STEELHEAD SURVEYS IN OMAK CREEK

2002 Annual Report

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Project # xxxx-xxx-xx
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P.O. Box 3621
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April 2003

Executive summary

Redd, snorkel, and canopy cover surveys were conducted in 2002 on Omak Creek, located in north central Washington, within the Columbia Cascade Province, a tributary to the Okanogan River. Redd surveys indicated that adults had returned to Omak creek in 2002 to spawn and 39 redds were observed in the two river miles utilized as reference reaches. The upper study reach (~15 mile) contained 37 of these redds. Snorkel surveys indicated that steelhead fry were abundant in both study reaches indicating good fry recruitment and little or no competition or predation risks from other fish species. Canopy cover increased three fold since 2000 resulting from land management changes and good riparian area recovery. Future surveys will allow for trend analysis of the steelhead population and improvements to riparian corridor conditions that will eventually result in lower summer water temperatures. Preliminary results are promising but long-term monitoring is needed to determine the actual success or failure of strategies implemented to reestablish endangered summer steelhead in Omak Creek.

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Introduction

Omak Creek is located in Okanogan County, Washington, and is wholly contained within the reservation of the Colville Confederated Tribes. The Omak Creek watershed has cultural significance to the twelve Colville Confederated Tribal Bands. Omak Creek is a common cultural-use area for activities such as resource gathering, berry picking, ceremonial sweating, education, picnicking and fishing. Fishing was important in Omak Creek since evidence of fish drying racks and nets were apparent in early photographs. Due to barriers, mid-stream reaches have been inaccessible by anadromous fish and land management practices within the watershed have reduced the quality of fish spawning habitat. Therefore, anadromous stocks have virtually been non-existent in Omak Creek since the early 1900's.

This project is, in part, to strengthen anadromous fish populations, particularly summer steelhead (listed as endangered), in the upper Columbia River Basin. Omak Creek was surveyed in 1992 by personnel of the CCT-Fish and Wildlife Department. The collected information estimated and described the physical condition of the in-stream habitats from the confluence of the Okanogan River upstream 12.2 miles (TFW Ambient Monitoring Stream Segment Summary 1992). The results of the survey indicated the habitat is in marginal condition, with most of the reaches evaluated for spawning habitat being embedded (Hanson 1992). Canopy closure exceeded 50% (57%) at only one of the four reaches surveyed. Consequently, water temperatures have been measured greater than 75^{o}F (lethal for juvenile steelhead) during 1997 and 1998 (CCT, Fish and Wildlife, unpublished data).

Since the mid-1990's the efforts to restore the anadromous fisheries resource, particularly steelhead, in Omak Creek has been extensive and funded through a variety of sources. Actions have included road decommissioning, riparian vegetation planting, removal of fish passage barriers, channel restoration, and construction of fences to reduce impacts caused by livestock. To assess the success of habitat improvements, particularly channel reconfiguration (RM 0.5 to 1.0) and improved bank stability (RM 2.9 to 4.6), as related to steelhead production in Omak Creek, redd, snorkel and canopy closure surveys were conducted during the spring and fall of 2002.

Site selection

Omak Creek is approximately 22 miles long. At RM 5.1 a natural falls impedes fish migration for steelhead and is a complete barrier to spring chinook salmon. To ensure consistent comparisons and trends of redd and fry abundance across years, which could be influenced by accessibility at and above the falls (i.e. flow conditions would change passage conditions), surveys were conducted downstream of the falls. Redd and snorkel surveys were conducted in two reaches (RM 0.5 to 1.0; RM 2.9 to RM 4.6). The lowermost reach is where extensive channel modification (floodplain creation, removal

of ~ 60,000 cubic yards of material, etc.) has occurred during the fall and winter of 2002/03. The upstream reach lies within Tribal Trust property and also where in-stream structures have been installed to improve bank stability, reduce the accelerated erosion, decrease the amount of fine sediment delivered to the stream channel, and reestablish riparian vegetation.

During August of 2001, a wild land fire burned 8,112 acres (~9%) within Omak Creek Watershed. During fire suppression activities, an inadvertent aerial drop fire retardant which completely killed fish from RM 8.0 to 2.9 partial kill fish RM 2.9 to the mouth.

Methods

Redd surveys were conducted on foot on May 3, 2002 and May 7, 2002 in the upper reach and April 25, 2002 in the lower reach. Redd surveys were conducted moving upstream. Physical habitat was recorded if observed within 1 meter of the redd's edge. Physical habitat categories include: none, large wood debris (LWD minimum = 3 in. diameter, 6 ft. long), canopy, and overhanging stream bank. A Global Position System (GPS) recorder was used to assess the spatial distribution of redds within the sample reaches.

Snorkel surveys were conducted by three CCT- Fish and Wildlife biologists during October 23, 2002. Snorkel surveys were conducted in an upstream direction by one snorkeler per reach (Thurow 1994). Snorkel survey reaches were 100 m in length. Each sample reach was separated by 100 m. From ~ RM 0.5 to 1.0 (beginning on the upstream side of HWY 155 bridge), a total of 400-m was snorkeled within a 700 m reach. From ~ RM 2.9 to 4.6, within two 900 m reaches, two 500 m reaches were snorkeled.

All fish species were recorded with the exception of suckers and sculpin, which were identified to genus. Fish species were further divided into length categories of < 100 mm and > 100 mm.

Canopy closure was estimated by walking the stream from river mile 2.9 to 4.6 and using a convex densitometer (Platt's 1983). Data was collected at 20-transects and readings were taken at 4 locations along each transect. The 4 location values were averaged to determine canopy closer at each transect and all transects were averaged to get a comparative value for data collected during 2000.

Results

The density of steelhead redds located in the upper reach (37 redds) was substantially greater than in the lower reach (2 redds). During the redd survey in the lower reach 6 steelhead were observed (April 24), while 11 steelhead were seen during the redd survey in the upper reach (May 3 and 6). Of the 39 redds, 2 were associated with canopy cover, 3 with large wood, 1 with undercut bank, and 5 with a combination of physical habitat parameters (3 LWD and undercut bank; 2 LWD and canopy cover). The remaining 28 redds were not associated with any physical habitat as described by this

survey. Due to corrupted files GPS data that identified location of Redds was not retrievable.

The snorkel survey was conducted October 23rd at 9:00am in the morning, skies were overcast and the water temperature was 49° F. Snorkel surveys indicated *Oncorhynchus mykiss* was the most abundant species in both stream reaches (Table 1). *Oncorhynchus mykiss* fry density was greater in the upper reach (214/100 m) than in the lower reach (52/100 m). Species richness was greater (7 species observed) in the lower reach than in the upper reach where only 4 species were observed and all were salmonids with the exception of one sucker.

Canopy closure estimates were collected from July 16 to July 18, 2002. The estimates of canopy closure for the upper reach (river mile 2.9-4.6) transects ranged from 0% to 73.5%. The average canopy closure for the upper reach in 2002 was 29.6% compared to a 10.3% estimate when data was collected in 2000 (Table 2).

Table 1. Number of fish observed during snorkel surveys by species and stream reach for Omak Creek during October of 2002.

Lower Reach

River Mile 0.5 to 1.0	O. Mykiss (<100m)	O. Mykiss (>100m)	Mountain Whitefish	SMB	NPM	Sucker	Chinook Salmon	EBT	Sculpin	Total
0 to 100 m	0	0	0					0		0
200 to 300m	21	3	2 > 100mm					1>100mm		27
400 to 500m	54	10	1							65
600 to 700 m	133	6	1<100mm	8< 100 mm;1 > 100mm)	8	5	1		1	75
Total	208	19	4	9	8	5	1	1	1	256

Upper Reach

River Mile (2.9 to 4.6)	O. Mykiss (<100mm)	O. Mykiss (>100mm)	Mountain Whitefish	SMB	NPM	Sucker	Chinook Salmon	EBT	Total
0 to 100 m	448	>12	2				1		463
200 to 300 m	114	3					1		118
400 to 500 m	165	5					3		173
600 to 700 m	152								152
800 to 900 m	226								43
1000 to 1,100 m	376								376
1,200 to 1,300 m	147	4							151
1,400 to 1,500 m	80	1	3		1				85
Total	1,708	25	5	0	1	0	5	0	1,744

Rainbow trout/ Steelhead = O. Mykiss

Smallmouth bass = SMB
Northern pike minnow = NPM
Eastern brook trout = EBT

Table 2. Comparison of transect data collected from 2000 and 2002 for estimated canopy closure form river mile 2.9-4.6 of Omak Creek.

Transect Number	2000 Canopy Closure Estimate (%)	2002 Canopy Closure Estimate (%)
1	0	0
2		5.9
3		0
4	10.3	48.5
5		0
6		42.6
7		14.7
8	33.8	66.2
9		82.4
10		8.8
11	7.4	8.8
12		4.4
13		1.5
14		51.5
15	7.4	42.6
16		75
17		73.5
18	2.9	17.6
19		7.4
20		51.5
Average	**10.3**	**29.6**

Discussion

Redd surveys are a common method used to monitor and evaluate adult steelhead returns and to determine population level trends. To do future trend analysis a baseline of data needed to be collected and this was achieved during 2002. Approximately 20,000 steelhead smolts have been outplanted in Omak Creek. One location of outplants has been on North Omak Lake road (~RM 4.6). The upper and lower reaches sampled provided 1-mile of buffer from the release site so this should not have skewed spatial distributions or spawning site fidelity. However, results indicated both higher redd densities, and fry densities in the upper sample reach, likely due to a substantial change in stream gradient (~ 1 % upper reach, 2.8% in the lower reach). Species richness was higher in the lower reach probably because of the close proximity to the Okanogan River. The Okanogan River is known to have populations of predatory species such as smallmouth bass and northern pike minnow observed during snorkeling surveys. These species are probably transitory and not residents of Omak Creek. Other species included

sculpins, suckers, and eastern brook trout in the lower reach were not found in the upper reach. This is probably the result of the effects from the fire retardant, which resulted in a complete fish killed in the upper reach, but only a particle kill in the lower reach. chinook salmon were present in both reaches and have been released in Omak Creek but are also common in the Okanogan River so the source of these fish is unknown. Juvenile chinook may have originated from spring chinook releases or possibly summer chinook from the Okanogan River that were seeking refugia. The abundance of redds indicates that passage and spawning of wild fish is occurring and the dominance of young steelhead shows that Omak Creek has considerable potential for natural production with minimal competition or predation.

Stream rehabilitation projects along Omak Creek are beginning to produce results. Canopy cover has increased three fold in the upper reach of Omak Creek since 2000. The increase in canopy should reduce warm water temperatures in the lower reach. Most of this increase is the result of reduced grazing pressures along the riparian corridor and recovery of grass and shrub communities that remained. Additional plantings have been made in areas that were heavily impacted by years of poor land use practices. It will take several years of collecting data over specific transects before measured benefits of these rehabilitation activities can be determined. Preliminary results indicate that recovery of endangered summer steelhead in Omak Creek is underway and similar rehabilitation efforts should be considered throughout the upper Columbia.