# 12e. Fish Passage: Barrier Evaluation Form

## Location Information

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|---|---|---|---|---|
| GPS Location: In decimal degrees using 9 decimal places. State Plane South, WGS84 | | Latitude: **46.181450000** | Longitude: **121.024250000** | |
| ¼ Section: **SW** | Section: **14** | Township: **8N** | Range: **14E** | East |
| County: **Yakima** | | Parcel: **n/a** | | |
| Stream Name: **Tepee Creek (IXL 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

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|---|---|---|---|---|---|
| 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: **0.05** | Length: **18.4** |
| Streambed material throughout culvert: Yes **X** No Unk | | | | Toe width (outside of culvert influence): **4.5** | |
| Outfall drop: **0.7** | | | | Culvert slope(%): **3.3 and 5.7** | |
| How did you calculate culvert slope? **X** Handheld laser level Transit Other (describe) | | | | | |
| Road width: **12.2** | | | | 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** | |

# 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? **X** Yes No If yes, describe. List source; use separate sheet if necessary.

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

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

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*

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|---|
| Mapped Species: bull trout/Dolly pink Chinook **X** resident trout chum coho cutthroat sockeye **?** steelhead<br>Information source: **YNFP spawning and habitat surveys and personal observation.** |
| Current fish use downstream and upstream from barrier (include source of information):<br>**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?:<br>**juvenile *O. mykiss.*** |
| Provide a qualitative description of habitat that will be made available by barrier correction, if available. Include source of information:<br>**Upstream habitat is unconfined to moderately-confined, low gradient (<1.5%), gravel-bed, with moderate LWD frequency. Riparian cover is good and is largely forested with shrub understory. Floodplain connectivity is better than downstream reaches. Perennial perennial streamflow is more abundant than downstream. Upstream habitat tends to be lower gradient with alluvial banks. The stream flows through an sequence of forested and meadow habitats. 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*

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|---|---|
| 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): **3.8 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 IXL Road is an arterial haul route for Cedar Valley. The surface is generally composed of crushed aggregate. Grades are moderate to gentle, and it transects watershed boundaries of White Creek and several of its tributaries (including Tepee Cr.). It is generally well-maintained.**

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

*Upstream Habitat/Channel*

Approximate channel slope: _____**0.9**__% (outside of culvert influence)

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

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

**Inlet skew is 44 degrees.**

*Downstream Habitat/Channel*

Approximate channel slope:_____**1.0**__% (outside of culvert influence)

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

**Channel incision downstream of the crossing is extensive. The crossing is currently preventing upstream migration of the incision. In-channel restoration activities are being planned for the downstream meadow and construction will be timed to coincide with culvert replacement.**

### 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 IXL Road is a major arterial 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. Were it not for the large elevation differential, this would be a good design option.**

Alternative 4 – **Replace crossing using stream-simulation option. Install pipe-arch, countersunk, at downstream grade. Use downstream bed composition plus safety factor to provide stability and reduce risk of triggering upstream incision. Invert of downstream channel will also be raised in association with other planned restoration activities.**

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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.*

**Invert of downstream channel will be raised in association with other planned restoration activities. May want to consider relocating the crossing upstream about 100' to improve alignment / decrease skew. Combined activities will require more detailed topographic survey and 1-dimensional modeling.**

**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: | $ 4,500 |
| Materials: | $ 38,700 |
| Construction: | $ 27,520 |
| **Total** | **$ 112,457** |

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

**Notes:**