1. BACKGROUND

Describe the fish resources (number of species or unique populations), the current habitat conditions, and other current and historic factors important to understanding this project. Be specific—avoid general statements. When possible, document your sources of information by citing specific studies and reports.

Native salmonid species in the Peshastin Creek sub-watershed are Spring Chinook, steelhead, rainbow, adfluvial bull trout, and westslope cutthroat trout (adfluvial bull trout spawn in the colder headwater tributaries and migrate within other Wenatchee sub-watersheds and the Columbia River). The Peshastin sub-watershed provides important bull trout and steelhead spawning and rearing habitat, both in the mainstem Peshastin and in Peshastin tributaries. Much of the planning, protection, and restoration/enhancement work in the Wenatchee River watershed including the Peshastin Creek sub-watershed has focused on the needs of salmonids because of the federal Endangered Species Act listings of Upper Columbia River steelhead and Spring Chinook as endangered and bull trout as threatened in 1997, 1998, and 1999, respectively. All the fish stocks present in Peshastin Creek are classified as depressed in the WA DNR Salmonid Stock Inventory (SaSi) index.

Much of Peshastin Creek is bounded and altered by highway construction and channel rerouting. In general, land use practices that have diminished fish productivity include road construction, orchards, irrigation, residential development, and historic mining.

The Upper Columbia Biological Strategy (UCRT*T, 2007) lists the following factors affecting habitat condition in the Peshastin sub-watershed:

- Channel migration, riparian habitat, floodplain function, stream sinuosity, and gravel recruitment are severely impacted by the State highway;
- Low instream flows in lower Peshastin Creek impede upstream migration, reduce rearing habitat, and likely contribute to elevated water temperature; and
- Loss of riparian habitat resulting from land development and State highway reduces quantity and quality of spawning and rearing habitat.

The Biological Strategy contains recommendations for habitat actions. Increasing streamflow in Peshastin Creek through improving irrigation efficiencies is rated a Tier 1 action. A Tier 1 action means the action has the highest priority and should be implemented prior to other habitat projects. Future habitat actions recommended in the Biological Strategy for lower Peshastin Creek include installing pool-forming in-stream structures and large woody debris.

Actions to increase streamflow are also recommended in the Proposed Upper Columbia Chinook Salmon, Steelhead and Bull Trout Recovery Plan (UCSRB 2006) and the Wenatchee Watershed Plan (WRIA 45 Planning Unit 2006). Instream flows have also been recommended to be set for Peshastin Creek in the Wenatchee Watershed Plan (with rule-making underway) to avoid further degradation of water quantity. Peshastin Creek is also listed on the 303(d) list for temperature. The draft TMDL submittal to EPA includes recommendations to increase stream flow to address temperature.

Additional information regarding the status of aquatic habitat in Peshastin Creek can be reviewed in the Limiting Factors Analysis (Andonaegui, 2001), the Chelan County Lead Entity Strategy (Chelan County, 2004), the Wenatchee Subbasin Plan (2004), Washington Conservation Commission fish distribution data (SSHIAP) (WCC, 2001), and an assortment of other reports as detailed in the Wenatchee Phase II Habitat Completion Memo (Golder, 2005) which is part of the Wenatchee Watershed Plan.

Figure 1 shows the timing of in-migration and spawning in Peshastin Creek (Anchor & EES Consulting, 2007). In-migration for Chinook occurs in July and August. No in-migration timing is shown for Bull Trout however it is assumed to occur from July through September (Anchor & EES Consulting, 2007). The period of in-migration coincides with the diversion of water for irrigation from Peshastin Creek by the Peshastin Irrigation District

Figure 1 Peshastin Creek Migration and Spawning Timing

Species	Lifestage	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept
Spring Chinook	Spawning												
	Incubation												
	Rearing												
	In-migration												
Steelhead	Spawning												
	Incubation												
	Rearing												
	In-migration												
Bull Trout	Spawning												
	Incubation												
	Rearing												

Based on:

Andonaegui, C., 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors for the Wenatchee Subbasin (WRIA 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum Drainages). Washington State Conservation Commission.

Comments from: USFS (Cam Thomas, Cindy Raekes), WDFW (Andrew Murdoch, Bob Vadas, Mark Cookson), USFWS (Kate Terrell) and NOAA-Fisheries (Dale Bambrick)

Key:

Black indicates periods of heaviest use

Grey indicates periods of moderate use

Blank areas indicate periods of little or no use

2. **PROBLEM STATEMENT**

State the nature, source, and extent of the problem that this project will address and help solve. When possible, document your sources of information by citing specific studies and reports. If known, provide the maximum legal diverted flow. If the diversion is equipped with a fish screen, provide details of why it is not functioning properly from a fish protection perspective (entrainment or impingement).

This project will address the problem of low instream flow in Peshastin Creek in the lower 2.4 miles below the Peshastin Irrigation District diversion dam during the late summer period. Flow in this reach of Peshastin Creek is very low during the time period of in-migration of Chinook salmon and Bull Trout. The creek channel in this reach has been affected by sedimentation, road construction and flood control activities and is very wide and shallow. Photo 1 shows a typical section of lower Peshastin Creek.

Photo 1 Example of Lower Peshastin Creek Channel Condition



The Peshastin Irrigation District diverts up to 40 cfs from Peshastin Creek during the irrigation season (mid-April to mid-September). Figure 2 illustrates diversions for two typical years.



Figure 2 2002/2003 Peshastin Canal Diversions

Streamflow downstream of the Peshastin Canal Diversion Dam declines through the irrigation season and becomes very low in August and September as a greater proportion of natural streamflow is diverted for irrigation. Streamflow typically declines to less than 10 cfs during late August and September. Figures 3 and 4 show streamflow hydrographs for Peshastin Creek measured at Green Bridge Rd, located downstream of the Peshastin Irrigation District Diversion Dam. During a drought year such as 2005 (Figure 4) streamflow may drop to a few cfs.



Figure 3 2003 Flow—Peshastin Creek (Average Flow Conditions)



Figure 4

The streamflow needed to provide adequate passage for Chinook salmon through the lower 2.4 miles of Peshastin Creek was estimated in the Peshastin Subbasin Needs and Alternatives Study completed for Chelan County Natural Resource Department (Anchor & EES Consulting, 2007). That study used a minimum depth criteria of 0.8 feet and the Oregon Method to estimate the Chinook salmon passage flow need to be approximately 40 cfs, which is much greater than the current flow available. The fish passage flow need is high because of the wide, shallow gravel bars that exist and the lack of structure in the creek.

3. **PROJECT OBJECTIVES**

List the project objectives. Objectives are statements of specific outcomes that typically can be measured or quantified over time. Objectives are more specific than goals (visions of the desired future condition) and less specific than tasks (the specific steps that would be taken to accomplish each of the objectives). For example, the objectives of an in-stream diversion project might be to reduce salmon mortality caused by water withdrawal. Explain how achieving the objectives will address and help solve the problem identified in #2 above.

The objective of the project is to reduce seepage in the Peshastin Irrigation District canal thereby increasing instream flow in Peshastin Creek. Achieving the objective will improve flow conditions for fish in the lower 2.4 miles of Peshastin Creek and help meet the goals of the Upper Columbia Biological Strategy, the Wenatchee Watershed Plan and the Upper Columbia Salmon Recovery Plan. The project will be complementary to the Peshastin Dam Fish Ladder project (constructed in 2006 and providing a bypass flow of 3.5 cfs) and will increase the minimum flow in Peshastin Creek by 34%. As discussed in Section 1, the improvement in instream flow should be implemented before future habitat improvements.

PROJECT APPROACH 4.

Has the project received a Screening Priority Index (SPI) Number? If yes, provide the SPI and indicate if WDFW a. developed the SPI. Refer to the WDFW Fish Passage Barrier and Screening Assessment and Prioritization http://wdfw.wa.gov/hab/engineer/fishbarr.htm.

No.

b. Is this a pump diversion? If yes, what is the flow of the diversion in gallons per minute (gpm). How was the flow determined (water right; meter – system meter; or calculated from irrigation system components)?

No.

c. For the gravity diversion, what is the flow in gallons per minute (gpm). How was the flow determined (water right; or direct measurement during peak spring/ summer diversion using a flow meter)?

The Peshastin Irrigation District currently diverts up to 40 cfs (18,000 gpm). The flow is measured at a flume installed in the Peshastin Canal. The flume rating was prepared by the U.S. Bureau of Reclamation. Daily records are kept by the irrigation district and reported to the Washington Department of Ecology on an annual basis.

d. If it is not possible to determine the flow, then provide the bank-full, cross-sectional area of the ditch, measured 100-300 feet downstream of the Point of Diversion (see page 25 of the WDFW Fish Passage Barrier and Screening Assessment and Prioritization Manual (August 2000).

N/A.

e. Briefly describe the location of the project within the context of the watershed (estuary, main stem, tributary, etc) and the life cycle stage(s) affected.

The Peshastin Irrigation District diversion is located on Peshastin Creek 2.4 miles upstream from its confluence with the Wenatchee River near Dryden. The affected reach is the lower 2.4 miles of Peshastin Creek., a tributary of the Wenatchee River. The primary life cycle stage that will benefit is in-migration for Chinook salmon and Bull Trout. The other life cycle stage that would benefit is rearing for Spring Chinook, Steelhead and Bull Trout from increased flow and reduced temperature.

f. List the individuals and methods used to identify the project and its location.

The project was identified by the Peshastin Irrigation District based upon their operating experience with their canal. The irrigation district started the project by constructing approximately 4100 feet of pipeline in 2005. The upper end of the pipeline proposed here will tie into their pipeline, providing a continuous pipeline for 3 miles of the lower Peshastin Canal. The project was also the top-ranked alternative in the Peshastin Subbasin Needs and Alternatives Study completed for Chelan County (Anchor & EES Consulting, 2007).

g. Describe the project design and how it will be implemented.

The project design will replace the current open canal with pipelines. Two sizes of pipe are required; 36-inch diameter Hancor pipe will be used on the main canal from the start of the project for 5,900 feet and 10-inch diameter PVC pipe will be used on the canal as it drops steeply towards Pioneer Drive and its end. The 36-inch pipe will be operated under gravity-flow conditions and the 10-inch pipe may be operated under either gravity or pressure flow conditions.

The project will be implemented using standard engineering design and construction practices. The design of the project will be performed by the U.S. Bureau of Reclamation. Contract management will be performed by the Peshastin Irrigation District. A construction contractor will be hired through a competitive bidding process.

h. Explain how the project's cost estimates were determined.

An engineer from the U.S. Bureau of Reclamation (Jeff Peterson, pers. comm. 2007) prepared a construction cost estimate, which was \$681,055. The estimate accounted for the length of pipeline to be constructed, the excavation and backfill required and the pipeline appurtances required. A contingency of 20% was applied to the estimate to account for unknown site and bidding conditions, which brought the cost up to \$820,000 (rounded off). Sales tax of 8.0% is required, which brings the total estimated construction cost to \$885,600. Once the design of the pipeline is complete, a more detailed cost estimate will be prepared.

i. How much water, if any, will be saved as a result of this project? Will water be put into trust, or are there plans to transfer water rights?

Flow measurements were made by the U.S. Bureau of Reclamation and Chelan Conservation District to estimate the seepage loss in the existing canal. The measurements indicate that 1.2 to 1.9 cfs is currently lost to seepage in the reach that will be piped. We are using the most conservative estimate of seepage loss (1.2 cfs) to determine the benefits from the project.

The 1.2 cfs water saved will be put into trust. A project partner who is anticipated to provide funding is the Washington Conservation Commission through the Irrigation Efficiencies Grant Program/Trust Water Rights Program which will require the water saved to be placed in trust. The Peshastin Irrigation District and Chelan County entered into an agreement in 2006 for the operation of a new fishway at the Peshastin Diversion Dam. In that agreement, the Peshastin Irrigation District agreed to discharge a minimum of 3.5 cfs over the fishway. It is anticipated that a similar agreement will be made between Washington State Department of Ecology or Washington Conservation Commission and the Peshastin Irrigation District for this project. The minimum discharge through the fishway would be increased to 4.7 cfs. The flow discharged will be measured and monitored using a staff gage or electronic data logger at the head of the fishway. Peshastin Irrigation District staff will monitor the discharge on a daily basis and it is anticipated Chelan County staff will have access to the dam to periodically check the operation. Chelan County and the Department of Ecology also maintain a real-time stream gage on lower Peshastin Creek downstream of the dam (Peshastin Creek at Green Bridge, Gage #45F070) which will enable streamflow to be remotely monitored.

The water saved will be put into trust for a minimum of 25 years, per the requirements of the Irrigation Efficiencies Grant Program. The 25-year time frame is the estimated life of the piping system per Natural Resource Conservation Service (NRCS) guidelines.

j. Describe other approaches and opportunities that were considered to achieve the project's objectives.

Other approaches to improving instream flow in Peshastin Creek have been studied (Anchor & EES Consulting, 2007). One potential approach identified consists of a pump station on the Wenatchee River to pump water into the Peshastin Canal and allowing water to flow down Peshastin Creek without being diverted. The capital cost of that alternative was estimated to be \$1.4M to \$4.1M and annual power costs would be incurred. Another potential approach would be to construct a reservoir in the Peshastin Creek watershed and supply late-season water needs from the reservoir. That cost is estimated to be \$10M to \$16.6M. The alternatives studied were more expensive from a capital cost and from an operating cost perspective. The Peshastin Pipeline project was recommended for immediate implementation in that study while the other alternatives that would increase instream flow in Peshastin Creek are studied in more detail.

k. List project partners. When appropriate, include a letter from each participating partner briefly outlining its role and contribution to the project (see sample form in section 2).

The project partners include:

- Peshastin Irrigation District
- United States Bureau of Reclamation
- Chelan County Natural Resource Department
- Cascadia Conservation District
- Washington Conservation Commission (potential source of grant funding)
- Tributary Fund (potential source of grant funding)
- 1. List all landowner names. Include a signed form from each landowner acknowledging their property is proposed for SRFB funding consideration (see sample form in section 2).

The project will be constructed on existing rights-of-way owned by the Peshastin Irrigation District.

m. Describe your approach to the long-term stewardship of the facility.

Although NRCS guidelines estimate the design life of pipelines to be 25 years, the design life of the pipeline project should exceed 50 years with only minimal maintenance required. Measurement and monitoring of the water saved is an important aspect of this project. As described in i. above, flow will be measured at the fishway of the Peshastin Diversion Dam. The water saved (1.2 cfs) will be measured along with the flow required to operate the fishway (3.5 cfs). A total of 4.7 cfs will be discharged through the fishway. The fishway will be operated and maintained by the Peshastin Irrigation District on a long-term basis. Chelan County will install and operate a gage to record the flow discharged through the fishway and track project performance.

n. When known, identify the staff, consultants, and subcontractors that will be designing and implementing the project, including their names, qualifications, roles and responsibilities. If not yet known, describe the selection process.

The following table outlines the staff of various agencies who will work to manage and implement the project. A construction contractor will be selected using a standard public works bidding process.

Name	Title	Project Role			
Joel Teeley	Manager, Peshastin Irrigation District	Project management, select contractor, manage construction			
Mike Kaputa	Director, Chelan County Natural Resource Department	Manage grant funding administration, point- of-contact for Chelan County for Trust Water Rights agreement with Peshastin Irrigation District			
Mike Rickel	Program Manager, Chelan Conservation District	Manage Chelan Conservation District grants, provide technical assistance to Peshastin Irrigation District and U.S. Bureau of Reclamation, assist with Trust Water Rights agreement			
Steve Kolk, P.E.	Wenatchee Sub-basin Liaison, U.S. Bureau of Reclamation	Manage the U.S. Bureau of Reclamation's involvement in the project, including design of the pipeline and assistance during construction.			
Joy Juelson	Natural Resources Specialist, Chelan County Natural Resource Department	Provide grant funding administration and assist with Trust Water Rights agreement.			

Table 1 Key Project Staff

5. TASKS AND TIME SCHEDULE

List and describe the major tasks and time schedule you will use to complete the project. Describe your experience with managing this type of project.

Table 2 provides a list of key milestones for the project completion. We anticipate preparing the engineering design this fall and early winter. Construction can start in spring 2008 and if not finished prior to the start of the irrigation season be completed in the fall of 2008. If a shortfall of funding exists, the project would be shortened or delayed until full funding becomes available. The Peshastin Irrigation District has managed construction of many pipelines, including the 5,000 feet of 36-inch pipe located immediately upstream of this project. The U.S. Bureau of Reclamation has designed thousands of irrigation pipelines throughout the west and is the most experienced engineering organization for water delivery pipelines in the west.

Table 2
Schedule of Milestones

Task	Date to be Completed		
Complete Engineering	January 15, 2008		
Complete Permitting	January 15, 2008		
Advertise for Construction Bids	Feb 1, 2008		
Start Construction	March 1, 2008		
Trust Water Rights Agreement	March 1, 2008		
Finish Construction	December 31, 2008		

6. CONSTRAINTS AND UNCERTAINTIES

State any known constraints or uncertainties that may hinder successful completion of the project. Identify any possible problems, delays, or unanticipated expenses associated with project implementation. Explain how you will address these constraints and the likelihood of success.

The project to replace open canal with a pipeline is straight-forward and no physical constraints or uncertainties are known to exist. One uncertainty is the cost of the project because of escalating construction costs. A construction cost contingency of 20% has been included in the cost estimate to provide extra cushion.

7. **REFERENCES**

Anchor Environmental & EES Consulting, 2007. Peshastin Subbasin Needs and Alternatives Study, prepared for Chelan County Natural Resource Department.

Andonaegui, C., 2001. Salmon, steelhead, and bull trout habitat limiting factors for the Wenatchee subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages).

WRIA 45 Planning Unit, 2006, Final Wenatchee Watershed Plan

Golder Associates (Golder), 2005. Wenatchee Watershed Planning Phase II Closeout Report Habitat Component. Submitted to: Chelan County Natural Resources and WRIA 45 Watershed Planning Unit. February 15, 2005.

Northwest Power and Conservation Council (NPCC), 2004. Wenatchee Subbasin Plan. Prepared for the Northwest Power and Conservation Council. Lead organizations: Chelan County and the Yakama Nation.

Peterson, Jeff, 2007. Email correspondence to Steve Kolk containing cost estimate for Peshastin Pipeline.

Upper Columbia Salmon Recovery Board, 2006. Proposed Upper Columbia Chinook Salmon, Steelhead and Bull Trout Recovery Plan.

Upper Columbia Regional Technical Team (UCRTT), 2007. A Biological Strategy to Protect and Restore Salmon Habitat in the Upper Columbia Region, A Report to the Upper Columbia River Salmon Recovery Board. May 2007. Available from the Upper Columbia Salmon Recovery Board, Chelan, Washington.

Washington Conservation Commission (WCC), 2001. Salmonid and Steelhead Habitat Inventory and Assessment Project (SSHIAP)

Washington Department of Ecology (Ecology), 2005. Draft Wenatchee River Total Maximum Daily Load Study. March 2005. Final Report expected late 2005.

Washington Department of Fish and Wildlife (WDFW), 2005. Priority Habitat and Species Data. June 30, 2005 -39- 043-1284-000.301