farm level rather than retail price of each crop.

Apples accounted for 37.5 percent of crop acres and contributed nearly 72 percent to total farm revenues within the district. Conversely, pasture and hay comprised 30 percent of the acres, but 4 percent of value. Pears are the second highest revenue crop in the district, earning 17.8 percent of the value from 10.3 percent of the acreage. Lastly, cherries make up 2.5 percent of the acres and 5.9 percent of value.

**Table 3**  
**Crop Acres, Value per Acre, and Total Crop Value,**  
**Okanogan Irrigation District, 2002**

Crop	Acres	Value/Acre	Total Value	Percent of Acres	Percent of Value
Alfalfa	372	\$810	\$301,646	8.8%	2.5%
Other Hay	101	\$845	\$84,930	2.4%	0.7%
Pasture	870	\$435	\$375,638	20.6%	0.8%
Apples	1,586	\$5,381	\$8,533,949	37.5%	71.9%
Pears	436	\$4,842	\$2,111,724	10.3%	17.8%
Cherries	107	\$6,528	\$696,500	2.5%	5.9%
Apricots	4	\$3,132	\$12,234	0.1%	0.1%
Peaches	5	\$6,895	\$35,419	0.1%	0.3%
Other Minor Crops	30	\$-	\$-	0.7%	0.0%
Young Trees	397	\$-	\$-	9.4%	0.0%
Fallow/Idle	321	\$-	\$-	7.6%	0.0%
<b>Total</b>	<b>4,228</b>		<b>\$12,152,039</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Totals may appear not to add precisely due to rounding.

Source: Washington Growers Clearing House, May 2003, Washington State Agricultural Statistics Service.

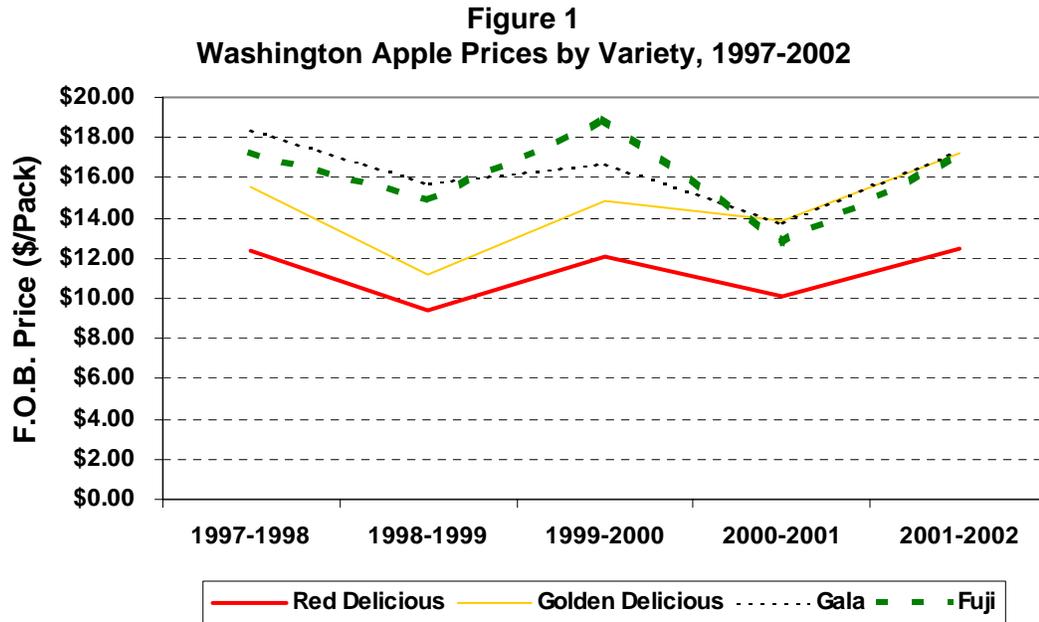
Apple prices vary considerably by variety. As shown on Figure 1, Red Delicious prices have been consistently below other varieties over the last five years. According to published Washington crop budgets for Red Delicious, the breakeven price is approximately \$13.20 per pack. As shown below, the average price did not reach the breakeven level between 1997 and 2002. Furthermore, there has only been one year in the last decade that the Red Delicious price has exceeded \$13.00.<sup>7</sup> Some newer Red Delicious crops are able to earn a profit because of high quality fruit production. However, older trees, which represent the majority of Red Delicious acres in Washington State and OID, generally have a lower

<sup>7</sup> Washington Growers Clearing House, May 2003.

packout of high quality fruit and earn lower prices. On average, Red Delicious producers have experienced estimated net losses of approximately \$1,000 per acre in recent years.<sup>8</sup>

Golden Delicious is a marginal performing apple variety with prices high enough in some years to earn a profit, but below breakeven levels in others. Much of the acreage consists of trees more than 20 years old which can make it difficult to produce and market the highest quality fruit. The estimated breakeven price for Golden Delicious is \$13.09. Average prices were above breakeven levels in four of the last five years and average net returns for Golden Delicious with good yields have been approximately \$450 per acre in recent years. However, older trees, with lower yields and less high quality fruit, have generally experienced losses.

Other apple varieties such as Gala and Fuji earn higher prices and tend to be more profitable than Red and Golden Delicious. For example, the average estimated net returns to Gala and Fuji production have been \$1,328 and \$793 per acre, respectively.



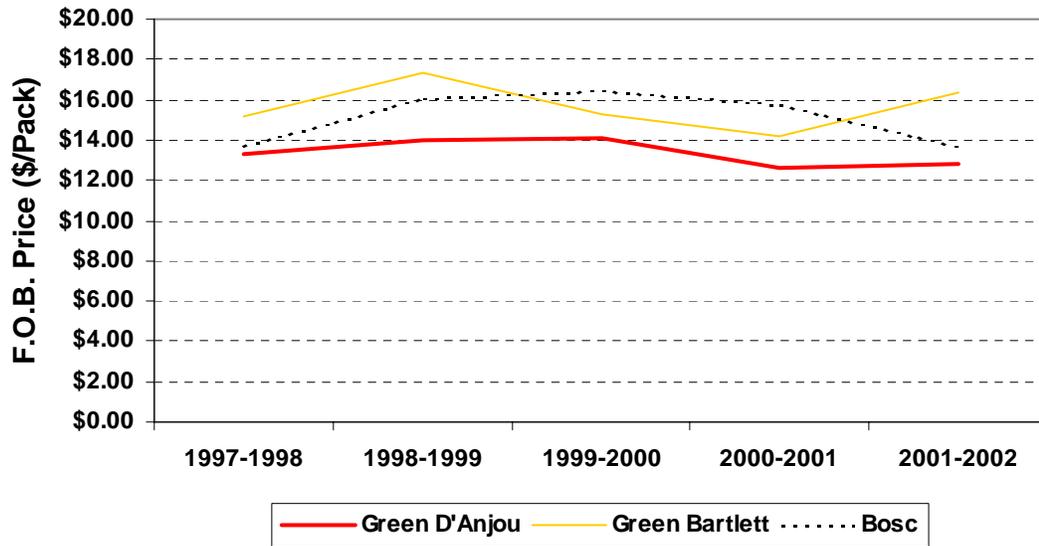
Source: Washington Growers Clearing House, May 2003.

Pear prices in Washington have remained relatively stable over the last five years. Figure 2 shows pear prices by variety from 1997 through 2002. Prices have ranged from \$12.57 to \$17.37 with D'Anjou pear prices lagging behind Bartlett and Bosc. The estimated breakeven price for Bartlett and Bosc is \$15.68 and \$14.43 for D'Anjou. Consequently, pear production has been profitable in recent years. The average net return across all varieties is estimated to

<sup>8</sup> Derived from crop budgets assembled by Jim DuBruille, Wenatchee Valley College, and Washington State University Cooperative Extension.

be \$201 per acre. Average prices for the major crops produced within OID are summarized in Table 4.

**Figure 2**  
**Washington Pear Prices by Variety, 1997-2002**



Source: Washington Growers Clearing House, May 2003.

**Table 4**  
**Selected Crop Prices, 1987-2001**

Year	Apples (\$/ton)	Cherries (\$/ton)	Bartlett Pears (\$/ton)	Winter Pears (\$/ton)	Alfalfa Hay (\$/ton)	Other Hay (\$/ton)
1997	\$328	\$1,430	\$262	\$280	\$111	\$136
1998	\$230	\$1,310	\$290	\$267	\$98	\$123
1999	\$342	\$1,730	\$228	\$341	\$107	\$135
2000	\$258	\$1,630	\$254	\$267	\$120	\$139
2001	\$354	\$1,360	\$216	\$316	\$112	\$142
<b>Average</b>	<b>\$302</b>	<b>\$1,492</b>	<b>\$250</b>	<b>\$294</b>	<b>\$110</b>	<b>\$135</b>

Source: Washington State Agricultural Statistics Service and Washington Growers Clearing House.

## Agricultural Production Model

An economic model describing agricultural production in OID was developed in order to estimate how the water supply alternatives are likely to affect crop choice, crop production, district revenues, and profits. The model utilizes annual water delivery information estimated

by the Water Allocation Model to estimate changes in irrigated acreage, cropping pattern, and total district production resulting from changes in district water supply. The “objective” of the model is to maximize annual profits from total crop production within the district. Water supply shortage criteria were incorporated into the economic model in order to determine the maximum irrigable acres that can be supported by the annual water supply estimated by the Water Allocation Model. Outputs from the model for each action alternative include the acreage, production, gross revenues, costs and profits for each crop.

Nine irrigated crop types are included in the model, based upon current and historic crop production in the district. The crops are alfalfa hay, other hay, pasture, apples, pears, cherries, apricots, peaches, and “other” crops.<sup>9</sup> Apple acres are allocated to variety according to OID apple variety information collected at the Okanogan County Assessor’s Office. In addition, each variety is further disaggregated according to tree age categories in order to account for differences in the marketable quantity of fruit harvested from older versus younger trees. The age classification was accomplished using information provided by the recent tree fruit survey of the Wenatchee District conducted by Washington Agricultural Statistics Service. Other, non-agricultural uses of OID assessed acres such as young tree, urban yards, and fallow lands are included in the model as well.

Crop prices used in the model are the average prices from 1997 through 2001 reported by Washington Agricultural Statistics Service and Washington Growers Clearing House. Production costs for each crop were obtained from budgets published by Washington State University Cooperative Extension and Jim DuBruille of Wenatchee Valley College. The crop budgets were adjusted to reflect growing conditions and production costs faced by growers receiving OID water. Crop yields were obtained from a variety of sources including OID, Washington Agricultural Statistics Service, and knowledgeable experts. Table 5 provides crop price, average yield, production costs, and gross and net returns for each harvested crop included in the economic model. The figures shown do not include owner-operator labor.

In general, there are many sources of variation in per acre farm profits. The values presented in the table are intended to reflect “average” producers within the district. Actual yields, production costs, and net returns to ownership could be higher or lower for individual growers than the values shown. In addition, growers that are able to produce the highest quality fruit can earn higher prices than those presented.

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<sup>9</sup> Peaches, apricots, and other minor crops within the district are not explicitly modeled and are assumed to remain fixed under each alternative.

**Table 5**  
**Crop Prices, Yields, Costs, and Returns Used in the Agricultural Production Model**

Crop	Units	Avg. Yield	Price (\$/Unit)	Gross Return per Acre	Variable Costs per Acre	Fixed Costs per Acre	Total Costs per Acre	Net Profit (Loss) per Acre
Alfalfa (tons)	Tons	7.0	\$109.50	\$766.50	\$505.77	\$222.12	\$727.89	\$38.61
Other Hay (tons)	Tons	6.5	\$135.00	\$877.50	\$620.44	\$226.11	\$846.55	\$30.95
Pasture (tons consumed) <sup>1/</sup>	Tons	3.2	\$135.00	\$432.00	\$282.81	\$136.88	\$419.68	\$12.32
Apples (bins) <sup>2/</sup>								
<i>Red Delicious (Pre 1981)</i>	Bins	34.0	\$72.19	\$2,454.48	\$2,360.00	\$1,410.00	\$3,770.00	-\$1,315.52
<i>Golden Delicious (Pre 1981)</i>	Bins	36.0	\$101.57	\$3,656.34	\$2,475.00	\$1,410.00	\$3,885.00	-\$228.66
<i>Other Apples (Pre 1981)</i>	Bins	34.0	\$151.85	\$5,162.96	\$2,898.00	\$2,042.00	\$4,940.00	\$222.96
<i>Red Delicious (1981-1985)</i>	Bins	38.0	\$72.19	\$2,743.24	\$2,460.00	\$1,410.00	\$3,870.00	-\$1,126.76
<i>Golden Delicious (1981-1985)</i>	Bins	41.0	\$101.57	\$4,164.17	\$2,600.00	\$1,410.00	\$4,010.00	\$154.17
<i>Other Apples (1981-1985)</i>	Bins	36.0	\$151.85	\$5,466.66	\$2,948.00	\$2,042.00	\$4,990.00	\$476.66
<i>Red Delicious (Post 1985)</i>	Bins	40.0	\$72.19	\$2,887.63	\$2,510.00	\$1,410.00	\$3,920.00	-\$1,032.38
<i>Golden Delicious (Post 1985)</i>	Bins	45.0	\$101.57	\$4,570.43	\$2,700.00	\$1,410.00	\$4,110.00	\$460.43
<i>Other Apples (Post 1985)</i>	Bins	38.0	\$151.85	\$5,770.36	\$2,998.00	\$2,042.00	\$5,040.00	\$730.36
Cherries (tons)	Tons	4.9	\$1,492.00	\$7,322.74	\$3,222.55	\$2,620.20	\$5,842.75	\$1,479.99
Pears (bins)	Bins	31.8	\$141.91	\$4,509.03	\$2,898.00	\$1,410.00	\$4,308.00	\$201.03

<sup>1/</sup> Pasture yields are converted to the estimated tons of grass hay (dry matter) consumed by livestock. The yield is valued at the same price as grass hay.

<sup>2/</sup> Apples are divided into three tree age categories: those that were planted prior to 1981, those planted between 1981 and 1985, and trees planted after 1985.

Sources: Washington Growers Clearing House; Washington Agricultural Statistics; Washington State University Cooperative Extension; Jim DuBruille, Wenatchee Valley College.

Constraints reflecting historic changes in cropping patterns are incorporated in the model in order to reflect physical limits on suitable land for orchard and hay crops, as well as marketing limits for crops such as cherries and pears. In addition, lower bounds were placed on crop and non-crop acres assessed by OID to reflect current land use characteristics. For example, there are many landowners that are part-time farmers and manage small irrigated plots of five acres or less. These smaller plots, which are often associated with rural/residential use, have land prices that exceed the per acre market price of commercial agricultural land within OID. Furthermore, the small plots are not managed as a primary source of income and use is unlikely to be responsive to any changes presented by the water supply alternatives. Consequently, lower bounds reflecting the total acreage in each crop farmed on small plots (five acres or less) are incorporated into the model structure. Similar constraints are placed on OID assessed acres that are currently being used for urban yards/gardens, roads, ditches, and drains.

The Water Allocation Model provides annual irrigation delivery and crop water demand estimates for each model year. By comparing water delivery to water demand and incorporating irrigation conveyance and application efficiency information, it is possible to determine the estimated water shortage or surplus for each model year. Shortage criterion developed by the Bureau of Reclamation are applied to the annual district water supply data provided by the Water Allocation Model in order to determine the sustainable irrigated acreage in the district. The shortage criterion allow for a maximum 50 percent water shortage in a single year and a ten-year maximum cumulative shortage of 100 percent.

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## **Acreage Base and Cropping Pattern under the No Action Alternative**

Apple production within OID and much of eastern Washington is currently in a transitional period. Poor fruit prices for some prevalent varieties caused by overproduction, international competition, and quality considerations have prompted growers to shift to alternative crops, including other tree fruits, new apple varieties, and annual crops. Currently, some acreage within OID that has historically produced tree fruits is idle as producers decide what crops to plant. Other acreage with trees removed is being used for forage crops either as a temporary or permanent crop change. Because these shifts are currently taking place within the district, a projected baseline that differs from the current cropping pattern is used to represent the No Action Alternative. The projected baseline is determined through crop and acreage shifts estimated by the agricultural production model. Table 6 compares the current crop acreage with the crop acres applied to the No Action Alternative.

**Table 6**  
**Comparison of Current Crop Acres with No Action Alternative Acres**

Crop	Current Acres	No Action Alternative
Hay	473	636
Pasture	870	970
Apples	1,586	1,467
<i>Red Delicious</i>	660	185
<i>Golden Delicious</i>	287	98
<i>Other Apples</i>	638	1,184
Pears	436	449
Cherries	107	213
Apricots	4	4
Peaches	5	5
Other Minor Crops	30	30
Young Trees	397	377
Urban Yards/Gardens	549	549
Fallow/Idle	321	76
Roads, Ditches, and Drains	255	255
<b>Total</b>	<b>5,032</b>	<b>5,032</b>

The projected baseline (No Action Alternative) contains a higher number of acres in pasture and hay crops, fewer apple acres, and more pear and cherry acres. These changes are consistent with current trends in the district and reflect the transition from less profitable Red and Golden Delicious to other crops and apple varieties. Overall acreage devoted to orchard crops is projected to decline slightly from 2,535 to 2,515 acres. Acreages in minor crops and urban yards/gardens were held constant.

# Property Value and Tax Base Implications

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## Introduction

There are several facets to the taxation of an agricultural enterprise in the State of Washington. Farmland can be taxed at its highest and best use value. In Okanogan County this is considered its market value for agricultural production. Under state law, agricultural land can also be taxed as “open space.” If the agricultural land is planted to perennial plants, such as orchards and vineyards, the trees and vines may be taxed. Personal property, such as farm machinery and irrigation systems, is also taxed. All of these facets of taxation are discussed below.

## Taxation on Open Space Agricultural and Farm Land

In 1970, the Washington State legislature enacted the “Open Space Law” (Chapter 84.34 of the Revised Code of Washington (RCW)), which includes the “Open Space Taxation Act.” This Act “...allows property owners to have their open space, farm and agricultural, and timberlands valued at their current use rather than their highest and best use.”<sup>10</sup>

### Eligibility

Agricultural and farm land must meet the following requirements to be eligible for the “Open Space Taxation Act” and its “current use” tax provision:<sup>11</sup>

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<sup>10</sup> Washington State Department of Revenue, January 1993, “Open Space Taxation Act.”

<sup>11</sup> Washington State Department of Revenue, January 1993, “Open Space Taxation Act.”

- Contiguous 20 acres or greater parcels either used primarily for livestock or agricultural production for commercial purposes or enrolled in a U.S. Department of Agricultural cropland retirement program;
- Parcel(s) between 5 and 20 acres principally devoted to agricultural uses which produce \$100 or more per acre per year for three of five calendar years if classified before 1993, or \$200 or more per acre per year for three of five calendar years if classified in or after 1993;
- Parcel(s) less than five acres primarily used for agriculture that produces \$1,000 or more per year in three of five calendar years if classified before 1993, and \$1,500 or more per year if classified in or after 1993.
- Uses associated with agricultural purposes providing these uses do not exceed 20 percent of the classified land;
- Noncontiguous parcel(s) between one to five acres that is part of the farming operations; and
- Land used by owners and employees for their principal place of residence.

## Valuation Method

Open space farm and agricultural land is assessed at its true and fair value in the following manner:

- Assessors use the “net cash rental” valuation, an average of three years of annual rent on other farm and agricultural land of similar quality and location.<sup>12</sup>
- The assessed value is capitalized at typical rates after subtracting establishment, production, harvest, and delivery costs from the assessed value.<sup>13</sup>
- Component for property taxes equals a figure obtained by dividing the assessed value of all property in the county into the property taxes levied within the county in the year preceding the assessment and multiplying the quotient obtained by one hundred.<sup>14</sup>

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<sup>12</sup> Washington State Legislature, 2003, “RCW 84.34.065.”

<sup>13</sup> Okanogan Assessor’s Office, February 2003, “Current Use/Open Space Agriculture.”

<sup>14</sup> RCW 84.34.065.

## Valuation of Open Space Agricultural and Farm Land

The Department of Revenue uses code numbers to identify the different types of land use.<sup>15</sup> The code numbers, corresponding land use description, and assessed value per acre are presented in Table 7.

**Table 7**  
**Open Space Agricultural and Farm Land Values**

Land Use Code	Land Use	2002 Current Use Valuation per acre*	2003 Current Use Valuation per acre**
831	Orchard	\$600	\$672
832	Irrigated Alfalfa	\$400	\$500 to \$921
833	Dryland Alfalfa	\$100	\$129
834	Improved Pasture	N/A	N/A
835	Irrigated Pasture	\$150	\$200
836	Range Land	\$6	\$6
837	Dryland Grain	\$100	\$100

\*Okanogan County Assessor valuation, January 30, 2002.

\*\*Okanogan County Assessor valuation, January 29, 2003.

## Taxation of Perennial Plants, including Orchards and Grapes

For tax purposes, crops are divided into two classifications: 1) growing crops (tax exempt) and 2) perennial plants (taxable). To distinguish between the two groups, the Washington Department of Revenue states that “growing crops” are grown from soil for annual production, and “perennial plants” produce fruit or some other vegetation that are harvested annually.<sup>16</sup> Fruit orchards and grape vineyards are considered perennial plants.

When the perennial plants qualify the land for farm and agricultural classification, the assessor needs to determine if the market dictates that the perennial plant has a true and fair market value, irrespective of the highest and best use of the land. If this is the case, that value

<sup>15</sup> Department of Revenue, April 1999, “Land Use Codes”

<sup>16</sup> State of Washington, Department of Revenue, October 2002, “Property Tax Advisory.”

is the improvement value when the land is classified as farm and agricultural land.<sup>17</sup> Table 8 provides the valuation for different types of perennial plants.

**Table 8**  
**Valuation of Perennial Plants**

<b>Fruit Types</b>	<b>Value Per Acre</b>
Apple	\$1,000
Pear	\$1,500
Cherry	\$2,000
Stone Fruits	\$1,000
Wine Grape Vines	\$1,000

Under certain circumstances, perennial plants may have true and fair value of zero as a result of limited yields of the plants or change in market conditions for the crop.<sup>18</sup> In Okanogan County, orchards are taxed a flat rate because of current poor markets for the varieties of apples commonly grown.<sup>19</sup> In addition, Red and Golden Delicious trees more than 16 years old are not taxed.

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## **Taxation on Agricultural and Farm Land Not Meeting the “Open Space” Criteria**

Agricultural and farm land in Okanogan County that does not meet the criteria listed above is assessed using market value (comparable sales). This results in a wide range of values as sales in different areas vary.<sup>20</sup>

### **Irrigated Land Values**

In recent years, the market value of land with water rights in Okanogan County and within OID has declined dramatically. Currently, it is estimated that bare ground with OID water rights is selling at between \$1,000 and \$2,000 per acre compared to \$6,000 per acre in the mid-to late-1990s. However, the majority of the recent transactions are “forced sales” prompted by foreclosure. In general, there are few buyers in the market relative to the

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<sup>17</sup> State of Washington, Department of Revenue, October 2002, “Property Tax Advisory.”

<sup>18</sup> State of Washington, Department of Revenue, October 2002, “Property Tax Advisory.”

<sup>19</sup> Personal communication with Jim White, Chief Appraiser, Okanogan County, April 8, 2003.

<sup>20</sup> Personal communication with Jim White, Chief Appraiser, Okanogan County, June 11, 2003.

availability of land. One local expert indicated that land with water rights outside of the district is selling for a higher price due to the relative ease in transferring of water rights to new lands and new uses, whereas such transfers of irrigation district water rights are more difficult to accomplish.<sup>21</sup> The low market value of irrigated land within OID has resulted in a conversion from commercial agricultural to rural/residential use in some areas of the district. These subdivided parcels, which retain rights to OID water, tend to sell for a significantly higher per acre price than land remaining in agricultural use.<sup>22</sup>

## **Non-Irrigated Land Values**

Non-irrigated parcels in OID are assessed using market values. There are approximately 80 parcels of land in the district that are larger than five acres and designated as agricultural or farm land not classified as open space or undeveloped land. The average market value per acre for these parcels is \$3,054, with values ranging from a low of \$567 per acre to a high of \$11,571 per acre. The wide range of value contained in this data set limits its use for analytical purposes.

## **Personal Property Valuation on Agriculture and Farm Lands**

Agricultural and farm equipment that is not licensed is subject to the personal property tax.<sup>23</sup> The Department of Revenue assesses the value of personal property by starting with the original cost of the item. The “Index to Personal Property Valuation Indicators” and “2003 Personal Property Valuation Percent Good Indicators” determine the depreciation and economic life of personal property including tractors, combines, and irrigation systems. The minimum value factor is 20 percent which is used to value personal property in the years following the economic life of the property.<sup>24</sup> Much of the agricultural and farm equipment in the study area has already reached its economic life and is taxed at 20 percent of its initial value. The tax impacts that might result from reductions in farm equipment associated with crop acreage changes were not quantified in this analysis as it is unclear how much of this property, if any, would leave the local area. Agricultural personal properties have the following economic life and depreciation rates:

- Tractors have an economic life of 12.5 years with 12 percent depreciation annually until the minimum 20 percent is reached at 12.5 years.

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<sup>21</sup> Personal communication with Richard Witt, Appraiser, June 16, 2003.

<sup>22</sup> Personal communication with Jim White, Chief Appraiser, Okanogan County, May 2003.

<sup>23</sup> Personal communication with Jim White, Chief Appraiser, Okanogan County, April 8, 2003.

<sup>24</sup> State of Washington, Department of Revenue, December 2002, “2003 Personal Property Valuation Guidelines for Assessing Property as of January 1, 2003.”

- Combines have an economic life of seven years with 20 percent depreciation annually until the minimum 20 percent is reached at seven years.
- Irrigation systems have an economic life of eight years with 18 percent depreciation annually until the minimum 20 percent is reached at eight years.<sup>25</sup>

## Levy Rate

The levy rate is the rate per \$1,000 of assessed value used to determine the property tax; that is, the assessed value of your property multiplied by the levy rate for the area that a property lies within determines the annual amount of property taxes. This amount can change from year to year based on changes in assessed value and/or the levy rate.<sup>26</sup> The levy rate is found in the Taxing Code Authority database for Okanogan County and ranges between 12.81 and 14.65 for the parcels discussed in this report.<sup>27</sup> For purposes of analysis the average levy rate, 13.73, is used.

## Summary of Valuation

The appraised values for agricultural land vary widely in the assessment database. The objective of this study is to provide some measure of how changing agricultural land from irrigated to non-irrigated would affect the tax base and thereby, taxes. The methods used to value open space use (Table 7) offer the best chance of making a meaningful comparison of this. As presented in this table, irrigated cropland is valued from \$500 to \$921 per acre. For analytical purposes, a mid-range value of \$725 per acre is used. Non-irrigated cropland is valued between \$100 to \$129 per acre and a mid-range value of \$125 is used. Thus, when an acre changes from an irrigated status to a non-irrigated status but remains in agricultural production, its use value changes \$600.

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## Conclusion

Agricultural enterprises are taxed in a number of different ways as described above. Agricultural personal property and perennial plants in the study area are not a factor in considering tax changes. It is assumed that the equipment defined as agricultural personal

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<sup>25</sup> State of Washington, Department of Revenue, December 2002, “Index to Personal Property Valuation Indicators” and “Combined Table—2003 Personal Property Valuation Percent Good Indicators.”

<sup>26</sup> Okanogan County Assessor’s Office, February 2003, [www.okanagancounty.org/Assessor](http://www.okanagancounty.org/Assessor).

<sup>27</sup> Okanogan County Assessor’s Office, 2003, “2003 Levy Rates Okanogan County.”

property would continue to be utilized within Okanogan County. In addition, it is assumed that land affected by irrigation curtailment or water right transfers consists of annual and perennial crops that are not taxable.

The taxation for agricultural land only is thus the main focus, based on the effects of reducing irrigation for those lands. The only effects resulting from alternatives to the No Action Alternative were from the Water Purchase Alternative. Under the Water Purchase Alternative, 1,470 acres of irrigated cropland would shift to non-irrigated cropland. Using the value change of \$600, this would result in a value change of \$882,000. Using the levy rate of 13.73, this would reduce tax revenues by \$12,110. It should be mentioned that if budgets for entities in the levy districts do not change, this reduction results in a redistribution of the tax burden among taxpayers.

# Regional Economic Impacts Model (Task 3233)

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## Economic Base of Okanogan County

### Study Region Definition

For the purposes of this analysis, the study region is defined as Okanogan County, Washington. Okanogan County is Washington's largest county in terms of land area, with nearly 3.4 million acres.<sup>28</sup> About 30 percent of the land within the county is in private ownership. The Colville Indian Reservation occupies approximately 700,000 acres of the county, and is located in the southeast corner of the county. The remainder of the land area is made up of state and federal land.<sup>29</sup>

### Economic Base Information

#### IMPLAN Base Information

An input-output (I-O) model has been developed for this study, incorporating economic activity in Okanogan County. The model is used to measure the indirect effect that changes in crop production may have on the regional economy, in terms of changes in industry output, employment, and income. The model is based on IMPLAN ("Impact analysis for PLANning"), a system of software and data used to perform economic impact analysis. Originally developed by the USDA Forest Service, the system is now maintained and

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<sup>28</sup> 3,371,698 acres, according to U.S. Department of Agriculture, *1997 Census of Agriculture*.

<sup>29</sup> "Okanogan County Demographics," from the Okanogan County website, <http://www.okanogancounty.org/DEMO.HTM>, accessed June 9, 2003.

marketed by the Minnesota IMPLAN Group, Inc. (MIG). The databases are developed by MIG annually, using data collected at the national, state, and county level for all possible elements from a variety of state and federal sources. The model developed for this study is based on 2000 data, the most recently available at the time of this analysis.

Table 9 displays the base data for the Okanogan County IMPLAN model developed for this study. Three different economic measures are presented here and will be referenced when discussing impacts later in this report. “Output” (also known as total industry output) is the first measure, and represents the value of production of goods and services by businesses in the local economy. This can serve as an overall measure of the local economy, and is useful for comparing regions and looking at impacts.

The second measure is “Personal Income,” which is the sum of employee compensation and proprietor income. Employee compensation represents total payroll costs, including wages and salaries paid to workers plus benefits such as health insurance, as well as retirement payments and non-cash compensation. Proprietor income includes payments received by self-employed individuals as income, such as income received by private business owners, doctors, or lawyers. This measure is useful to show how the employees and proprietors of businesses producing the output share in the fortunes of those businesses. The third measure is “Employment.” This represents the annual average number of employees, whether full- or part-time, of the businesses producing the output.

**Table 9**  
**2000 Okanogan County IMPLAN Model**

<b>Industry</b>	<b>Output (\$millions)</b>	<b>Income (\$millions)</b>	<b>Employment (# of jobs)</b>
Agriculture, Forestry, and Fishing	\$202.329	\$94.907	5,480
Mining	\$17.024	\$3.843	92
Construction	\$119.066	\$33.523	1,081
Manufacturing	\$159.396	\$40.709	1,172
Transportation, Communication, and Public Utilities	\$56.535	\$16.636	450
Trade (Retail and Wholesale)	\$161.580	\$72.227	4,165
Finance, Insurance, and Real Estate	\$206.812	\$22.947	1,062
Services	\$223.606	\$115.075	5,152
Government	\$216.778	\$156.300	4,618
Other <sup>1/</sup>	-\$0.743	\$1.232	119
<b>TOTAL</b>	<b>\$1,362.383</b>	<b>\$557.401</b>	<b>23,391</b>

<sup>1/</sup> For this model, “other” consists primarily of domestic services (such as cleaning and maid services), as well as an “inventory valuation adjustment,” used to estimate the value of goods removed from inventory that were produced in a previous time period at a different value.

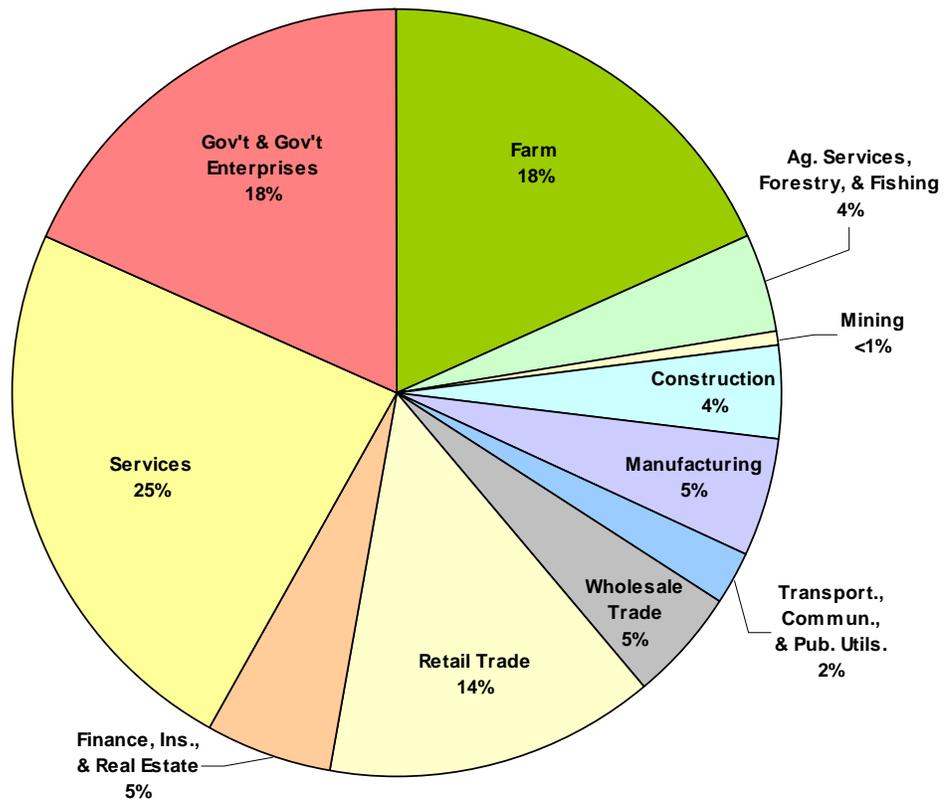
Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

Nearly \$1.4 billion in goods and services are produced within Okanogan County, with local industry supporting over 23,000 jobs and earnings in excess of \$557 million. The most significant industries in terms of output, each accounting for about 15 to 16 percent of the total county output, are services; government; finance, insurance, and real estate; and agriculture, forestry, and fishing. Nearly 5,500 jobs, or 23 percent of county employment, are in the agriculture, forestry, and fishing industry, making it the largest employer in the county. Other significant employers are services, government, and wholesale and retail trade.

## Employment and Earnings

Employment and earnings by industry are presented in Figures 3 and 4. These employment numbers from the Department of Commerce’s Regional Economic Information System (REIS) count all jobs, including non-agricultural wage and salary employment, agricultural employment, and non-agricultural jobs that are not covered by state unemployment insurance, such as the self-employed. These numbers may differ slightly from the IMPLAN model data, which are compiled from a number of sources.

**Figure 3**  
**Okanogan County 2000 Employment by Industry**



Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, May 2002, *Regional Economic Information System (REIS), 1969-2000*, CD-ROM.

The importance of agricultural production to Okanogan County's economy is evident by the large share, nearly one-quarter of total county jobs, found either on farms or in the agricultural services, forestry, and fishing sector. Over 85 percent of these agricultural jobs are in fruit orchards.<sup>30</sup> Apples are the prominent crop produced in Okanogan County, although other orchard crops are also grown, such as pears and cherries. Livestock production, primarily cattle, is also an important element of the county's agricultural sector.

The services sector is also a significant employer in Okanogan County, providing one-quarter of the total jobs in the county. One of the largest areas of employment in the services sector is health services, which includes private hospitals (public hospitals fall into the government category), dentist and doctor offices, nursing care facilities, and other health-related businesses.<sup>31</sup> Membership organizations also are significant employers in Okanogan County that belong to the services sector, and include unions, religious organizations, fraternal organizations, tribal administration, and similar groups. One of the larger employers in the county is the Colville Tribal Enterprise, which belongs to this division of the services sector.<sup>32</sup> Social services, such as individual and family social services, job training and vocational rehabilitation services, child day care, and residential care, and lodging services, such as hotels and motels, also provide employment within the county's services sector.

With 18 percent of employment, government is another significant employer in the county. Government is typically a large sector in all counties, but is even larger in Okanogan County due to the state and federal management of forests, parks, and dams in the county, as well as regulatory oversight of farming. Local government makes up about two-thirds of government employees, and many of these jobs are in primary and secondary education, as well as other executive and legislative work and public hospitals. A small portion of government employment is for the state, and includes employees of community colleges and social workers. The federal government has a large share, about 22 percent, of the government jobs in the county. Many of these jobs are related to the operation of the large irrigation system, while others are involved in land, mineral, or wildlife conservation.<sup>33</sup>

Retail and wholesale trade account for 14 and 5 percent of employment, respectively. Within the retail sector, eating and drinking establishments employ the most workers, followed by food stores and auto dealers and service stations.<sup>34</sup> About 80 percent of wholesale trade

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<sup>30</sup> Washington State Employment Security Department, Labor Market and Economic Analysis Branch, September 2002, *Okanogan County Profile*, p. 18.

<sup>31</sup> *Ibid.*, p. 23.

<sup>32</sup> *Ibid.*

<sup>33</sup> *Ibid.*

<sup>34</sup> *Ibid.*, p. 21.

employment is related to wholesale fresh fruit and vegetable distribution, primarily for apples, but also pears, other tree fruits, grain, and livestock/meat products.<sup>35</sup>

The other sectors of the local economy are responsible for smaller shares of employment. Finance, insurance, and real estate provide a little over five percent of the total jobs in the county, most of these in real estate and banking. Manufacturing employment contributes slightly less than five percent of total jobs, and the majority of these jobs are in lumber and wood processing. About four percent of total county jobs are in construction, which includes special trade contractors, general building contractors, heavy construction workers, and other construction trade workers. Transportation, communication, and public utilities, with just over two percent of total employment, consists mainly of trucking and warehousing; communications such as telephone, television, or radio services; and utilities such as electric, gas, and sanitary services. About one-third of these jobs are in trucking and warehousing, related to the transportation of agricultural crops. Mining is the smallest sector in the county in terms of employment, with less than one percent of the total jobs found in this sector.

Earnings represent the sum of three components of personal income: wage and salary disbursements, other labor income (includes employer contribution to pension and profit-sharing, health and life insurance, and other non-cash compensation), and proprietors' income. Earnings reflect the amount of income that is derived directly from work and work-related factors. Earnings can be used as a proxy for the income that is generated within a geographical area by industry sectors, and can be used to identify the significant income-producing industries of a region or to show trends in industry growth or decline.

In terms of earnings, government is the largest sector in the county, with 27 percent of all earnings. The government sector accounts for just 18 percent of jobs in the county, but these jobs tend to be higher paying than those in some other sectors, such as agriculture or retail trade. The second largest county sector in terms of earnings is the services sector, contributing 24 percent of total earnings. As in the government sector, higher pay also characterizes the manufacturing and transportation, communication, and public utilities sectors, where five and two percent of total jobs, respectively, are responsible for seven and four percent of total earnings.

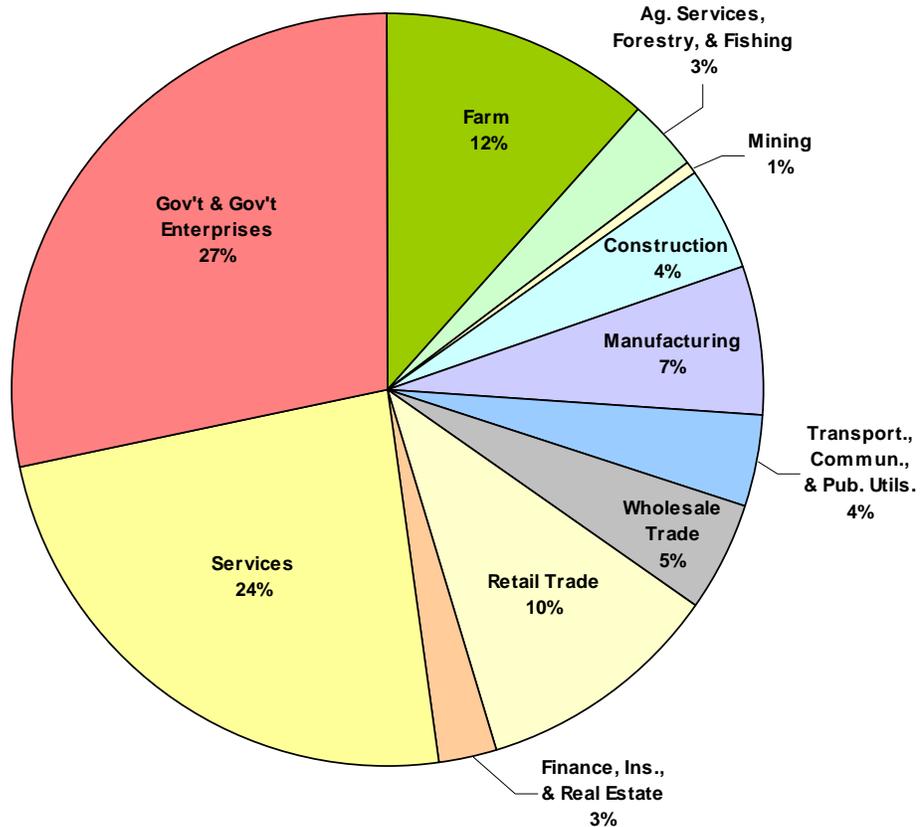
While agricultural jobs make up a large portion of county employment, earnings for farm and agricultural services, forestry, and fishing workers make up a lesser share of the total county earnings. Farm employment accounts for 18 percent of all jobs in the county, yet only contributes 12 percent of total earnings, and jobs in the agricultural services, forestry, and fishing sector account for four percent of total employment, yet only three percent of total earnings. The preponderance of part-time and seasonal workers in the agricultural industry,

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<sup>35</sup> Washington State Employment Security Department, Labor Market and Economic Analysis Branch, *Okanogan County Profile*, September 2002, p. 21.

as well as the tendency for wages to be lower for these jobs than those in other industries, contributes to this lesser earning power. This is also true for retail trade, where employment makes up 14 percent of total jobs, but these jobs earn just 10 percent of the county's total earnings.

**Figure 4**  
**Okanogan County 2000 Earnings by Industry**



Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, May 2002, *Regional Economic Information System (REIS), 1969-2000*, CD-ROM.

The labor force is made up of all persons 16 years of age or older within a specific geographic area who are either working or actively looking for work. The unemployment rate is the percentage of people within this labor force who are not employed, but still actively seeking work. The unemployment rate for Okanogan County has been almost five percentage points higher than the state average in the past three decades, only falling below 10 percent during the relatively prosperous 1990s.<sup>36</sup> The annual average unemployment rate

<sup>36</sup> Ibid., p. 10.

for Okanogan County was 11.6 percent in 2002, compared to a rate of 6.4 percent for Washington State.<sup>37</sup>

The seasonal nature of many agricultural jobs leads to a changing unemployment pattern in Okanogan County throughout the year. During the summer months, the unemployment rate typically falls, as agricultural work opportunities increase, and the unemployment rate increases in the winter months when agricultural work opportunities slacken off. This seasonality is typical of counties with agricultural or timber dependent economies.

## Population

Age, race, and ethnic characteristics of the Okanogan County population, as recorded by the 2000 Census, are presented in Table 10. A total of 39,564 people lived within the county in 2000. The distribution among age groups is fairly similar to that of the state of Washington except for a slightly larger percentage, 14 percent, of county residents are over the age of 65, compared to less than 11 percent for the state, and a smaller percentage of county residents, 16 percent, belong to the age group of 20 to 34 years, compared to 21 percent for the state.<sup>38</sup>

The county population is predominantly white, with 75 percent of those counted by the 2000 Census identifying themselves as white. The next largest racial group is American Indian or Alaska Native, which accounts for 11 percent of the county population, likely due to the presence of the Colville Indian Reservation. Of the 4,537 people within Okanogan County that identified their race as American Indian or Alaska Native, 3,369 live on the reservation.<sup>39</sup> Another 10 percent of the county population identified themselves as “Some Other Race.” Because the 2000 Census allowed the selection of more than one race for each person, another three percent of the county population selected “two or more races.”

Hispanic origin is tallied separately from race, as a person of Hispanic origin can be of any race. Over 14 percent of the county’s population identified themselves as being of Hispanic origin in the 2000 Census, as compared to 7 percent of the state population.<sup>40</sup> The economic

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<sup>37</sup> Washington State Employment Security Department, Labor Market and Economic Analysis Branch, April 1, 2003, *2001 Annual Average Washington State Resident Civilian Labor Force and Employment*.

<sup>38</sup> U.S. Census Bureau, Census 2000, *Table DP-1 Profile of General Demographic Characteristics: 2000*, Geographic Area: Washington.

<sup>39</sup> U.S. Census Bureau, 2000 Census of Population and Housing, 2002, *Summary Population and Housing Characteristics*, PHC-1-49, Washington, p. 48.

<sup>40</sup> U.S. Census Bureau, Census 2000, *Table DP-1 Profile of General Demographic Characteristics: 2000*, Geographic Area: Washington.

dominance of agriculture and specifically labor-intensive orchard crops such as apples and cherries in Okanogan County has drawn many laborers of Hispanic origin to the area.<sup>41</sup>

**Table 10**  
**Age, Race, and Ethnicity Characteristics of Okanogan County Population**

Age, Race, and Ethnicity Characteristics	Number of People	Percentage of County Total
<b>Age Group (years)</b>		
0 to 19 years	12,012	30%
20 to 34 years	6,156	16%
35 to 44 years	5,757	15%
45 to 54 years	5,937	15%
55 to 64 years	4,145	10%
65 years and over	5,557	14%
<b>Race</b>		
White	29,799	75%
Black or African American	109	<1%
American Indian and Alaska Native	4,537	11%
Asian	176	<1%
Native Hawaiian and Other Pacific Islander	28	<1%
Some Other Race	3,791	10%
Two or More Races	1,124	3%
<b>Hispanic Origin</b>		
Hispanic	5,688	14%
Non-Hispanic	33,876	86%
<b>TOTAL POPULATION</b>	<b>39,564</b>	<b>100%</b>

Note: Percentages may not appear to add to 100 due to rounding.

Source: U.S. Census Bureau, Census 2000, *Table DP-1 Profile of General Demographic Characteristics: 2000*, Geographic Area: Okanogan County, California.

Most of the residents of Okanogan County, or 60 percent of the total population, live outside of the incorporated areas of the county, as shown in Table 11. The largest city is Omak, with a population of 4,721 people, or 12 percent of the county's residents. The cities of Okanogan, with a population of 2,484, and Brewster, with a population of 2,189, each account for about six percent of the county total. The other cities and towns are even smaller, with the smallest being Conconully, with only 185 residents.

<sup>41</sup> Washington State Employment Security Department, Labor Market and Economic Analysis Branch, September 2002, *Okanogan County Profile*, p. 6.

**Table 11**  
**Okanogan County Cities and Population (2000)**

City	Number of People	Percentage of County Total
Brewster	2,189	6%
Conconully	185	<1%
Coulee Dam (part)	915	2%
Elmer City	267	1%
Nespelem	212	1%
Okanogan	2,484	6%
Omak	4,721	12%
Oroville	1,653	4%
Pateros	643	2%
Riverside	348	1%
Tonasket	1,013	3%
Twisp	938	2%
Winthrop	349	1%
Incorporated	15,917	40%
Unincorporated	23,647	60%

Source: Washington State Office of Financial Management, Forecasting Division, June 28, 2002, *April 1 Population of Cities, Towns, and Counties Used for Allocation of Selected State Revenues State of Washington*, (Census 2000 series).

## **Economic Well-Being**

Personal income is another indicator of a region's economic vitality. Personal income encompasses not only earnings, such as wages and salaries and other work-related compensation as discussed previously, but also transfer payments and investment income. Transfer payments are comprised of payments such as income maintenance, unemployment insurance, retirement benefits, and medical payments. Investment income includes interest, dividends, and rent from investments.

Per capita income is calculated by dividing the total personal income by the total population for a particular area. This figure can be used to compare regions or time periods, and is a useful indicator of the character of consumer markets and the overall economic "well-being" of area residents. Per capita income provides a good measure of how personal income is growing relative to a population, but does not necessarily indicate how that income is distributed among the population.

Okanogan County's per capita income in 2000 was \$20,117, which was substantially less than that of the state of Washington, or \$31,230.<sup>42</sup> Okanogan County ranked 34<sup>th</sup> of Washington's 39 counties in terms of per capita income, with King County reporting the highest, at \$45,536.<sup>43</sup>

Another measure used to indicate economic well-being in a region is the percentage of people who are estimated to live below the poverty level. These data are based on national levels set for minimum income requirements for various different sizes of households. There is no correction for the variation in costs of living among areas. For example, if housing prices and food prices in a county were lower than national levels, then a family in that county with an income at the national poverty level might be better off than a family with the same income living elsewhere in the nation. However, poverty figures can be useful to permit comparison between geographic areas and time periods.

The most recent available poverty data is from the 2000 Census, and is based on income levels reported for 1999. In 1999, 1,697 families in Okanogan County were found to have incomes below the poverty level, representing 16.0 percent of all families in the county for which poverty status was determined.<sup>44</sup> This is much greater than the 7.3 percent of families living in poverty that was reported for the state of Washington.<sup>45</sup> When individual people are counted, 8,311, or 21.3 percent, of the Okanogan County residents for which poverty status was determined lived below the poverty level in 1999.<sup>46</sup> This is also a far greater rate than that of the state, which reported that 10.6 percent of individuals for which poverty status was determined had incomes below the poverty level in 1999.<sup>47</sup>

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## Defining Regional Impacts

Regional economic impact analysis provides for the measurement of income, industry output, and employment adjustments that occur as a result of changes in the demand for regionally produced goods and services. Measures of economic impacts are generally developed to

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<sup>42</sup> U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, May 2002, *Regional Economic Information System (REIS), 1969-2000*, CD-ROM.

<sup>43</sup> Ibid.

<sup>44</sup> U.S. Census Bureau, Census 2000, *Table DP-3, Profile of Selected Economic Characteristics: 2000*, Geographic Area: Okanogan County, Washington.

<sup>45</sup> U.S. Census Bureau, Census 2000, *Table DP-3, Profile of Selected Economic Characteristics: 2000*, Geographic Area: Washington.

<sup>46</sup> U.S. Census Bureau, Census 2000, *Table DP-3, Profile of Selected Economic Characteristics: 2000*, Geographic Area: Okanogan County, Washington.

<sup>47</sup> U.S. Census Bureau, Census 2000, *Table DP-3, Profile of Selected Economic Characteristics: 2000*, Geographic Area: Washington.

provide an indication of modifications in the level of economic activity caused by resource changes within a region. Among the most common measures of economic impacts are jobs, employment earnings, total personal income, and industry outputs associated with the sales of goods and services. Depending on whether the resource adjustments include increases or decreases in the demand for local products, changes in the economic impact measures may be either positive or negative.

The impact measures are generally developed to provide an indication of the relative magnitude of changes to economic activity in a region. Increases or decreases in the sales of goods and services provide an overall indication of the impacts to regional economic activity. Economic impact models were developed so that the economic effects of changes in crop production resulting from changes in the allocation of Salmon Creek water supplies could be quantified.

One of the most commonly used methods of quantifying regional economic changes is through the use of an input-output model. A business is linked to the regional economy through its purchase of inputs required to produce goods and services and through the sales of these goods to other businesses in the local area. The input-output model includes detailed information on the purchases of production inputs from local business, purchases of inputs from outside the region, purchases of labor inputs, and payments to management and ownership.

## Direct Effects

Because the businesses within a local economy are linked together through the purchase and sales patterns of goods and services produced in the local area, an action which has a *direct* impact on one or more local industries is likely to have an *indirect* impact on many other businesses in the region. Direct impacts are the change in industry sales. These sales can be either for inputs to other industries in the region, or for final consumption by households and government in the region, or for exports from the region

For example, a decline in the production of wheat (a direct impact) will lead to a reduction in spending in the adjacent area as farms reduce production. Firms providing production inputs and support services to the farms would see a decline in their industry outputs as the demand for their products also declines. These additional effects are known as the indirect economic impacts. As household income is affected by the reductions in regional economic activity, additional impacts occur. The additional effects generated by reduced household spending are known as *induced* economic impacts.

Measuring the direct impacts is a key step in analyzing the impacts on a regional economy. Frequently, the impacts are measured in physical quantities, such as the change in the

quantity of a crop that is produced or in the quantity of power generated. These physical quantities must be converted to a sales value for introduction to the input-output model.

## Regional Impacts

These input-output models are used to measure these direct, indirect, and induced linkages within a regional economy. The tool most often used to measure these interrelationships is known as a multiplier. An input-output model generates a variety of multipliers and each is associated with a specific industry. A multiplier is a single number that quantifies the total economic effects (for all businesses) which arise from direct changes in the economic activity of a single industry. Multipliers can be generated to measure the total output, income, and employment effects associated with changes in the demand for regional goods and services. For example, an output multiplier of 2.5 for the fruit industry would indicate that a \$100,000 decline in sales by this industry would lead to an overall decline of \$250,000 in business sales throughout the economy, including the initial \$100,000 loss to the fruit sector. An employment multiplier of 2.0 for the railroad industry would indicate that a loss of 10 jobs in this sector would lead to an additional loss of 10 jobs in other industries for a total loss of 20 jobs throughout the regional economy.

IMPLAN models the economy by organizing and tracking the transactions of businesses and industries into as many as 528 sectors. It is a “non-survey” or secondary I-O system, as it does not require primary, survey-based data. It is based on national average technical relationships among industries to which information has been added on regional economic activity. The software allows for national average conditions to be adjusted in order to account for unique regional conditions. IMPLAN is a widely-used tool to analyze regional impacts of policy changes because of the ease with which specific regional or local information can be incorporated into a model. While such information generally is from secondary sources, primary data, if available, can be incorporated as easily.

Changes to the data are commonly made in order to “fine tune” the model, so that it accurately reflects the region’s unique economy. The IMPLAN data were compared with published sources in order to verify the accuracy of the data. Employment and earnings were compared to Regional Economic Information System (REIS, from the U.S. Department of Commerce) data, as well as county-level employment and earnings data from the Washington Employment Department. In most cases, the IMPLAN data were fairly consistent with other data sources, so no changes were made to employment or income data in the model.

The regional purchase coefficients (RPCs), which indicate the portion of locally produced goods and services used to meet local demand, were also evaluated. RPCs are by definition always positive and never larger than one. The supply/demand pool ratio, which is the ratio of local supply of a commodity to local demand, also serves as an upper limit for the RPCs. The appropriateness of the RPC for a commodity is evaluated based on a number of factors,

including the size of the economy and number of economic linkages within the economy, as well as the nature of the commodity itself. “Commodities” are defined as bundles of goods, and in some cases, this bundle of goods is small (e.g., for Sector 1, dairy farm products, the primary commodity is raw milk, with some livestock sales), while in others it is large (e.g., for Sector 315, screw machine products and bolts, a large number of different commodities are produced). For commodities where the bundle of goods is large, it is more important to know specifically which good(s) are being produced locally, and how much is likely to be used to meet local demand. Adjustments to a small number of RPCs were made based on local trading patterns, determined by identifying the manufacturers of certain goods within the county and knowledge of local conditions. For example, the RPC associated with hay and pasture was revised to reflect the fact that most of the hay demanded in the county would be supplied by local producers rather than imported from outside the county.

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## Measuring Regional Impacts

Impacts are measured by estimating the direct effect on the economy of a proposed action. Direct effects occur when there is a change in final demand in one or more sectors of the economy. Basically, final demand is comprised of sales to final consumption within the economy or sales that are exported from the local economy either as intermediate goods or for consumption elsewhere. Final consumption within the economy is primarily by households and government entities.

For example, the change expected here is in the production of fruit, or a change in fruit sales to final demand or exports. This would be the direct effect. It, and any other compensating changes, is entered into the IMPLAN model as a change in final demand and the indirect and induced changes are estimated by the model. The results are analyzed and their significance discussed later in this report.

## **Water Purchase Alternative, Issues, and Case Studies (Task 3234)**

Under the Water Purchase Alternative, water rights would be permanently acquired from OID and used to meet instream flow objectives in Salmon Creek. A review of existing water acquisition programs was conducted to provide guidance on water acquisition methods that have been effective in other areas. Specific attention was focused on programs that have acquired water rights from irrigation districts for environmental purposes. The programs presented in this review are limited to programs that involved making water available through crop fallowing rather than water conservation or source substitution. In addition to this review, alternative program structures were presented and discussed with OID in order to elicit a program structure that would likely be followed by the district if water purchases were determined to be an acceptable alternative. Lastly, the Washington Department of Ecology was consulted in order to determine the agency's likely course of action when assessing the proposed water right transfers.

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### **Western Water Transfer Programs – A Summary**

Water acquisitions by federal and state agencies and nonprofit groups for flow augmentation are increasing throughout the Pacific Northwest and other western states. In 1990, for example, it is estimated that less than \$500,000 was spent on water right purchases and leases for environmental purposes. In comparison, current annual expenditures are estimated at \$20 million.<sup>48</sup>

Active water acquisition programs have been increasing in the Pacific Northwest primarily due to efforts to improve habitat conditions for federally protected fish species. Currently, there are programs to purchase or lease water for instream flows in the Yakima, Walla Walla,

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<sup>48</sup> Landry, Clay, 2001, "Buy that Fish a Drink," *Water Law*, 12 (4):240.

and Dungeness River Basins in Washington, the Deschutes and Klamath River Basins in Oregon, and the Snake and Lemhi River Basins in Idaho. Active environmental purchase programs also exist in Montana, California, and Nevada, among other states.

## **Contract Structure**

A variety of methods are used to procure water in the programs reviewed. Acquisition methods include permanent purchases, leases, donations, dry year options, and split-season leases. In many cases, program policies and state water law have restricted the acquisition methods that can be utilized. For example, split-season leases have not been allowed in some states and permanent purchases have not been an element of public programs in others. The most common contract term has been an annual lease extending throughout the irrigation season. Leases are often negotiated directly with the water right holder or district or some type of auction mechanism is employed in which water right holders submit bids to sell or lease water their water rights. In other cases, a standing offer price is used.

Few water acquisition programs implemented to augment streamflows have permanently acquired water rights from irrigation districts. Many districts are reluctant to allow a permanent transfer of water outside of district boundaries due to uncertainties surrounding water rights and potential impacts on remaining district members and the surrounding community. Due to the limited number of active public programs that permanently acquire water rights for instream flows from irrigation districts, this review was expanded to include irrigation district involvement in permanent transfers for other purposes, including municipal and industrial development. Several of the programs are summarized below.

## **Yakima River Basin, Washington**

In Washington State, the Bureau of Reclamation, Upper Columbia Area Office, has been permanently acquiring water rights under the Yakima River Basin Watershed Enhancement Program in an effort to improve streamflow conditions for federally protected fish species. A limited number of these purchases have involved water rights within irrigation districts. USBR deals with the water right owners individually and negotiates prices based upon appraised value. In all cases, the Upper Columbia Area Office continues to pay the annual district assessment fees associated with the water rights.<sup>49</sup> All water right purchases have come from land used to produce forage crops.

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<sup>49</sup> Personal communication with Jim Esget, USBR Upper Columbia Area Office, April 2003.

## **Stillwater National Wildlife Refuge, Nevada**

The U.S. Fish and Wildlife Service in Fallon, Nevada, has one of the most active programs identified to permanently acquire water rights from irrigation districts. USFWS has been buying water rights from within the Newlands Project since 1985 to improve water supply to the Stillwater National Wildlife Refuge. USFWS has purchased over 33,000 acre-feet of entitlements with a goal of acquiring 75,000 acre-feet. In most cases, USFWS purchases the land and appurtenant water rights together through negotiation with individual property owners. The appraised market value of the property is used to establish payment. The water rights are then transferred to the refuge and the land is sold as dryland property if it is located outside of the refuge boundary.<sup>50</sup> All water right purchases have come from land used to produce forage crops primarily in support of local dairy operations. USFWS pays annual assessment fees to the irrigation districts for all water transferred to the refuge.

## **California Irrigation Districts**

### **Glenn-Colusa Irrigation District**

Glenn-Colusa Irrigation District (GCID) is located in the northern Sacramento Valley. Its service area includes almost 130,000 acres. The dominant crop is rice, accounting for about 70 percent of planted acres. The district has pre-1914 rights to Sacramento River water and is also a Central Valley Project (CVP) contractor.

GCID has made water transfers for more than a decade, typically to other agricultural districts and to some municipal and industrial (M&I) users in the area. The district's transfer program is compatible with other district objectives. Recently, the district negotiated with Metropolitan Water District of Southern California (MWD) to sell water under an option arrangement. In none of these cases is water transferred for more than a year, and GCID does not anticipate making any permanent transfers. GCID also does not anticipate changing substantially the amount of water it transfers in the future.

GCID determines the availability of water for transfer based on information from board members (who are farmers) and from other feedback from the irrigators it services. Transfer opportunities are open to all irrigators in the district. The water for transfers is typically from conserved water based on improved irrigation techniques and from groundwater substitution. It is not taken from the district's surface water supplies, unless such water is made available by land fallowing. The district currently does not have a policy regarding the maximum amount of land in its service area which may be fallowed to provide water for transfer.

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<sup>50</sup> Personal communication with Richard Grimes, USFWS, Fallon, Nevada.

Prices for transferred water are determined by negotiations between the district and the buyer. Both cost and market considerations enter into pricing. The district receives payment for the transferred water, then pays the irrigator(s) making the water available. If land is fallowed, the district does not have specific requirements for maintenance and pest control on the land. However, the seller is responsible for all assessments and fees connected with the water the seller makes available for transfer.

## **San Joaquin River Exchange Contractors Water Authority**

The San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) is a joint-powers authority with four separate member agencies centered around Los Banos, California. The combined service areas of the four agencies include almost 240,000 acres. Prominent crops are cotton, grains, alfalfa, and nuts. The Exchange Contractors hold pre-1914 water rights on the San Joaquin River. In lieu of diversions from the river, the Exchange Contractors receive water conveyed by the Delta-Mendota Canal. All water delivered is for agricultural purposes.

Transfers are done by the Exchange Contractors rather than by the individual agencies. All transfers are for a single year and must be compatible with the Exchange Contractors' transfer policy. Transfers have been made for about 10 years, but no permanent transfers have been made and no permanent transfers are anticipated at any time in the future. The amount of water available for transfers is determined by the district managers. Historically, transfers have gone only to other agricultural districts and to local wildlife refuges. In the future, the Exchange Contractors may make transfers to M&I users.

Water for transfer is made available through water conservation using improved irrigation techniques and tailwater recovery systems. In the past, some water has also been made available by land fallowing. The Exchange Contractors do not currently have a policy on the maximum amount of land which can be fallowed in any year, but anticipate having such a policy in the future.

Prices for transferred water are based on both current market prices and negotiations. Firm water is more expensive than option year water. Payment goes from the buyer to the Exchange Contractors, which subtracts its costs and provides net proceeds to the irrigator. The irrigator is responsible for all assessments and fees. Irrigators fallowing land are responsible for maintaining their land and for monitoring groundwater levels, since parts of the Exchange Contractors service area are reliant on recharge for groundwater use.

## **Tulare Lake Basin Water Storage District**

Tulare Lake Basin Water Storage District (TLB) is a State Water Project (SWP) contractor in Corcoran, California in the San Joaquin Valley. All water is used for irrigated agriculture, with cotton, grains, and hay the prominent crops. The district has been making single-year exchanges for about 20 years and permanent transfers for two years. The district does not decide in any year how much water to transfer, but rather responds to requests from landowners in the area.

Transfers have been made to other agricultural districts and, more recently, to M&I users. TLB has made single-year transfers to agricultural districts and permanent transfers to M&I users. The only water source is SWP water. District policy requires that irrigators wishing to sell water permanently must designate the land which will no longer be irrigated with SWP water. If an irrigator has alternative water sources, he or she may continue to irrigate the land. If the alternative source is groundwater, the transfer amount is limited to the amount of SWP water that has historically been applied to the land.

Pricing for the water is set based on negotiations between the individual irrigator and the buyer. The TLB does not get involved in the negotiations. The seller is responsible for all fees and assessments. However, the district charges a flat \$5,000 fee for administration. If land is fallowed to make water available for transfer, the landowner must create a one-half mile buffer around his or her land to protect neighboring parcels from weeds and pests.

## **Wheeler Ridge-Maricopa Water Storage District**

Wheeler Ridge-Maricopa Water Storage District (WRM) is a member of Kern County Water Agency (KCWA) and receives SWP water for which KCWA contracts. Cultivated land within WRM ranges from 60,000 to about 95,000 acres depending on water availability, crop prices, and other factors. Historically, most district land was in annual crops, particularly cotton. More recently, however, many more acres of permanent crops have been developed, while the acreage of land in annual crops has fallen. Since the early 1990s, WRM has diversified its portfolio of water sources to include not only SWP water, but also groundwater from district wells, water banks, and other sources.

WRM has made both temporary and permanent transfers for about 20 years. Temporary transfers have been made to other agricultural districts and environmental users, while permanent transfers have been made to M&I users. Permanent transfers have gone primarily to urban districts. Sources of water include surface water, groundwater substitution, and crop fallowing. The district has transferred some SWP water permanently.

Pricing is based on market forces as well as costs. The seller is responsible for all assessments and fees, but the district does not have a policy on maintenance or pest control on land which has been fallowed.

## Summary

A summary of the elements that are consistent across the programs is provided below.

- Permanent transfers of water rights outside of irrigation districts are occurring more frequently in some regions but are still relatively uncommon. Some irrigation districts have established water transfer policies prohibiting a permanent sale of water rights.
- All permanent transfers reviewed for this analysis involved water used to produce relatively low valued forage crops or water made available through conservation. No water transfers from permanent crops such as orchards were identified.
- Purchase prices are negotiated between the buyer and seller and are often based upon an appraisal of market value of the water rights individually or the land and water rights together.
- In all cases reviewed, annual assessments associated with the permanently transferred water are paid to the district. In some cases the buyer is required to pay annual assessment fees to the irrigation district in order to prevent increased assessments to other irrigators in the district. In others, the irrigation district requires the water right seller to pay the assessment fees.

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## Washington Water Transfer Rules

A key step in the instream flow water right transfer process is to quantify the amount of water that can be transferred from its current use to instream flows. In Washington, the highest annual consumptive use quantity within the last five years of continuous use can be permanently transferred to a trust water right for instream flows if the transfer involves the full water right. For a partial transfer, the transferable quantity is determined as the average two highest years of use within the most recent five year period of continuous use.<sup>51</sup> In either

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<sup>51</sup> Washington Department of Ecology, January 2003, "Washington Water Acquisition Program, Finding Water to Restore Streams."

case, there can be no impairment to other water right holders. Washington's quantification procedures differ from other states. In Oregon, for instance, the full diversion quantity listed on the water right is allowed to be transferred provided there is no injury to other water right holders.

"Primary" and "secondary" stream reaches are considered when quantifying instream flow water right transfers in Washington. The primary reach is the portion of the stream between the historical point of diversion and the point at which return flows contribute to stream flow. The secondary reach is the reach downstream of the primary reach. Washington transfer rules allow the full, historic diversion quantity to be transferred to instream flows in the primary reach. Below the primary reach, only the consumptive portion of the water right can be protected as an instream flow right.

Washington Department of Ecology (Ecology), which has responsibility for overseeing state water rights, has not made a preliminary determination of the extent, validity, and transferable quantity associated with OID's Salmon Creek water rights. However, Ecology has indicated that it would need to look at the full extent and use of all of OID's water rights as part of the determination.<sup>52</sup> In addition, because some acres within OID are only served by Salmon Creek while others receive a mix of water supply, Ecology may need to examine intra-district water use as well. At this point, it cannot be determined which acres will be idled as a result of the Water Purchase Alternative. Furthermore, it is unclear if the transferable quantity from acres served only by Salmon Creek would differ from acres served by multiple water sources.

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<sup>52</sup> Personal communication with Bob Barwin, Washington Department of Ecology, June 2003.

## **Direct and Indirect Impacts of Water Supply Alternatives (Task 3236)**

The following sections describe the direct and indirect economic impacts of the three water supply alternatives. As previously mentioned, three distinct flow regimes representing different enhancement options are analyzed for each action alternative. Each enhancement option results in different water supply volumes to OID from each source available to the district. However, while the mix of water supply may differ among the three enhancement options, the Water Allocation Model estimates that overall district crop water needs are met in most years. Consequently, the impacts are presented for each action alternative but separate impacts are not provided for each of the enhancement options.

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### **Impacts on Okanogan Irrigation District**

#### **No Action Alternative**

As previously described, a projected baseline is used to establish the cropping pattern within OID due to cropping changes that are currently in progress within the district. According to the Water Allocation Model used by the hydrologist in this study, annual water diversions to OID average 15,745 acre-feet from all supply sources and range between 13,149 and 19,201 acre-feet. The Water Allocation Model allows OID to respond to reduced water supplies through short-term improvements in on-farm irrigation efficiency and increased pumping from the Shellrock Pump Station. According to the Water Allocation Model, these two actions allow OID to divert and pump adequate water supplies to fully meet crop irrigation needs in all model years.

According to data provided by OID, the variable cost (energy and O&M) of operating Shellrock averaged \$40.19 per acre-foot pumped in 2001 and 2002. Under the No Action Alternative, pumping from Shellrock is estimated to increase over historic levels. Between

1987 and 2002, OID pumped an average of 1,733 acre-feet annually from Shellrock. In comparison, the Water Allocation Model predicts that OID will pump an average of 2,414 acre-feet from Shellrock each year. The estimated annual variable cost associated with this level of pumping is \$97,021 compared to \$69,642 historically. This increased level of pumping would result in somewhat higher assessment charges to district members due to higher water delivery costs. In this analysis, the increased pumping costs are incorporated into the estimation of direct economic impacts as an increase in production costs.

Table 12 summarizes the cropping pattern, revenues, and returns estimated under the No Action Alternative.

**Table 12**  
**OID Crop Acres, Revenues, and Net Income, No Action Alternative**

Crop	Model Acres	Revenue per Acre	Costs per Acre	Net Income per Acre	OID Revenue	OID Net Income
Alfalfa	591	\$767	\$728	\$39	\$453,225	\$22,831
Other Hay	45	\$878	\$847	\$31	\$39,232	\$1,384
Pasture	969	\$432	\$420	\$12	\$418,766	\$11,938
Apples	1,467	\$5,308	\$4,833	\$475	\$7,786,644	\$696,318
Pears	450	\$4,509	\$4,308	\$201	\$2,029,066	\$90,466
Cherries	213	\$7,323	\$5,843	\$1,480	\$1,559,743	\$315,237
Apricots	4	1/	1/	1/	1/	1/
Peaches	5	1/	1/	1/	1/	1/
Other Minor Crops	30	1/	1/	1/	1/	1/
Young Trees	377	1/	1/	1/	1/	1/
Urban Yards/Gardens	549	-	-	-	-	-
Fallow/Idle	76	-	-	-	-	-
Roads, Ditches, and Drains	255	-	-	-	-	-
<b>Total</b>	<b>5,032</b>				<b>\$12,286,675</b>	<b>\$1,138,173</b>
<b>Adjusted for Additional Pumping at Shellrock</b>					<b>\$12,286,675</b>	<b>\$1,110,795</b>

<sup>1/</sup> Crop revenues, production costs, and returns were not calculated for minor crops (apricots, peaches, and “other”) and young trees. Acreages in minor crops were assumed not to vary under the alternatives and therefore were not explicitly modeled.

Under the No Action Alternative, annual revenues and net income to producers within the district are estimated to be \$12,286,675 and \$1,138,173, respectively. These revenues and net returns do not include minor crops or annual costs associated with young (non-bearing) fruit trees. Total net income is reduced to \$1,110,795 after adjusting for the increased costs associated with pumping additional water above historic levels at Shellrock.

## **Impacts of Okanogan River Pump Exchange (80 cfs)**

Under the Okanogan River Pump Exchange Alternative, it is assumed that OID will not bear any of the fixed costs associated with constructing the facility or pipelines to convey the water to the district. However, OID will pay pumping costs equivalent to the annual pumping costs identified under the No Action Alternative (\$97,021 per year). Pumping costs beyond the No Action level are assumed to be paid by a public agency located outside of Okanogan County. The Water Allocation Model estimates that pumping from the Okanogan River would average as high as 9,491 acre-feet annually and that district irrigation needs are fully met in all years.

## **Impacts of Shellrock Pump Upgrade (35 cfs)**

Under the Shellrock Pump Upgrade Alternative, it is assumed that OID will only be responsible for pumping costs up to the amount estimated under the No Action Alternative (\$97,021 per year) and that a public agency would pay capital and operating costs above that amount. Under the alternative, the Water Allocation Model estimates that district irrigation needs are fully met in all years for two of the enhancement options and all but four of the 99 model years under the other enhancement option (steelhead and Chinook) according to the Water Allocation Model. The level of shortage identified by the model is within the range allowed by the shortage criteria. As a result, the long-term cropping pattern, total production, crop revenue, and net income within the district are not estimated to change relative to the No Action Alternative. The shortages, which occur during periods of sustained drought, will require the district to ration water supplies and may result in a small reduction in crop yields. However, the level and duration of the estimated shortages indicate that yield losses are likely to be minor and are therefore not specifically addressed in this analysis. As a result, the cropping pattern, total production, and crop revenue within the district is estimated to not change relative to the No Action Alternative. Impacts of Water Purchase Alternative

## **Structure and Analysis of Water Purchase Alternative**

Several potential alternative structures of the Water Purchase Alternative were presented to the OID Board in order to determine the most appropriate structure for impact analysis. The alternative structures included:

- Limit participation to specific district locations or service areas;
- Limit participation to certain crop types;
- Allow open access to all district members;

- Place upper acreage limits on district member participation;
- Allow district members to individually negotiate price; and
- Set a fixed price for water.

The Board indicated that if it were to pursue the Water Purchase Alternative, it would allow any district member to participate rather than restrict participation according to location or crop type. In addition, the price of water would be set through negotiation at the district level and would not vary across participating acreage or district members. Lastly, upper limits would be placed on participation of each district member if more acres than needed to meet the streamflow objective were enrolled in the program.<sup>53</sup> This is an unlikely scenario, however. As demonstrated by other programs in effect, permanently acquiring water rights on a large scale typically requires a significant amount of time and occurs incrementally.

The following criteria and assumptions are applied in the analysis of the Water Purchase Alternative. These criteria and assumptions are developed from the requirements as specified by the OID Board, review of existing transfer programs, discussions with Ecology, and analysis of property values in the area.

- Water would be made available to the instream flow water right through irrigated land retirement. The same volume of water (5,100 acre-feet) would be allocated to instream flows in Salmon Creek in all years and could not be carried over as reservoir storage for use in subsequent years.
- Crop acres are retired according to estimated profitability with the least profitable crops retired first. This is consistent with observed activity in other water purchase programs. In addition, because the price for water rights would be set by the district rather than negotiated on an individual basis, owners of less productive land with less profitable crops would have more of an incentive to sell water than owners of more productive land.
- No crops are retired from accounts with less than five assessed acres. Small acreage properties (less than five acres) are not generally used for commercial agriculture and agricultural income from these properties does not contribute a large portion of the overall income of the residents. Furthermore, these rural/residential parcels sell for a significantly higher price per acre than larger agricultural properties within the district boundaries. Consequently, it is less likely that the small acreage properties would be willing to permanently sell their water rights.

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<sup>53</sup> Personal communication with OID Board, March 2003.

- The water right purchaser would pay the annual irrigation assessment for retired acres. This is an important assumption because it allows assessment fees to remaining district members to be unaffected by land retirement. If the assessment fee on the retired land was not continued, district fixed costs would spread over fewer acres and assessment fees would increase as a result. The higher assessment fees could have additional impacts on crop production and income within the district.
- A water purchase price is not determined in this analysis for permanently transferred water. However, the decline in net income estimated by the Agricultural Production Model represents the estimated *minimum* level of payment that would be required to leave irrigators no worse off. A premium above this amount is typically required to bid water away from irrigators. The level of premium depends upon many specific factors that were not analyzed in this study.
- Because there are little, if any, return flows to lower Salmon Creek, it is assumed in this analysis that the full diversion quantity would be transferable to an instream flow water right.

Under the Water Purchase Alternative, the Water Allocation Model estimates that irrigation diversions by OID would range between 9,972 and 10,679 among the three enhancement options. Despite the smaller district size, pumping from Shellrock would be significantly increased over the No Action Alternative, on average. Pumping at Shellrock would increase to as much as 5,092 acre-feet in an average year, compared to 2,414 acre-feet under the No Action Alternative. Under one of the enhancement options, crop water requirements are not fully met in two consecutive years out of the 99 model years. The shortage criteria are not violated and the remaining district acreage (following the water right sale) will not be impacted in the long-term. The shortages may result in a small reduction in crop yield but the impact is expected to be insignificant due to the low level of shortage.

Table 13 summarizes the change in cropping pattern and irrigated acres associated with the Water Purchase Alternative. Total irrigated acreage within OID is reduced by 1,470 acres under this alternative. Hay and pasture acres are reduced by 941 acres. Orchard crops, primarily consisting of apples, are reduced as well. Due to the reduction in orchard crops, the estimated acreage in young trees is also reduced.<sup>54</sup>

Estimated changes in revenue and net income are shown in Table 14. Total OID revenue is estimated to decline by \$2.9 million annually. Net income is not projected to change

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<sup>54</sup> It is assumed that no more than 15 percent of the orchard acres are in young trees.

however because it is assumed that the reduction in income is exactly offset by payments to growers participating in the water purchase program.

**Table 13**  
**Change in Old Cropping Pattern Under the Water Purchase Alternative**

Crop	Acreage Change
Hay	-444
Pasture	-497
Apples	-260
Pears	-190
Cherries	0
Apricots	0
Peaches	0
Other Minor Crops	0
Young Trees	-79
Urban Yards/Gardens	0
Fallow/Idle	0
Roads, Ditches, and Drains	0
<b>Total Acreage Reduction</b>	<b>-1,470</b>

**Table 14**  
**Change in Revenue and Net Income, Water Purchase Alternative**

Action Alternative	Change in Revenue	Change in Net Income
3	-\$2,913,048	\$0

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## Indirect Impacts on the Economy of Okanogan County

Each of the action alternatives would cause some changes in economic activity in Okanogan County. All of the alternatives had an effect on household income within the county, and the water purchase alternative also had an effect on agricultural revenue.

For the Water Purchase Alternative, the additional losses anticipated in agricultural revenue were also entered into the economic impact model for Okanogan County. The impacts resulting from the change in agricultural revenues are presented in Table 15. The losses in agricultural revenue are estimated to be \$2.9 million under the Water Purchase Alternative. These result in additional indirect and induced losses of economic output within the local economy, with the total loss to output of nearly \$4.1 million, primarily in the agriculture sector. Job losses associated with the change in agricultural revenue are fairly significant,

and are estimated to be 118 jobs. Most of these jobs lost are farm labor directly involved in the production and harvesting of the crop that is no longer produced. The agricultural jobs lost represent about two percent of the total jobs in the agriculture sector. Income is reduced by nearly \$1.8 million annually in Okanogan County.

**Table 15**  
**Economic Impacts of Change in Agricultural Revenue,**  
**Water Purchase Alternative (Action Alternative 3)**

<b>Impacts</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
Output (\$)	-\$2,913,048	-\$502,140	-\$639,924	\$4,055,112
Income (\$)	-\$1,356,617	-\$203,545	-\$213,318	-\$1,773,479
Employment ( <i>jobs</i> )	-96.0	-11.9	-10.5	-118.4

# Economic Impacts of Reservoir Reoperation (Task 3237)

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## Recreation in Conconully and Okanogan County

### Okanogan County Overview

In 1972, the North Cascades Scenic Highway (Highway 20) was completed, thus significantly reducing the travel time for people from Seattle and other areas on the I-5 corridor to the scenic North Cascades and to Lake Chelan. Since that time tourism has increased in importance in Okanogan County.<sup>55</sup> Okanogan County offers impressive vistas, including large glaciers in the North Cascades. It also offers opportunities for alpine and nordic skiing, hiking, biking, mountain and rock climbing, snowmobiling, fishing, hunting, lake and river recreation, rodeos, pow-wows, and other outdoor activities.<sup>56</sup>

Okanogan County can be viewed as having five distinct recreation regions, as defined by the geography of the county, the prevalence of federal lands, and the types of recreation available. These are the northwest, southwest, central, northeast, and southeast areas, which are described below.

The Okanogan National Forest, including the Pasayten Wilderness, covers a great deal of the northwestern area of the county and includes a large section of the Northern Cascade

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<sup>55</sup> Twisp Chamber of Commerce, 2002, "Welcome to Twisp, Washington!" Webpage: <http://www.twispinfo.com/history.html>, accessed June 17, 2003. Okanogan County Tourism Council, 2002, "Camping and Fishing Guide to Washington's Okanogan County." The Omak Chronicle, Inc.

<sup>56</sup> The Omak Chronicle, Inc., 2002, *Vacationland: The Official Visitors' Guide to Okanogan Country 2002-03*, The Chronicle, Omak, Washington. Omak-Okanogan County Chronicle, 2003, *InfoBook Okanogan County 2003*, Omak, Washington.

Mountains. The Pacific Crest National Scenic Trail is located near the northwest border of the county. The area is popular for cross-country skiing and snowmobiling in the winter, and in the summer, hiking, biking, rafting, and fishing are common.<sup>57</sup>

The southwest region includes the popular Methow River Valley as well as more of the Okanogan National Forest, which includes a portion of the Lake Chelan-Sawtooth Wilderness along the southwest border of the county. Towns in the area include Pateros, Methow, Carlton, Twisp, Winthrop, and Mazama, of which Twisp, Winthrop, and Mazama are perhaps the best known for outdoor recreation and tourism. This area is also popular for cross-country skiing in the winter, and hiking, biking, rafting, camping, and fishing in the summer.<sup>58</sup>

The central county region is defined by the Okanogan River Valley that extends from the confluence of the Okanogan and Columbia rivers in the south, to Osoyoos Lake in the north at the Canadian border. The Okanogan Valley includes, from the southern county border to the northern border, the towns of Brewster, Monse, Malott, Okanogan, Omak, Riverside, Tonasket, Ellisforde, and Oroville.<sup>59</sup> These towns are popular for rodeos, horseback riding, fishing, hunting, motorcycle riding, snowmobiling, and skiing.<sup>60</sup>

West of the Okanogan River Valley are the towns of Conconully, Loomis, and Nighthawk. Fishing, hunting, camping, water sports, and snowmobiling are popular in this area. The Okanogan National Forest extends only partway into this region from the west, with a small section of the forest extending east above the northern border of Conconully that features several campgrounds.<sup>61</sup>

The northeast section of the county is delineated by the Okanogan Highlands that includes the towns of Wauconda, Havillah, Chesaw, and Molson. Patches of the Okanogan National Forest appear throughout this region. Downhill skiing at the Sitzmark Ski Hill, fishing and water sports at various lakes, hunting, camping, and other activities are popular in this area.<sup>62</sup>

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<sup>57</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002. Omak-Okanogan County Chronicle, 2003.

<sup>58</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002. Omak-Okanogan County Chronicle, 2003. Twisp Chamber of Commerce, 2002.

<sup>59</sup> Okanogan County Tourism Council, 2002.

<sup>60</sup> Omak-Okanogan County Chronicle, 2003.

<sup>61</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002. Omak-Okanogan County Chronicle, 2003.

<sup>62</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002. Omak-Okanogan County Chronicle, 2003.

The western half of the Colville Indian Reservation covers most of the southeast section of the county. The reservation includes the towns of Disautel, Nespelem, and Keller. Just south of the Colville Indian Reservation and located on the Columbia River are the towns of Bridgeport, Coulee Dam, and Elmer City. The reservation features the unusually deep glacially formed Omak Lake and a number of camping sites that are open to non-tribal members.<sup>63</sup> Coulee Dam is noted for its laser light shows performed at the Grand Coulee Dam among other attractions, and Bridgeport is the location of a State Park. Gaming is also available at the Confederated Colville Tribes' Coulee Dam Casino.<sup>64</sup>

There are six state parks within the county. Those that feature camping are, from west to east Pearrygin Lake near Winthrop, Alta Lake south of Methow and Pateros, Conconully State Park, Bridgeport State Park, and Osoyoos Lake State Park. Fort Okanogan State Park and Museum is a day use park overlooking the Columbia River north of Bridgeport. Three state parks are located outside the county but near its borders: Twenty Five Mile Creek and Lake Chelan located on Lake Chelan, and Steamboat Rock, southwest of Grand Coulee.<sup>65</sup>

Lake Chelan and the North Cascades National Park are close to the county's southwest border, and the Colville National Forest includes many lands just east of the northern part of the county's eastern border. Chief Joseph Dam is located just south of the county along the Columbia River.<sup>66</sup> The Canadian border forms the northern boundary of the county. Several British Columbia Provincial Parks dot the border region.<sup>67</sup> Osoyoos Lake, which tops the Okanogan River Valley, is shared with Canada.<sup>68</sup>

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## Conconully

The city of Conconully is on the North Fork of Salmon Creek. It was originally settled as a mining community. Dams form two lakes near the city: Salmon Lake, an off-stream storage reservoir, and Conconully Reservoir, formed just downstream within Salmon Creek.

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<sup>63</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002. Omak-Okanogan County Chronicle, 2003. Widell, Elizabeth, 2000, "Okanogan County Geology (Or How The Okanogan Grew)," The Chronicle, Inc., Omak, WA, Webpage, <http://www.omakchronicle.com/geology/geodex1.htm>, accessed June 17, 2003.

<sup>64</sup> Qwestdex, Online Directory, <http://www.qwestdex.com/>, accessed June 18, 2003. The Omak Chronicle, Inc., 2002. Washington State Parks and Recreation Commission, March, 1999, "Adventures for a Lifetime: A Comprehensive Guide to Washington State Parks."

<sup>65</sup> Washington State Parks and Recreation Commission, March, 1999.

<sup>66</sup> Okanogan County Tourism Council, 2002. The Omak Chronicle, Inc., 2002.

<sup>67</sup> Government of British Columbia, Ministry of Water, Land, and Air Protection, British Columbia Parks, Recreation, Website, <http://wlapwww.gov.bc.ca/bcparks/explore/regions.htm>, accessed June 23, 2003.

<sup>68</sup> Okanogan County Tourism Council, 2002.

Conconully is located approximately 19 miles from Okanogan and 16 miles west of Riverside.

## Recreation and the Conconully Economy

Employment within the town of Conconully is highly dependent upon recreation. The Conconully Chamber of Commerce's membership directory includes seven camping and lodging facilities, three of which also provide boating access and rentals, three restaurants, and one general store.<sup>69</sup> One additional motel was not listed in the membership directory. The state park also provides access for fishing, camping, and boating. Another general store and one recreational vehicle park closed within the last three years. Privately owned or rented cabins and summer homes dot the area, with some 28 summer homes along the north shore of Salmon Lake.<sup>70</sup>

Fishermen and boaters impact the Conconully economy by paying locally for camping spaces and other lodging, paying for boat rentals and launch fees, and buying fishing equipment, gasoline for boats and cars, camping supplies and equipment, and food and drink. During fall and winter, hunters and snowmobilers rent cabins or motel rooms, and frequent the restaurants and the general store in town.

Recreation businesses and tourism are service sectors with a dominant role in the local economy. Service sectors generally receive lower income per worker than professional or production market sectors. Median household income in Conconully was \$23,314 in 1999, which is lower than the 1999 median household income for Okanogan County of \$29,726.<sup>71</sup>

## Recent Conditions and Recreation

NEA staff interviewed owners of Conconully businesses that are supported largely by tourism and recreation. The purpose of the interviews was to determine: (1) the nature and capacity of the business, including peak seasons; (2) the types of patron activities the business supports, the origin of their patrons, and visitation length; and (3) opinions regarding the qualitative relationship between lake levels and visitation. Efforts were made to contact all such businesses, including those listed in the Conconully Chamber of Commerce's membership directory as well as non-members. All were phoned and later interviewed in person. The Conconully State Park manager was also interviewed. Finally, the former owner

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<sup>69</sup> Omak-Okanogan County Chronicle, 2003.

<sup>70</sup> Highlands Associates, n.d., *Salmon Creek Project: Salmon Lake Level Increase Built Environment Analysis*, Okanogan, Washington.

<sup>71</sup> U.S. Census Bureau, 2000, *Census 2000 Summary File 3 (SF3) Sample Data*, Table: "P56, Median Household Income in 1999 (Dollars) by Age of Householder." Omak-Okanogan County Chronicle, 2003.

of a now-defunct general store was interviewed over the phone. Interviews were completed with 13 persons, including the owners or representatives of a total of seven camping and lodging facilities, three of which also provide boating access and rentals, three restaurants, two general stores, and the manager of the state park. The findings of these interviews are summarized below.

Since about 1999, Conconully residents and business owners have experienced a consistent decline in spring and summer water levels at both Salmon Lake and Conconully Reservoir. The record of lake levels discussed below documents this observation. During the height of the fishing and summer seasons in 2001 and 2002, and at the beginning of the fishing season in 2003, lake levels were low enough to expose large expanses of muddy flats up to lakeshores and around boat launches and docks.

The muddy lakeshore area is unattractive and has affected boat launching from docks and ramps. Some trucks that were used in the attempt to launch boats got stuck in the mud and had to be towed out. Motorboats that were successfully launched were forced to navigate carefully around exposed tree stumps. Boat operators also had to clean off milfoil and other vegetation from their propellers, as this vegetation thrived in the low water levels. Families coming up in the summer were discouraged from swimming or waterskiing due to the necessity to either walk through a large muddy area or the inability to launch a boat and because of the water vegetation. Thus, boating, fishing, waterskiing, and swimming in the Conconully lakes became difficult and unattractive.

After experiencing more than one year of low lake levels, it is reported that a large percentage of repeat visitors to Conconully decided not to return. In addition, it was reported that some tourists saw the condition of the lakes, and left to look for another location to camp. Business owners reported that they began to see their profits decline dramatically and are concerned that their businesses may ultimately fail if lake levels do not improve.

## **Businesses in Conconully**

All business owners had purchased the business from prior owners within the last eleven years. Three owners purchased in 1992 and 1993, two in 1995 and 1996, two in 1998, three in 1999, and two in 2000. Most of the businesses had been open for many decades before the current owners purchased them. In some cases, the current owners made major repairs and improvements to the businesses, thereby increasing their investments. Many of the current owners are retirees or “second jobbers” who planned to support their retirements from the businesses.

Prior to the recent low lake levels, approximately 230 seats were available for three meals a day, seven days a week in restaurants and bars year-round. Since the recent decline in water levels, one restaurant has decreased its non-weekend hours. Including the state park, 231 RV

spaces, 25 cabins, and 8 tent spaces are available in town. Approximately 40 additional RV pads were available prior to the closure of one RV park in town. Eighteen motel rooms with kitchenettes or one-bedroom apartments were available among the businesses studied, and additional motel rooms are available at one other location. Finally, before 2000 there was roughly 4,800 square feet of store space, which has decreased to 2,800 square feet with the closure of one of the general stores. In addition to these general stores, two or more resorts and RV parks have some small space devoted to sales of propane, fishing, and “last-minute” items.

All of the restaurants are open year-round. The state park and three RV park/cabin businesses without lake access are open year-round. One RV park without lake access, and three RV parks with access to the lakes are open from the beginning of fishing season in April through the end of hunting season at the end of October, although one resort opened occasionally in winter for winter sports. The general store is open year round.

## **Patrons and Recreational Activities**

The peak visitation period for all businesses and the state park generally fall between late April and early November. Fishing is dominant in late April through May. Another peak occurs in August when families with children come for swimming and water sports. Weekend holidays and Conconully celebrations, including those in the winter, provide other visitation opportunities.

Recreational visitors and tourists to Conconully range in age from families with babies to 80-year-old retirees. The average age of many repeat visitors is about 55, and many of the older visitors are in their late sixties and seventies. Visitors generally come from the I-5 corridor in Washington, although some visitors come from as far away as California. Most visitors come to Conconully to fish and/or enjoy motor-powered water sports. Some older visitors have been coming to the town for many years, in some cases since the late 1950s, and generations of families have come in the summer for fishing and reunions.

Business owner estimates of visitors from the “westside” (western Washington) range from a low of no winter visitors, to a high of 95 percent of all summer visitors. Businesses open only in the spring through fall season indicate a range of 65 to 95 percent of their visitors are from the westside. Out-of-county visitors from the “eastside,” primarily the areas of Wenatchee, Spokane, and the Tri-Cities, are estimated to constitute a low of five percent for seasonal businesses, to a high of 50 percent of all visitors to year-round businesses. During the winter, visitors from Omak and Okanogan constitute from zero to about 10 or 15 percent of the visitors, with the rest generally being local residents.

Spring and summer fishing and motorized water sports are the foundations of Conconully’s recreation economy, with business owners estimating that 60 to 90 percent of their April

through August visitors fish and participate in water-based recreation. Camping and room rentals increase along with visitation for fishing and water sports. Fishing is mostly for trout stocked in the lakes. In addition to the Washington Department of Fish and Wildlife's stocking of rainbow trout, local residents purchased large, fast-growing, sterile trout and stocked the lakes with those. Most fishing, approximately 70 percent, is catch and keep. Other activities occurring in the summer include over 30 family reunions per summer, over 12 weddings per summer (mostly at the state park), four-wheeling, hiking, biking, birdwatching, and even "deer counting." Hunting and snowmobiling generally provide fewer out-of-county visitors but are nonetheless important contributors to the town's economy in the fall and winter seasons.

Length of visitor stays varies with the season and the type of services offered. A very small number of visitors stay the entire summer season. A small number stay several months in the spring and summer. Generally, the largest number of visitors stay for weekends, and a smaller group stay for week-long periods in the summer. In the winter, it is estimated that about one-third of the local residents of Conconully leave the area for warmer regions. Some snowmobilers come from outside the county, but most fall and winter visitors are from Omak and Okanogan.

There are a number of local town events, such as "Outhouse Races" the "Supermush" dog sled races (two winter events), Independence Day Parade, "Miners' Daze" that celebrates the town's mining heritage, the Grubstake Open golf tournament, and the Western Swing Jam. The impact of these events depends on the type of business. Those lodging businesses that were not located on the lake generally did not believe that the events drew a significant number of non-local and non-county visitors. In contrast, businesses on the lakes found that these events did increase their business. The general store owners and the restaurant owners believed that patronage increased with out-of-towners, but it is not clear how many of the patrons were from outside the county.

There is some impact to Conconully from festivals in other towns. The attendees at the August Omak Stampede often escape the heat and crowding of Omak by camping in Conconully. It appears that there is greater consensus among business owners that the Stampede encourages more visitors from the westside than do Conconully events. Conversely, one business owner expressed the belief that loss of business in Conconully likely means losses in business for other towns in the county.

## **Historic Lake Levels and Recreation**

The general consensus among business owners is the past two years were "the worst" in terms of lake levels, although some noted that lake levels have been getting progressively worse for about four years. The past two years saw the Conconully Reservoir at less than one-third full and boat ramps, docks, and beaches were almost 100 feet from the water. In

the past, in the middle of the summer, water levels used to flood some campsites at the state park.

Historic records on lake levels for Salmon Lake and Conconully Reservoir were provided by the hydrologist for this study for 58 years. In Salmon Lake, the highest recorded level was 2,318.9 feet above sea level, occurring in May of 1956. The lowest minimum level recorded was 2,287.4 feet, occurring from January through March 1971. The difference between these two levels is 31.5 feet in elevation. In 1971, strong spring inflows followed the low levels of January through March, raising the level to 2,318.4 feet, within one half foot of the highest level of record. The situation was different in 2001 and 2002. While the lowest levels in those years were not as low as in 1971, they were still very low and there were not strong inflows in the spring to refill the lake.

In 45 of the 58 years (78 percent) of record, the annual maximum level was within two feet of the maximum level for all years, and in 48 of the 58 years (83 percent), it was within three feet. This indicates that the supply of water from the watershed feeding the lake will fill the lake close to capacity in about three out of four years. The pattern displayed in the data indicates that it is rare for the lake to not fill to near capacity two years in a row. The exception to this pattern began in 1999 and continues to present, with the highest lake level reached during this period in 2002, when the highest level was about 20 feet below full capacity.

A similar but more extreme pattern occurs in Conconully Reservoir. There, the maximum level, 2,288.0 feet, was reached in May 1983 and again in April 1998. The lowest minimum level, 2,248.7 feet, was reached in September 2001, for a difference of almost 40 feet in lake elevation. In 36 of the 58 years (62 percent) of record, the annual maximum level was within two feet of the maximum level for all years, and other levels were all below three feet of the maximum level.

## **Impacts to Businesses of Recent Low Lake Levels**

At Salmon Lake the past two years, the low lake levels resulted in about 40 feet of mud surrounding the water of the lake. No water came around the beach side of the “T” dock at one resort and there was only six inches of water on the lakeside of the 90-foot dock. In the years before lake levels started to drop, by mid-summer the water lapped the grassy area above the beach.

There is universal agreement among all business owners and the park manager that the consistency of low lake levels, especially at the beginning of the fishing season, was primarily to blame for a dramatic loss in business and for the close of the general store. By fall, even the smallest boats had no access to the water at Conconully reservoir. Boating hazards, such as getting stuck in the mud trying to launch, exposed tree stumps, and milfoil,

became common, especially at the lower lake. Older patrons had to be transported to distant access points, since it was too dangerous for them to fish from the rocky shorelines at the upper lake, or wade through mud at either lake. Families could not swim unless they were willing to wade through the mud and to swim with milfoil and other vegetation in the water. Waterskiing was too dangerous with exposed tree stumps.

In addition, low water levels appear to have decreased water in wells at lakeside businesses and cabins. One business had to buy bottled water for their guests and send them to the state park for showers when their well went dry. Some summer homeowners abandoned their homes due to low well water and one has purchased a new home elsewhere. Another business could not operate the laundry facility due to low water in their well.

Most of the business owners and the state park manager agree that fishing success and fish size is actually quite high for those who fish the two lakes. However, access to the lakes for Conconully's traditional customer base has decreased significantly. This year, only a few local residents were seen fishing at the start of the fishing season. One business owner observed that the town was historically full at the start of the fishing season.

Businesses estimated that impacts to them range from losses in patrons in low-lake-level years over normal years from about 20 to 40 percent. The state park had about 50 percent of normal visitation last year and this year may have even lower visitation. Some older repeat patrons that had been returning to Conconully every year for three or more decades reportedly have cancelled reservations or failed to make them this year. Several businesses are up for sale, and, as already noted, one general store went out of business.

Those who had been in Conconully for many years, or whose families had lived in the area, explained that while other drought years had occurred in the past, Salmon Lake had rarely if ever dropped to its current level and the droughts rarely impacted the lake levels for two or more years. They attribute the major loss of visitation due to the consistency of the low lake levels. Customers in the past who would have been willing to tolerate one year of low lake levels felt that they could not afford to spend their vacations for a second year being unable to fish, boat, or swim.

Most businesses agreed with the sentiment that water levels could easily go all the way up to the spillways and trip valves and would not damage their business. While a few state park camping sites would be flooded, the rest of the town could likely take the overflow campers from the state park. One business owner on the lower reservoir stated that water half way up the bank would be better than it is now.

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## Impacts of the Water Supply Alternatives on Recreation

A No Action Alternative and three action alternatives were examined for their impact on recreation through two component characteristics: absolute lake level and seasonal fluctuations in lake level. The comparisons were made for wet, normal, and dry water year types. Historically, Salmon Lake has experienced less lake level drawdown during the summer than Conconully Reservoir because OID manages it as a backup water supply. Under the No Action Alternative, the Salmon Lake elevation changes by nearly eight feet during dry years to less than three feet during normal and wet years. According to the Water Allocation Model, Salmon Lake would experience less lake level fluctuation during the recreation season (April through September) under all of the action alternatives. Similarly, Conconully Reservoir would experience less fluctuation for all action alternatives and water year types. Under the No Action Alternative, Conconully Reservoir level varies by nearly 14 feet in dry years, nine feet in normal years, and five feet in wet years. Reservoir levels would be higher in dry, wet, and normal years under the action alternatives versus the No Action Alternative. Considered alone, the reduced variation in lake levels during the recreation season would tend to have a positive impact on lake-based recreation.

In addition to lake level fluctuation, the absolute lake levels for the action alternatives were compared to lake levels predicted under the No Action Alternative for each water year type. The elevations of both Conconully Reservoir and Salmon Lake reach maximum levels during the recreation season for nearly all of the alternatives and water year types. In addition, the lake levels tend to be higher, on average, for the action alternatives during the recreation season. Average lake levels are reduced only in Salmon Lake and Conconully Reservoir during dry water years. The impact is relatively small, however, as levels average no more than a few feet less than those achieved in the No Action Alternative during the recreation season.

Conconully has an economy based primarily on recreation, of which recreation on Conconully Reservoir and Salmon Lake is an important component. Recreation on the lakes is sensitive to the timing, degree, and duration of low lake levels. The longer the lakes are low during the fishing and summer seasons, the fewer visitors that can be expected to come to Conconully. Low lake levels, or an increase in lake level variability, during the recreation season will ultimately hurt the economy, while activities that stabilize and maintain higher lake levels will likely enable the economy to recover. As described above, the majority of the action alternatives will either improve or not impact lake level conditions at Conconully Reservoir and Salmon Lake and consequently would improve or not affect the local economy. Only the Water Purchase Alternative in dry years would result in lower lake levels during the recreation season and could result in a small, negative economic impact. The lake level and associated recreation impacts are summarized in Table 16.

**Table 16**  
**Recreation Impacts, Salmon Lake and Conconully Reservoir,**  
**Compared to No Action Alternative**

<b>Water Year:</b>	<b>Salmon Lake</b>			<b>Conconully Reservoir</b>		
	<b>Wet</b>	<b>Normal</b>	<b>Dry</b>	<b>Wet</b>	<b>Normal</b>	<b>Dry</b>
<b><u>Shellrock Pump Upgrade Alternative</u></b>						
Alternative 1	N/C	N/C	+	N/C	N/C	+
<b><u>Okanogan River Pump Exchange Alternative</u></b>						
Alternative 2	N/C	N/C	+	N/C	N/C	+
<b><u>Water Purchase Alternative</u></b>						
Alternative 3	N/C	N/C	-	N/C	N/C	-

N/C = no change  
+ = positive (beneficial)  
- = somewhat negative

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## Lower Salmon Creek

Rainbow trout, brook trout, and some kokanee spilled over during flood events can be found in the middle reach of Salmon Creek. However, Washington Department of Fish and Game prevents any fishing in the reaches of Salmon Creek below Conconully, and this has been the case for some years.<sup>72</sup> The lower reach of the creek is dewatered except in rare cases of flood conditions. The lack of flow in this reach has prevented fish from inhabiting this area.

It is likely that additional water and stream rehabilitation would be beneficial to game species in addition to the target species.<sup>73</sup> However, this benefit may be mitigated by competition between game fish and populations of steelhead and Chinook.<sup>74</sup> It is uncertain under what conditions the middle and/or lower reaches may be opened to sport fishing, given that endangered species might be taken incidentally if sport fishing were to occur in the same reaches. Thus, the benefits of the alternatives on recreational sport fishing in the middle and lower reaches, and the subsequent impacts on the recreation economy cannot be assessed at this time.

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<sup>72</sup> Washington Department of Fish and Wildlife, May 1, 2003, Fishing in Washington, Sport Fishing Rules, 2003/2004 Pamphlet Edition, Olympia, Washington, p. 72, Webpage: <http://www.wa.gov/wdfw/fish/regs/2003/2003sportregs.pdf>, accessed July 8, 2003. Personal communication with Ryan Layton, Conconully State Park Ranger, April 29, 2003.

<sup>73</sup> ENTRIX, n.d., "3.5.4 Environmental Impact of Feeder Canal Upgrade," Salmon Creek Rehabilitation PDEIS.

<sup>74</sup> Personal communication with Greg Reub, ENTRIX, Inc., July 3, 2003.

## Lower Salmon Creek Rehabilitation – A Review of Nonmarket Benefits

Stream restoration involves the repair of a natural resource asset. In the case of Salmon Creek, the objective of the restoration of flows is the enhancement of spawning and rearing habitat for salmon and steelhead. This restoration and enhancement of the fishery is expected to produce benefits to society. Some of these benefits result from direct use of the fishery. Other benefits may not involve direct use but may still be important in understanding the total benefits associated with the repair of a natural resource asset.

The direct use value comes from fishing and other visits to the resource involving non-consumptive use such as viewing the fish, bird watching, etc. Nonmarket valuation techniques are commonly used to quantify these types of benefits. These involve devising a way to measure use, such as establishing a relationship between fish catch, angler effort, and a per day value for the number of days or the number of fish per angler. Typically the value is estimated using a nonmarket valuation technique such as the travel cost method and the contingent valuation method. Principles and guidelines for using these techniques for evaluating benefits from federal water resource projects are contained in “Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,” published by the U.S. Water Resources Council, March 1973.

In addition to direct use values, there are nonuse values. Randall and Peterson<sup>75</sup> define these as option value, quasi-option value, and existence value. Option value and quasi-option value relate to the value of maintaining options for the future and differ only in how the existence of future information is treated. Existence value is the value an individual obtains from just knowing something exists. In a natural resource context, this typically means maintaining a natural resource in a certain condition (or preserving it). If a particular state of resource condition declines, such as the diminishing of the population of a species, then individuals will suffer a loss in existence value. Conversely, the restoration in a natural resource that has been perceived as diminished will result in a gain in existence value to individuals.

Because of the size of the Salmon Creek project and its predominantly local nature, gains in direct use values are likely to be small, particularly if measured using the travel cost method, which is one possible method for site measurement. On the other hand, measurement of existence value using contingent valuation methods is likely to identify significant values over a wider geographic area. Loomis<sup>76</sup> studied the existence value of the removal of dams on the Elwha River and the restoration of the river for anadromous fish habitat in

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<sup>75</sup> Peterson, George L., and Alan Randall, eds., 1984, *Valuation of Wildland Resources*, Chapter 1, Westview Press, Boulder, CO, p. 29.

<sup>76</sup> Loomis, John B., February 1996, “Measuring the economic benefits of removing dams and restoring the Elwha River: Results of a contingent valuation survey,” *Water Resources Research*, Vol. 32, pp. 441-447.

Washington. He found that the mean annual value per household locally (Clallam County) was \$59 per year for ten years, for the state \$73, and \$68 in the rest of the United States. Since Salmon Creek is a small project and has not received widespread publicity as did the Elwha dams, a similar study would likely produce much lower values for Salmon Creek. It is cited here to illustrate that existence values exist, can be measured, and can be perceived to exist over a wider geographic area than use values. In a companion study, Loomis<sup>77</sup> included a variable for distance from the site to test the idea that values would be lower the farther removed the respondents to the survey were from the site. He found this to be true. However, since a majority of households were outside the immediate site, even though their values diminished with distance the sheer preponderance of numbers meant that a large part of the total benefit came from outside the immediate area.

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## Effects on Valuation of Personal Property on the Salmon Lake Shoreline

There are concerns that fluctuations in lake levels or long term lowering of lake levels will affect property values and thereby affect taxable property values. Research indicates that proximity to lakes and characteristics of lakes does influence the value of property located on or near a lake.<sup>78</sup> The value that owners perceive that they receive from proximity to a lake may be capitalized into the value of the property. It is very likely that this would be the case with Salmon Lake and Conconully Reservoir if fluctuations in lake levels or long term lowering of lake levels were to occur.

Current assessed values for selected homes on the shore of Salmon Lake were investigated. Assessed value of property bordering the Salmon Lake shoreline do not include the value of land as the land is federal property and, therefore, exempt from taxation.<sup>79</sup> The land is under long-term lease by the homeowners. The analysis was limited to Okanogan County Road No. 4290 (Fish Lake Road), an area that contains private homes. As a result, the study of tax impacts along the Salmon Lake shoreline focuses on the valuation of the homes on the Bureau of Reclamation land. The 2002 Okanogan County Assessor parcel database shows

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<sup>77</sup> Loomis, John B., 1996, "How large is the extent of the market for public goods: evidence from a contingent valuation survey," *Applied Economics*, pp. 779-782.

<sup>78</sup> Feather, Timothy D., 1992, "Valuation of Lake Resources through Hedonic Pricing," IWR Report 92-R-8, U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources.

<sup>79</sup> Parcels with cabins located in the 2002 Okanogan Assessor Parcel database and selected by ENTRIX for the following report: "Salmon Creek Water Supply Alternatives Scoping Report," Task 0301, December 2002, p. 2

the assessed values for these homes range from \$25,400 to \$81,900, with an average value of \$38,857.<sup>80</sup>

## Levy Rate

The levy rate is the rate per \$1,000 of assessed value used to determine the property tax; that is, the assessed value of your property multiplied by the levy rate for the area that your property lies within determines the annual amount of property taxes. This amount can change from year to year based on changes in assessed value and/or the levy rate.<sup>81</sup> The levy rate is found in the Taxing Code Authority database for Okanogan County and ranges between 12.81 and 14.65 for the parcels discussed in this report.<sup>82</sup>

## Potential Tax Effect

The direction of the effect could be either positive or negative. That is, the alternatives could have either a stabilizing or a destabilizing effect. For purposes of illustration, consider a 10 percent change in assessed value of an average home. This represents a change in assessed value of \$3,886. At the lower levy rate, this would reflect a tax change of about \$50 per property per year and at the higher levy rate a change of \$57. Such a change would result in a minor redistribution of the tax burden.

Under most alternatives for both lakes water level conditions would be more stable than under the No Action Alternative. Rather than a reduction in assessed values, this would likely increase real estate values over time and provide a basis for assessed values to increase.

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<sup>80</sup> Parcels with cabins located in the 2002 Okanogan Assessor Parcel database and selected by ENTRIX for the following report: “Salmon Creek Water Supply Alternatives Scoping Report,” Task 0301, December 2002, Attachment.

<sup>81</sup> Okanogan County Assessor’s Office, February 2003, [www.okanagancounty.org/Assessor](http://www.okanagancounty.org/Assessor).

<sup>82</sup> Okanogan County Assessor’s Office, 2003, “2003 Levy Rates Okanogan County.”

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