

# Tucannon Lakes Fishery Monitoring Report for 2003



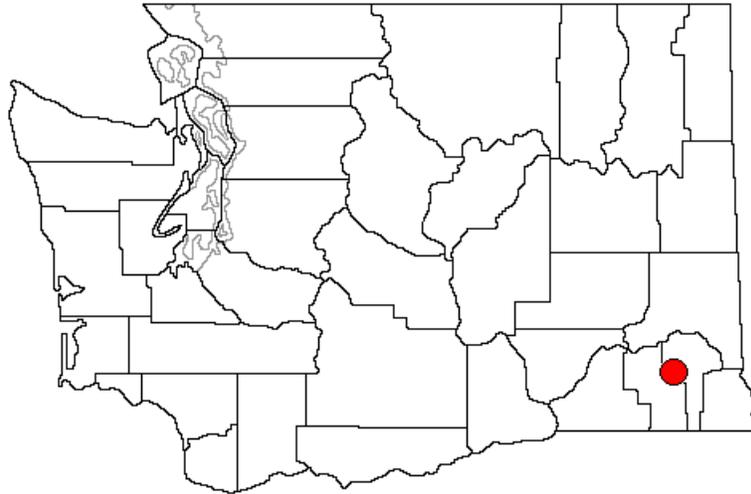
by Glen Mendel and Jeremy Trump



Washington Department of  
**FISH AND WILDLIFE**  
Fish Program  
Management Division



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Glen Mendel and Jeremy Trump  
Washington Department of Fish and  
Wildlife  
Fish Program - Fish Management  
Division  
529 West Main Street,  
Dayton, WA. 99328

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## Abstract

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In 2003, WDFW conducted trout fishery monitoring on four of the eight Tucannon Lakes to evaluate fishery statistics (e.g. angler effort, catch rates, exploitation rates, and numbers of trout harvested and released), compare results between 2003 and 1985 surveys, and estimate economic return on investment for the fishery. Angler residence locations were also documented.

Sampling to determine angler effort was based on stratified random sampling every week on each of the four lakes. We sampled one weekend day and one or two weekdays per week. Angler counts at each lake were conducted multiple times per day at predetermined intervals, after a random start time was determined. Anglers were interviewed between count periods to determine their catch and harvest rates, to examine their catch, and to determine their origin (place or residence).

This study provided valuable information regarding the trout fisheries in the Tucannon Lakes in 2003. Angler effort on four of the Tucannon Lakes was estimated to be 38,116 angler hours and 19,749 angler days (with a completed angler day averaging 1.9 hrs). This partial fishing season estimate of angler days on only four of the Tucannon Lakes exceeded 29% of the LSRCP mitigation goal of 67,500 angler days for all of southeast Washington. An estimated 27,436 rainbow trout were harvested during the first 4.5 months of the fishing season (March 1 to mid-July). Approximately 58-78% of hatchery trout were removed from the lakes by anglers, excluding hooking mortalities for released fish. Jumbo trout were retained in the fishery at a higher rate than catchable-sized trout. Most anglers (79-82%) used bait when fishing the Tucannon Lakes. Anglers were generally satisfied with the numbers and quality of trout they caught, but satisfaction levels decreased temporarily in April as the catch rate and size of available hatchery trout decreased. Anglers in March were mostly from relatively nearby areas of southeast Washington, but later in the season a portion of anglers were from very distant areas. The Tri-cities area was the source of the largest percentage (>50%) of anglers using the Tucannon Lakes, but some anglers from distant states also fished these lakes.

Estimated angling expenditures for fishing at these four lakes were \$780,895 (derived from economic expenditures per day in put-and-take trout lakes in nearby areas of northern Idaho). Cost to produce the trout in the four surveyed Tucannon Lakes was \$88,088 in 2003. Therefore, the estimated economic return on investment ratio was 8.9/1. The Tucannon Lakes are in need of maintenance (dredging and levee maintenance) soon to maintain these trout fisheries.

We recommend that fisheries at Bennington Lake be the next southeast Washington Lake to be surveyed in the near future.

# Introduction

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Trout fishing in Washington is a popular pastime. A recent survey found that 78% of all licensed anglers in Washington fish for rainbow trout and that 33% of Washington licensed resident (in-state) anglers prefer fishing in lowland lakes (Responsive Management 2008, Michael 2004).

Eight small man-made impoundments (Tucannon Lakes) are stocked with hatchery rainbow trout annually in the Washington Department of Fish and Wildlife's (WDFW) Wooten Wildlife Area (WWA), along the upper Tucannon River in southeast Washington. These ponds, constructed in the 1950's, are popular fishing areas with the public. The Lower Snake River Compensation Program (LSRCP) hatchery trout program is intended to mitigate for lost fishing opportunities associated with the construction and operation of the four lower Snake River dams. The WDFW raises the mitigation fish for the LSRCP and also supplements those "catchable" hatchery trout (fish are usually 7-12 inches, 18-30 cm, long) in the Tucannon Lakes with 100-300 large rainbow trout per lake from a state funded "jumbo" trout program (fish are 12-19 inches, 30-48 cm long, and 1.5-2.5 lbs, 0.67-0.90 kg each). In the late 1990s, WDFW ceased all stocking of catchable trout in southeast Washington streams and rivers to minimize any adverse effects on salmon, steelhead and bull trout that are listed as threatened under the Endangered Species Act (ESA). Therefore, the importance of these lakes has increased for maintenance of hatchery trout fisheries to meet LSRCP mitigation goals and public demand.

The Tucannon "Lakes" range in size from about 1 to 10 acres (0.4-4.0 hectares). Curl Lake, the uppermost of these lakes, does not open for fishing until the last Saturday in April because it is used as an acclimation facility for spring chinook until mid-April. After the Chinook are released, the lake is drained, refilled, and stocked with rainbow trout for anglers. All the other lakes are open for fishing from March 1 to October 31 each year. The daily limit is five trout of any size and fishing is limited to shore anglers only (no boats or floating devices allowed). Anglers can use bait, flies, or lures.

The WDFW desired to evaluate the amount of angler use and the success of the LSRCP and jumbo trout releases in these lakes in 2003. Because of a very limited budget and conflicts for staff time with spring Chinook salmon fishery monitoring, we were unable to monitor more than four of the eight lakes. The four lakes (Spring, Blue, Rainbow and Deer lakes) were selected because they were near each other, which increased efficiency of our monitoring efforts (Figure 1). The upper four lakes (Watson, Beaver, Big Four and Curl) were not sampled as part of this fishery monitoring effort. This is the first time we have surveyed the Tucannon Lakes fisheries since 1985 (Schuck and Mendel, 1987) when all the lakes were monitored during spring and early summer. We terminated the 2003 creel surveys shortly after the July 4<sup>th</sup> weekend because

our past experience indicated that angler effort declined significantly after that time (Schuck and Mendel 1987) and funding was limited. Therefore, even though these surveys do not include the entire fishing season, we believe that we have captured the majority of angling effort and harvest expected for the entire season.

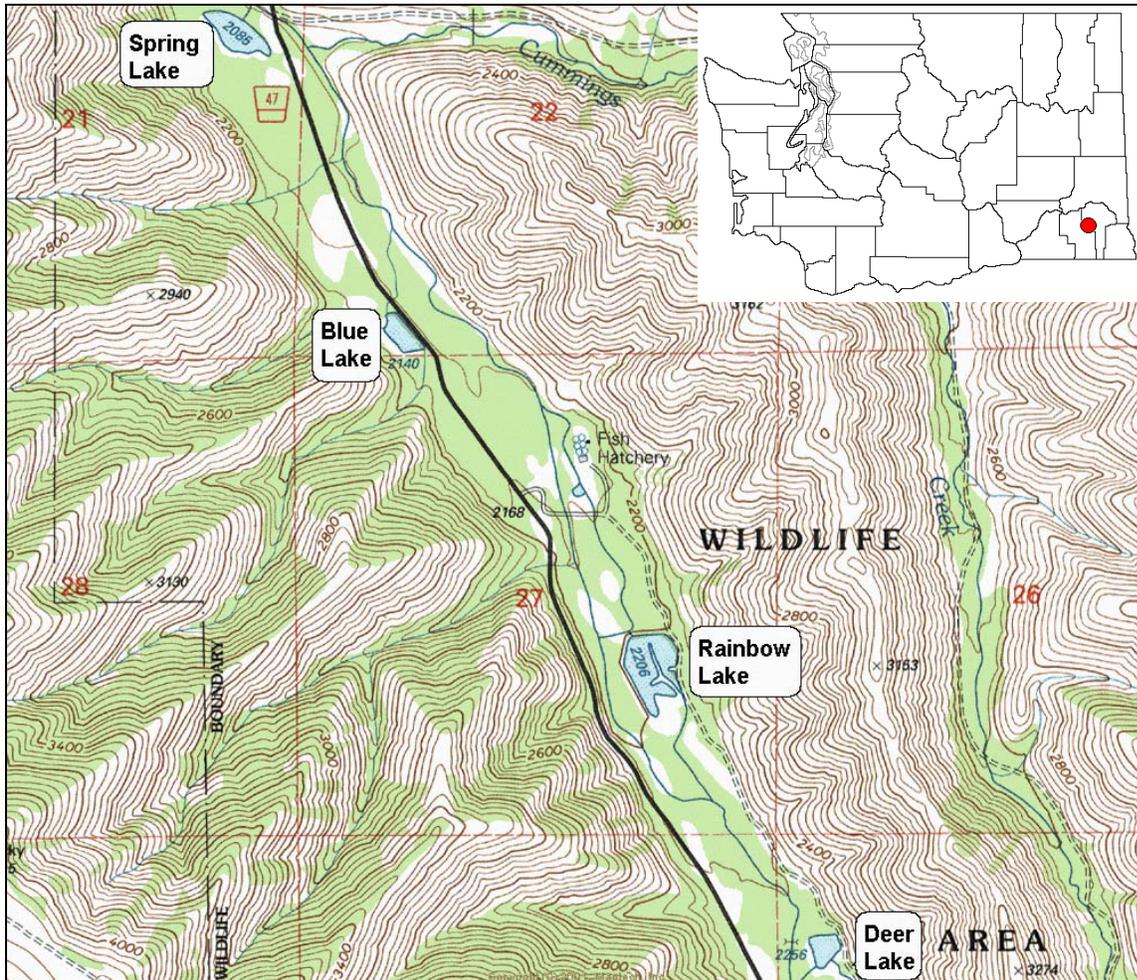


Figure 1 Map of the four sampled Tucannon Lakes in the WDFW Wooten Wildlife Area, in Columbia County, southeast Washington.

The objectives of this fishery monitoring effort were as follows:

- 1) Determine angler effort, catch, harvest, angler-day (and angler-trip) length, and exploitation rates for hatchery rainbow trout in four of the Tucannon Lakes from opening day (March 1) through mid-July, as an indicator of the level of angler use and success in all the Tucannon Lakes.
- 2) Evaluate how opening day angler results compare with results from opening week, and other intervals.

- 3) Compare results of these Tucannon Lakes fishery surveys with similar fishery surveys conducted here in the mid 1980s.
- 4) Compare results with LSRCP goals for this program.
  
- 5) Summarize and evaluate other aspects of the fishery (e.g. the use of bait, angler satisfaction, etc.).
  
- 6) Determine the residence of anglers and how far they are traveling to fish these lakes and recreate on the WDFW WWA.

## Methods

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Fish Management staff from the WDFW Dayton office began conducting angler counts and interviews initially at Spring, Blue and Rainbow lakes. In late March of 2003, Deer Lake was added to the creel surveys because it was small and very close to Rainbow Lake, and thus it could be included in the surveys with minimal effort. The sampling design was a stratified random roving creel survey (Hahn et al. 2000, Malvestuto 1983). We rolled dice to randomly select one weekend and one or two weekdays to be sampled per week. Opening day was included with weekends because of the expected increase in anglers during opening day. Initially, one weekend day and one weekday were randomly selected each week for monitoring the fisheries at these four lakes. Monitoring was increased to up to two weekdays per week during May through mid-July, except during May 1-15 when staff shortages and schedule conflicts prevented us from sampling on weekdays. Weekends during the first two weeks of May were sampled. We applied the averages from the nearest weekday creel surveys and angler counts on either side of the missing creel survey sampling period to estimate the angler effort, catch and harvest for all weekdays during May 1-15, and for use in the total estimates for the sampled season. The last weekday surveyed during the season was Tuesday, July 8, and the last weekend sampled was Saturday, July 12.

Angler counts were completed by walking a small portion of the shoreline of each lake to a point where all of the lake shore could be observed and all anglers quickly enumerated during four to six times per monitoring day, depending on day length and other factors. The first count time was randomly selected (0630, 0700, 0730, 0800 hrs) and subsequent counts were predetermined for every 2.5-3.5 hrs to cover the fishery from daylight until dark. The last count of the day was as late as 2100 hrs (9 pm), depending on day light. The goal was to complete all angler counts in less than one hour so statistically they could be considered “instantaneous” counts. On average, counts of the three largest lakes only took about 15-20 minutes. Angler counts were averaged over a two-week period and multiplied by the number of daylight hours, and days, available during weekends and weekdays for each two-week period. These results were summed per month, and for the entire sampling season, to estimate angler effort. Angler interviews were conducted before or after angler counts. Fish in the angler’s creel were counted and approximately half of the harvested fish were selected randomly and measured. The angler was asked the number of anglers in their party and when they started fishing so we could estimate angler effort and catch rate (see Appendix A for angler creel instructions and forms). The average catch rate for each two week block was multiplied by angler effort during that period, by day type, to estimate the number of fish kept, or caught and released (Hahn et al. 2000). These values were summed over the season to arrive at sampling season totals for angler effort, catch and harvest.

# Results and Discussion

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## Angler Effort, Catch and Harvest

We monitored the fisheries on opening day (March 1) for Rainbow, Blue and Spring lakes and found that catch rates were similar from opening day throughout the first two weeks or more of the fishing season (Table 1). However, we noticed that catch rates were often highest during weekends throughout the season at all three of these lakes when compared with weekdays (Appendix B). Deer Lake was added to the creel survey on March 28<sup>th</sup>. This lake had few anglers and variable catch rates during the season.

Angler effort was low during the first week of creel surveys in early March because the lakes were partially or mostly ice-covered and the temperatures were cold on opening morning. The first weekday surveyed (March 7) had cool temperatures and heavy rain/sleet all day, which likely contributed to the low angler turnout.

The most fishing effort occurred on Rainbow Lake, but it is larger than all the other Tucannon Lakes. Blue Lake had the highest estimated trout harvest and nearly the same amount of angling effort as Rainbow Lake (Figure 2). Blue Lake is also the deepest and the most recently dredged and restored lake of all the Tucannon Lakes. Total estimated angler effort for the four sampled lakes combined, for that portion of the fishing season sampled, was 38,116 angler hours.

Total rainbow trout harvest during the sampling season was estimated to be 27,436 (summed from Table 1). The most trout were removed from Blue Lake (12,066) and Rainbow Lake (9,992). Anglers caught and released 29-48% as many trout as were harvested per lake, with the highest percentage of released fish in Blue Lake (47.9% of trout harvested).

Interview data from anglers with completed fishing trips (the angler was finished fishing for the day in that lake) indicated that few anglers caught their limit of five fish, except from Blue Lake in March (Table 2). Sample sizes of anglers with completed trips from Spring and Deer Lakes were too small to partition the data by month, so only totals for the sampling season are shown. Completed fishing trips averaged 1.93 hours per angler (March 1 to mid July) for the four sampled lakes. Therefore, 19,749 angler days were completed by trout anglers fishing these four Tucannon Lakes (38,116 angler hours / 1.93 hours per completed fishing trip). This estimate of angler-days does not include the entire fishing season, nor does it include the fishery results for the early part of March on Deer Lake (we began surveys on Deer Lake on March 28 and expanded the data to provide estimates for the period of March 16-30). The number of angler days also does not include the other four Tucannon Lakes, plus many other ponds or lakes

stocked in southeast Washington with hatchery trout. Yet, this estimate of angler days on four Tucannon Lakes slightly exceeds 29% of the 67,500 angler days the LSRCP mitigation program was expected to provide with the hatchery trout program in all of southeast Washington. The LSRCP program stocked a total of 31 lakes with trout in 2003.

**Table 1 Comparison of opening day, the first week, the first two weeks, and monthly effort and harvest during the Tucannon Lakes creel surveys, 2003.**

	Angler Counts		Angler Interview Data				Expanded Totals				
	Number of Anglers	Average # of Anglers	Total Hours	Rainbow Trout Harvested	Rainbow Trout Released	Average Catch Rate (hrs/fish harvested) <sup>a</sup>	Average Release Rate (hrs/fish released)	Angler Effort (hrs) <sup>b</sup>	Total Estimated Rainbow Trout Harvested	Total Estimated Rainbow Trout Released	
<b>Spring Lake</b>											
Opening Day	128	32.00	194.66	77	3	2.528	64.887	<b>368.00</b>	<b>145.57</b>	<b>5.67</b>	
1 <sup>st</sup> Week (March 1-7)	132	16.50	197.84	80	3	2.473	65.947	<b>1,328.25</b>	<b>537.10</b>	<b>20.14</b>	
1 <sup>st</sup> Two Weeks (March 1-15)	175	10.94	240.10	138	3	1.740	80.033	<b>1,886.72</b>	<b>1,084.32</b>	<b>23.57</b>	
1 <sup>st</sup> Month (March 1-31) <sup>c</sup>	277	8.66	378.74	240	41	1.578	9.238	<b>2,501.25</b>	<b>1,686.34</b>	<b>378.94</b>	
April (1-30)	289	5.78	399.27	128	60	3.119	6.655	<b>2,058.52</b>	<b>608.95</b>	<b>267.06</b>	
May (1-31)	241	3.65	257.83	172	89	1.499	2.897	<b>1,522.91</b>	<b>1,061.43</b>	<b>436.97</b>	
June (1-30)	178	2.97	228.69	171	49	1.337	4.667	<b>1,213.58</b>	<b>932.71</b>	<b>419.74</b>	
July (1-15) <sup>d</sup>	107	3.69	119.58	58	38	2.062	3.147	<b>764.68</b>	<b>373.11</b>	<b>227.49</b>	
<b>Monthly Totals</b>								<b>8,060.94</b>	<b>4,663</b>	<b>1,730</b>	
<b>Blue Lake</b>											
Opening Day	236	59.00	184.80	147	27	1.257	6.844	<b>678.50</b>	<b>539.78</b>	<b>99.14</b>	
1 <sup>st</sup> Week (March 1-7)	247	30.88	195.65	151	35	1.296	5.590	<b>2,485.84</b>	<b>1,918.09</b>	<b>444.69</b>	
1 <sup>st</sup> Two Weeks (March 1-15)	324	20.25	294.26	241	46	1.221	6.397	<b>3,493.13</b>	<b>2,860.87</b>	<b>546.06</b>	
1 <sup>st</sup> Month (March 1-31) <sup>c</sup>	566	17.69	566.62	636	168	0.891	3.373	<b>5,134.38</b>	<b>5,742.47</b>	<b>2,786.43</b>	
April (1-30)	530	10.60	539.14	330	101	1.634	5.338	<b>4,445.41</b>	<b>2,939.43</b>	<b>854.35</b>	
May (1-31)	339	5.14	354.23	339	138	1.045	2.567	<b>2,238.70</b>	<b>2,134.92</b>	<b>921.90</b>	
June (1-30)	263	4.38	336.77	207	175	1.627	1.924	<b>1,717.27</b>	<b>1,102.91</b>	<b>1,013.90</b>	
July (1-15) <sup>d</sup>	62	2.14	57.17	19	27	3.009	2.117	<b>458.90</b>	<b>146.14</b>	<b>202.87</b>	
<b>Monthly Totals</b>								<b>13,994.66</b>	<b>12,066</b>	<b>5,779</b>	
<b>Rainbow Lake</b>											
Opening Day	126	31.50	159.11	142	25	1.120	6.364	<b>362.25</b>	<b>323.44</b>	<b>56.92</b>	
1 <sup>st</sup> Week (March 1-7)	145	18.13	180.33	152	25	1.186	7.213	<b>1,459.47</b>	<b>1,230.58</b>	<b>202.34</b>	
1 <sup>st</sup> Two Weeks (March 1-15)	212	13.25	242.28	209	46	1.159	5.267	<b>2,285.63</b>	<b>1,972.07</b>	<b>433.95</b>	
1 <sup>st</sup> Month (March 1-31) <sup>c</sup>	485	15.16	617.78	629	207	0.982	2.984	<b>4,446.88</b>	<b>4,718.02</b>	<b>1,807.96</b>	
April (1-30)	514	10.28	539.79	219	79	2.465	6.833	<b>4,162.38</b>	<b>1,757.51</b>	<b>701.87</b>	
May (1-31)	479	7.26	599.96	377	176	1.591	3.409	<b>3,021.93</b>	<b>1,863.15</b>	<b>1,032.36</b>	
June (1-30)	334	5.57	476.02	249	110	1.912	4.327	<b>2,365.24</b>	<b>1,422.04</b>	<b>585.76</b>	
July (1-15) <sup>d</sup>	135	4.66	140.11	30	11	4.670	12.737	<b>980.12</b>	<b>231.22</b>	<b>79.37</b>	
<b>Monthly Totals</b>								<b>14,976.55</b>	<b>9,992</b>	<b>4,207</b>	
<b>Deer Lake</b>											
Opening Day	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
1 <sup>st</sup> Week (March 1-7)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
1 <sup>st</sup> Two Weeks (March 1-15)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
1 <sup>st</sup> Month (March 16-31) <sup>c,e</sup>	11	1.38	17.00	10	5	1.700	3.400	<b>171.88</b>	<b>101.10</b>	<b>50.55</b>	
April (1-30)	33	0.66	44.29	26	1	1.703	44.290	<b>255.33</b>	<b>113.26</b>	<b>3.38</b>	
May (1-31)	60	0.91	73.55	62	12	1.186	6.129	<b>396.02</b>	<b>337.39</b>	<b>81.83</b>	
June (1-30)	29	0.48	10.14	5	3	2.028	3.380	<b>209.80</b>	<b>80.52</b>	<b>45.55</b>	
July (1-15) <sup>d</sup>	8	0.28	7.49	9	2	0.832	3.745	<b>51.30</b>	<b>82.63</b>	<b>27.70</b>	
<b>Monthly Totals</b>								<b>1,084.33</b>	<b>715</b>	<b>209</b>	

<sup>a</sup> Average catch rate for the month was calculated for all creels conducted including weekends and weekdays.  
<sup>b</sup> Average release rate for the month was calculated for all creels conducted including weekends and weekdays.  
<sup>c</sup> Angler effort for the month was calculated on 12 hour day length, an average of the first two week period (11.5 hrs) and the second two week period (12.5 hrs).  
<sup>d</sup> July totals only represent July 1-15, no creels were conducted in the second half of July.  
<sup>e</sup> March totals are calculated from two creels near the end of the month, therefore expanded totals only reflect the March 16-31.



Figure 2 An example of observed angling effort on Blue Lake in 2003.

Table 2 Rainbow trout caught per angler for anglers with completed fishing trips for the season, or by month, during Tucannon Lakes creel, 2003.

Two Week Period	Number of Anglers Interviewed	Total Hours Fished	Trout Harvested	Trout Released	Ave. Number of Trout Harvested per Angler	Ave. Hours per Angler-Day
<b>Spring Lake</b>						
<b>Spring Lake Total</b>	<b>66</b>	<b>132.87</b>	<b>106</b>	<b>56</b>	<b>1.61</b>	<b>2.01</b>
<b>Blue Lake</b>						
<u>March</u>	31	60.81	154	0	4.97	1.96
April	14	24.81	28	1	2.00	1.77
<u>May</u>	43	73.28	111	57	2.58	1.70
June	16	28.93	27	23	1.69	1.80
July	0	N/A	N/A	N/A	N/A	N/A
<b>Blue Lake Total</b>	<b>104</b>	<b>187.83</b>	<b>320</b>	<b>81</b>	<b>3.08</b>	<b>1.80</b>
<b>Rainbow Lake</b>						
<u>March</u>	51	89.32	148	2	2.90	1.75
April	33	84.76	64	3	1.94	2.57
<u>May</u>	50	103.24	57	30	1.14	2.06
June	33	71.91	55	33	1.67	2.18
July	20	32.70	4	0	0.20	1.63
<b>Rainbow Lake Total</b>	<b>187</b>	<b>381.93</b>	<b>328</b>	<b>68</b>	<b>1.75</b>	<b>2.04</b>
<b>Deer Lake</b>						
<b>Deer Lake Total</b>	<b>23</b>	<b>30.83</b>	<b>18</b>	<b>3</b>	<b>0.78</b>	<b>1.34</b>
<b>Weighted Average</b>	<b>380</b>	<b>733.46</b>	<b>772</b>	<b>208</b>	<b>2.03</b>	<b>1.93</b>

The range of exploitation rates (percent harvested of the total catchable-sized hatchery trout stocked) were similar to those reported in 1985 for the three larger lakes. In 1985, exploitation rates were 56-77 % for these three lakes (Schuck and Mendel, 1987), but in 2003 they ranged from 58-78% for Spring, Blue and Rainbow Lakes (Table 3). The exploitation rates for individual lakes in 1985 were 69% in Spring Lake, 56.5% in Blue Lake, and 77.7% in Rainbow Lake. The Blue Lake exploitation rate of 78% in 2003 exceeded the 1985 rate, but the other two lakes had lower rates in 2003 than in 1985. The very low exploitation rate (23.56 %) for trout harvest in Deer Lake does not include those fish removed the first two weeks of March because our creel surveys did not begin there until March 28 (the data however, were expanded for March 16-30). Exploitation rates in Spring, Rainbow and Deer lakes may be reduced because these lakes have become shallow and weedy and need to be excavated. Fishing is more difficult in these lakes because of the large quantities of aquatic vegetation so angler effort and harvest is probably reduced as a result. The cold, wet opening week of the fishing season in 2003 also may have contributed to the reduced exploitation rates.

Exploitation rates undoubtedly exceeded those noted in Table 3 because a portion of released trout are expected to have died from hooking and handling, especially when bait is used (Mongillo 1984, Muoneke and Childress 1994). If we apply a conservative hooking mortality rate of 10% to the released trout (Table 3) and include that in total exploitation, the estimates would increase by 2-3% in the three larger lakes, and by 0.6% in Deer Lake.

**Table 3 Monthly rainbow trout stocked (including jumbo trout), expanded harvest and release, and percent cumulative exploitation rates during the Tucannon Lakes creel, 2003.**

Lake/ Month	Number of Jumbos Stocked	Number of Catchable-Sized Trout Stocked <sup>a</sup>	Expanded Totals		% Cumulative Exploitation <sup>b</sup>
			Total Estimated Number Harvested	Total Estimated Number Released	
<b>Spring Lake</b>					
March	200	4,022	1,686	379	41.92
April	100	2,024	609	267	37.96
May	0	1,976	1,061	437	41.83
June	0	0	933	420	53.47
July	0	0	373	227	58.13
<b>Season Total</b>	<b>300</b>	<b>8,022</b>	<b>4,663</b>	<b>1,730</b>	<b>58.13</b>
<b>Blue Lake</b>					
March	201	8,295	5,742	2,786	69.22
April	100	1,702	2,939	854	86.84
May	0	4,399	2,135	922	75.14
June	0	1,047	1,103	1014	77.19
July	0	0	146	203	78.13
<b>Season Total</b>	<b>301</b>	<b>15,443</b>	<b>12,065</b>	<b>5,779</b>	<b>78.13</b>
<b>Rainbow Lake</b>					
March	200	7,140	4,718	1,808	66.08
April	100	3,965	1,757	702	58.31
May	0	3,130	1,863	1,032	58.57
June	0	1,762	1,422	586	61.01
July	0	0	231	79	62.46
<b>Season Total</b>	<b>300</b>	<b>15,997</b>	<b>9,991</b>	<b>4,207</b>	<b>62.46</b>
<b>Deer Lake</b>					
March	0	1,002	101	51	10.08
April	0	1,007	113	3	10.65
May	0	1,022	337	82	18.18
June	0	0	81	46	20.82
July	0	0	83	28	23.59
<b>Season Total</b>	<b>0</b>	<b>3,031</b>	<b>715</b>	<b>210</b>	<b>23.59</b>
<sup>a</sup> Rainbow trout stocking for the month of March also include fish planted in February for the March 1 <sup>st</sup> fishing opener.					
<sup>b</sup> Exploitation is the percentage of catchable sized rainbow trout harvested divided by the number stocked; calculated cumulatively throughout the season.					

Small numbers of jumbo (> 33 cm FL per fish) rainbow trout were stocked (Table 3) in some of the Tucannon Lakes to create more angler excitement and anticipation of catching a large fish (Figure 3). The total harvest estimate for each lake was partitioned into jumbo trout and “catchable-sized” (about 18-30 cm FL) hatchery trout releases from Lyons Ferry (LFH) and Tucannon (TFH) fish hatcheries. An average of 2.8% of the harvested fish were jumbo trout (Table 4). The jumbo trout harvest rate is higher than the jumbo trout stocking rate (2.1%) and suggests that those large fish were more likely to be harvested than “catchable-sized” trout. The jumbo trout harvest is estimated to have been approximately 768 (27,436 total trout harvested x 2.8%). Therefore, the jumbo trout exploitation rate would be 85.2% (768 harvested divided by

901 stocked), which is well above the average calculated exploitation rate for all rainbow trout (Table 3).



Figure 3 An example of the size range of harvested fish (one “jumbo” and two “catchable-sized” trout) observed in angler creels in 2003.

Table 4 Numbers of harvested and released rainbow trout, and number of catchable (< 33.0cm) and jumbo (≥ 33.0cm) rainbow trout harvested (and percent of total harvested) derived from Tucannon Lakes creel survey interviews, 2003.

Area	Total Rainbow Trout Kept	Total Rainbow Trout Released	Rainbow kept < 33.0 cm FL	Rainbow kept ≥ 33.0 cm FL
Spring Lake	769	277	749 (97.4%)	20 (2.6%)
Blue Lake	1,531	609	1,490 (97.3%)	41 (2.7%)
Rainbow Lake	1,504	583	1,455 (96.7%)	49 (3.3%)
Deer Lake	112	23	112 (100.0%) <sup>a</sup>	0 (0.0%) <sup>a</sup>
<b>Total for all Lakes</b>	<b>3,916</b>	<b>1,592</b>	<b>3,806 (97.2%)</b>	<b>110 (2.8%)</b>

<sup>a</sup> No Jumbo rainbow trout (≥ 33.0cm) were planted in Deer Lake so none were observed during the catch.

## **Fishing Gear, Angler Satisfaction, and Other Species Harvested**

Most anglers using the Tucannon Lakes preferred to use bait (78-82%), but lures and flies often produced better catch rates (Table 5). It may be that more experienced anglers used lures or flies and therefore had higher success rates. Bait use at the Tucannon Lakes was much higher than the Washington statewide average (25%) for rainbow trout fishing (Responsive Management 2008).

We asked anglers whether they were satisfied with the number of fish they were catching and the quality of the fish they caught in 2003. Satisfaction levels generally exceeded 65 % except during April and July (Table 6). The decrease in satisfaction in April of 2003 is probably a reflection of the smaller sized trout stocked that month that came from the Tucannon Fish Hatchery. Lyons Ferry Hatchery had provided all the stocked trout in February and March, but Tucannon Hatchery stocked the trout in April, May and June. The Tucannon Hatchery has cold water temperatures in winter and spring and, therefore, is not able to consistently produce 8-12 inch (20-30 cm) fish by April. Lyons Ferry Hatchery can produce large trout as early as February or March because of the use of constant temperature well water at this facility (Table 7). The catch of smaller fish, and relative dissatisfaction in April could be alleviated by having additional rainbow trout produced at Lyons Ferry Hatchery for April releases and delaying use of Tucannon Hatchery releases until later to allow additional growth and increased size at release. In addition, most or all the jumbo trout may have been harvested from the lakes by early April so that probably contributed to angler dissatisfaction with the size of fish caught during that month. Also, we had expected, and indeed found, lower satisfaction levels in July because of poorer fishing conditions and fewer trout remaining for harvest

**Table 5 Summary of gear type used by anglers interviewed during Tucannon Lakes creel surveys, and catch success (in numbers of fish caught and released and catch rates) for each gear type, 2003.**

Lake/ Gear Type	Number of Anglers Interviewed (% of Total)	Number of Fish Harvested	Number of Fish Released	Catch Rate for Rainbow Trout		
				Fish Harvested per Angler (hrs./fish harvested)	Fish Released Rate (hrs./fish released)	Total Fish Caught per Angler (hrs./fish caught)
<b>Spring Lake</b>						
Bait	765 (81.9%)	637	138	0.8 (1.79)	8.27	1.0 (1.47)
Lure	50 (5.4%)	35	44	0.7 (1.67)	1.32	1.6 (0.74)
Fly	19 (2.0%)	17	44	0.9 (1.73)	0.67	3.2 (0.48)
Bait/Lure	96 (10.3%)	77	51	0.5 (1.97)	2.97	1.3 (1.18)
Bait/Fly	4 (0.4%)	3	0	0.7 (1.56)	0.0	0.7 (1.56)
<b>Total</b>	<b>934</b>	<b>769</b>	<b>277</b>	<b>0.8 (1.80)</b>	<b>5.00</b>	<b>1.1 (1.32)</b>
<b>Blue Lake</b>						
Bait	1,151 (78.9%)	1,239	214	1.1 (1.14)	6.63	1.3 (0.98)
Lure	56 (3.8%)	40	98	0.7 (1.56)	0.64	2.5 (0.45)
Fly	66 (4.5%)	36	160	0.5 (2.54)	0.57	3.0 (0.47)
Bait/Lure	95 (6.5%)	144	65	1.5 (1.34)	2.08	2.2 (0.82)
Bait/Fly	56 (3.8%)	61	32	1.1 (1.18)	2.25	1.7 (0.77)
Lure/Fly	16 (1.1%)	8	10	0.5 (1.57)	1.25	1.1 (0.70)
Bait/Lure/Fly	19 (1.3%)	3	30	0.2 (12.87)	1.29	1.7 (1.17)
<b>Total</b>	<b>1,459</b>	<b>1,531</b>	<b>609</b>	<b>1.0 (1.21)</b>	<b>3.04</b>	<b>1.5 (0.87)</b>
<b>Rainbow Lake</b>						
Bait	1,309 (79.0%)	1,245	294	0.9 (1.51)	6.39	1.2 (1.22)
Lure	93 (5.6%)	75	124	0.8 (1.51)	0.91	2.1 (0.57)
Fly	61 (3.7%)	38	104	0.6 (2.49)	0.91	2.3 (0.67)
Bait/Lure	152 (9.2%)	131	43	0.9 (1.92)	5.85	1.1 (1.45)
Bait/Fly	37 (2.2%)	15	17	0.4 (2.03)	1.79	0.9 (0.95)
Lure/Fly	2 (0.1%)	0	1	0.0 (0.00)	5.84	0.5 (5.84)
Bait/Lure/Fly	4 (0.2%)	0	0	0.0 (0.00)	0.00	0.0 (0.00)
<b>Total</b>	<b>1,658</b>	<b>1,504</b>	<b>583</b>	<b>0.9 (1.58)</b>	<b>4.07</b>	<b>1.3 (1.14)</b>
<b>Deer Lake</b>						
Bait	112 (81.2%)	93	15	0.8 (1.28)	7.96	1.0 (1.11)
Lure	7 (5.1%)	10	4	1.4 (0.27)	0.67	2.0 (0.19)
Fly	3 (2.2%)	0	2	0.0 (0.00)	7.71	0.7 (7.71)
Bait/Lure	11 (8.0%)	7	1	0.6 (1.43)	10.01	0.7 (1.25)
Bait/Fly	5 (3.6%)	2	1	0.4 (2.50)	5.00	0.6 (1.67)
<b>Total</b>	<b>138</b>	<b>112</b>	<b>23</b>	<b>0.8 (1.36)</b>	<b>6.63</b>	<b>1.0 (1.13)</b>

**Table 6 Angler satisfaction with the number of rainbow trout and quality of trout caught during the Tucannon Lakes creel surveys, 2003.**

Lake/Month	Satisfied with number of trout?			Satisfied with quality of trout?		
	# Anglers Interviewed	Yes	No	# Anglers Interviewed	Yes	No
<b>Spring Lake</b>						
March	201	155 (77.1%)	46 (22.9%)	188	158 (84.0%)	30 (16.0%)
April	276	117 (42.4%)	159 (57.6%)	228	122 (53.5%)	106 (46.5%)
May	135	91 (67.4%)	44 (32.6%)	89	88 (98.9%)	1 (1.1%)
June	123	94 (76.4%)	29 (23.6%)	123	94 (76.4%)	29 (23.6%)
July	64	40 (62.5%)	24 (37.5%)	64	40 (62.5%)	24 (37.5%)
<b>Total</b>	<b>799</b>	<b>497 (62.2%)</b>	<b>302 (37.8%)</b>	<b>645</b>	<b>507 (78.6%)</b>	<b>138 (21.4%)</b>
<b>Blue Lake</b>						
March	346	308 (89.0%)	38 (11.0%)	346	288 (83.2%)	58 (16.8%)
April	457	163 (35.7%)	294 (64.3%)	390	196 (50.3%)	194 (49.7%)
May	250	200 (80.0%)	50 (20.0%)	150	150 (100.0%)	0 (0.0%)
June	186	132 (71.0%)	54 (29.0%)	145	135 (93.1 %)	10 (6.9%)
July	48	17 (35.4%)	31 (64.6%)	23	23 (100.0%)	0 (0.0%)
<b>Total</b>	<b>1,287</b>	<b>820 (63.7%)</b>	<b>467 (36.3%)</b>	<b>1,054</b>	<b>792 (75.1%)</b>	<b>262 (24.9%)</b>
<b>Rainbow Lake</b>						
March	365	310 (84.9%)	55 (15.1%)	365	300 (82.2 %)	65 (17.8%)
April	385	134 (34.8%)	251 (65.2%)	271	158 (58.3%)	113 (41.7%)
May	320	213 (66.6%)	107 (33.4%)	192	187 (97.4%)	5 (2.6%)
June	251	172 (68.5%)	79 (31.5%)	188	185 (98.4%)	3 (1.6%)
July	109	14 (12.8%)	95 (87.2%)	17	16 (94.1%)	1 (5.9%)
<b>Total</b>	<b>1,430</b>	<b>843 (59.0%)</b>	<b>587 (41.0%)</b>	<b>1,033</b>	<b>846 (81.9%)</b>	<b>187 (18.1%)</b>
<b>Deer Lake</b>						
March	11	9 (81.8%)	2 (18.2%)	11	9 (81.8%)	2 (18.2%)
April	36	20 (55.6%)	16 (44.4%)	30	8 (26.7%)	22 (73.3%)
May	51	43 (84.3%)	8 (15.7%)	32	32 (100.0%)	0 (0.0%)
June	16	6 (37.5%)	10 (62.5%)	8	8 (100.0%)	0 (0.0%)
July	10	3 (30.0%)	7 (70.0%)	3	3 (100.0%)	0 (0.0%)
<b>Total</b>	<b>122</b>	<b>81 (66.4%)</b>	<b>41 (33.6%)</b>	<b>84</b>	<b>60 (71.4%)</b>	<b>24 (28.6%)</b>

**Table 7 Number and average size (number of fish per pound, or per 0.45 kg) of catchable-sized trout (excluding jumbo trout) released into four of the Tucannon Lakes in 2003 from the Tucannon Fish Hatchery (TFH) and Lyons Ferry Hatchery (LFH) (information from Jon Lovrak, pers. comm. 2008).**

Lake/ Hatchery	February	March	April	May	June
Spring Lake/ TFH			2,024 (4.4)	1,976 (3.8)	
LFH	2,006 (3.2)	2,016 (2.8)			
Blue Lake/ TFH			1,702 (4.4)	4,399 (4.3)	1,047 (2.3)
LFH	3,978 (3.4)	4,317 (2.7)			
Rainbow Lake/ TFH			3,965 (4.4)	3,130 (4.3)	1,762 (3.1)
LFH	3,060 (3.4)	4,080 (2.8)			
Deer Lake/ TFH			1,007 (4.4)	1,022 (3.8)	
LFH	1,002 (3.0)				

Anglers did catch species of fish other than hatchery trout, particularly in Spring and Rainbow lakes (Table 8). Smallmouth bass, a favored gamefish, were harvested from Spring Lake. Redside shiners are a small native fish that seldom exceeds 4-5 inches (10-13 cm). Northern pikeminnows, a species native to the Tucannon River, were commonly caught in Rainbow Lake. One bridgelip sucker was also caught. No other species were observed or reported during angler interviews.

**Table 8 Species of fish other than rainbow trout observed during Tucannon Lakes creel surveys, 2003.**

Lake	Other Species Caught	Number Caught
Spring Lake	Smallmouth bass	62
Blue Lake	Redside shiner	1
Rainbow Lake	Northern pikeminnow	109
	Redside shiner	6
	Bridgelip sucker	1
Deer Lake	None	

## Comparison of 2003 and 1985 Creel Results

In 1985, the trout fishing in the Tucannon Lakes opened on April 21. In 2003, opening day was March 1. Additionally in 1985, the Tucannon River was stocked with hatchery trout and was open for fishing in late May (25<sup>th</sup>), but in 2003 the river was not stocked and it did not open until June 1. In 1985, the random sampling of Tucannon Lakes was stratified between weekends and weekdays, and AM and PM periods per day. Two or three counts were made each sampling period (half day). The creel surveys extended into August in 1985, but counts were decreased to

only one per half day in August because of low numbers of anglers. July and August accounted for a very small percentage of the season's total angler effort, except at Curl Lake, which did not open until May 25, in 1985. Completed angling trips averaged 1.77 hrs per day (less than the 1.93 hrs/day in 2003), resulting in an estimated 26,094 angler days at the eight Tucannon Lakes during the spring and summer of 1985 (Schuck and Mendel 1987). Anglers caught an average of 2.89 fish each and harvested 52-107 % of the fish stocked into the lakes in 1985, compared with 2.03 fish per angler and 24-78% of the trout stocked in 2003. In 1985, Curl Lake anglers apparently harvested many steelhead smolts that had not left the lake before the trout season opened and the lake had been restocked with rainbow trout, thus accounting for greater than 100% exploitation. Also, Rainbow Lake angling in 1985 may have been artificially low because of a "Hatchery Closed" sign at the bridge that may have deterred anglers from crossing the bridge to access Rainbow Lake. In 1985, bull trout were harvested from Spring Lake, Blue Lake, and Big 4 Lake. No ESA threatened bull trout were caught in the 2003 fishery in the four lakes sampled in this study, probably because of improved screening practices that excluded bull trout from entering the lakes.

Cost estimates for the catchable trout program can be made and compared between 1985 (Schuck and Mendel 1987) and 2003. In 1985, 79,513 trout weighing 22,664 lbs were produced and stocked in all the Tucannon Lakes at a cost of \$56,660 (\$0.71 per trout). Those fish provided over 46,186 angling hours of recreation. By contrast in 2003, the total cost to produce the rainbow trout for all trout releases in southeast Washington was estimated at \$440,795 (TFH and LFH average in 2003 was \$2.03 per trout, or \$6.05 per lb with both catchable and jumbo trout combined (Doug Maxey and Jon Lovrak, TFH and LFH, respectively, personal communication). In 2003, a total of 43,393 hatchery trout were stocked in these four lakes at a cost of \$88,088.

We were able to estimate the economic value of the Tucannon Lakes trout fisheries by using specific information from five similar "put and take" hatchery trout lakes in nearby counties of northern Idaho (Latah, Lewis, and Nez Perce counties). Based on an Idaho Fish and Game economic study of the value of trout fishing in various Idaho lakes (Grunder et al. 2008), we were able to extract a range of \$24-67 expended per angler-trip (average of \$51.40/trip), or \$18-51 per angler-day (based on the statewide average of 1.3 days per trip, and 5.1 hrs per day) We converted the estimated cost per trip that economists use (which may include more than one day of fishing if anglers camp in the area) to estimate economic values or direct expenses of fishing to costs per angler-day that we then applied to a completed angler-day. Applying the average costs (\$39.54 per day) to our estimate of angler-days (19,749) produced an economic expenditures value for the fisheries at the four Tucannon Lakes of \$780,895. Comparison of the cost of trout production with angler expenditures in the fisheries at the four Tucannon Lakes provides a ratio of economic activity/cost (or return on investment) of 8.9/1. This ratio falls

within the range of values determined in the 1985 Tucannon Lakes creel study of 6.6/1 and 13.1/1 (and \$374,246-740,025 in economic expenditures -Schuck and Mendel 1987).

## **Residence of Anglers Interviewed**

On March 13, we began asking anglers their residence location (a.k.a. “origin”) when we did angler interviews for determination of angling effort and catch rate (the three earliest creel survey days in March were not sampled for angler origin). The results of our query regarding angler residence indicated that anglers from a large geographic area used the Tucannon Lakes in 2003 (Table 9). Because some anglers were interviewed more than once during a sampling day, we evaluated angler origin data by using the total angler interviews (Appendix C) and compared that with randomly selected angler interview periods per sampling-day (Table 9). We did not find much difference in the percentage of anglers by geographic origin using these two interview datasets. Local area anglers from Columbia and Garfield Counties comprised about 9% of the anglers in both datasets, while the larger population areas of nearby Asotin and Walla Walla counties comprised about 22%. Anglers from the Tri-Cities and that general geographic area comprised about 52-54% of the anglers interviewed, depending on whether all anglers are included or only those from one interview period per day.

Some anglers from very distant areas were found fishing the Tucannon Lakes. They were likely visiting friends or family in the local area, as they were usually associated with more local anglers. Anglers from as far away in Washington as Seattle, Hoquiam and Whidbey Island were interviewed, as well as anglers from distant states such as Florida and Wisconsin. Anglers from Oregon and Idaho made up 1-2% of anglers we interviewed at the Tucannon Lakes, except during March. Most anglers during March were from relatively local areas such the Tri-cities (Pasco, Kennewick and Richland -35%), Walla Walla (27%), and nearby areas of Columbia and Garfield counties (19% - Table 10). No anglers from Oregon, Idaho or states other than Washington were contacted in March, but anglers from distant areas comprised over 2.6% of the total anglers over the entire sampled fishing season (Table 9 and Appendix C).

**Table 9 Angler residence data from one interview period per day for the entire season of the Tucannon Lakes creel surveys, 2003.**

Residence	Number of Anglers	% of Anglers	Residence	Number of Anglers	% of Anglers
<b><u>Washington State Anglers</u></b>			Ritzville	0	0.00
<b>Columbia and Garfield County Anglers</b>			Sammamish	1	0.11
Blind Grade	4	0.41	Seattle	2	0.21
Dayton	46	4.73	Silverdale	0	0.00
Lyons Ferry	0	0.00	Snohomish	1	0.11
Pomeroy	35	3.60	Soap Lake	2	0.21
Starbuck	4	0.41	Spokane	13	1.37
Tucannon	0	0.00	Sunnyside	3	0.32
<b>Columbia and Garfield County Totals</b>	<b>89</b>	<b>9.35</b>	Tri-Cities	492	51.68
<b>Walla Walla and Asotin County Anglers</b>			Union Town	1	0.11
Asotin	0	0.00	Vancouver	3	0.32
Burbank	4	0.42	Washtucna	3	0.32
Clarkston	4	0.42	Wenatchee	1	0.11
College Place	1	0.11	Whidbey Island	2	0.21
Dixie	0	0.00	Yakima	3	0.32
Prescott	5	0.53	Zillah	0	0.00
Touchet	17	1.79	<b>Washington Totals</b>	<b>927</b>	<b>97.37</b>
Waitsburg	28	2.94	<b><u>Oregon State Anglers</u></b>		
Walla Walla	144	15.13	Glide, OR	0	0.00
Wallula	4	0.42	Hermiston, OR	3	0.32
<b>Walla Walla and Asotin County Totals</b>	<b>207</b>	<b>21.74</b>	Irrigon, OR	1	0.11
<b>Other Cities in Washington State</b>			Medford, OR	0	0.00
Arlington	0	0.00	Milton-Freewater, OR	5	0.53
Bellevue	0	0.00	Portland, OR	0	0.00
Benton City	10	1.05	Salem, OR	2	0.21
Chehalis	0	0.00	Wallowa, OR	0	0.00
Cheney	1	0.11	<b>Oregon Totals</b>	<b>11</b>	<b>1.16</b>
Cle-Elum	0	0.00	<b><u>Idaho State Anglers</u></b>		
Colfax	0	0.00	Bothell, ID	0	0.00
Connell	9	0.95	Lewiston, ID	0	0.00
Ellensburg	0	0.00	Peck, ID	0	0.00
Eltopia	0	0.00	Pocatello, ID	3	0.32
Finley	1	0.11	Winchester, ID	11	1.16
Gig Harbor	8	0.84	<b>Idaho Totals</b>	<b>14</b>	<b>1.47</b>
Goldendale	0	0.00	<b><u>Anglers from other U.S. Cities and States</u></b>		
Grandview	7	0.74	Alabama	0	0.00
Hoquiam	0	0.00	Arizona	1	0.11
Ione	0	0.00	Mesa, AZ	0	0.00
Kahlotus	9	0.95	California	0	0.00
Lind	4	0.42	Sacramento, CA	0	0.00
Mesa	0	0.00	Florida	0	0.00
Moses Lake	7	0.74	Michigan	0	0.00
Olympia	0	0.00	Missouri	0	0.00
Othello	11	1.16	Nebraska	0	0.00
Prosser	24	2.52	Las Vegas, NV	0	0.00
Pullman	8	0.84	Carson City, NV	0	0.00
Puyallup	3	0.32	Texas	0	0.00
Reardon	1	0.11	Salt Lake City, UT	0	0.00
Redman	0	0.00	Wisconsin	0	0.00
Ridgefield	0	0.00	<b>Other Totals</b>	<b>1</b>	<b>0.11</b>

**Table 10 Angler residence data from one interview period per day during the first month of the Tucannon Lakes creel surveys, 2003.**

Residence	Number of Anglers	% of Anglers	Residence	Number of Anglers	% of Anglers
<b>Washington State Anglers</b>			Ritzville	0	0.00
<b>Columbia and Garfield County Anglers</b>			Sammamish	0	0.00
Blind Grade	0	0.00	Seattle	2	0.84
Dayton	23	9.70	Silverdale	0	0.00
Lyons Ferry	0	0.00	Snohomish	0	0.00
Pomeroy	21	8.86	Soap Lake	2	0.84
Starbuck	0	0.00	Spokane	5	2.11
Tucannon	0	0.00	Sunnyside	0	0.00
<b>Columbia and Garfield County</b>			Tri-Cities	83	35.02
<b>Totals</b>					
<b>Walla Walla and Asotin County Anglers</b>			Union Town	0	0.00
Asotin	0	0.00	Vancouver	2	0.84
Burbank	0	0.00	Washtucna	0	0.00
Clarkston	0	0.00	Wenatchee	0	0.00
College Place	0	0.00	Whidbey Island	0	0.00
Dixie	0	0.00	Yakima	0	0.00
Prescott	0	0.00	Zillah	0	0.00
Touchet	8	3.38	<b>Washington Totals</b>		
Waitsburg	9	3.80		<b>113</b>	<b>47.68</b>
Walla Walla	63	26.58	<b>Oregon State Anglers</b>		
Wallula	0	0.00	Glide, OR	0	0.00
<b>Walla Walla and Asotin County</b>			Hermiston, OR	0	0.00
	<b>80</b>	<b>33.76</b>	Irrigon, OR	0	0.00
<b>Totals</b>					
<b>Other Cities in Washington State</b>			Medford, OR	0	0.00
Arlington	0	0.00	Milton-Freewater, OR	0	0.00
Bellevue	0	0.00	Portland, OR	0	0.00
Benton City	0	0.00	Salem, OR	0	0.00
Chehalis	0	0.00	Walla, OR	0	0.00
Cheney	0	0.00	<b>Oregon Totals</b>		
Cle-Elum	0	0.00		<b>0</b>	<b>0.00</b>
Colfax	0	0.00	<b>Idaho State Anglers</b>		
Connell	5	2.11	Bothell, ID	0	0.00
Ellensburg	0	0.00	Lewiston, ID	0	0.00
Etopia	0	0.00	Peck, ID	0	0.00
Finley	0	0.00	Pocatello, ID	0	0.00
Gig Harbor	0	0.00	Winchester, ID	0	0.00
Goldendale	0	0.00	<b>Idaho Totals</b>		
Grandview	0	0.00		<b>0</b>	<b>0.00</b>
Hoquiam	0	0.00	<b>Anglers from other U.S. Cities and States</b>		
Ione	0	0.00	Alabama	0	0.00
Kahlotus	1	0.42	Arizona	0	0.00
Lind	0	0.00	Mesa, AZ	0	0.00
Mesa	0	0.00	California	0	0.00
Moses Lake	7	2.95	Sacramento, CA	0	0.00
Olympia	0	0.00	Florida	0	0.00
Othello	6	2.53	Michigan	0	0.00
Prosser	0	0.00	Missouri	0	0.00
Pullman	0	0.00	Nebraska	0	0.00
Puyallup	0	0.00	Las Vegas, NV	0	0.00
Reardon	0	0.00	Carson City, NV	0	0.00
Redman	0	0.00	Texas	0	0.00
Ridgefield	0	0.00	Salt Lake City, UT	0	0.00
			Wisconsin	0	0.00
			<b>Other Totals</b>		
				<b>0</b>	<b>0.00</b>

## Summary and Conclusions

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This study provided valuable information regarding the trout fisheries in the Tucannon Lakes in 2003. The angler effort on four of the Tucannon Lakes was estimated to be 38,116 angler-hours and 19,749 angler-days (with an average completed angler day of 1.93 hrs). This partial fishing season estimate of angler-days on only four of the Tucannon Lakes exceeded 29% of the LSRCP mitigation goal of 67,500 angler days for all of southeast Washington. An estimated 27,436 rainbow trout were harvested during the first 4.5 months of the fishing season (March 1 to mid-July). Approximately 58-78% of hatchery trout were removed from the lakes by anglers, excluding hooking mortalities for released fish. Jumbo trout were apparently harvested at a higher rate than catchable-sized trout. Most anglers (79-82%) used bait when fishing the Tucannon Lakes, even though catch rate was higher with artificial lures. Anglers were generally satisfied with the numbers and quality of trout they caught, but satisfaction levels decreased temporarily in April as the size of available hatchery trout decreased. Anglers in March were mostly from nearby areas of southeast Washington, but later in the season a portion of anglers were from very distant areas. The Tri-cities area was the source of the largest percentage (>50%) of anglers using the Tucannon Lakes, but some anglers from distant states also fished these lakes.

Estimated angling expenditures for fishing at these four lakes was \$780,895 (derived from economic expenditures per-day in put-and-take trout lakes in nearby areas of northern Idaho). Cost to produce the trout in the four surveyed Tucannon Lakes was \$88,088 in 2003. Therefore, the estimated economic return on investment ratio was 8.9/1.

## Future Outlook

It is obvious from the information provided by this evaluation that the fisheries on the Tucannon Lakes provide valuable fishing opportunities to anglers from a wide area. Based on the estimated return on investment for put-and-take trout fisheries in the four Tucannon Lakes sampled, all eight Tucannon Lakes could provide more than \$1 million annually in economic activity in the local area of southeast Washington. Unfortunately, the lake structure, habitat and fishing conditions in all eight of the Tucannon Lakes are deteriorating. These lakes need to be maintained by dredging (to increase depth and reduce aquatic vegetation) and the dams are in need of repair. Hatchery trout stocking rates have been reduced since 2003 in Rainbow, Spring and Deer lakes because of less lake volume, depth and fishing access, which equates to lower fishing success. The WDFW may be forced to close some of these lakes in the near future if they are not adequately maintained. Also, the Washington Department of Ecology (DOE) has notified WDFW that these lakes are in violation of DOE dam safety regulations and they must be brought into compliance, or dewatered. No mitigation funding is available to maintain these

lakes. The WDFW, the legislature, and the public should make maintenance of at least the larger of the Tucannon Lakes a priority and assist with securing funding for maintenance activities soon if angling opportunities are to continue. Preliminary estimates are available regarding repairs needed and estimated costs (Thomas, Dean and Hoskins, 2003). It has been estimated that some of these lakes will require \$500,000 to over \$1 million each for needed repairs, and costs will increase in the future. The WDFW should begin evaluation of the maintenance needs, the priorities for maintenance, and whether some of these lakes should be decommissioned. The public must be engaged during this evaluation and their input and assistance should be solicited.

The fishery monitoring results summarized in this report provide a valuable “snapshot” in time regarding the Tucannon Lakes fisheries and the level of achievement of WDFW fishery management goals for southeast Washington as well as LSRCP mitigation goals for replacing angler-days lost to the construction and operation of Snake River dams and reservoirs. Other southeast Washington resident trout fisheries should be monitored in the future to provide additional insight regarding their fisheries and the level of contribution to achieving LSRCP and WDFW fishery management goals. We recommend that Bennington Lake, the largest lake (reservoir) in southeast Washington stocked with hatchery trout, should be the next site for a detailed fishery survey in the near future.

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**Appendix A. Creel Instructions/Questions and Creel  
Survey Form for the Tucannon Lakes, 2003.**

## **Instructions**

Count 1: starts at 06:00 and ends by 07:00

Interviews 1: starts at end of count 1 finished by 10:00

Count 2: starts at 10:00 and ends by 11:00

Interviews 2: starts at end of count 2 finished by 13:00

Count 3: starts at 13:00 and ends by 14:00

Interviews 3: starts at end of count 3 finished by 16:00

Count 4: starts at 16:00 ends by 17:00

First count begins at Spring Lk., then Blue Lk., then Rainbow Lk. You have up to one hour to complete the count. At the end of the count write something in the comments section of the creel form about the weather (cold, warm, sunny, rainy, etc.). Once count is finished begin interviews (at least 10 groups per lake).

## **Questions**

1. Number of people in party (adults/kids)?
2. What time did you start fishing? (Quit time is time interviewed)
3. Are you done fishing?
4. What are you using for bait? (Bait, Lure, Fly)
  - 5a. How many trout have you caught?
  - 5b. How many trout did you keep/how many did you release?
- 6a. Have you caught anything other than trout?
- 6b. Were the other species kept or released?
  - 7a. Are you satisfied with the # of fish available?
  - 7b. Are you satisfied with the quality of the fish you are catching? (take extra notes on any specific comments)
8. Take measurements on some or all of the fish (at least ½ of the groups surveyed)





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**Appendix B. Angler Effort and Harvest for Spring,  
Blue, Rainbow and Deer Lakes, 2003.**

**Appendix B. Table 1.** Spring Lake Angler Effort and Harvest, 2003.

			Angler Counts			Angler Interview Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>March 1-15 Weekday Totals</b>				<b>23</b>	<b>2.88</b>	<b>38.53</b>	<b>54</b>	<b>0</b>	<b>0.714</b>	<b>0.000</b>	<b>330.63</b>	<b>463.38</b>	<b>0.00</b>
3	7	WD	7:00	0	1.00								
3	7	WD	10:00	0									
3	7	WD	13:00	2									
3	7	WD	16:00	2									
3	13	WD	8:00	4	4.75								
3	13	WD	11:00	3									
3	13	WD	14:00	5									
3	13	WD	17:00	7									
<b>March 16-31 Weekday Totals</b>				<b>30</b>	<b>3.75</b>	<b>42.10</b>	<b>27</b>	<b>22</b>	<b>1.559</b>	<b>1.914</b>	<b>515.63</b>	<b>330.68</b>	<b>269.45</b>
3	19	WD	7:00	2	4.50								
3	19	WD	10:00	7									
3	19	WD	13:00	4									
3	19	WD	16:00	5									
3	28	WD	7:00	0	3.00								
3	28	WD	10:30	6									
3	28	WD	14:00	6									
3	28	WD	17:30	0									
<b>April 1-15 Weekday Totals</b>				<b>59</b>	<b>5.90</b>	<b>77.64</b>	<b>15</b>	<b>6</b>	<b>5.176</b>	<b>12.940</b>	<b>854.73</b>	<b>165.13</b>	<b>66.05</b>
4	1	WD	7:00	5	2.25								
4	1	WD	10:30	2									
4	1	WD	14:00	2									
4	1	WD	17:30	0									
4	11	WD	7:00	2	8.33								
4	11	WD	9:30	9									
4	11	WD	12:00	6									
4	11	WD	14:30	17									
4	11	WD	17:00	14									
4	11	WD	19:30	2									
<b>April 16-30 Weekday Totals</b>				<b>17</b>	<b>0.94</b>	<b>24.09</b>	<b>17</b>	<b>3</b>	<b>1.417</b>	<b>8.030</b>	<b>145.44</b>	<b>102.64</b>	<b>18.11</b>
4	17	WD	6:30	1	2.00								
4	17	WD	9:00	1									
4	17	WD	11:30	5									
4	17	WD	14:30	3									
4	17	WD	17:00	0									
4	17	WD	19:00	2									
4	24	WD	6:30	0	0.50								
4	24	WD	9:00	0									
4	24	WD	11:30	0									
4	24	WD	14:00	3									
4	24	WD	16:30	0									
4	24	WD	19:00	0									
4	29	WD	7:00	0	0.33								
4	29	WD	9:30	0									
4	29	WD	12:00	0									
4	29	WD	14:30	2									
4	29	WD	17:00	0									
4	29	WD	19:30	0									
<b>May 1-15 Weekday Totals</b>				<b>0</b>	<b>1.75</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.251</b>	<b>11.680</b>	<b>282.40</b>	<b>225.67</b>	<b>24.18</b>

No weekday creel surveys conducted during this period, data was determined by averaging the number of anglers from 4/29 and 5/16 and by calculating a combined catch and release rate for 4/29 and 5/16.

**Appendix B. Table 1.** Spring Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow Trout Harvested	Rainbow Trout Released
<b>May 16-31 Weekday Totals</b>				<b>43</b>	<b>1.43</b>	<b>65.71</b>	<b>58</b>	<b>36</b>	<b>1.133</b>	<b>1.825</b>	<b>241.70</b>	<b>213.35</b>	<b>132.42</b>
5	16	WD	7:30	5	3.17								
5	16	WD	10:00	1									
5	16	WD	12:30	6									
5	16	WD	15:00	4									
5	16	WD	17:30	3									
5	16	WD	20:00	0									
5	20	WD	7:30	2	0.83								
5	20	WD	10:00	2									
5	20	WD	12:30	0									
5	20	WD	15:00	1									
5	20	WD	17:30	0									
5	20	WD	20:00	0									
5	21	WD	7:30	1	2.33								
5	21	WD	10:00	0									
5	21	WD	12:30	2									
5	21	WD	15:00	1									
5	21	WD	17:30	4									
5	21	WD	20:00	6									
5	28	WD	7:00	0	0.00								
5	28	WD	9:30	0									
5	28	WD	12:00	0									
5	28	WD	14:30	0									
5	28	WD	17:00	0									
5	28	WD	19:30	0									
5	29	WD	7:30	0	0.83								
5	29	WD	10:00	0									
5	29	WD	12:30	1									
5	29	WD	15:00	2									
5	29	WD	17:30	0									
5	29	WD	20:00	2									
<b>June 1-15 Weekday Totals</b>				<b>20</b>	<b>1.67</b>	<b>16.67</b>	<b>17</b>	<b>16</b>	<b>0.981</b>	<b>1.042</b>	<b>261.17</b>	<b>266.33</b>	<b>250.66</b>
6	3	WD	7:30	0	1.33								
6	3	WD	10:00	4									
6	3	WD	12:30	0									
6	3	WD	15:00	2									
6	3	WD	17:30	2									
6	3	WD	20:00	0									
6	10	WD	7:00	0	2.00								
6	10	WD	9:30	2									
6	10	WD	12:00	4									
6	10	WD	14:30	0									
6	10	WD	17:00	0									
6	10	WD	19:30	6									
<b>June 16-30 Weekday Totals</b>				<b>52</b>	<b>2.17</b>	<b>78.72</b>	<b>69</b>	<b>7</b>	<b>1.141</b>	<b>11.246</b>	<b>342.98</b>	<b>300.63</b>	<b>30.50</b>
6	18	WD	7:30	0	2.33								
6	18	WD	10:00	0									
6	18	WD	12:30	6									
6	18	WD	15:00	4									
6	18	WD	17:30	4									
6	18	WD	20:00	0									
6	20	WD	7:00	0	2.00								
6	20	WD	9:30	2									
6	20	WD	12:00	4									
6	20	WD	14:30	4									
6	20	WD	17:00	2									
6	20	WD	19:30	0									

**Appendix B. Table 1.** Spring Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 16-30 Weekday Totals Continued</b>													
6	25	WD	7:00	0	1.50								
6	25	WD	9:30	0									
6	25	WD	12:00	6									
6	25	WD	14:30	0									
6	25	WD	17:00	3									
6	25	WD	19:30	0									
6	26	WD	8:00	0	2.83								
6	26	WD	10:30	5									
6	26	WD	13:00	8									
6	26	WD	15:30	0									
6	26	WD	18:00	0									
6	26	WD	20:30	4									
<b>July 1-15 Weekday Totals</b>				<b>53</b>	<b>2.94</b>	<b>66.25</b>	<b>35</b>	<b>8</b>	<b>1.949</b>	<b>8.281</b>	<b>458.74</b>	<b>235.43</b>	<b>55.40</b>
7	1	WD	7:00	0	2.33								
7	1	WD	9:30	0									
7	1	WD	12:00	2									
7	1	WD	14:30	6									
7	1	WD	17:00	6									
7	1	WD	19:30	0									
7	3	WD	6:30	0	4.33								
7	3	WD	9:00	8									
7	3	WD	11:30	0									
7	3	WD	14:00	7									
7	3	WD	16:30	4									
7	3	WD	19:00	7									
7	8	WD	7:00	0	2.17								
7	8	WD	9:30	3									
7	8	WD	12:00	4									
7	8	WD	14:30	4									
7	8	WD	17:00	2									
7	8	WD	19:30	0									
<b>Spring Lake Weekday Sub-totals</b>				<b>297</b>		<b>409.71</b>	<b>291</b>	<b>98</b>			<b>3,433.42</b>	<b>2,303.24</b>	<b>846.77</b>
<b>March 1-15 Weekend Totals</b>				<b>152</b>	<b>19.00</b>	<b>201.57</b>	<b>84</b>	<b>3</b>	<b>2.400</b>	<b>67.190</b>	<b>1,092.50</b>	<b>455.28</b>	<b>16.26</b>
3	1	WE	7:00	22	32.00								
3	1	WE	10:00	39									
3	1	WE	13:00	36									
3	1	WE	16:00	31									
3	8	WE	7:00	0	6.00								
3	8	WE	10:00	14									
3	8	WE	13:00	3									
3	8	WE	16:00	7									
<b>March 16-31 Weekend Totals</b>				<b>72</b>	<b>9.00</b>	<b>96.54</b>	<b>75</b>	<b>16</b>	<b>1.287</b>	<b>6.034</b>	<b>562.50</b>	<b>437.00</b>	<b>93.22</b>
3	16	WE	7:30	4	10.25								
3	16	WE	11:00	20									
3	16	WE	14:30	14									
3	16	WE	17:30	3									
3	30	WE	7:00	2	7.75								
3	30	WE	10:30	15									
3	30	WE	14:00	12									
3	30	WE	17:30	2									

**Appendix B. Table 1.** Spring Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>April 1-15 Weekend Totals</b>				<b>107</b>	<b>10.70</b>	<b>162.00</b>	<b>54</b>	<b>19</b>	<b>3.000</b>	<b>8.526</b>	<b>563.68</b>	<b>187.89</b>	<b>66.11</b>
4	5	WE	7:00	8	13.50								
4	5	WE	10:30	18									
4	5	WE	14:30	10									
4	5	WE	17:30	18									
4	13	WE	7:00	3	8.83								
4	13	WE	9:30	14									
4	13	WE	11:30	17									
4	13	WE	14:30	15									
4	13	WE	17:00	4									
4	13	WE	19:30	0									
<b>April 16-30 Weekend Totals</b>				<b>106</b>	<b>8.83</b>	<b>135.54</b>	<b>42</b>	<b>32</b>	<b>3.227</b>	<b>4.236</b>	<b>494.67</b>	<b>153.29</b>	<b>116.79</b>
4	19	WE	7:00	0	11.17								
4	19	WE	9:00	11									
4	19	WE	11:30	16									
4	19	WE	14:30	18									
4	19	WE	16:30	22									
4	19	WE	19:00	0									
4	27	WE	7:00	4	6.50								
4	27	WE	9:30	17									
4	27	WE	12:00	6									
4	27	WE	14:00	7									
4	27	WE	17:00	5									
4	27	WE	19:30	0									
<b>May 1-15 Weekend Totals</b>				<b>88</b>	<b>7.33</b>	<b>92.59</b>	<b>27</b>	<b>21</b>	<b>3.429</b>	<b>4.409</b>	<b>430.32</b>	<b>125.48</b>	<b>97.60</b>
5	3	WE	7:00	1	8.83								
5	3	WE	9:30	5									
5	3	WE	12:00	18									
5	3	WE	14:30	7									
5	3	WE	17:00	17									
5	3	WE	19:30	5									
5	11	WE	6:30	0	5.83								
5	11	WE	9:30	2									
5	11	WE	12:30	18									
5	11	WE	14:30	0									
5	11	WE	17:00	8									
5	11	WE	19:00	7									
<b>May 16-31 Weekend Totals</b>				<b>89</b>	<b>7.42</b>	<b>99.53</b>	<b>87</b>	<b>32</b>	<b>1.144</b>	<b>3.110</b>	<b>568.49</b>	<b>496.93</b>	<b>182.78</b>
5	17	WE	7:00	0	3.00								
5	17	WE	10:00	7									
5	17	WE	12:30	7									
5	17	WE	15:00	1									
5	17	WE	17:30	3									
5	17	WE	20:00	0									
5	25	WE	7:00	3	11.83								
5	25	WE	10:00	21									
5	25	WE	12:30	12									
5	25	WE	15:00	20									
5	25	WE	17:30	12									
5	25	WE	20:00	3									
<b>June 1-15 Weekend Totals</b>				<b>40</b>	<b>3.33</b>	<b>83.07</b>	<b>59</b>	<b>11</b>	<b>1.408</b>	<b>7.552</b>	<b>261.17</b>	<b>185.49</b>	<b>34.58</b>
6	7	WE	6:30	2	2.17								
6	7	WE	9:00	0									
6	7	WE	12:00	3									
6	7	WE	14:00	2									
6	7	WE	16:30	0									
6	7	WE	19:00	6									

**Appendix B. Table 1.** Spring Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 1-15 Weekend Totals Continued</b>													
6	15	WE	6:30	1	4.50								
6	15	WE	9:00	3									
6	15	WE	11:30	15									
6	15	WE	14:00	6									
6	15	WE	16:30	0									
6	15	WE	19:00	2									
<b>June 16-30 Weekend Totals</b>				<b>66</b>	<b>5.50</b>	<b>50.23</b>	<b>26</b>	<b>15</b>	<b>1.932</b>	<b>3.349</b>	<b>348.26</b>	<b>180.27</b>	<b>104.00</b>
6	21	WE	6:30	0	5.00								
6	21	WE	9:00	2									
6	21	WE	11:30	1									
6	21	WE	14:00	7									
6	21	WE	17:00	17									
6	21	WE	19:00	3									
6	29	WE	6:30	4	6.00								
6	29	WE	9:00	4									
6	29	WE	11:30	8									
6	29	WE	14:00	8									
6	29	WE	16:30	6									
6	29	WE	19:00	6									
<b>July 1-15 Weekend Totals</b>				<b>54</b>	<b>4.91</b>	<b>53.33</b>	<b>24</b>	<b>30</b>	<b>2.222</b>	<b>1.778</b>	<b>305.93</b>	<b>137.68</b>	<b>172.10</b>
7	6	WE	7:00	0	4.50								
7	6	WE	9:30	1									
7	6	WE	12:00	10									
7	6	WE	14:30	6									
7	6	WE	17:00	7									
7	6	WE	19:30	3									
7	12	WE	7:00	3	5.40								
7	12	WE	10:00	2									
7	12	WE	13:00	4									
7	12	WE	16:00	6									
7	12	WE	19:00	12									
<b>Spring Lake Weekend Sub-total</b>				<b>774</b>		<b>974.40</b>	<b>478</b>	<b>179</b>			<b>4,627.51</b>	<b>2,359.30</b>	<b>883.44</b>
<b>Spring Lake Season Totals</b>				<b>1,071</b>		<b>1,384.11</b>	<b>769</b>	<b>277</b>			<b>8,060.93</b>	<b>4,662.54</b>	<b>1,730.21</b>

**Appendix B. Table 2.** Blue Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>March 1-15 Weekday Totals</b>				<b>36</b>	<b>4.50</b>	<b>48.10</b>	<b>46</b>	<b>18</b>	<b>1.046</b>	<b>0.408</b>	<b>517.50</b>	<b>494.88</b>	<b>1,269.63</b>
3	7	WD	7:00	0	2.75								
3	7	WD	10:00	7									
3	7	WD	13:00	4									
3	7	WD	16:00	0									
3	13	WD	8:00	2	6.25								
3	13	WD	11:00	7									
3	13	WD	14:00	8									
3	13	WD	17:00	8									
<b>March 16-31 Weekday Totals</b>				<b>70</b>	<b>8.75</b>	<b>97.59</b>	<b>123</b>	<b>74</b>	<b>0.793</b>	<b>1.319</b>	<b>1,203.13</b>	<b>1,516.42</b>	<b>912.29</b>
3	19	WD	7:00	4	6.50								
3	19	WD	10:00	12									
3	19	WD	13:00	4									
3	19	WD	16:00	6									
3	28	WD	7:00	2	11.00								
3	28	WD	10:30	19									
3	28	WD	14:00	16									
3	28	WD	17:30	7									
<b>April 1-15 Weekday Totals</b>				<b>181</b>	<b>18.10</b>	<b>189.11</b>	<b>132</b>	<b>32</b>	<b>1.433</b>	<b>5.910</b>	<b>2,622.15</b>	<b>1,830.21</b>	<b>443.70</b>
4	1	WD	7:00	2	4.75								
4	1	WD	10:30	8									
4	1	WD	14:00	7									
4	1	WD	17:30	2									
4	11	WD	7:00	14	27.00								
4	11	WD	9:30	29									
4	11	WD	12:00	31									
4	11	WD	14:30	34									
4	11	WD	17:00	38									
4	11	WD	19:30	16									
<b>April 16-30 Weekday Totals</b>				<b>27</b>	<b>1.50</b>	<b>25.02</b>	<b>33</b>	<b>18</b>	<b>0.758</b>	<b>1.390</b>	<b>231.00</b>	<b>304.67</b>	<b>166.19</b>
4	17	WD	6:30	0	1.33								
4	17	WD	9:00	0									
4	17	WD	11:30	3									
4	17	WD	14:30	2									
4	17	WD	17:00	0									
4	17	WD	19:00	3									
4	24	WD	6:30	0	0.83								
4	24	WD	9:00	3									
4	24	WD	11:30	0									
4	24	WD	14:00	2									
4	24	WD	16:30	0									
4	24	WD	19:00	0									
4	29	WD	7:00	2	2.33								
4	29	WD	9:30	2									
4	29	WD	12:00	4									
4	29	WD	14:30	6									
4	29	WD	17:00	0									
4	29	WD	19:30	0									
<b>May 1-15 Weekday Totals</b>				<b>0</b>	<b>2.58</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.059</b>	<b>1.959</b>	<b>416.87</b>	<b>393.68</b>	<b>212.80</b>

No weekday creel surveys conducted during this period, data was determined by averaging the number of anglers from 4/29 and 5/16 and by calculating a combined catch and release rate for 4/29 and 5/16.

**Appendix B. Table 2.** Blue Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>May 16-31 Weekday Totals</b>				<b>57</b>	<b>1.90</b>	<b>66.94</b>	<b>84</b>	<b>56</b>	<b>0.797</b>	<b>1.195</b>	<b>320.40</b>	<b>402.05</b>	<b>268.02</b>
5	16	WD	7:30	0	2.83								
5	16	WD	10:00	2									
5	16	WD	12:30	2									
5	16	WD	15:00	7									
5	16	WD	17:30	2									
5	16	WD	20:00	4									
5	20	WD	7:30	0	2.50								
5	20	WD	10:00	3									
5	20	WD	12:30	2									
5	20	WD	15:00	2									
5	20	WD	17:30	4									
5	20	WD	20:00	4									
5	21	WD	7:30	0	2.00								
5	21	WD	10:00	0									
5	21	WD	12:30	2									
5	21	WD	15:00	5									
5	21	WD	17:30	5									
5	21	WD	20:00	0									
5	28	WD	7:00	0	0.00								
5	28	WD	9:30	0									
5	28	WD	12:00	0									
5	28	WD	14:30	0									
5	28	WD	17:00	0									
5	28	WD	19:30	0									
5	29	WD	7:30	0	21.7								
5	29	WD	10:00	4									
5	29	WD	12:30	4									
5	29	WD	15:00	5									
5	29	WD	17:30	0									
5	29	WD	20:00	0									
<b>June 1-15 Weekday Totals</b>				<b>17</b>	<b>1.42</b>	<b>26.60</b>	<b>14</b>	<b>37</b>	<b>1.900</b>	<b>0.719</b>	<b>221.99</b>	<b>116.84</b>	<b>308.79</b>
6	3	WD	7:30	4	2.33								
6	3	WD	10:00	0									
6	3	WD	12:30	3									
6	3	WD	15:00	4									
6	3	WD	17:30	2									
6	3	WD	20:00	1									
6	10	WD	7:00	0	0.50								
6	10	WD	9:30	1									
6	10	WD	12:00	2									
6	10	WD	14:30	0									
6	10	WD	17:00	0									
6	10	WD	19:30	0									
<b>June 16-30 Weekday Totals</b>				<b>65</b>	<b>2.71</b>	<b>54.13</b>	<b>32</b>	<b>25</b>	<b>1.692</b>	<b>2.165</b>	<b>428.73</b>	<b>253.45</b>	<b>198.01</b>
6	18	WD	7:30	0	2.00								
6	18	WD	10:00	3									
6	18	WD	12:30	9									
6	18	WD	15:00	0									
6	18	WD	17:30	0									
6	18	WD	20:00	0									
6	20	WD	7:00	14	4.17								
6	20	WD	9:30	2									
6	20	WD	12:00	8									
6	20	WD	14:30	0									
6	20	WD	17:00	0									
6	20	WD	19:30	1									

**Appendix B. Table 2.** Blue Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 16-30 Weekday Totals Continued</b>													
6	25	WD	7:00	0	2.33								
6	25	WD	9:30	2									
6	25	WD	12:00	6									
6	25	WD	14:30	5									
6	25	WD	17:00	1									
6	25	WD	19:30	0									
6	26	WD	8:00	0	2.33								
6	26	WD	10:30	8									
6	26	WD	13:00	4									
6	26	WD	15:30	0									
6	26	WD	18:00	2									
6	26	WD	20:30	0									
<b>July 1-15 Weekday Totals</b>				<b>36</b>	<b>2.00</b>	<b>34.23</b>	<b>9</b>	<b>11</b>	<b>3.803</b>	<b>3.112</b>	<b>311.60</b>	<b>81.93</b>	<b>100.13</b>
7	1	WD	7:00	0	2.17								
7	1	WD	9:30	2									
7	1	WD	12:00	4									
7	1	WD	14:30	2									
7	1	WD	17:00	5									
7	1	WD	19:30	0									
7	3	WD	6:30	0	2.67								
7	3	WD	9:00	6									
7	3	WD	11:30	9									
7	3	WD	14:00	0									
7	3	WD	16:30	1									
7	3	WD	19:00	0									
7	8	WD	7:00	0	1.17								
7	8	WD	9:30	5									
7	8	WD	12:00	1									
7	8	WD	14:30	0									
7	8	WD	17:00	0									
7	8	WD	19:30	1									
<b>Blue Lake Weekday Sub-totals</b>				<b>489</b>		<b>541.72</b>	<b>473</b>	<b>271</b>			<b>6,273.36</b>	<b>5,394.13</b>	<b>3,879.57</b>
<b>March 1-15 Weekend Totals</b>				<b>288</b>	<b>36.00</b>	<b>246.16</b>	<b>195</b>	<b>28</b>	<b>1.262</b>	<b>8.791</b>	<b>2,070.00</b>	<b>1,639.73</b>	<b>235.46</b>
3	1	WE	7:00	42	59.00								
3	1	WE	10:00	78									
3	1	WE	13:00	80									
3	1	WE	16:00	36									
3	8	WE	7:00	4	13.00								
3	8	WE	10:00	21									
3	8	WE	13:00	13									
3	8	WE	16:00	14									
<b>March 16-31 Weekend Totals</b>				<b>172</b>	<b>21.50</b>	<b>174.77</b>	<b>272</b>	<b>48</b>	<b>0.643</b>	<b>3.641</b>	<b>1,343.75</b>	<b>2,091.44</b>	<b>369.06</b>
3	16	WE	7:30	14	24.25								
3	16	WE	11:00	41									
3	16	WE	14:30	36									
3	16	WE	17:30	6									
3	30	WE	7:00	0	18.75								
3	30	WE	10:30	25									
3	30	WE	14:00	36									
3	30	WE	17:30	14									

**Appendix B. Table 2.** Blue Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>April 1-15 Weekend Totals</b>				<b>149</b>	<b>14.90</b>	<b>147.90</b>	<b>70</b>	<b>16</b>	<b>2.113</b>	<b>9.244</b>	<b>784.93</b>	<b>371.50</b>	<b>84.91</b>
4	5	WE	7:00	2	17.00								
4	5	WE	10:30	24									
4	5	WE	14:30	27									
4	5	WE	17:30	15									
4	13	WE	7:00	2	13.50								
4	13	WE	9:30	24									
4	13	WE	11:30	18									
4	13	WE	14:30	21									
4	13	WE	17:00	11									
4	13	WE	19:30	5									
<b>April 16-30 Weekend Totals</b>				<b>173</b>	<b>14.42</b>	<b>177.11</b>	<b>95</b>	<b>35</b>	<b>1.864</b>	<b>5.060</b>	<b>807.33</b>	<b>433.05</b>	<b>159.54</b>
4	19	WE	7:00	6	18.67								
4	19	WE	9:00	11									
4	19	WE	11:30	44									
4	19	WE	14:30	25									
4	19	WE	16:30	11									
4	19	WE	19:00	15									
4	27	WE	7:00	0	10.17								
4	27	WE	9:30	14									
4	27	WE	12:00	23									
4	27	WE	14:00	11									
4	27	WE	17:00	10									
4	27	WE	19:30	3									
<b>May 1-15 Weekend Totals</b>				<b>68</b>	<b>5.67</b>	<b>76.13</b>	<b>62</b>	<b>11</b>	<b>1.228</b>	<b>6.921</b>	<b>332.52</b>	<b>270.80</b>	<b>48.05</b>
5	3	WE	7:00	0	6.50								
5	3	WE	9:30	8									
5	3	WE	12:00	13									
5	3	WE	14:30	2									
5	3	WE	17:00	12									
5	3	WE	19:30	4									
5	11	WE	6:30	0	4.83								
5	11	WE	9:30	5									
5	11	WE	12:30	11									
5	11	WE	14:30	4									
5	11	WE	17:00	6									
5	11	WE	19:00	3									
<b>May 16-31 Weekend Totals</b>				<b>183</b>	<b>15.25</b>	<b>211.16</b>	<b>193</b>	<b>71</b>	<b>1.094</b>	<b>2.974</b>	<b>1,168.91</b>	<b>1,068.38</b>	<b>393.03</b>
5	17	WE	7:00	0	8.17								
5	17	WE	10:00	8									
5	17	WE	12:30	13									
5	17	WE	15:00	6									
5	17	WE	17:30	20									
5	17	WE	20:00	2									
5	25	WE	7:00	7	22.33								
5	25	WE	10:00	40									
5	25	WE	12:30	18									
5	25	WE	15:00	24									
5	25	WE	17:30	23									
5	25	WE	20:00	22									
<b>June 1-15 Weekend Totals</b>				<b>89</b>	<b>7.42</b>	<b>101.64</b>	<b>88</b>	<b>59</b>	<b>1.155</b>	<b>1.723</b>	<b>581.10</b>	<b>503.11</b>	<b>337.32</b>
6	7	WE	6:30	0	4.50								
6	7	WE	9:00	3									
6	7	WE	12:00	5									
6	7	WE	14:00	8									
6	7	WE	16:30	5									
6	7	WE	19:00	6									

**Appendix B. Table 2.** Blue Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 1-15 Weekend Totals Continued</b>													
6	15	WE	6:30	0	10.33								
6	15	WE	9:00	8									
6	15	WE	11:30	18									
6	15	WE	14:00	20									
6	15	WE	16:30	11									
6	15	WE	19:00	5									
<b>June 16-30 Weekend Totals</b>				<b>92</b>	<b>7.67</b>	<b>154.40</b>	<b>73</b>	<b>54</b>	<b>2.115</b>	<b>2.859</b>	<b>485.45</b>	<b>229.52</b>	<b>169.78</b>
6	21	WE	6:30	0	10.33								
6	21	WE	9:00	13									
6	21	WE	11:30	10									
6	21	WE	14:00	12									
6	21	WE	17:00	12									
6	21	WE	19:00	15									
6	29	WE	6:30	2	5.00								
6	29	WE	9:00	11									
6	29	WE	11:30	5									
6	29	WE	14:00	2									
6	29	WE	16:30	8									
6	29	WE	19:00	2									
<b>July 1-15 Weekend Totals</b>				<b>26</b>	<b>2.36</b>	<b>22.94</b>	<b>10</b>	<b>16</b>	<b>2.294</b>	<b>1.434</b>	<b>147.30</b>	<b>64.21</b>	<b>102.74</b>
7	6	WE	7:00	1	1.00								
7	6	WE	9:30	0									
7	6	WE	12:00	2									
7	6	WE	14:30	3									
7	6	WE	17:00	0									
7	6	WE	19:30	0									
7	12	WE	7:00	8	4.00								
7	12	WE	10:00	0									
7	12	WE	13:00	4									
7	12	WE	16:00	4									
7	12	WE	19:00	4									
<b>Blue Lake Weekend Sub-total</b>				<b>1,240</b>		<b>1,312.21</b>	<b>1,058</b>	<b>338</b>			<b>7,721.30</b>	<b>6,671.74</b>	<b>1,899.88</b>
<b>Blue Lake Season Totals</b>				<b>1,729</b>		<b>1,853.93</b>	<b>1,531</b>	<b>609</b>			<b>13,994.66</b>	<b>12,065.88</b>	<b>5,779.45</b>

**Appendix B. Table 3.** Rainbow Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>March 1-15 Weekday Totals</b>				<b>33</b>	<b>4.13</b>	<b>41.47</b>	<b>28</b>	<b>16</b>	<b>1.481</b>	<b>2.592</b>	<b>474.38</b>	<b>320.29</b>	<b>183.02</b>
3	7	WD	7:00	0	4.75								
3	7	WD	10:00	13									
3	7	WD	13:00	5									
3	7	WD	16:00	1									
3	13	WD	8:00	0	3.50								
3	13	WD	11:00	7									
3	13	WD	14:00	6									
3	13	WD	17:00	1									
<b>March 16-31 Weekday Totals</b>				<b>59</b>	<b>7.38</b>	<b>75.39</b>	<b>114</b>	<b>68</b>	<b>0.661</b>	<b>1.109</b>	<b>1,014.06</b>	<b>1,533.44</b>	<b>914.64</b>
3	19	WD	7:00	2	6.25								
3	19	WD	10:00	12									
3	19	WD	13:00	4									
3	19	WD	16:00	7									
3	28	WD	7:00	0	8.50								
3	28	WD	10:30	18									
3	28	WD	14:00	9									
3	28	WD	17:30	7									
<b>April 1-15 Weekday Totals</b>				<b>148</b>	<b>14.80</b>	<b>140.87</b>	<b>60</b>	<b>29</b>	<b>2.348</b>	<b>4.858</b>	<b>2,144.08</b>	<b>913.23</b>	<b>441.39</b>
4	1	WD	7:00	0	4.00								
4	1	WD	10:30	7									
4	1	WD	14:00	2									
4	1	WD	17:30	7									
4	11	WD	7:00	0	22.00								
4	11	WD	9:30	34									
4	11	WD	12:00	40									
4	11	WD	14:30	28									
4	11	WD	17:00	18									
4	11	WD	19:30	12									
<b>April 16-30 Weekday Totals</b>				<b>60</b>	<b>3.33</b>	<b>48.81</b>	<b>24</b>	<b>8</b>	<b>2.034</b>	<b>6.101</b>	<b>513.33</b>	<b>252.40</b>	<b>84.14</b>
4	17	WD	6:30	0	4.83								
4	17	WD	9:00	8									
4	17	WD	11:30	7									
4	17	WD	14:30	3									
4	17	WD	17:00	2									
4	17	WD	19:00	9									
4	24	WD	6:30	0	1.67								
4	24	WD	9:00	3									
4	24	WD	11:30	7									
4	24	WD	14:00	0									
4	24	WD	16:30	0									
4	24	WD	19:00	0									
4	29	WD	7:00	2	3.50								
4	29	WD	9:30	4									
4	29	WD	12:00	8									
4	29	WD	14:30	4									
4	29	WD	17:00	1									
4	29	WD	19:30	2									
<b>May 1-15 Weekday Totals</b>				<b>0</b>	<b>2.83</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.744</b>	<b>1.642</b>	<b>457.22</b>	<b>262.10</b>	<b>278.48</b>

No weekday creel surveys conducted during this period, data was determined by averaging the number of anglers from 4/29 and 5/16 and by calculating a combined catch and release rate for 4/29 and 5/16.

Appendix B. Table 3. Rainbow Lake Angler Effort and Harvest, 2003.													
Month	Day	WE/WD	Time	Angler Counts		Creel Data			Expanded Totals				
				# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>May 16-31 Weekday Totals</b>				<b>81</b>	<b>2.70</b>	<b>96.04</b>	<b>88</b>	<b>61</b>	<b>1.091</b>	<b>1.574</b>	<b>455.30</b>	<b>417.17</b>	<b>289.19</b>
5	16	WD	7:30	0	2.17								
5	16	WD	10:00	4									
5	16	WD	12:30	3									
5	16	WD	15:00	4									
5	16	WD	17:30	2									
5	16	WD	20:00	0									
5	20	WD	7:30	0	3.00								
5	20	WD	10:00	0									
5	20	WD	12:30	8									
5	20	WD	15:00	9									
5	20	WD	17:30	1									
5	20	WD	20:00	0									
5	21	WD	7:30	2	2.50								
5	21	WD	10:00	8									
5	21	WD	12:30	0									
5	21	WD	15:00	1									
5	21	WD	17:30	4									
5	21	WD	20:00	0									
5	28	WD	7:00	1	3.67								
5	28	WD	9:30	4									
5	28	WD	12:00	1									
5	28	WD	14:30	5									
5	28	WD	17:00	11									
5	28	WD	19:30	0									
5	29	WD	7:30	1	2.17								
5	29	WD	10:00	0									
5	29	WD	12:30	4									
5	29	WD	15:00	5									
5	29	WD	17:30	3									
5	29	WD	20:00	0									
<b>June 1-15 Weekday Totals</b>				<b>40</b>	<b>3.33</b>	<b>71.46</b>	<b>78</b>	<b>28</b>	<b>0.916</b>	<b>2.552</b>	<b>522.33</b>	<b>570.11</b>	<b>204.67</b>
6	3	WD	7:30	0	3.50								
6	3	WD	10:00	5									
6	3	WD	12:30	8									
6	3	WD	15:00	2									
6	3	WD	17:30	5									
6	3	WD	20:00	1									
6	10	WD	7:00	0	3.17								
6	10	WD	9:30	6									
6	10	WD	12:00	3									
6	10	WD	14:30	0									
6	10	WD	17:00	2									
6	10	WD	19:30	8									
<b>June 16-30 Weekday Totals</b>				<b>90</b>	<b>3.75</b>	<b>87.59</b>	<b>58</b>	<b>17</b>	<b>1.510</b>	<b>5.152</b>	<b>593.63</b>	<b>393.08</b>	<b>115.21</b>
6	18	WD	7:30	0	3.50								
6	18	WD	10:00	5									
6	18	WD	12:30	2									
6	18	WD	15:00	7									
6	18	WD	17:30	7									
6	18	WD	20:00	0									
6	20	WD	7:00	0	4.33								
6	20	WD	9:30	2									
6	20	WD	12:00	5									
6	20	WD	14:30	11									
6	20	WD	17:00	5									
6	20	WD	19:30	3									

Appendix B. Table 3. Rainbow Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 16-30 Weekday Totals Continued</b>													
6	25	WD	7:00	0	4.00								
6	25	WD	9:30	3									
6	25	WD	12:00	4									
6	25	WD	14:30	1									
6	25	WD	17:00	6									
6	25	WD	19:30	10									
6	26	WD	8:00	0	3.17								
6	26	WD	10:30	7									
6	26	WD	13:00	7									
6	26	WD	15:30	5									
6	26	WD	18:00	0									
6	26	WD	20:30	0									
<b>July 1-15 Weekday Totals</b>				<b>72</b>	<b>4.00</b>	<b>68.80</b>	<b>20</b>	<b>6</b>	<b>3.440</b>	<b>11.467</b>	<b>623.20</b>	<b>181.16</b>	<b>54.35</b>
7	1	WD	7:00	0	3.67								
7	1	WD	9:30	10									
7	1	WD	12:00	6									
7	1	WD	14:30	2									
7	1	WD	17:00	0									
7	1	WD	19:30	4									
7	3	WD	6:30	5	3.83								
7	3	WD	9:00	1									
7	3	WD	11:30	2									
7	3	WD	14:00	6									
7	3	WD	16:30	3									
7	3	WD	19:00	6									
7	8	WD	7:00	0	4.50								
7	8	WD	9:30	4									
7	8	WD	12:00	5									
7	8	WD	14:30	6									
7	8	WD	17:00	8									
7	8	WD	19:30	4									
<b>Rainbow Lake Weekday Sub-totals</b>				<b>583</b>		<b>630.43</b>	<b>470</b>	<b>233</b>			<b>6,797.52</b>	<b>4,842.98</b>	<b>2,565.09</b>
<b>March 1-15 Weekend Totals</b>				<b>179</b>	<b>22.38</b>	<b>200.81</b>	<b>181</b>	<b>30</b>	<b>1.109</b>	<b>6.694</b>	<b>1,286.56</b>	<b>1,159.69</b>	<b>192.20</b>
3	1	WE	7:00	16	31.50								
3	1	WE	10:00	50									
3	1	WE	13:00	30									
3	1	WE	16:00	30									
3	8	WE	7:00	9	13.25								
3	8	WE	10:00	9									
3	8	WE	13:00	23									
3	8	WE	16:00	12									
<b>March 16-31 Weekend Totals</b>				<b>214</b>	<b>26.75</b>	<b>300.11</b>	<b>306</b>	<b>93</b>	<b>0.981</b>	<b>3.227</b>	<b>1,671.88</b>	<b>1,704.60</b>	<b>518.09</b>
3	16	WE	7:30	8	25.25								
3	16	WE	11:00	68									
3	16	WE	14:30	23									
3	16	WE	17:30	2									
3	30	WE	7:00	12	28.25								
3	30	WE	10:30	49									
3	30	WE	14:00	41									
3	30	WE	17:30	11									
<b>April 1-15 Weekend Totals</b>				<b>128</b>	<b>12.80</b>	<b>139.66</b>	<b>67</b>	<b>12</b>	<b>2.085</b>	<b>11.638</b>	<b>674.30</b>	<b>323.48</b>	<b>57.94</b>
4	5	WE	7:00	3	17.50								
4	5	WE	10:30	30									
4	5	WE	14:30	26									
4	5	WE	17:30	11									
<b>Appendix B. Table 3. Rainbow Lake Angler Effort and Harvest, 2003.</b>													
			Angler Counts			Creel Data			Expanded Totals				

Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>April 1-15 Weekend Totals Continued</b>													
4	13	WE	7:00	3	9.67								
4	13	WE	9:30	16									
4	13	WE	11:30	28									
4	13	WE	14:30	2									
4	13	WE	17:00	5									
4	13	WE	19:30	4									
<b>April 16-30 Weekend Totals</b>				<b>178</b>	<b>14.83</b>	<b>210.45</b>	<b>68</b>	<b>30</b>	<b>3.095</b>	<b>7.015</b>	<b>830.67</b>	<b>268.40</b>	<b>118.41</b>
4	19	WE	7:00	8	21.00								
4	19	WE	9:00	21									
4	19	WE	11:30	33									
4	19	WE	14:30	33									
4	19	WE	16:30	15									
4	19	WE	19:00	16									
4	27	WE	7:00	3	8.67								
4	27	WE	9:30	16									
4	27	WE	12:00	17									
4	27	WE	14:00	11									
4	27	WE	17:00	4									
4	27	WE	19:30	1									
<b>May 1-15 Weekend Totals</b>				<b>144</b>	<b>12.00</b>	<b>204.80</b>	<b>138</b>	<b>60</b>	<b>1.484</b>	<b>3.413</b>	<b>704.16</b>	<b>474.47</b>	<b>206.30</b>
5	3	WE	7:00	8	17.00								
5	3	WE	9:30	14									
5	3	WE	12:00	25									
5	3	WE	14:30	7									
5	3	WE	17:00	27									
5	3	WE	19:30	21									
5	11	WE	6:30	2	7.00								
5	11	WE	9:30	11									
5	11	WE	12:30	6									
5	11	WE	14:30	7									
5	11	WE	17:00	11									
5	11	WE	19:00	5									
<b>May 16-31 Weekend Totals</b>				<b>220</b>	<b>18.33</b>	<b>299.12</b>	<b>151</b>	<b>55</b>	<b>1.981</b>	<b>5.439</b>	<b>1,405.25</b>	<b>709.40</b>	<b>258.39</b>
5	17	WE	7:00	2	9.17								
5	17	WE	10:00	18									
5	17	WE	12:30	17									
5	17	WE	15:00	8									
5	17	WE	17:30	6									
5	17	WE	20:00	4									
5	25	WE	7:00	8	27.50								
5	25	WE	10:00	44									
5	25	WE	12:30	21									
5	25	WE	15:00	38									
5	25	WE	17:30	30									
5	25	WE	20:00	24									
<b>June 1-15 Weekend Totals</b>				<b>138</b>	<b>11.50</b>	<b>255.82</b>	<b>85</b>	<b>48</b>	<b>3.010</b>	<b>5.330</b>	<b>901.03</b>	<b>299.38</b>	<b>169.06</b>
6	7	WE	6:30	0	11.67								
6	7	WE	9:00	9									
6	7	WE	12:00	13									
6	7	WE	14:00	10									
6	7	WE	16:30	12									
6	7	WE	19:00	26									

**Appendix B. Table 3.** Rainbow Lake Angler Effort and Harvest, 2003.

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>June 1-15 Weekend Totals Continued</b>													
6	15	WE	6:30	5	11.33								
6	15	WE	9:00	12									
6	15	WE	11:30	21									
6	15	WE	14:00	14									
6	15	WE	16:30	9									
6	15	WE	19:00	7									
<b>June 16-30 Weekend Totals</b>				<b>66</b>	<b>5.50</b>	<b>61.15</b>	<b>28</b>	<b>17</b>	<b>2.184</b>	<b>3.597</b>	<b>348.26</b>	<b>159.47</b>	<b>96.82</b>
6	21	WE	6:30	2	7.33								
6	21	WE	9:00	2									
6	21	WE	11:30	9									
6	21	WE	14:00	16									
6	21	WE	17:00	13									
6	21	WE	19:00	2									
6	29	WE	6:30	2	3.67								
6	29	WE	9:00	12									
6	29	WE	11:30	6									
6	29	WE	14:00	2									
6	29	WE	16:30	0									
6	29	WE	19:00	0									
<b>July 1-15 Weekend Totals</b>				<b>63</b>	<b>5.73</b>	<b>71.31</b>	<b>10</b>	<b>5</b>	<b>7.131</b>	<b>14.262</b>	<b>356.92</b>	<b>50.05</b>	<b>25.03</b>
7	6	WE	7:00	2	5.17								
7	6	WE	9:30	9									
7	6	WE	12:00	11									
7	6	WE	14:30	5									
7	6	WE	17:00	4									
7	6	WE	19:30	0									
7	12	WE	7:00	7	6.40								
7	12	WE	10:00	7									
7	12	WE	13:00	2									
7	12	WE	16:00	9									
7	12	WE	19:00	7									
<b>Rainbow Lake Weekend Sub-total</b>				<b>1,330</b>		<b>1,743.23</b>	<b>1,034</b>	<b>350</b>			<b>8,179.03</b>	<b>5,148.95</b>	<b>1,642.24</b>
<b>Rainbow Lake Season Totals</b>				<b>1,913</b>		<b>2,373.66</b>	<b>1,504</b>	<b>583</b>			<b>14,976.55</b>	<b>9,991.93</b>	<b>4,207.33</b>

**Appendix B. Table 3. Deer Lake Angler Effort and Harvest, 2003.**

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>March 1-15 Weekday Totals</b>				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No surveys done this lake was added to the creel in late March													
<b>March 16-31 Weekday Totals</b>				0	0.00	0.00	0	0	0.000	0.000	0.00	0.00	0.00
3	28	WD	7:00	0	0.00								
3	28	WD	10:30	0									
3	28	WD	14:00	0									
3	28	WD	17:30	0									
<b>April 1-15 Weekday Totals</b>				8	0.80	8.00	2	0	4.000	0.000	115.90	28.97	0.00
4	1	WD	7:00	0	0.00								
4	1	WD	10:30	0									
4	1	WD	14:00	0									
4	1	WD	17:30	0									
4	11	WD	7:00	0	1.33								
4	11	WD	9:30	8									
4	11	WD	12:00	0									
4	11	WD	14:30	0									
4	11	WD	17:00	0									
4	11	WD	19:30	0									
<b>April 16-30 Weekday Totals</b>				4	0.22	5.09	1	0	5.090	0.000	34.22	6.72	0.00
4	17	WD	6:30	0	0.00								
4	17	WD	9:00	0									
4	17	WD	11:30	0									
4	17	WD	14:30	0									
4	17	WD	17:00	0									
4	17	WD	19:00	0									
4	24	WD	6:30	0	0.17								
4	24	WD	9:00	1									
4	24	WD	11:30	0									
4	24	WD	14:00	0									
4	24	WD	16:30	0									
4	24	WD	19:00	0									
4	29	WD	7:00	0	0.50								
4	29	WD	9:30	0									
4	29	WD	12:00	0									
4	29	WD	14:30	3									
4	29	WD	17:00	0									
4	29	WD	19:30	0									
<b>May 1-15 Weekday Totals</b>				0	0.42	N/A	N/A	N/A	1.106	2.950	67.24	60.78	22.79
No weekday creel surveys conducted during this period, data was determined by averaging the number of anglers from 4/29 and 5/16 and by calculating a combined catch and release rate for 4/29 and 5/16.													
<b>May 16-31 Weekday Totals</b>				4	0.13	4.84	16	3	0.303	1.163	22.48	74.33	19.33
5	16	WD	7:30	0	0.33								
5	16	WD	10:00	2									
5	16	WD	12:30	0									
5	16	WD	15:00	0									
5	16	WD	17:30	0									
5	16	WD	20:00	0									
5	20	WD	7:30	0	0.00								
5	20	WD	10:00	0									
5	20	WD	12:30	0									
5	20	WD	15:00	0									
5	20	WD	17:30	0									
5	20	WD	20:00	0									

**Appendix B. Table 3. Deer Lake Angler Effort and Harvest, 2003.**

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>May 16-31 Weekday Totals Continued</b>													
5	21	WD	7:30	0	0.00								
5	21	WD	10:00	0									
5	21	WD	12:30	0									
5	21	WD	15:00	0									
5	21	WD	17:30	0									
5	21	WD	20:00	0									
5	28	WD	7:00	0	0.33								
5	28	WD	9:30	2									
5	28	WD	12:00	0									
5	28	WD	14:30	0									
5	28	WD	17:00	0									
5	28	WD	19:30	0									
5	29	WD	7:30	0	0.00								
5	29	WD	10:00	0									
5	29	WD	12:30	0									
5	29	WD	15:00	0									
5	29	WD	17:30	0									
5	29	WD	20:00	0									
<b>June 1-15 Weekday Totals</b>				<b>6</b>	<b>0.50</b>	<b>5.16</b>	<b>4</b>	<b>3</b>	<b>1.290</b>	<b>1.720</b>	<b>78.35</b>	<b>60.74</b>	<b>45.55</b>
6	3	WD	7:30	0	0.67								
6	3	WD	10:00	2									
6	3	WD	12:30	0									
6	3	WD	15:00	0									
6	3	WD	17:30	2									
6	3	WD	20:00	0									
6	10	WD	7:00	0	0.33								
6	10	WD	9:30	0									
6	10	WD	12:00	0									
6	10	WD	14:30	0									
6	10	WD	17:00	2									
6	10	WD	19:30	0									
<b>June 16-30 Weekday Totals</b>				<b>1</b>	<b>0.04</b>	<b>0.34</b>	<b>0</b>	<b>0</b>	<b>0.000</b>	<b>0.000</b>	<b>6.60</b>	<b>0.00</b>	<b>0.00</b>
6	18	WD	7:30	0	0.17								
6	18	WD	10:00	1									
6	18	WD	12:30	0									
6	18	WD	15:00	0									
6	18	WD	17:30	0									
6	18	WD	20:00	0									
6	20	WD	7:00	0	0.00								
6	20	WD	9:30	0									
6	20	WD	12:00	0									
6	20	WD	14:30	0									
6	20	WD	17:00	0									
6	20	WD	19:30	0									
6	25	WD	7:00	0	0.00								
6	25	WD	9:30	0									
6	25	WD	12:00	0									
6	25	WD	14:30	0									
6	25	WD	17:00	0									
6	25	WD	19:30	0									
6	26	WD	8:00	0	0.00								
6	26	WD	10:30	0									
6	26	WD	13:00	0									
6	26	WD	15:30	0									
6	26	WD	18:00	0									
6	26	WD	20:30	0									

**Appendix B. Table 3. Deer Lake Angler Effort and Harvest, 2003.**

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>July 1-15 Weekday Totals</b>				<b>2</b>	<b>0.11</b>	<b>1.25</b>	<b>4</b>	<b>2</b>	<b>0.313</b>	<b>0.625</b>	<b>17.31</b>	<b>55.40</b>	<b>27.70</b>
7	1	WD	7:00	0	0.17								
7	1	WD	9:30	0									
7	1	WD	12:00	0									
7	1	WD	14:30	1									
7	1	WD	17:00	0									
7	1	WD	19:30	0									
7	3	WD	6:30	0	0.17								
7	3	WD	9:00	0									
7	3	WD	11:30	1									
7	3	WD	14:00	0									
7	3	WD	16:30	0									
7	3	WD	19:00	0									
7	8	WD	7:00	0	0.00								
7	8	WD	9:30	0									
7	8	WD	12:00	0									
7	8	WD	14:30	0									
7	8	WD	17:00	0									
7	8	WD	19:30	0									
<b>Deer Lake Weekday Sub-totals</b>				<b>25</b>		<b>24.68</b>	<b>27</b>	<b>8</b>			<b>342.10</b>	<b>286.93</b>	<b>115.37</b>
<b>March 1-15 Weekend Totals</b>				<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
No surveys done this lake was added to the creel in late March													
<b>March 16-31 Weekend Totals</b>				<b>11</b>	<b>2.75</b>	<b>17.00</b>	<b>10</b>	<b>5</b>	<b>1.700</b>	<b>3.400</b>	<b>171.88</b>	<b>101.10</b>	<b>50.55</b>
3	30	WE	7:00	0	2.75								
3	30	WE	10:30	4									
3	30	WE	14:00	4									
3	30	WE	17:30	3									
<b>April 1-15 Weekend Totals</b>				<b>12</b>	<b>1.20</b>	<b>18.73</b>	<b>14</b>	<b>1</b>	<b>1.338</b>	<b>18.730</b>	<b>63.22</b>	<b>47.25</b>	<b>3.38</b>
4	5	WE	7:00	0	1.50								
4	5	WE	10:30	0									
4	5	WE	14:30	6									
4	5	WE	17:30	0									
4	13	WE	7:00	0	1.00								
4	13	WE	9:30	0									
4	13	WE	11:30	3									
4	13	WE	14:30	0									
4	13	WE	17:00	3									
4	13	WE	19:30	0									
<b>April 16-30 Weekend Totals</b>				<b>9</b>	<b>0.75</b>	<b>12.47</b>	<b>9</b>	<b>0</b>	<b>1.386</b>	<b>0.000</b>	<b>42.00</b>	<b>30.31</b>	<b>0.00</b>
4	19	WE	7:00	0	0.50								
4	19	WE	9:00	0									
4	19	WE	11:30	0									
4	19	WE	14:30	3									
4	19	WE	16:30	0									
4	19	WE	19:00	0									
4	27	WE	7:00	0	1.00								
4	27	WE	9:30	1									
4	27	WE	12:00	0									
4	27	WE	14:00	5									
4	27	WE	17:00	0									
4	27	WE	19:30	0									

**Appendix B. Table 3. Deer Lake Angler Effort and Harvest, 2003.**

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>May 1-15 Weekend Totals</b>				<b>13</b>	<b>1.08</b>	<b>12.85</b>	<b>4</b>	<b>1</b>	<b>3.213</b>	<b>12.850</b>	<b>63.57</b>	<b>19.79</b>	<b>4.95</b>
5	3	WE	7:00	0	2.17								
5	3	WE	9:30	8									
5	3	WE	12:00	5									
5	3	WE	14:30	0									
5	3	WE	17:00	0									
5	3	WE	19:30	0									
5	11	WE	6:30	0	0.00								
5	11	WE	9:30	0									
5	11	WE	12:30	0									
5	11	WE	14:30	0									
5	11	WE	17:00	0									
5	11	WE	19:00	0									
<b>May 16-31 Weekend Totals</b>				<b>38</b>	<b>3.17</b>	<b>55.86</b>	<b>42</b>	<b>8</b>	<b>1.330</b>	<b>6.983</b>	<b>242.73</b>	<b>182.50</b>	<b>34.76</b>
5	17	WE	7:00	0	1.00								
5	17	WE	10:00	0									
5	17	WE	12:30	0									
5	17	WE	15:00	6									
5	17	WE	17:30	0									
5	17	WE	20:00	0									
5	25	WE	7:00	4	5.33								
5	25	WE	10:00	7									
5	25	WE	12:30	2									
5	25	WE	15:00	4									
5	25	WE	17:30	9									
5	25	WE	20:00	6									
<b>June 1-15 Weekend Totals</b>				<b>7</b>	<b>0.58</b>	<b>0.64</b>	<b>0</b>	<b>0</b>	<b>0.000</b>	<b>0.000</b>	<b>45.70</b>	<b>0.00</b>	<b>0.00</b>
6	7	WE	6:30	0	0.00								
6	7	WE	9:00	0									
6	7	WE	12:00	0									
6	7	WE	14:00	0									
6	7	WE	16:30	0									
6	7	WE	19:00	0									
6	15	WE	6:30	0	1.17								
6	15	WE	9:00	5									
6	15	WE	11:30	2									
6	15	WE	14:00	0									
6	15	WE	16:30	0									
6	15	WE	19:00	0									
<b>June 16-30 Weekend Totals</b>				<b>15</b>	<b>1.25</b>	<b>4.00</b>	<b>1</b>	<b>0</b>	<b>4.000</b>	<b>0.000</b>	<b>79.15</b>	<b>19.79</b>	<b>0.00</b>
6	21	WE	6:30	0	1.83								
6	21	WE	9:00	0									
6	21	WE	11:30	0									
6	21	WE	14:00	3									
6	21	WE	17:00	4									
6	21	WE	19:00	4									
6	29	WE	6:30	0	0.67								
6	29	WE	9:00	4									
6	29	WE	11:30	0									
6	29	WE	14:00	0									
6	29	WE	16:30	0									
6	29	WE	19:00	0									

**Appendix B. Table 3. Deer Lake Angler Effort and Harvest, 2003.**

			Angler Counts			Creel Data			Expanded Totals				
Month	Day	WE/WD	Time	# of Anglers	Average # of Anglers	Total Hours	RBT Harvested	RBT Released	Average Catch Rate (hrs/fish harvested)	Average Release Rate (hrs/fish released)	Angler Effort (hrs)	Rainbow trout Harvested	Rainbow trout Released
<b>July 1-15 Weekend Totals</b>				<b>6</b>	<b>0.55</b>	<b>6.24</b>	<b>5</b>	<b>0</b>	<b>1.248</b>	<b>0.000</b>	<b>33.99</b>	<b>27.24</b>	<b>0.00</b>
7	6	WE	7:00	0	0.00								
7	6	WE	9:30	0									
7	6	WE	12:00	0									
7	6	WE	14:30	0									
7	6	WE	17:00	0									
7	6	WE	19:30	0									
7	12	WE	7:00	0	1.20								
7	12	WE	10:00	1									
7	12	WE	13:00	2									
7	12	WE	16:00	3									
7	12	WE	19:00	0									
<b>Deer Lake Weekend Sub-total</b>				<b>111</b>		<b>127.79</b>	<b>85</b>	<b>15</b>			<b>742.23</b>	<b>427.98</b>	<b>93.64</b>
<b>Deer Lake Season Totals</b>				<b>136</b>		<b>152.47</b>	<b>112</b>	<b>23</b>			<b>1,084.33</b>	<b>714.91</b>	<b>209.01</b>

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**Appendix C. Angler Residence Data from all Interviews Conducted During the Sampling Season for the Tucannon Lakes Creel Surveys, 2003.**

**Appendix C. Angler residence data from all interviews conducted during the sampling season for the Tucannon Lakes creel surveys, 2003.**

Residence	Number of Anglers	% of Anglers	Residence	Number of Anglers	% of Anglers
<b>Washington State Anglers</b>			Ritzville	1	0.03
<b>Columbia and Garfield County Anglers</b>			Sammamish	1	0.03
Blind Grade	4	0.11	Seattle	16	0.44
Dayton	170	4.64	Silverdale	1	0.03
Lyons Ferry	5	0.14	Snohomish	1	0.03
Pomeroy	136	3.71	Soap Lake	2	0.05
Starbuck	7	0.19	Spokane	38	1.04
Tucannon	3	0.08	Sunnyside	3	0.08
<b>Columbia and Garfield County Totals</b>			Tri-Cities	1,928	52.63
<b>Walla Walla and Asotin County Anglers</b>			Union Town	1	0.03
Asotin	2	0.05	Vancouver	10	0.27
Burbank	35	0.96	Washtucna	7	0.19
Clarkston	32	0.87	Wenatchee	1	0.03
College Place	19	0.52	Whidbey Island	4	0.11
Dixie	12	0.33	Yakima	39	1.06
Prescott	18	0.49	Zillah	2	0.05
Touchet	38	1.04	<b>Washington Totals</b>		
Waitsburg	92	2.51		<b>3536</b>	<b>96.53</b>
Walla Walla	537	14.66	<b>Oregon State Anglers</b>		
Walla Walla	8	0.22	Glide, OR	2	0.05
<b>Walla Walla and Asotin County Totals</b>			Hermiston, OR	8	0.22
	<b>793</b>	<b>21.65</b>	Irrigon, OR	11	0.30
<b>Other Cities in Washington State</b>			Medford, OR	3	0.08
Arlington	1	0.03	Milton-Freewater, OR	33	0.90
Bellevue	1	0.03	Portland, OR	3	0.08
Benton City	42	1.15	Salem, OR	2	0.05
Chehalis	1	0.03	Walla Walla, OR	1	0.03
Cheney	5	0.14	<b>Oregon Totals</b>		
Cle-Elum	2	0.05		<b>63</b>	<b>1.72</b>
Colfax	8	0.22	<b>Idaho State Anglers</b>		
Connell	29	0.79	Bothell, ID	4	0.11
Ellensburg	6	0.16	Lewiston, ID	9	0.25
Eltopia	4	0.11	Peck, ID	7	0.19
Finley	5	0.14	Pocatello, ID	3	0.08
Gig Harbor	13	0.35	Whinchester, ID	12	0.33
Goldendale	3	0.08	<b>Idaho Totals</b>		
Grandview	54	1.47		<b>35</b>	<b>0.96</b>
Hoquiam	1	0.03	<b>Anglers from other U.S. Cities and States</b>		
Ione	2	0.05	Alabama	1	0.03
Kahlotus	21	0.57	Arizona	3	0.08
Lind	14	0.38	Mesa, AZ	2	0.05
Mesa	6	0.16	California	1	0.03
Moses Lake	13	0.35	Sacramento, CA	2	0.05
Olympia	1	0.03	Florida	1	0.03
Othello	27	0.74	Michigan	1	0.03
Prosser	68	1.86	Missouri	1	0.03
Pullman	23	0.63	Nebraska	5	0.14
Puyallup	5	0.14	Las Vegas, NV	6	0.16
Reardon	1	0.03	Carson City, NV	1	0.03
Redman	3	0.08	Texas	1	0.03
Ridgefield	4	0.11	Salt Lake City, UT	1	0.03
			Wisconsin	3	0.08
			<b>Other Totals</b>		
				<b>29</b>	<b>0.79</b>



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