

South Bank Tributaries Culvert Assessment

Water Resource Inventory Areas 22 & 23



Lewis County Conservation District

Final Report

By: Kelly Verd
June 2009

Funded by:
The Washington State Salmon Recovery Funding Board &
The Chehalis Fisheries Restoration Program of the United States Fish and Wildlife Service

Table of Contents
South Bank Tributaries Culvert Survey

Introduction	4
Scope	5
Survey Methods	5
<i>Initial Landowner Contact</i>	5
<i>Level 'A' Analysis</i>	5
<i>Level 'B' Analysis</i>	5
<i>Previously Surveyed Culverts</i>	6
<i>Other Survey Methods</i>	6
Results	6
South Bank Tributaries Watershed	7
<i>Sub Basins</i>	7
<i>Davis Creek</i>	7
<i>Rock Creek</i>	7
<i>Gaddis Creek</i>	7
<i>Eaton Creek</i>	8
<i>Delezene Creek</i>	8
<i>Workman Creek</i>	8
<i>Unnamed Tributaries</i>	9
<i>Priority Indexes</i>	9
<i>Dam 1706W28A</i>	9
<i>Culvert 1705W28A</i>	10
<i>Culvert 1706W11A</i>	10
<i>Culvert 1706W27A</i>	11
<i>Culvert 1705W19A</i>	11
<i>Culvert 1706W10C</i>	11
Conclusion	12
References	13

Appendix

*Access Database-Lewis County Conservation District Culverts Only
South Bank Tributaries Culvert Assessment Map*



Introduction

This survey includes westside tributaries that all flow underneath South Bank Road and Lambert Road between Oakville and Satsop in Grays Harbor County, Washington, WRIA 22. 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, chum, 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 and the Chehalis Fisheries Restoration Program of the United States Fish and Wildlife Service.

Scope

The purpose of this survey was to identify all culverts on type 1-4 streams in Grays Harbor County. A few type 9 streams were included if they met the physical requirements for fish bearing. This survey involved obtaining information from private landowners, timber companies, the Department of Natural Resources, and the Washington State Department of Fish and Wildlife (WDFW). 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 area and a list of landowners along these streams was created. 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.

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 handheld Garmin GPS unit. Culvert lengths and slopes were obtained using a transit 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. WDFW completed a level B for culvert 1705W19A.

Previously Surveyed Culverts

Data for culverts on forestland was obtained from the Road Maintenance Abandonment Plan (RMAP) that is available from the Department of Natural Resources(DNR). WDFW completed a habitat survey on Davis Creek and provided data for some of the culverts on the stream. The county road culverts were resurveyed as most of the data was old and incomplete. Most culverts in the basin had not been surveyed.

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>Davis Creek</i>	5	1	0	6
<i>Rock Creek</i>	3	2	0	5
<i>Gaddis Creek</i>	2	3	1	6
<i>Eaton Creek</i>	1	2	0	3
<i>Delezene Creek</i>	10 1 dam	2	0	12 1 dam
<i>Workman Creek</i>	7	2	0	9
<i>Unnamed Tributaries</i>	8	1	1	10
Totals	36 1 dam	13	2	51 1 dam

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.

South Bank Tributaries Watershed

Sub Basins

Davis Creek

Below South Bank Road, Davis Creek flowed through open fields and the riparian consisted primarily of canary grass and deciduous trees. Above the road, the stream meanders through forestlands. Culverts 1605W36A and 1605W36B were both partial barriers that impede access to high quality forested stream habitat. Davis Creek provides important spawning and rearing areas for coho, searun cutthroat and steelhead. Chum were also present historically.

Rock Creek

Culvert 1605W17A was partially blocking a small tributary to Rock Creek. Two culverts were located on tributaries to Williams Creek. Culvert 1605W20B was partially blocking access to off channel rearing habitat. Culvert 1605W20A was only 33% passable due to an outfall drop.

The lower reaches of Rock Creek flowed primarily through agricultural lands. The upper reaches were in timberlands. A waterfall on the mainstem, possibly caused by poor logging practices in the past, was a complete barrier to fish. The riparian buffer width was limited by the proximity to Langabeer Road but was otherwise in good condition.

The riparian buffer width of Williams Creek was limited by the proximity to Williams Creek Road and consisted of canary grass, deciduous trees and shrubs, and scattered conifers. The upper basin was located in timberlands. Fish utilizing the basin include coho, searun cutthroat, chinook and steelhead.

Gaddis Creek

Culvert 1705W28A, located underneath South Bank Road, was partially blocking a significant amount of habitat. A stream survey was completed for this culvert and more information is available in the priority index section of this report. Downstream of the

culvert the stream had been ditched extensively in the past. The stream could possibly flow two directions including the way it is currently mapped. The other direction is through passable culvert 1705W28B. However, no defined channel existed either way and no water was present for a significant section below South Bank Road. Abundant water was present above the road and salmon are able to access the stream during Chehalis River flood events.

Eaton Creek

Culvert 1705W19A, located underneath South Bank Road, was partially blocking a significant amount of habitat. A stream survey was completed for this culvert and more information is available in the priority index section of this report. Downstream of this culvert the stream flowed an agricultural area. The landowner would not allow access to their property but it appeared that no crossings were present. The riparian buffer was poor and it appeared that animal access was present. One passable culvert was located in the forestland upstream of South Bank Road. Culvert 1705W19B was a newly installed culvert underneath South Bank Road that allowed fish access to an unnamed tributary.

Delezene Creek

Delezene Creek flowed parallel to Delezene Road and logging roads for the majority of its length which limited the width of the riparian buffer. In the lower reaches, houses and agriculture encroached on the stream. The upper reaches were in timberlands with a high quality buffer in most places that was limited by the proximity to the road. Some open areas of canary grass and beaver activity were present. Fish utilizing the basin include coho, chum, sea run cutthroat, and steelhead with chinook utilizing the lower reaches. Culverts 1706W24A and 1706W24B were completely impassable culverts located on small streams. The first culvert had some upstream habitat but replacing the culvert would be cost prohibitive. The second culvert only had a negligible amount of upstream habitat and would not be worth replacing. Culverts 1706W26A and 1706W27A were both partial barriers that were blocking small tributaries that appeared to have quality habitat. Five barriers were located in timberlands. Forestry regulations mandate that these culverts be replaced by 2016. Several forestry culverts had been replaced with passable culverts or bridges. Dam 1706W28A was an old dam that had mainly the frame left so it was rated as 67% passable. A waterfall just below the old dam had been blasted historically to allow fish passage. Stream surveys were completed above culvert 1706W27A and dam 1706W28A and more information is available in the priority index section of this report.

Workman Creek

Workman Creek closely paralleled Workman Creek Road and logging roads in the lower reaches. The riparian buffer was narrow and consisted primarily of deciduous trees and canary grass. The lower reaches had some agricultural and a few rural residences but

the majority of the basin was in timberlands. Seven barrier culverts existed on side tributaries. Fish utilizing the basin would include coho and sea run cutthroat.

Unnamed Tributaries

Two unnamed tributaries flowed underneath South Bank Road. The first flowed through impassable barrier culvert 1706W11A underneath Taylors Ferry Road. Barrier culvert 1706W11C was located just upstream underneath an abandoned section of the county road. Underneath South Bank Road, culvert 1706W11B was of unknown barrier status due it being bottomless halfway through. It was most likely passable. Two barrier culverts were located in the forestlands near the headwaters. The next unnamed tributary had impassable culvert 1706W10C at the mouth. Two other barrier culverts were located on this stream. Fish utilizing these tributaries would include coho and searun cutthroat. Habitat surveys were completed for culverts 1706W11A and 1706W10C and more information is available in the priority index section of this report.

Priority Indexes

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 five culverts, 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 1706W28A Priority Index 34.71

Located on Delezene Creek, this remnant dam was 67% passable. An old concrete frame was present but the boards that were used to back up water were no longer in place. Removal of this fish passage barrier would greatly benefit this high quality stream. Fish that would utilize the section of stream above the culvert include coho, searun cutthroat, resident trout and chum.

Due to a low gradient and high quality spawning habitat, chum could be expected to utilize the stream to the vicinity of culvert 1314. The remainder of species would be

expected to use the majority of the stream. The survey on the mainstem was ended when the stream became less than .6 meter wide.

A total of nine tributaries contributed to the abundant fish habitat. Tributary C contributed the greatest amount of habitat. However, the gradient of the upper reaches increased to the point that only resident fish could be expected to utilize the headwaters. The survey on tributary C ended in a steep canyon at an impassable waterfall.

Overall a total of 14,994.8 linear meters of stream was surveyed. Although some areas in the basin had been scoured to bedrock, spawning habitat was abundant with 16,913.49 square meters was present. Rearing habitat was also abundant, although some areas had poor instream cover. A total of 27,631.56 square meters of rearing habitat was available.

Culvert 1705W28A Priority Index 26.91

This 67% passable culvert was located underneath South Bank Road on Gaddis Creek. Part of the culvert had been replaced but the lower section was decaying and was undersized as illustrated by the plunge pool that was present. Fish that would utilize the stream would include coho, chum, resident trout, steelhead and searun cutthroat. A chum carcass and an unidentified fish head were observed in the basin.

Above the culvert and below the passable culvert underneath Russell Road the stream had been ditched historically. The riparian buffer was narrow and consisted primarily of scattered trees, blackberries, and canary grass. Above Russell Road the riparian buffer was still of poor quality for a short ways until it entered the timberlands. A total of 10382.3 linear meters of stream was surveyed including 10 tributaries. Spawning area was abundant with 15112.61 square meters available. Rearing habitat was more limited with only 8812.4 square meters present. Limiting factors included shallow pools and increasing gradient in the headwaters. Tributaries also tended to quickly become steep with abundant bedrock. Tributary C had a bedrock cascade at 498 meters that was rated as being passable to only steelhead and searun cutthroat. Recent heavy rains and flooding had scoured the streams in several areas and created debris torrents and landslides throughout the timberland area. This resulted in high instream cover from abundant large logs. It appeared that beavers had been trapped out but that they were returning. This should help to increase the rearing habitat.

Culvert 1706W11A Priority Index 18.96

This smooth concrete culvert, located underneath Taylors Ferry Road, was rated as completely impassable due to a .55 meter outfall drop. Just over 200 meters upstream was 67% passable barrier culvert 1706W11C. This crossing was an old abandoned section of county road. Culvert 1706W11B, located underneath South Bank Road, was rated as unknown. However, the water in the culvert was deep and halfway through the pipe it turned into a bottomless arch so it would probably be passable most of the time. Culvert 0526 was a partial barrier located in forestland.

Overall, a total of 4642.5 linear meters of stream was surveyed including four small tributaries. Tributary A had old puncheon 1706W14A located near the headwaters.

Quality spawning was present with 3722.02 square meters. Beaver activity contributed to the 8455.88 square meters of rearing habitat available.

Culvert 1705W27A Priority Index 15.22

This 67% passable smooth concrete culvert was located underneath Delezene Road on an unnamed tributary to Delezene Creek. This stream provided excellent fish habitat and several resident trout were observed along with a few juvenile coho. The stream meandered through forestland and no other culverts were present. A buffer had been left along the stream after logging however, most of it had blown down into the stream. This provided excellent instream cover for most reaches. Spawning habitat was limited with only 373.87 square meters present. Although rock was present in the riffle areas, a portion of it was too large to be used for spawning. In the lower reaches there were several areas that had been scoured to bedrock. Rearing habitat was abundant due to beaver activity with a total of 5840.16 square meters present. Overall, a total of 2219 linear meters of stream was surveyed including 2 tributaries.

Culvert 1706W19A Priority Index 13.55

This 67% passable culvert was located underneath South Bank Road on Eaton Creek. Fish that would utilize the stream would include coho, chum, resident trout and searun cutthroat. The first reaches flowed through an open rural residential area. The riparian buffer was narrow and reed canary grass was abundant. The landowner is open to restoration opportunities and has attempted to establish more trees along the stream. Upstream of this area the stream flows through timberlands. The stream in this area was a mix of beaver ponds and rocky reaches. Spawning habitat was limited by the large size of the majority of the rock with only 342.1 square meters present. Rearing habitat was more abundant with 2243.99 square meters present. A total of 1240.6 linear meters of stream was walked. The survey was ended at an 2.8 meter tall impassable waterfall. No plunge pool was present below the falls to allow fish to attempt to navigate the barrier.

Culvert 1706W10C Priority Index 10.57

This smooth concrete culvert, located underneath South Bank Road, was rated as 0% passable. The lower part of the stream flows through a deeply incised area. The high banks along with deciduous trees and shrubs provided adequate cover. The headwaters of the stream were more open with canary grass cover. Beavers had been in the stream in the past but appeared to currently be absent. Fish utilizing this stream would include coho, steelhead, searun cutthroat and resident trout. A total of 1247.5 linear meters of stream was surveyed. Spawning habitat was abundant with 794.26 square meters present. Rearing habitat was also abundant with 1340.19 square meters available. Unfortunately, this high quality stream had three additional barrier culverts.

Conclusion

The culvert survey of the South Bank tributaries revealed that 67% of culverts were impassable. The most significant impassable culverts existed underneath public roads and in forestland. 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. Only a few barriers existed on private land. Habitat restoration and culvert replacement projects underneath the county roads in the basin would significantly improve habitat for anadromous fish.. In conclusion, culvert replacement projects in this basin would open up significant habitat for anadromous fish.

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. Washington State Department of Natural Resources, P.O. Box 280, Castle Rock, WA 98611-0280***
- 4. Personal Communication with Dave Collins and Laura Till. Washington Department of Fish and Wildlife. 600 Capitol Way North, Olympia, WA 98501-1091***