

**Centralia and Chehalis
Area
Tributaries
Culvert Assessment**

Water Resource Inventory Area 23



Lewis County Conservation District

Final Report

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Introduction

Dillenbaugh, Salzer and China Creeks are in the Centralia and Chehalis area, which is located in Lewis County, Washington, WRIA 23. Culverts, if improperly installed or deteriorated over time, can prevent or limit the ability of adult and juvenile salmonids to access all habitats. Coho salmon, searun cutthroat, and steelhead travel up into the smaller streams and are therefore more likely to be impacted by blocking culverts. It is important that fish have access to all habitats to spawn, elude predators, find food, and escape high flows. However, a complete database that listed all the culverts in the system did not exist. Therefore, the Lewis County Conservation District undertook the task of finding and evaluating culverts. The data that was acquired was combined with existing information to make a complete map and database. This project was funded by a grant from the Washington State Salmon Recovery Funding Board.

Scope

The purpose of this survey was to identify all culverts on type 1-4 streams, in the Centralia and Chehalis area. This survey involved obtaining information from private landowners, timber companies, Lewis County Public Works, and the Washington State Department of Fish and Wildlife. The final goal of the project was to produce a single map detailing all culverts as, passable, impassable or of unknown barrier status.

Survey Methods

Initial Landowner Contact

Initially, streams typed 1-4 were identified in the Centralia and Chehalis area. A list of landowners along these streams was generated using information from the Lewis County Assessor's office. All identified landowners were sent a letter explaining the survey and that district personnel would be contacting them at their residence. If a landowner was not at home an attempt was made at contacting them via telephone. Agencies were contacted via telephone or e-mail. In addition, research was conducted at the Washington State Archives to locate Hydraulic Permit Applications (HPA's) to further identify landowners that might have culverts.

Level 'A' Analysis

Surveying the culverts was completed according to Washington Department of Fish & Wildlife (WDFW) protocol using the *Fish Passage Barrier Assessment and Prioritization Manual* of the Salmonid Screening, Habitat Enhancement, and Restoration (SSHEAR) Division (August 2000). The data was collected on the Site Identification Field Form and the Culvert Evaluation Field Form. Site location was established by the use of a backpack mounted Trimble GPS receiver. Culvert lengths and slopes were obtained using a hand held laser level with a reflector mounted on a survey pole. Other data was obtained using normal field practices.

Level 'B' Analysis

A level B survey analysis was conducted when level A analysis did not clearly distinguish barrier status. A Level B Analysis Elevations Worksheet was completed in the field. The WDFW protocol was used to perform a site evaluation. A transit was used in conjunction with a rod and reflector to complete cross sections and to determine culvert elevations. In the office, the Level B 2.3 Barrier Analysis spreadsheet was used to determine fish passage status.

Previously Surveyed Culverts

Information on culverts underneath county roads was obtained from Lewis County Public Works. County culverts were surveyed using WDFW guidelines. The District re-surveyed some of the higher priority unknown barrier status county culverts to determine passability. WDFW provided additional data on Lewis County road culverts.

Other Survey Methods

Not all landowners replied to our request to survey their culverts. Aerial photos were viewed to determine locations of crossings. In areas where the stream could be seen from the road, windshield assessments were performed to detect the presence or absence of culverts. If culverts were observed the field forms were filled out with as much detail as possible. In addition, information was obtained from other local landowners. If we could not actually evaluate the culvert, it was listed as unknown barrier status. Overall, the majority of landowners allowed access to their properties for our survey.

Results

Sub-basin	Impassable	Passable	Unknown	Totals
<i>Dillenbaugh Creek</i>	12	11	0	23
<i>Salzer Creek</i>	23	14	5	40
<i>China Creek</i>	4	8	5	17
Totals	39	33	10	82

When culverts are evaluated they fall into the categories of impassable, passable or unknown, based on the ability to pass a 6 inch trout. If a culvert is rated impassable it is not necessarily a total barrier to fish passage. It can be causing a delay or limiting a certain lifestage of the salmonid. A passable culvert allows the 6 inch fish to pass the culvert at all times. Unknown culverts were unable to have barrier status determined.

Centralia & Chehalis Area Tributaries

Sub Basins

Dillenbaugh Creek

Dillenbaugh Creek flowed through a swampy area near the City of Chehalis before dumping into the Chehalis River near I-5 exit 77. The swamp accumulates storm water runoff from the City. The riparian buffer of this formally agricultural section consisted primarily of canary grass. The stream then crossed underneath an I-5 overpass and coursed parallel to I-5. Near where Berwick Creek branched off, the narrow riparian buffer was fenced to prevent animal access.

Upstream from Berwick Creek, the Dillenbaugh flowed through an industrial park. The riparian buffer consists of deciduous trees and canary grass. Beavers had been active in this area creating dams. Above Jackson Highway the stream paralleled Sanderson Road. As the creek moved away from the road it meandered through a mixture of forest and agricultural lands. Culvert 1302W02A was also blocking a small tributary that flowed primarily through forest land. Culvert 021(40051)(01423) was blocking a small tributary. Spot checks revealed high quality spawning gravel for most of Dillenbaugh Creek above Jackson Highway.

In the lower reaches of Berwick Creek the riparian buffer was narrow and consisted of scattered deciduous trees and shrubs. The proximity to roads and houses would limit the width of a buffer. Between Hamilton Road North and I-5, Berwick Creek had little room to meander. The stream crossed underneath I-5 through blocking culvert 994286. Above, barrier culvert 021(40077)(00103), the stream closely paralleled Logan Hill Road. The riparian buffer in this reach had a few open areas but was generally forested. Culvert 1302W12E, located on a private driveway, was a barrier to juvenile fish. The landowner had a keen interest in improving his culvert and stated that coho often spawned on his property.

Past blocking culvert 021(40077)(01126), the stream moved away from roads and through a mix of agricultural and forest lands. In this area a small tributary branched off that had three impassable culverts. Due to the stream flowing in the ditch along Logan Hill Road, repairing the culverts would result in little habitat gain.

Culvert 021 (40077)(00815), underneath Pattee Road, was a major obstacle to all life stages due to an outfall drop and sheet flow. Above blocking culvert 021(40077)(03671), the stream quickly diminished. Spot checks revealed that Berwick Creek had excellent spawning gravel for much of the basin except in the lower reaches.

Salzer Creek

Salzer Creek is an example of a stream that has been highly impacted by human activities. The stream flowed into the Chehalis River in an agricultural area between the cities of Centralia and Chehalis. Near Chehalis, a large dike prevented Salzer Creek floodwaters from entering the Southwest Washington Fairgrounds. Trees had been planted in this area in an attempt to establish a quality buffer. The stream then skirted Chehalis. Above the City, the stream flowed through another agricultural area. Culvert 021(15781)(00325), underneath Fair St., blocked a small tributary. A livestock containment area was located near the confluence of an unnamed tributary that flowed parallel to Centralia Alpha Road. Two blocking culverts existed on this stream. Above this point the majority of Salzer Creek was fenced where livestock were present. An unnamed tributary flowed parallel to Salzer Valley Road. It flowed through agricultural lands with the headwaters in timberlands. Neighbors stated that they had regularly seen coho spawning where the stream flowed down the ditch. Other areas that were checked had no spawning gravel. The riparian area in the agricultural areas was poor with animal access present. Four blocking culverts were present with the most significant being culvert 021(150051)(03086). Two culverts were observed from the road in a field;

however, the landowner would not allow us to survey them. It is doubtful that the culverts were significant blockages due to the low gradient of the stream in this area.

An unnamed tributary that paralleled Reinke Road flowed primarily through areas of houses and agricultural lands. Four blocking culverts existed along its length with the lowest in the system being culvert 021(15080)(00490). Culvert 1402W24A was the most significant blockage due to a 1.5 m outfall drop. Culvert 021(15080)(00292) was blocking a small tributary to this stream.

A small tributary to Salzer Creek that paralleled Salzer Road had three barrier culverts. However, the stream was disconnected from the mainstem and flowed primarily down the road ditch. A landowner in the area said it was spring fed and flowed all year.

Culvert 021(15050)(02675) was blocking a small tributary. No impassable culverts were present on Salzer Creek. Historically, logging in the headwaters has impacted the mainstem negatively. New logging rules will allow the stream to recover but it will take many years. Overall, improving the riparian buffer and excluding livestock would improve this system.

Coal Creek, a major tributary to Salzer Creek, had been ditched to parallel National Avenue. The riparian in this area consisted of ash trees. The stream then flowed through a business district. Above National Avenue, the stream flowed through a former agricultural area. The riparian was primarily canary grass with a few scattered trees. Culvert 1402W27A was a blockage on an unnamed tributary. This culvert, located on forest land, was slated to be fixed. Barrier culverts existed on three small tributaries to Coal Creek but fixing them would open up only small areas of habitat.

The first barrier on Coal Creek was culvert 1402W28A. Although the culvert had bed material throughout, it was undersized. This resulted in it being a velocity barrier to juveniles and resident fish at certain times of the year. Culvert 1402W34B, was a bottomless arch that replaced a barrier culvert in the summer of 2000. The old plunge pool was modified with a series of log and rock weirs. The current landowner has committed to maintaining the fishway. The upper watershed was primarily forest and the riparian was in better condition.

China Creek

China Creek, which flowed through the City of Centralia, is an example of a stream that has been highly impacted by urbanization. Garbage, including tires, car batteries, a bicycle and numerous other items were present in the stream. A few people were dumping their lawn clippings in or near the stream. The riparian buffer was sparse throughout the City with only a few areas shaded by trees. Reed canary grass choked the stream in most reaches prompting a lady to ask if we were planning on weed whacking it to make the water flow better. Water temperatures were generally warm which contributed to the proliferation of sticklebacks. Bullfrog tadpoles were also present in large numbers. The stream bank had been armored for most of the City limits. A significant portion of the stream coursed underneath buildings and roads. Culvert 1402W08A was a partial blockage located underneath Plum St. Just before The Chronicle building, located on Pearl Street, the stream goes underneath the City for 211 meters.

Recently redone, this concrete structure appears to be passable to fish although a complete assessment was not made. Throughout the passageway, juvenile coho were present by the hundreds. Above the City, no fish were observed. After China Creek reemerged it flowed through a channelized area with no valuable habitat. A small area of spawning gravel existed where the stream paralleled Gold Street.

Just before the old Agnew Mill ponds, a tributary branched off to the east. It was primarily a mud bottom stream that had little fish habitat. The first reaches consisted of a large swamp which would have some value for rearing. The headwaters flowed through an open area with no riparian buffer. The stream was choked with canary grass and had little value to fish. The barrier status of three culverts was unable to be determined. Culvert 1402W04B, was a blockage but little habitat existed above this site.

The Agnew Mill ponds provided valuable rearing habitat and were the only places in the system where resident trout could survive the summer low flow period. Above the ponds, the channelized stream flowed through a small residential area where willows provided some shade. The stream then flowed parallel to Little Hanaford Road. A berm of dredge spoils separated the stream from the roadside ditch. A mix of conifer and willow trees had been planted on the spoils to help shade out canary grass. One of the culverts underneath Mc Atee Road was a slope barrier making the site a blockage. Above this site beaver activity had created a swamp. Near Loop Road, gravel had washed into the stream from the road creating a potential spawning area. Level B's could not be performed at two sites causing the barrier status to be unknown.

Priority Index

The amount of culverts that need to be replaced or upgraded in Washington State will probably be enormous. Therefore, the SSHEAR priority index method was developed to determine the culverts that would most benefit fish by being replaced. The priority index takes into account the quantity and quality of the upstream habitat. It considers fish usage and the condition of the stock. The cost of replacement is also taken into consideration.

To determine the priority index for one dam on China Creek a full survey assessment was performed. A 20% sampling rate was used where 60 meters out of every 360 meters were sampled. Reaches were areas where the habitat was similar. Reach breaks were made when the habitat changed significantly or a man made barrier was encountered. Pools, riffles and ponds were measured and documented. An estimation of the percent boulder, rubble, gravel and sand was made. A gradient measurement was made with a clinometer. A hip chain was used to measure the length of the stream reaches. After all the field data was collected, the data was analyzed to determine the amount of usable habitat. The results were used to calculate a priority index number.

Dam 994294

Priority Index 19.95

At river mile .07 a large concrete slab, the purpose of which was unknown, formed a dam in China Creek. A drop of 1.3 meters resulted in this structure receiving a passability rating of zero. However, anadromous fish could pass over during high water events as evidenced by the numerous juvenile coho observed above. A total of 7231.92 linear

meters of China Creek and one tributary was surveyed. The majority of the 2665.8 square meters of spawning habitat was within the City limits. Rearing habitat was spread throughout the basin with 13035.33 square meters present.

Conclusion

The culvert survey of the Centralia and Chehalis area tributaries revealed that almost 49% of culverts were impassable. The most significant impassable culverts existed underneath public roads. The county and state are working on a long-range plan to fix impassable culverts. The timber companies are required by law to complete a road management plan that includes fixing barrier culverts by July 2016. Also, a fair amount of blocking culverts existed on private land. Habitat restoration and some culvert replacement projects in the Centralia and Chehalis area tributaries would significantly improve habitat for anadromous fish. However, some of the impacts of urbanization can not be undone. Cleaning garbage of the streams will help but runoff from the numerous impervious surfaces would be difficult to control. Limited room existed along the streams in the cities to plant a riparian buffer. China Creek was the most impacted in these regards. Overall, concentrating on reaches of the streams above the cities would have the greatest benefit.

References

1. ***Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual.*** Washington Department of Fish and Wildlife Habitat Program Environmental Restoration Division. Salmonid Screening, Habitat Enhancement, and (SSHEAR) Section. August 2000
2. Phinney, Lloyd and Bucknell, Patrick. ***A Catalog of Washington Streams and Salmon Utilization. Volume 2 Coastal Region.*** Washington Department of Fisheries. November 1975
3. Ringen, Pete, et al. ***Culvert Inventory and Assessment, Lewis County, Washington.*** County Road Project No. 1998 March 2002 Lewis County, WA
4. Washington State Department of Natural Resources, Central Region, 1405 Rush Rd., Chehalis, WA 98532.