12e. Fish Passage: Barrier Evaluation Form

Location Information

GPS Location: In decimal degrees using 9 decimal places. State Plane South, WGS84	Latitude: **46.159033330**	Longitude: **121.039783330**

¼ Section: **SW**	Section: **22**	Township: **8N**	Range: **14E** East
County: **Yakima**		Parcel: **n/a**	
Stream Name: **Tepee Creek (175 Rd crossing)**		WRIA#: **30**	
Tributary To: **Tepee Creek**		Stream #:	

Driving Directions: **From State Highway 14 at Lyle, travel 16 miles NE on State Highway 142 to Wahkiacus. Turn right onto Horseshoe Bend Rd. Cross Klickitat River bridge, then turn left into driveway to YN Fisheries Klickitat Field Office. Proceed into Closed Area of reservation with YN Fisheries staff (advance notice and special entry permits required).**

Landowner Information

Landowner Name: **Confederated Tribes and Bands of the Yakama Nation**			Landowner Agent: **Mel Sampson**		
Mailing Address: **P.O. Box 151**			Mailing Address: **same**		
City: **Toppenish**	State: **WA**	Zip: **98948**	City:	State:	Zip:
Phone: **509-865-6262**	Fax: **509-865-6293**		Phone:	Fax:	
Cell:	Email:		Cell:	Email:	

Investigator

Investigator Name: **Will Conley**		Affiliation: **Yakama Nation Fisheries Program**	
Mailing Address: **P.O. Box 215**			
City: **Klickitat**		State: **WA**	Zip: **98628**
Phone: **509-369-3183**	Fax: **509-369-3194**	Cell:	Email: **willfish@gorge.net**

Barrier Measurements (in meters)

Is the stream fish bearing? X Yes ☐ No ☐ Unknown Species, if known ___*O. mykiss*_____
Is this culvert a fish passage barrier? X Yes ☐ No ☐ Unknown ☐ Level B needed

Level A analysis completed: **X** Yes No If yes, attach. If no, complete below:

Shape: **Pipe Arch**	Material: **CM**	Span/Diam: **2.4**	Rise: **1.7**	Water depth in culvert: **0.1**	Length: **17.4**

Streambed material throughout culvert: Yes **X** No Unk	Toe width (outside of culvert influence):
Outfall drop: **0.49**	Culvert slope(%): **2.5**
How did you calculate culvert slope? **X** Handheld laser level Transit Other (describe)	
Road width: **9.0**	Road fill height over top of culvert (D.S. end): **0.5**

Velocity: **not measured**	Apron: **X** None Upstream Downstream Both
Problem with culvert: **Slope/Outfall**	Percent Passability: 0% **X** 33% 67% 100%
Comments: **original survey completed by YNFP technicians in July 2000; passable to most anadromous adults under most flows; not passable to most juveniles under most flows. The pipe is bowed such that the upper ½ of the pipe is steeper than the reported slope.**	

12f. Fish Passage: Expanded Barrier Evaluation Form

Project Name: **Tepee Creek Fish Passage Restoration** Sponsor: **Yakama Nation**

Part 1. Background Data Assessment

Attachments:

Barrier Evaluation Form for project site

Map – Basin area map showing fish use, other known barriers, gradient and basin area. (WDFW generated)

Surrogate PI #_____ (attach) PI# _____ (attach if available)

Watershed Information

Basin area: _____ Amount of habitat which would be made available upstream: _____(m)

Has a barrier inventory been conducted in the watershed? Yes **X** No If yes, list source and date completed:

Culverts on primary spawning and rearing streams have been surveyed. There has not been a comprehensive barrier survey throughout the watershed.

Are there downstream barriers? Yes **X** No If yes, describe. List source; use separate sheet if necessary.

Are there upstream barriers? **X** Yes No If yes, describe. List source; use separate sheet if necessary.

A crossing roughly 2 miles upstream is a partial barrier (slope and outfall) and is proposed for replacement as part of this project.

Has the stream been walked? **X** Yes No If yes, information source:

Upstream and downstream reaches have been walked by YNFP staff 2 to 3 times each spring for steelhead spawner surveys..

Fish Species/Use

Mapped Species: bull trout/Dolly Chinook chum coho cutthroat pink **X** resident trout sockeye **X** steelhead

Information source: **YNFP spawning and habitat surveys and personal observation.**

Current fish use downstream and upstream from barrier (include source of information):

YNFP spawning and habitat surveys. Juvenile and resident *O. mykiss* are present upstream and downstream of culvert. Adult steelhead have been observed upstream of the crossing.

What species and life history stages might use the habitat made accessible by the project?:

juvenile *O. mykiss.*

Provide a qualitative description of habitat that will be made available by barrier correction, if available. Include source of information:

Upstream habitat tends to be lower gradient with alluvial banks. The stream flows through an sequence of forested and meadow habitats. Historically, much of the adjacent habitats were wet meadows, though channel incision has restricted floodplain inundation. Consequently, the lowered water table in conjunction with livestock grazing has seriously impacted riparian cover. However, in places where LWD is abundant, the effects of incision have been moderated. Despite degraded conditions, an appreciable amount of steelhead spawning still occurs in the vicinity. See section 12c-I for general description.

Part 2. Site Visit Documentation & Correction Alternatives

Site Information

Date of visit: **8/01, 5/02, 11/03, 4/04**	Recent precipitation: **none (except 11/03 – recent snow)**

Photographs attached of barrier inlet and outfall, upstream habitat, downstream habitat, and road.

Bankfull width (outside of influence from the culvert): **3.9 m**

Stream flow: Perennial **X** Intermittent Unknown Source of information: **personal observation**

Flow conditions: low **X** moderate high	Utilities crossing: Yes **X** No Unknown

Road description/condition (county road, private driveway, access road):

The 175 Road is a connector for two arterials. The surface is composed of native materials, grades are gentle, and it tends to follow valley bottoms. It is occasionally graded, though rutting is locally present.

Fish observed on site: **yes, fry and 1+ aged *O. mykiss*.**

Upstream Habitat/Channel

Approximate channel slope: _____**3.1**__% (outside of culvert influence)

Dominant substrate: sand (<.20") gravel (.20"–3") cobble (3"-12") **X** boulder (>12") bedrock

Additional upstream information, habitat description, other site conditions or concerns:

Stream immediately upstream of crossing is confined, moderate gradient (3.1%), cobble/gravel bed, that is boulder-controlled. Riparian shrub cover is marginal. Overstory is mainly ponderosa pine. Floodplain connectivity is moderate to poor and the channel is horizontally and vertically stable. Streamflow is intermittent. Pool frequency and quality are poor. Naturally confined channel is even more-se because of road-fill encroachment. Inlet skew is 59 degrees.

Downstream Habitat/Channel

Approximate channel slope:_____**2.1**__% (outside of culvert influence)

Additional downstream information, habitat description, other site conditions or concerns:

Immediately downstream of crossing, gradient and substrate size decrease. Confinement decreases appreciably. Finer (sands/silts) size fractions form shallow floodplain soils over coarse stream-worked gravels and cobbles. Riparian cover is poor. There is an avulsion path migrating headward to the left of the active channel.

Correction Alternatives

Alternatives to consider – *Using your best professional judgment provide one, two, or even three alternatives to consider. Please recognize landowner desires or concerns, potential sponsor and their capabilities, and state fish passage requirements. See example on the following pages.*

Alternative 1 – **Abandonment is not an option since the 175 Road is a major connector in Cedar Valley.**

Alternative 2 – **Build downstream grade control to backwater existing pipes in situ. Because conveyance is already inadequate (due to inlet skew and possible undersized cross-sectional area), decreasing slope through the crossing would further decrease conveyance and increase the risk of prism failure.**

Alternative 3 – **Replace crossing using no-slope option. Crossing occurs at a natural geomorphic grade-break. Would result in over-building the crossing and unnecessary expense.**

Alternative 4 – **Replace crossing using stream-simulation option. Install bottomless arch. Use downstream grade and upstream bed composition plus safety factor to provide stability. Consider relocating crossing and/or changing alignment.**

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General recommendation *– Provide a one or two paragraph recommendation for this site. Note any special concerns discovered during the site visit. In some situations a preliminary design may have already been completed or design concepts generated. If this is the case please include this information.*

Though vertical instability is common throughout Tepee Creek, the reach in the vicinity of the crossing appears to be vertically stable with a well-armored bed. LWD placement and riparian and floodplain revegetation would improve downstream habitat conditions.

Preliminary survey data indicates that the crossing occurs at a geomorphic break is profile gradient. This will require some basic modeling and an iterative design process to ensure that fish passage, conveyance, and stability objectives are maintained. Consider relocating crossing and/or changing alignment. The gradient and confinement decrease coupled with substrate changes are indicative of a small alluvial fan sub-reach. A more thorough site evaluation should be conducted before enagaging in design to assess natural instability potential.

Rough cost estimate* - The purpose of the rough cost estimate is to provide a project specific estimate to establish a funding level.

Culvert Replacement – Alternative #_4__

Permitting/Oversight:	$ 1,800
Engineering:	$ 8,500
Materials:	$ 66,300
Construction:	$ 34,477
Total	**$ 111,077**

* This estimate is provided as a rough approximation of project costs; actual costs will vary depending on specifications identified during project design.

Notes:

Relocation of the crossing is not accounted for in the cost-estimate.