Chelan County Natural Resource Department

June 29, 2012

Mill Creek/Mountain Home Ranch Road Fish Passage

13th Round Funding Cycle

Anticipated Request from SRFB:	$ 218,890
Anticipated Match (USFWS):	$ 99,000
Anticipated TOTAL Project Budget	**$ 317,890**

SRFB/TRIB Proposal Checklist

Project Title: **Mill Creek/Mountain Home Ranch Road Fish Passage**

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SUMMARY OF PROJECT CHANGES SINCE THE PRE-PROPOSAL AND RESPONSE TO COMMENTS

1. No changes

RESPONSES TO RTT COMMENTS

-Provide Temperature Data:
See attachments for graph of flow and temp data collected in 2011.

-Provide Fish use data:

Resident trout were seen in most pools throughout the 1.5 miles surveyed in 2010. The Wenatchee River Ranger District will survey habitat in Mill Creek in August 2012, so more detailed information will be available regarding species composition at that time.

-Does Mill Creek provide potential Bull trout habitat?

It is unknown at this time if bull trout will use this habitat. Temperatures are favorable during most of the year.

Mill Creek/Mountain Home Ranch Road Fish Passage

1. Project Overview

A. Describe the primary goal and objectives of this project. When answering this question please refer to chapter 4 of the *Stream Habitat Restoration Guidelines* for a definition of restoration goals and objectives. Link to *Stream Habitat Restoration Guidelines* wdfw.wa.gov/publications/pub.php?id=00043

The objective of the Mill Creek Passage project is to open 2.2 miles of perennial stream to provide access to spawning and rearing habitat on Mill Creek (RM 5.2 on Peshastin Cr.). Currently a 4'x5' box culvert with a 1.5% slope and 2' outfall drop at RM 0.1 on Mill Creek creates a complete barrier to fish passage. The project would remove this structure and replace it with a bridge to allow access to spawning and rearing habitat for adult steelhead and possibly spring Chinook and bull trout. Peshastin Creek is a Category 2 watershed and a major spawning area for steelhead and minor spawning area for spring Chinook and a bull trout core area (UCRTT 2008). Peshastin Creek is disconnected from most of the floodplain and side channel habitat from the mouth to RM 9.4 (Ingalls Creek) and disconnected from the best potential tributary habitat, Mill Creek at RM 5.2, in that same reach. Mill Creek has perennial flow, drains a north and east facing basin, and has a relatively shallow stream gradient compared to nearby Allen, Hansel and Camas Creeks. Mill Creek has good riparian cover with few areas below 50% canopy cover, has moderate amounts of woody debris in the first 1.5 miles, numerous plunge pools of 1-2' with some 3-4' drops and fish including resident rainbow trout, *O. mykiss gairdneri* were observed throughout the reach (October 2010 survey, ~1cfs). The completion of this project will address Tier 4 habitat restoration as recommended in the Biological Strategy (Provide improved fish passage culvert replacement in Mill, Ruby and Scotty Creek (more info needed for Mill Creek to determine the extent of potential rearing habitat and flow regime) (UCRTT 2008) and Recovery Plan (UCSRB 2007) for Peshastin Creek.

B. Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project (if only a portion of the watershed is targeted), and whether the project occurs in the near-shore, estuary, main stem, tributary, off channel, or other location.

The project is located within the Wenatchee River Watershed (WRIA 45) at RM 0.1 on Mill Creek which is at RM 5.2 on Peshastin Creek and on the Mountain Home Ranch Road in Chelan County. The project is primarily on Chelan County Right of Way, with a small portion of the temporary impacts being on the adjacent Smith property.

C. Is the project located on state owned aquatic lands? Please refer to page 20 of this manual for information on state owned aquatic lands and who to contact at the Washington Department of Natural Resources for assistance.
N/A

D. Provide an overview of current project site conditions and the nature, source, and extent of salmon recovery problem(s) that the project will address. Include current and historic factors important to understanding the need for this project. Be specific – avoid general statements. (acquisition, fish passage, diversions, and screening projects should refer to the supplemental questions later in this worksheet for information to include in the problem statement.) When possible, list your sources of information by citing specific studies, reports, and other documents.

The project would reconnect 2.2 miles of perennial small stream habitat with an average gradient of 6-8%. In 2004, the Mill Creek Diversion Dam, identified by the U.S. Fish and Wildlife Service and the Chelan County Conservation District (Cascadia CD) as a barrier to fish movement was replaced by six log weirs allowing passage for all species and life stages. The location of the diversion dam is about 500' upstream of the barrier culvert.

The USFS completed a stream survey of Mill Creek in November of 1994 after the Rat Creek Fire had burned through the watershed. They surveyed 2.3 miles of Mill Creek from the mouth to a barrier culvert further up Mountain Home Ranch Road. They found the number of large woody debris per mile and number of pools per mile to be below the Forest Plan Standards and Guidelines (36 primary pools and 75 plunge pools). Sediment levels also exceeded the allowable amount stated by the Forest Plan. Electroshocking was done in selected locations and rainbow trout were observed. Valley form is moderately V-shaped and channel confinement varied from unconfined in lower elevations to moderately confined in the upper portion of the reach. They called average gradient 12%. Temperatures during the survey period 35-37 degrees F.

CCNRD staff completed an informal survey of the first 1.5 miles of the reach in late September 2010 to insure there were no other significant barriers and to observe existing habitat conditions. Large woody debris amounts are likely higher than those observed in the 1994 survey due to recruitment of snags from the Rat Creek Fire. Riparian condition was good with only a couple small areas seen with canopy cover of less than 50%. Informal surveys of imbeddedness did not indicate overloading of sediment in this drainage. As in the USFS survey, numerous plunge pools were observed with drops of 1-2' common and a couple drops of 3-4'. The weir structure built in 2004 seems to be functioning as designed with drops of about 1'. Flow was estimated to be about 1cfs. Fish were seen in most pools throughout the 1.5 miles surveyed and at least one 6" rainbow trout was observed. The Forest Service is planning to complete a habitat assessment of Mill Creek in 2012.

E. Provide a detailed description of the proposed project, including project size, scope, design, and how it will address the problem(s) described above. Describe specific restoration methods and design elements you plan to employ. (Acquisition-only projects need not respond to this question.)

The existing box culvert structure was indentified in the 2004 Chelan County Fish Barrier Inventory as passage barrier due to outfall drop. Mountain Home Road crosses Mill Creek at River Mile 0.05 and is administered by the Chelan County Public Works Department. A complete topographic survey was completed by the Bureau of Reclamation during late fall 2009. The US Fish and Wildlife Service staff engineer will provide design and permit review assistance. The Chelan County Natural Resource

Department (CCNRD) will provide construction management. Chelan County will direct the permitting process, pre-project implementation and effectiveness monitoring and general project management to replace the culvert. During the work window of 2013 the existing culvert will be removed and replaced with a bridge. During construction the creek will be diverted around the work area. The stream section opened by removal of the existing box culvert will be replaced by a section of designed constructed channel. In addition to the correction of barriers, riparian vegetation will be planted to restore and enhance habitat.

F. If restoration or acquisition will occur in phases or is part of a larger recovery strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps is included in this application.

The barrier replacement on Mill Creek is part of a strategy to address multiple issues on Peshastin Creek including, access to tributaries and off-channel habitat, high sediment inputs from the upper watershed and low flow issues in the lower 3.5 miles. CCNRD is sponsoring 4 proposals in the current round focused on restoration in Peshastin Creek and partnering with the US Fish and Wildlife Service, US Forest Service and the Wild Fish Conservancy to achieve these goals. CCNRD is partnering with the Office of the Columbia River to address instream flow issues in the lower river.

G. Describe the long-term stewardship and maintenance obligations for the project or acquired land. For acquisition and combination projects, identify any planned use of the property, including upland areas.

The Chelan County Public Works Department will accept the bridge as part of the county transportation system. Public Works maintenance crews will provide normal roadway maintenance. Annual bridge inspection will performed by a staff engineer. Natural Resource Department (CCNRD) will be responsible for post project monitoring and stewardship of restored areas adjacent to the bridge.

H. Has any part of this project previously been reviewed or funded by the SRFB? If yes, please provide the project name and SRFB project number (or year of application if a project number is not available). If the project was withdrawn from funding consideration or not awarded SRFB funding, please describe how the current proposal differs from the original.

Yes. The project difference is that CCNRD now has a commitment for design funding from USFWS.

1. Salmon Recovery Context Describe the fish resources present at the site and targeted by this project.

Peshastin Creek is a Category 2 watershed and contains major spawning area for steelhead and minor spawning area for spring Chinook, and is a bull trout core area (UCRTT 2008).

The reconnection of tributary habitats as proposed by this project will benefit the following life-history stages:

Species	Life History Present (egg, juvenile, adult)	Current Population Trend	ESA Coverage (Y/N)	Life History Target (egg,
Chinook Salmon		Decline	Y	Juvenile
Steelhead		stable	Y	Egg, juvenile, adult
Bull Trout		stable	Y	Juvenile

Chelan County Natural Resource Department (CCNRD) staff has collected flow data since July 2011. Flows range from 5.8 cfs in July to 1.3 cfs in October. Flow measurements were taken this year on April 24 with 25.8 cfs and April 27 with 19.8 cfs.

B. Discuss how this project fits within your regional recovery plan or local lead entity strategy to restore or protect salmonid habitat in the watershed (i.e., does the project address a priority action, occur in a priority area, or target priority fish species?).

Restoration of Peshastin Creek tributary habitat is identified as one of the priorities in the Upper Columbia Salmon Recovery Plan (UCSRB 2007). The Wenatchee Watershed Implementation Schedule identified the removal of obstructions at this project site as a priority habitat restoration project within Peshastin Creek (Implementation Schedule PC-1460). This barrier removal on Mill Creek would likely improve diversity and spatial structure.

Within Peshastin Creek, the reconnection of floodplain and lengthening of the mainstem is a Biological Strategy Tier 1 action and top priority for addressing limiting habitat factors and the recovery and long-term viability of salmonids in Peshastin Creek (UCRTT 2008, UCSRB 2007). This project will directly benefit ESA-listed spring Chinook salmon and steelhead, and bull trout.

C. Explain why it is important to do this project now instead of at a later date. Consider its sequence relative to other needs in the watershed and the current level and imminence of risk to habitat in your discussion.

As mentioned previously, this project is part of a watershed strategy to restore habitat, passage and normative flows. The consequences for not implementing this particular project would be to maintain existing conditions and degraded habitats, which will continue to limit productivity of listed salmonids within Peshastin Creek.

3. Design and Implementation Questions for Restoration Projects (Acquisition-only projects need not respond to these questions.)

A. Will the project design be (or has it been) developed by a licensed professional engineer? If your project will not be designed by a professional engineer, please describe the

qualifications and experience of your project design team.
Project design will be provided by a US Fish and Wildlife staff engineer who is licensed in the state of Washington as a Professional Engineer. Project design will follow the guidelines provided in the Washington Department of Fish and Wildlife's *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual*. Project Design will be subject to review by the Chelan County Public Works Department bridge engineer in compliance with Chelan County Code Chapter 15.30

B. Describe your experience managing this type of project. Please describe other projects where you have successfully used a similar approach.
The Chelan County Natural Resource Department (CCNRD) has successfully replaced 26 passage barrier culverts with bridge structures since 2006. All projects were completed within budget and timeline.

C. Please describe who will provide construction management for the project.
Chelan County Natural Resource Department Habitat Project Manager will act as Contracting Officer for the construction of the replacement bridge. Construction oversight will be provided by the USFWS design engineer.

D. The design process for restoration projects is expected to follow that described in Appendix D1-4. If your process differs from those expectations, please describe your process and how it differs. This includes projects where you intend to follow a "design-build" process. Please describe the design and construction process you intend to follow.
Chelan County Natural Resources will follow the guidelines provided in Appendix D1-4

Conceptual Design

The preferred design is in accordance with the guidelines included in the Washington State Department of Fish and Wildlife "Design of Road Culverts for Fish Passage Manual" and with respect to addressing the intent of WAC 220-110-070 which states in part "***In fish bearing waters, bridges are preferred as water crossing structures by the department in order to ensure free and unimpeded fish passage for adult and juvenile fishes and preserve spawning and rearing habitat."*** The proposed design concept for the Mill Creek culvert replacement is to utilize pre-cast concrete or modular steel bridge super structures set in place on pre-cast concrete abutments. Design of bridge-type structures will be in accordance Manufacturers claim low initial cost, prompt delivery, and fast easy installation. Furthermore, load ratings and normal maintenance practices are preserved.

Preliminary Design

The US Fish and Wildlife Service design engineer will use the topographic survey the Washington State Department of Fish and Wildlife "Design of Road Culverts for Fish Passage Manual" and the Washington State Stream Habitat Restoration Guidelines 2004. Alternatives to structure replacement and evaluation of different crossing structures such as pipe arches will considered at this stage. Calculation of required stream channel width, scour and sediment transport will determine the restored section of stream channel design criteria. Roadway elements such as bridge load, paved width, guardrail and slope ratios will be calculated. Using AutoCAD Civil 3-D the design engineer will calculate construction quantities and cost estimates including excavation, rock,

and any bio-engineering materials. Preliminary 90% plans that include a site plan area map showing property boundaries, road right of way and utilities. Plans will include limits for clearing and grubbing, details for diversion and care of stream, stream profile and cross sections. Details for replacement bridge structure will include all dimensions and material specifications. Submittal of the preliminary design to Public Works bridge engineer for review and approval.

Final Design

A Design Report including all calculations and incorporation of permitting and Public Works comments. Completion of contract bidding documents including structure specifications, drawings, special provisions, wage rates and permitting conditions as required by state and federal agencies.

A cultural resource survey will be completed at this stage.

Construction

Advertising for bids from local contractors qualified to complete the work will be in accordance with Chelan County Financial Procedures. Contract award and issuance of the Notice to Proceed will allow the contractor to mobilize equipment and materials to the site. All replacement bridge shop drawings will be stamped by a Washington State structural engineer. Traffic control, diversion and care of stream will be under the direct observation of the Contracting Officer. Use of heavy construction equipment such as a track hoe, small dozer, road grader and dump truck can be assumed. Construction staking and verification of horizontal and vertical dimensions will be done as required. Construction activities will be accomplished during low flow periods to reduce the potential impacts to juvenile fish. On-site sediment mitigation measures could include silt fencing where necessary, isolating and/or diverting the stream around the work site, and either pouring concrete footings isolated from the water, or using pre-cast footings. Road closures of no more than three (3) days with one way traffic controlled by flaggers are expected. The Mill Creek culvert replacement concept contains commonly accepted designs with required materials and qualified construction contractors locally available. Typical construction after requirements for all permitting and contracting documents have been secured would proceed in accordance with the contract plans and specifications. As built construction survey will be completed immediately after contractor completes all work. Close out of contract documents will be processed and final payment made to the contractor. Re-vegetation will be completed by Chelan County Natural Resources and US Fish and Wildlife staff. Native riparian vegetation will be planted in the disturbed sites to restore and enhance riparian habitat as well as minimize erosion and noxious weed establishment.

D. As-built drawings must be prepared if changes are made to the final design during construction and if the sponsor is using a design-build construction approach. Describe how you anticipate documenting as-built conditions.

Construction of the project will be under the inspection of the Contracting Officer. A complete

as-built survey will be completed immediately after construction is complete. Modern survey equipment will be used to determine final horizontal and vertical placement of the projects roadway and instream structures.

E. Describe other approaches, opportunities, and design alternatives that were considered to achieve the project's objectives and why the preferred alternative was selected.

Chelan County Natural Resources has explored alternatives to replacement of the existing structure with a bridge. Design options such as installing baffles, removing the bottom of the existing box culvert and constructing a roughened channel were studied. Backwatering is not considered feasible due to the steep gradient of Mill Creek. Any design that increases risk of a debris jam or scouring of the structure foundation would not be approved. The option to not provide temporary access during construction has been considered, but Mountain Home Road is managed by the Public Works Department and serves as a one way access to numerous single family residences as well as access to National Forest lands. Therefore, during project construction one way traffic will have to be maintained.

G. Have members of the community, recreational user groups, adjacent landowners, or others been contacted about this project? Describe any public safety or other concerns about the project raised from these contacts and how those concerns were or will be addressed.

Yes – see reference to road design above.

4. Project Development

A. Explain how the project's cost estimates were determined. Please include a detailed project cost estimate and attach in PRISM. Clearly label the attachment in PRISM "Cost Estimate."

Construction Cost Estimate - Mill Creek Culvert Replacement

Item	Unit	Quantity	Unit Cost	Total
PREPARATION				
Mobilization (incl. bid preparation work, pre-construction expenses, Spill Prevention and Control Plan, Temporary Erosion and Sediment Control plans preparation, bonding costs, compliance with prevailing wage rates, pre-bid walkthrough, hiring employees, purchasing materials.	LS	1	$22,000	$22,000
Clearing and Grubbing	AC	1.5	$2,000	$3,000
Removing Drainage Structures	LS	1	$6,000	$6,000
Care and Diversion of Stream	LS	1	$5,000	$5,000
GRADING & DRAINAGE				
Structure Excavation Incl. Haul	CY	250	$13	$3,250
Select Backfill	CY	130	$30	$3,900
Light Loose Rip Rap	TON	310	$50	$15,500
Shoring or Extra Excavation Class B	SF	400	$6	$2,400
STREAM RESTORATION				
Roughened Channel		1	$20,000	$20,000
Streambed Gravel	CY	160	$35	$5,600
STRUCTURE				
Temporary Bridge and Detour Road	LS	1	$25,000	$25,000
Gravel Backfill for Abutments	CY	75	$35	$2,625
Bridge Installation	LS	1	$86,000	$86,000
Abutment Footing	CY	53	$50	$2,650
SURFACING				
Crushed Surfacing Base Course	TON	175	$16	$2,800
Crushed Surfacing Top Course	TON	80	$16	$1,280
HMA	TON	90	$100	$9,000
TRAFFIC				
Beam Guardrail Flared Terminal	EA	4	$2,500	$10,000
Beam Guardrail Type Thrie Beam	LF	160	$150	$24,000
Beam Guardrail Transition Type 1	EA	4	$1,400	$5,600

Striping	LF	480	$0	$72
Traffic Control and Signage	LS	1	$8,000	$8,000
OTHER ITEMS				
Orange Barrier Fence	LF	220	$1	$110
Reinstall utilities	EA	1	$7,000	$7,000
Seeding & Mulching	AC	0.5	$2,000	$1,000
Plants	EA	3	$1,200	$3,600
SPCC Plan	LS	1	$1,000	$1,000
Design (provided by USFWS)				
Permitting	LS	1	$10,000	$10,000
Sub-Total (bid items includes wsst)				$286,387
Plans Specs Construction Administration (11%) Project Administration 30% Includes landowner coordination, topographical survey, engineering design, cultural survey, wetland delineation, schedule public meetings, travel to project site, contract preparation, advertising, pre-bid walk through, contract award, construction inspection, billing invoices, preparing as built plans, substantial completion and final acceptance, contract closeout documentation.				$31,503
Total Est. Project Cost				**$317,890**

PROPOSED PROJECT COST: **$317,890**

Costs for bridge construction were based on the 2009 replacement of the Sunitsch Canyon crossing (County road) by CCNRD as part of the Chumstick barrier removal project. CCNRD staff consulted with the County bridge engineer on our original estimate for the NNFP grant and made changes to reflect their feedback. Personnel estimates involve using the hourly rates for each staff person and the percentage of their time that is anticipated for that person per project.

B. Include a Partner Contribution Form (Appendix J), when required, from each partner outlining the partner's role and contribution to the project. Refer to Section 3 of this manual for information on when a Partner Contribution Form is required.

- Chelan County Natural Resource Department – Project Lead Sponsor
- U.S. Fish and Wildlife Service-NFFP funding and replacement bridge design.
- Chelan County Public Works Department- landowner/engineering review
- Yakama Nation – Completion of the Peshastin Creek Reach Assessment.

C. List all landowner names. If the proposed project occurs on land not owned by the grant applicant, attach a signed Landowner Acknowledgement Form (Appendix K) in PRISM, when applicable, from each landowner acknowledging that his or her property is proposed for SRFB funding consideration. Refer to Section 3 of this manual for information on when a Landowner Acknowledgement Form is required.

Chelan County Public Works owns the 60' wide ROW and all work will be completed within public ROW

5. Tasks and Schedule

A. List and describe the major tasks and time schedule you will use to complete the project.

PROJECT TIMELINE

Project Activity	**Anticipated Dates of Implementation**
Project Design	September, 2012– January, 2013
Permitting process	February, 2013– July, 2013
Pre-project monitoring	July, 2012 – August, 2013
In stream construction	August, 2013– September, 2013
Riparian Revegetation	September, 2013 – November, 2013
Post-project monitoring	1-year beginning September 2013

6. Constraints and Uncertainties

A. Each project should include an adaptive management approach that provides for contingency planning. State any constraints, uncertainties, possible problems, delays, or unanticipated expenses that may hinder completion of the project. Explain how you will address these issues as they arise and their likely impact on the project.

Supplemental Questions

2. **Fish Passage Projects** (Answer the following questions)

NOTE: For fish passage design and evaluation guidance, applicants should refer to the Washington Department of Fish and Wildlife's *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* at wdfw.wa.gov/publications/pub.php?id=00061, and the *Design of Road Culverts for Fish Passage* manual at wdfw.wa.gov/hab/engineer/cm/. For prioritization questions or technical assistance, contact Susan Cierebiej at Department of Fish and Wildlife at (360) 902-2561 or susan.cierebiej@dfw.wa.gov. For engineering design questions or technical assistance, contact Don Ponder at (360) 902-2547 or donald.ponder@dfw.wa.gov.

A. Information to include in item 1D above: Concisely describe the passage problem

(outfall, velocity, slope, etc). Describe the current barrier (age, material, shape, and condition). Is the structure a complete or partial barrier? Describe the amount and quality of habitat to open if the barrier is corrected.

The existing concrete box culvert was built by Public Works in 1955 with cast in place concrete. The structure measures 4-ft by 5-ft, 49-ft long with a 1.5% grade. The structure currently presents a total passage barrier at all flows due to a 2-ft outfall drop. Replacement of this structure will provide 2.2 miles of critical juvenile rearing habitat.

B. Project Design

i. If a culvert is proposed, does it employ a stream simulation, no slope, hydraulic, or other design?

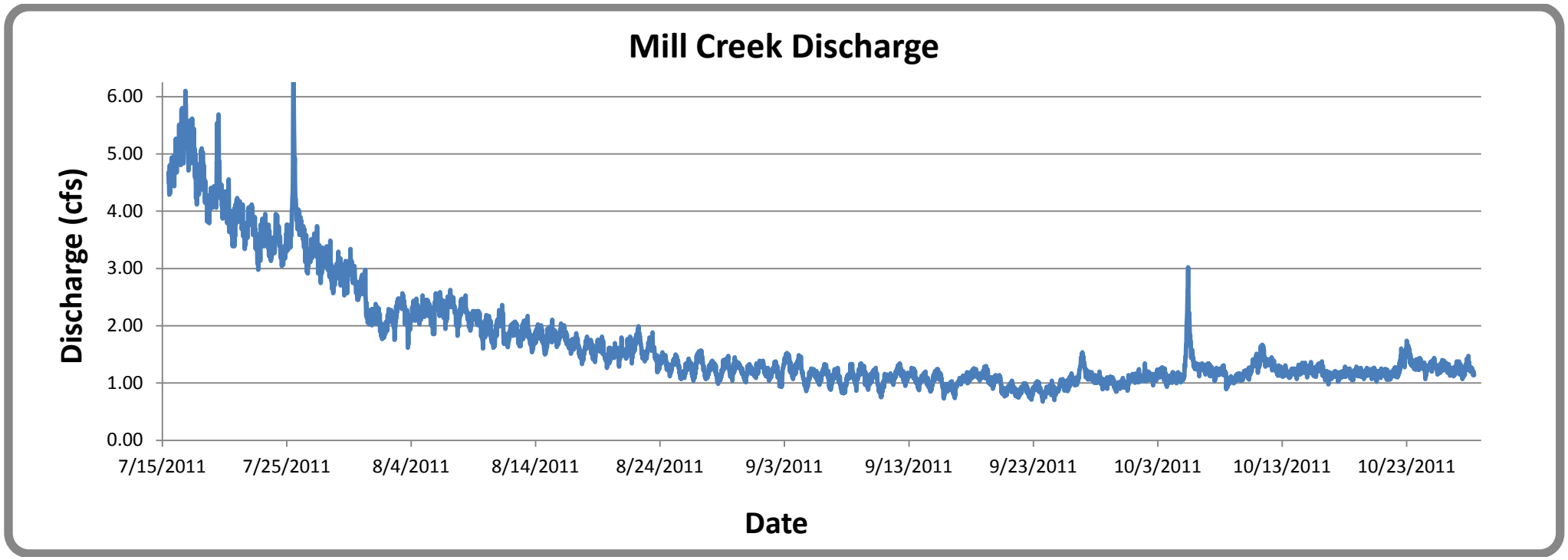
ii. Has the project received a Priority Index (PI) number? If so, provide the PI number and indicate the method used: Physical survey, reduced sample full survey, expanded threshold determination, or Washington Department of Fish and Wildlife generated PI (list source, such as a study or inventory).

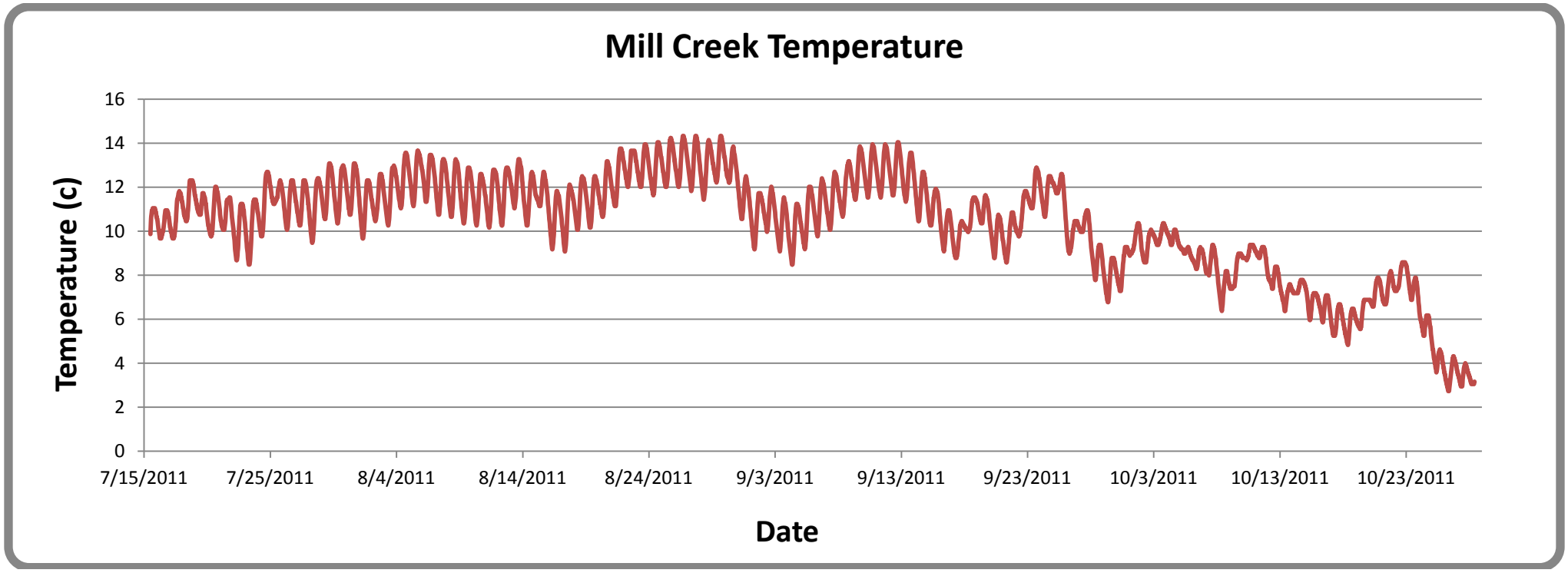
PI number total is 16.1

iii. Identify if there are additional fish passage barriers downstream or upstream of this project.
Yes, upstream of this barrier 2.2 miles there is another fish passage barrier.

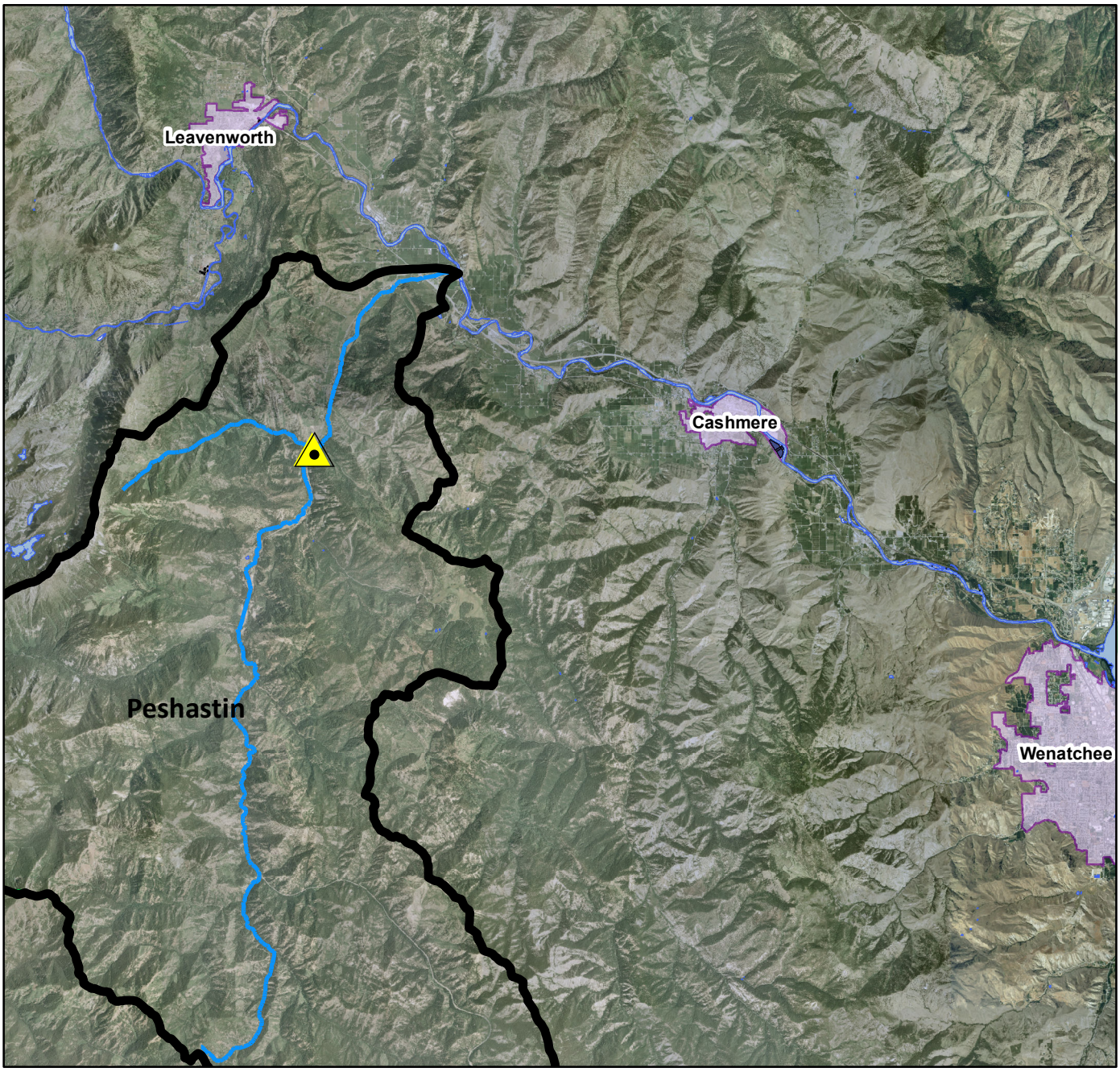
iv. Complete and attach the Barrier Evaluation Form and Correction Analysis Form. These forms are available in Appendix Q of this manual and on the RCO Web site at www.rco.wa.gov/doc_pages/app_materials.shtml#salmon.

See attached barrier form.


Mill Creek Discharge
Discharge (cfs)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
7/15/2011
7/25/2011
8/4/2011
8/14/2011
8/24/2011
9/3/2011
9/13/2011
9/23/2011
10/3/2011
10/13/2011
10/23/2011
Date


Mill Creek Temperature
Temperature (c)
16
14
12
10
8
6
4
2
0
7/15/2011
7/25/2011
8/4/2011
8/14/2011
8/24/2011
9/3/2011
9/13/2011
9/23/2011
10/3/2011
10/13/2011
10/23/2011
Date

Mill Creek/Mountain Home Ranch Road
Fish Passage



Legend

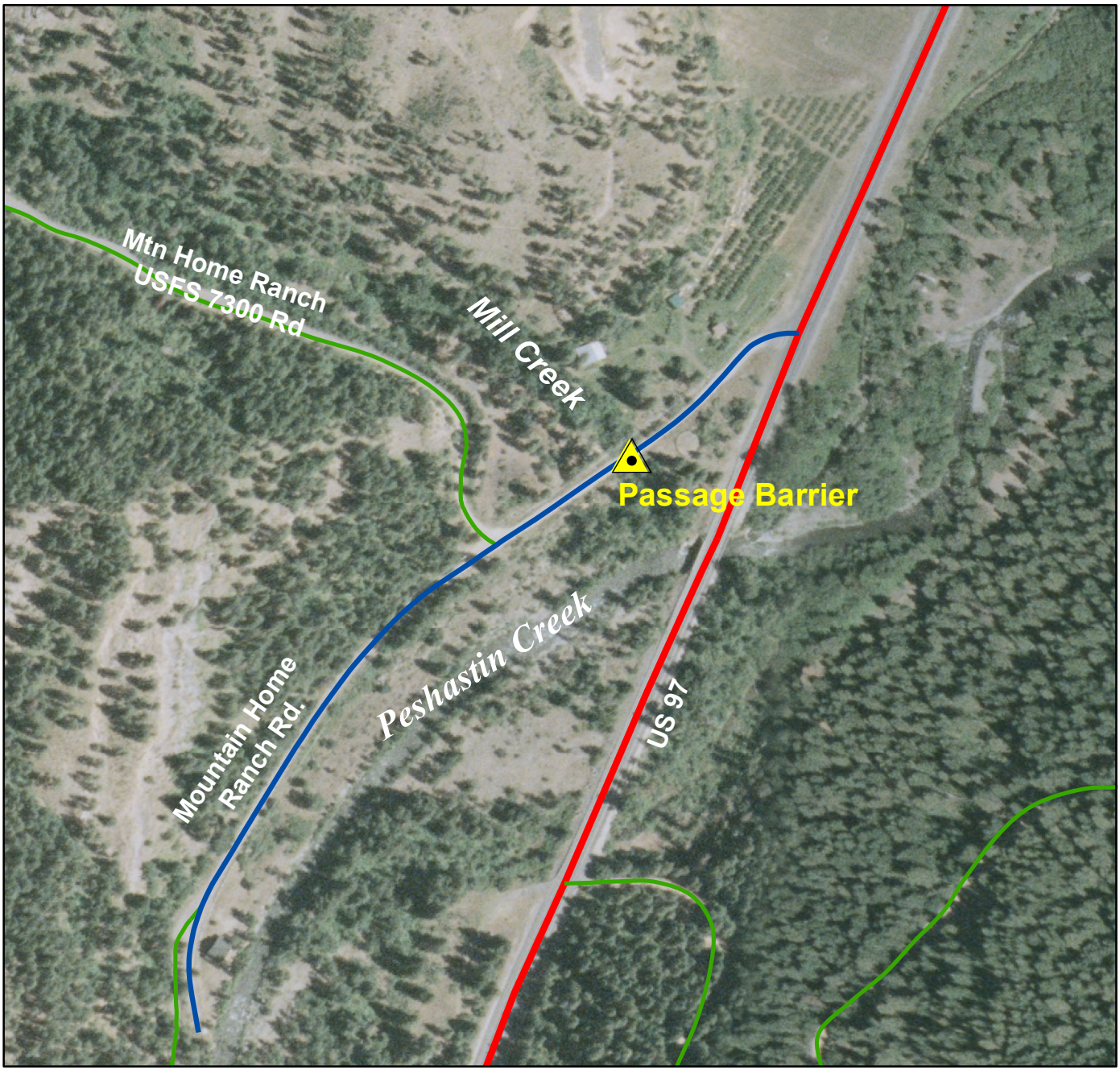
- Barrier Location
- Peshastin
- Stream
- City Limits

N

Map Scale: 1 inch = 14,900 feet

Cartography by
Chelan County Natural
Resource Department
February 2011

Mill Creek/Mountain Home Ranch Road
Fish Passage



Legend

- Barrier Location
- County
- Highway
- USFS

N

Map Scale: 1 inch = 300 feet

Cartography by
Chelan County Natural
Resource Department
February 2011

Mill Creek Photos from September/October 2010.

Box culvert at RM 0.1 on Mill Creek (Mountain Home Ranch Road).

Six log weirs on Mill Creek (Smith property) upstream of box culvert.

Diversion structure on Mill Creek (Smith property) at head of log weirs. Alan is standing on a chipped slab presumed to be part of historic dam.

Pool habitat at about RM 1.0 on Mill Creek, Oct. 1, 2010.

Small gravels in Mill Creek near RM 1.0.

Young riparian community and LWD on Mill Creek (about RM 1.2) in area where Rat Creek Fire and/or past logging reduced mature conifer/deciduous cover.

Barrier Evaluation Form - Single Culvert at Crossing

Location Information

Project Name: **Mill Creek**		SRFB Project #:	County: **Chelan**
HPA #:		Parcel #:	
GPS Location: Datum - WGS84 -decimal degrees		Latitude:	Longitude:
¼ Section:	Section:	Township:	Range: ☐ East ☐ West
Stream Name: **Mill Creek**		Tributary To: **Peshastin Creek**	WRIA #: **45**
Driving Directions:			

Landowner Information

Landowner:		Mailing Address:	
City:	State:	Zip:	Phone: ( )
Cell: ( )	Fax: ( )	Email:	
Landowner Agent:		Mailing Address:	
City:	State:	Zip:	Phone: ( )
Cell: ( )	Fax: ( )	Email:	

Evaluator Information

Evaluator Name: **Colin Forsyth**		Affiliation: **Bureau of Reclamation**	
Mailing Address: **301 Yakima St., Room 319**		City: **Wenatchee**	State: **WA** Zip: **98801**
Phone: **509-703-8320**	Fax:	Cell:	Email: **cforsyth@usbr.gov**

Barrier Information (measurements in meters)

Is the stream fish-bearing? ☐ Yes ☐ No ☒ Unknown		Species:	Date of Visit: 06/15/2011
Fish-bearing criteria: ☐ Fish Observation ☐ Stream Type ☐ SASSI/Stream Catalog ☐ Physical Criteria ☐ Other:			
Stream flow: ☐ Perennial ☐ Intermittent ☒ Unknown Source of information:			
Will this culvert be entered into the WDFW-FPDSI (formerly SSHEAR) database? ☐ Yes ☐ No If yes, Site ID #:			
Shape: **BOX**	Material: **PCC**	Apron: ☐ None ☐ Upstream ☐ Downstream ☒ Both	Span: **1.6m**
Rise: **1.27m**	Length: **14.55m**	Water Depth in Culvert: **0.089m**	Water Surface Drop: **.635m**
Drop Location: ☒ Outlet ☐ Inlet ☐ Inside		Countersunk: ☐ Yes ☒ No ☐ Unknown	Culvert Slope(%): **2.99**
Bankfull Width (outside influence of culvert): **2.67m**		Culvert Span/Bankfull Width Ratio: **0.64**	
Plunge Pool: Length (culvert to tail-out): **4.42m** OHW width: **2.67m** Max depth: **0.635m**			Road fill DS: **1.20m** Road width:
Fishway Present? ☐ Yes ☒ No (if yes, describe in Comments)		Tide gate Present? ☐ Yes ☒ No ☐ Unknown	
Is this culvert a fish passage barrier? ☒ Yes ☐ No ☐ Unknown ☐ Level B needed			
Problem with culvert: ☒ WS drop ☒ Slope ☐ Velocity ☐ Depth		Percent Passability: ☐ 0% ☒ 33% ☐ 67% ☐ 100%	
Habitat Quality: ☐ Excellent ☐ Good ☐ Poor ☒ Unknown			
Comments(Describe crossing condition, fish observations, habitat quality etc):			