Project ID: 29023

Restoration/protection of Kartar Creek In-stream, Riparian, and Wetland Habitats
Sponsor: CCT

Responses to ISRP comments:
ISRP captured the ideas and purpose of this project well and stated; "The project seems logical with a laudable goal of attempting to convert a hatchery supported recreational fishery to a self-supporting self-sustaining fishery.

More detail needs to be provided in the budget section that links specific costs to specific objectives and tasks. As presented, large dollar amounts are associated with generalized multiple objectives making it difficult to assess task-specific effort and cost.

ISRP wanted addition information on budget items so it was less difficult to assess task-specific effort and costs. However, this is problematic because much of the information needed to outline specific tasks will not be completed until after the first year of the project and uncertainty associated with different scenarios compounds these problems. In an attempt to provide an adequate response, we have outlined several tasks that will be completed during the first year and an estimate of the cost associated with each. We hope that this helps the ISRP but the question was unclear and we were uncertain if our response properly addressed their concerns. If additional information is needed the proponents would be glad to supply more information provided more detail is supplied on what information is being requested.

2003 Itemized Task	Cost
Administration	
Preparation, evaluation, and selection of subcontractors for Hydro geologic study and design work (2 RFP @ 48 hours/RFP @ 28.00/hr)	$2,688
Personnel hiring (5 positions @120 hours /position @ 28.00/hr)	$16,800
Report writing and contract correspondence (180 hours @ 28.00/hr)	$5,040
Attend meetings and training as needed for biologists and technicians (604 hrs @ 28.00/hr + travel 7,560)	$24,472
Purchasing equipment (360 hours @ 28.00 hr)	$10,080
Data entry and analysis (240 hours @ 28.00 hr)	$6,720
Field work and other administrative duties (2080 hours @ 18.00/hr)	$37,440
Sub-total administration and travel	**$103,240**
Fringe @ 22.92% of salaries	$22,175
Indirect @ 42.1% of salaries	$40,732
Administration total	**$166,147**
Sub-contracts	
Hydro geology study	$70,000
Sub-contract task will include (drilling and monitoring test wells, site survey, infiltration rates, water budget, allocation options, stream	

relocation options, surface/ground water interactions, etc….) Initial stream design Sub-contract tasks will include (site survey, establishing sites for wetland creation/expansion, feasibility study for connecting upper and lower Kartar Creek with cost benefit analysis, specifications for implementation RFP and costs, determine needed riparian improvements, etc….). **Sub-contracting total**	$80,000 $150,000
Supplies and Materials Purchases will include: equipment and supplies needed to construct, repair and maintain fences, survey fish, wildlife, and plant species, office and computer supplies, equipment maintenance costs, water quality equipment, and surveying equipment, needed to complete objectives.	$64,676
Capital Acquisitions Specific items in this category may include items associated with land and water right acquisitions or items needed to complete landowner conservation easements (i.e. remote watering sites/troughs for cattle and will be used in conjunction with matching funds or outside grant were possible). Large equipment purchases over $10,000 would also be purchased from these funds including but not limited to such things as vehicles, or large equipment needed to complete objectives.	$57,000
2003 Total Costs	$437,823

There should be discussion of the potential numbers of Lahontan cutthroat trout that might be produced in Kartar Creek. Some reasonable estimate ought to be possible, given experience in similar streams. Such a number could be compared with the number of fish currently being planted to evaluate the feasibility of the project's objective. The number could be too high or too low.

To evaluate the number of Lahontan cutthroat trout that would be produced from this project a model based on known discharges on upper Kartar Creek was created. Using the equation Q = A * V where:
Q=the mean annual discharge for Kartar Creek which has a Colville Confederated Tribes gauging station (4.6 cfm).
V=the median desired velocity for cutthroat spawning is defined as 47cm/sec. from (Hunter 1973). Because this stream section will be modified, this velocity requirement will be used in our design.
A=is the cross sectional area of the stream and was derived by changing the above equation to A = Q / V.
Mean depth was determined by Hunter (1973) who defined depth requirements for cutthroat trout at $\geq$6 cm. Using this as a mean depth will insure that deeper areas for large fish are present and this value will be used as part of the design criteria for Kartar Creek. With "A" derived and mean depth defined, mean stream width (W) was calculated as 4.62m using the equation: W = A / Mean Depth.

Wetted channel area could be calculated by the length of the lower section of Kartar Creek measured as 3885m times the mean stream width (4.62m). Available spawning habitat was calculated using 30% usable area so we multiplied the wetted channel area by 0.30. Available spawning area was calculated as 5380m^2 and this value is considered conservative because we are designing a spawning area with precise spawning substrate sizes, velocities and depth as outlined by Hunter (1973) for cutthroat trout. The average size of a cutthroat trout redd was determined by Hunter (1973) and ranged from 0.09-0.9-m^2 in area and because of the large size of Lahontan cutthroat trout in Omak Lake we used the maximum size of redds which would also make our estimates conservative. However, Burner (1951) determined that competition between spawning fish required that redd size be multiplied by 4 to account for competitive exclusion increasing our average redd area to 3.6m^2.

Table 1 identifies the potential number of redds, that are possible for the lower section of Kartar Creek. It was calculated by dividing the spawning area, by the area of each redd. The average number of eggs per female was based on spawning records from 1989-2001. The number of eggs produced was calculated by multiplying the number of redds in the spawning area with average eggs per female assuming a 1:1 female to redd ratio. By looking at data from similar streams that indicated the percent of fines was around 30% and with this information, embryo survival was estimated using the tables from Irving and Bjornn (1984). The percent fines estimated may be conservative because riparian rehabilitation is planned (this should minimize fine sediment introductions) and initial values were based on local streams. The number of fry produced was calculated by multiplying the number of eggs produced by survival of 25% (Irving and Bjornn 1984). The Colville Tribal Hatchery currently stocks 60,000 fish at approximately 25 fish per pound (sub-sub-adults). In attempting to relate potential Kartar Creek production estimates back to current hatchery stocking effort, we had difficulty determining an appropriate survival modifier from fry to sub-adult. After reviewing the literature and conferring with other biologists, it was thought 20% survival would be a conservative estimate. Therefore, this project upon completion could potentially replace hatchery introductions of 176,429 sub-sub-adult fish through natural reproduction.

Table 1: Potential production of Lahontan cutthroat trout in the lower 3885 meters of Kartar Creek.

Number Of Redds	Average Eggs/ female	Number Of eggs	Embryo Survival	Number Of fry	Fry to sub-adult Survival	Sub-adult Production
1,495	2,361	3,528,588	0.25	882,147	0.20	176,429

Production estimates indicate that 176,429 sub-adult fish (20-25 fish/lb) would be recruited to the population at Omak Lake annually. Natural reproduction would more than replace current hatchery production of 60,000 sub-adult fish annually. Omak Lake at 1,361 hectares would have a maximum annual recruitment of 130 fish/per hectare which may result in more but smaller fish but survival is density dependent so the

biology of the lake would likely act as a control on the fish population and no supplemental stocking would be required.

Historically, this should have been red band trout habitat, although the highly alkaline nature of the natural Omak Lake may have prevented their occurrence in the lake and portions of the watershed. Nevertheless, the Kartar Creek watershed above the lake should be surveyed for the existence of native salmonids such as red band trout. The existence of remnant red band trout populations in the upper Kartar Creek watershed could complicate the plans for introducing Lahontan cutthroat trout into the creek, Redband trout are a species of special concern and their protection would be threatened by potential hybridization with Lahontan cutthroat trout, if they occur together.

We conducted a preliminary presence/absence survey of upper Kartar Creek (a perennial stream). We surveyed three segments of the stream upper, middle, and lower. Each segment was between 0.9 and 1.3 miles in length and included both riffle and pool habitats. The stream was characterized as high gradient with mostly cobble substrate. Using a Smith-root backpack electro fishing unit, the survey crew of two people shocked all areas within each study segment. The species, number, and lengths of fish were recorded. A total of 39-brook trout were collected that ranged in size from 50 to 140mm. No fish species other than brook trout were observed and research of historical stocking efforts indicated that these fish must be remnants from WDFW plantings in 1962, indicating that some natural reproduction is occurring. However, historical stocking records show several attempts to stock Omak Lake. Kamloops rainbow trout and brook trout were stocked in 1958 and rainbow trout stockings were repeated in 1962 by WDFW but none survived. Experimental stocking of Lahontan cutthroat trout and a complete lake survey were conducted in 1968 and no rainbow trout or brook trout were discovered. Lahontan cutthroat trout have existed ever since. Redband rainbow trout is a primary focus of our resident fish program for the Colville Reservation. The Omak lake basin, including Kartar Creek, were not included in our recovery plans because of high lake alkalinity, and high stream water temperatures in the summer and fall.

Literature cited

Burner, C. J. 1951. Characteristics of spawning nests of Columbia River salmon. U. S. Fish and Wildlife Service Fisheries Bulletin 52(61):97-110.

Hunter, J. G. 1973. A discussion of game fish in the State of Washington as related to water requirements. Report by the Washington Department of Game, Fishery Management Division, to the Washington State Department of Ecology, Olympia.

Irving, J. S., and T. C. Bjornn. 1984. Effects of substrate size composition on survival of kokanee salmon and cutthroat and rainbow trout embryos. University of Idaho, Cooperative Fish and Wildlife Research Unit, Technical Report 84-6, Moscow.