

Independence and Garrard Creek Watersheds Culvert Assessment

Water Resource Inventory Area 23



Lewis County Conservation District

Final Report

By: Kelly Verd
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Table of Contents

Independence and Garrard Creek Watersheds Culvert Survey

Introduction	3
Scope	4
Survey Methods	4
<i>Initial Landowner Contact</i>	4
<i>Level 'A' Analysis</i>	4
<i>Level 'B' Analysis</i>	4
<i>Previously Surveyed Culverts</i>	5
<i>Other Survey Methods</i>	5
Results	5
Independence and Garrard Creeks Basin	5
Sub Basins	5
<i>Independence Creek</i>	5
<i>Garrard Creek</i>	7
<i>Unnamed Tributaries</i>	8
Priority Indexes	8
<i>1504W30A</i>	9
<i>1505W25A</i>	9
Conclusion	9
References	11
Appendix	
<i>Access Database-Lewis County Conservation District Culverts Only</i>	
<i>Independence and Garrard Creeks Culvert Assessment Map</i>	
<i>Excel Database-All Culverts (On CD version only)</i>	



Introduction

Independence and Garrard Creeks are located in Lewis, Thurston and Grays Harbor Counties, 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 Independence Creek and Garrard Creek basins. 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 Independence Creek and Garrard Creek basins 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. 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 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. 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 Lewis County roads was obtained from Lewis County Public Works. Information on culverts underneath Thurston County roads was obtained from Thurston County Public Works. The District re-surveyed some of the higher priority unknown barrier status county culverts to determine passability. WDFW provided additional data on 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>Independence Creek</i>	23	17	3	43
<i>Garrard Creek</i>	15	8	0	23
<i>Unnamed Tributaries</i>	2	0	0	2
Totals	40	25	3	68

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.

Independence Creek and Garrard Creek Basins

Sub Basins

Independence Creek

Independence Creek closely paralleled Independence and Garrard Creek Roads for most of its length. The basin was primarily agricultural with forestlands in the headwaters. Over the course of this survey, numerous juvenile coho were observed in the mainstem. Historically, chum utilized this low gradient stream. Several of the unnamed tributaries in this system could also support anadromous fish.

Several bridges were used to cross the mainstem. Although not abundant in this basin, culverts were highly impacting fish. Culverts 1504W30A and 1505W25A, both located

on small forest owner land, were blockages on the mainstem. More information on both these culverts is available in the priority index section of this report.

The first drainage and its tributaries that connected to Independence Creek were a vital part of this basin. Above the confluence with Independence Creek the stream was a large swamp. The proximity of the swamp to Independence Creek and the Chehalis River made it especially important for rearing habitat. A tributary branched off from the swamp towards the southeast. The lower reaches of the stream were in a designated agricultural area. Animal access to the stream was present but most landowners had the animals excluded. The rest of this tributary was in timberlands. On an unnamed tributary, culvert 1504W14A was primarily a juvenile barrier. Just upstream, culvert 1504W14B was of unknown barrier status due to us not being allowed access. Over half a mile of habitat existed above this site.

Above the swamp the main unnamed tributary to Independence Creek flowed between timberlands and agricultural lands. Livestock were accessing the stream in several places. Where the stream closely paralleled Michigan Hill Road the riparian zone was narrow. Above this area, the stream was swampy with a large amount of beaver activity. Cattle had previously grazed the area but the current land occupants were allowing the stream to be in its natural state. The headwaters, which had been altered historically, originated in timberlands. According to the current landowner he had blasted the stream over twenty years ago with dynamite to straighten the channel and remove beaver dams.

Seven blocking culverts were impacting this main tributary to Independence Creek. Juvenile barrier 1503W12A was the lowest culvert in the system. Barrier culvert 1503W07A was a complete blockage. The landowner was planning on building a house in 2004 and needed access to the other side so the culvert would need to be replaced. It was blocking almost two miles of habitat. Landowners both above and below this culvert commented on the lack of fish in the system. It appeared that little spawning habitat existed in the lower reaches. Completely impassable culvert 1503W17B was located on a small tributary just above recently replaced culvert 341972.

An unnamed tributary that closely paralleled Harris Road had three blocking culverts. Concrete box Culvert 1504W15A was almost a complete blockage due to an outfall drop and sheet flow throughout. However, juvenile coho were observed above the culvert so a few fish had made it above to spawn. Culvert 1504W16B was completely blocking all fish passage and no juveniles were observed above it. Almost one mile of habitat existed above this barrier.

A small unnamed tributary to Independence that paralleled Nelson Road was being highly impacted by blocking culverts. Crossing 1504W21A, the lowest of the five blockages in this system, was completely impassable. Water was flowing underneath the two culvert crossing which had one culvert placed at over a 9% slope. Culvert 1504W28A was of unknown barrier status due to it being obscured by brush and completely plugged by beavers. Most likely, it would be too small for the size of the stream.

Continuing upstream, three unnamed tributaries had barrier culverts underneath Lewis County roads. Each tributary had at least a half mile of habitat above the barrier. Closer to the headwaters, the stream Culvert 021(91009)(02604) was blocking most likely would

not be significant for fish due to being less than .6 meters wide. At the headwaters Culvert 021(91009)(02925) was blocking a small tributary.

Garrard Creek

Garrard Creek, an important stream for coho and steelhead, also historically supported chum. The stream, which flowed through agricultural lands, paralleled Garrard Creek Road for most of its length. The riparian buffer was narrow in most areas and few conifers were present. However, a Conservation Reserve Program (CRP) buffer had been planted near Mattson Road. Also, a Conservation Reserve Enhancement Program (CREP) buffer was planted in a small area between Harp and Forrest Roads. Another landowner in the area was considering enrolling his land in the buffer program.

Cattle were accessing the stream in several areas. In the lower reaches, high banks limited the damage. The headwaters originated in timberlands. Named tributaries in this system were Forest Creek, Bloomquist Creek, Kellogg Creek and South Fork Garrard Creek.

No culverts existed on the mainstem of Garrard Creek although barrier culverts were impacting several tributaries. Seven blocking culverts existed on unnamed tributaries. Culvert 1505W02F, underneath Garrard Creek Road, was blocking the first tributary to the north. The small tributary was choked with reed canary grass in the lower reaches. The second tributary on the north had three blocking culverts and a side tributary that had one dam. Culvert 1505W02A, located in forestland was the most significant barrier. An outfall drop of .5 meters, along with large rocks below the culvert created an impassable blockage. The stream appeared to be most valuable for rearing. Impassable dam 1505W02D was put in place to provide water for a farmstead. Numerous native trout were observed in the pond.

Going upstream, the first south side tributary had two blocking culverts. Culvert 1505W11C was a juvenile barrier that existed in an area of beaver activity. At the end of Harp Branch Road, Culvert 1505W12A was a complete blockage. The culvert had been placed on top of a dilapidated culvert. Most of the water was trickling through the old collapsed structure. The riparian area for this tributary varied from a narrow buffer of shrubs and deciduous trees near a hay field to forestland.

Culvert 1505W10A, underneath Garrard Creek Road near the intersection with Brooklyn Road, was blocking a small tributary. Below Garrard Creek Road the stream flowed through an area of animal access. For a short length the stream flowed down the road ditch. Above the road, the stream originated in timberlands. Completely impassable driveway culvert 1505W04A was located on the fifth north side tributary to Garrard Creek. The stream flowed primarily through timberlands and was mapped as having coho usage.

Forest Creek, a south bank tributary near Forrest Road, had two barrier culverts. Both culverts were juvenile blockages. The proximity to the mainstem of Garrard Creek made it especially important that juveniles be able to migrate freely up and downstream. The lower reaches of Forrest Creek had a narrow riparian zone consisting mainly of deciduous trees and shrubs. A Conservation Reserve Program (CRP) buffer was planted along the banks above Culvert 1505W11B. The headwaters originated in timberlands.

Bloomquist Creek, the highest quality tributary in the Garrard Creek basin, flowed primarily through timberlands. Spot checks revealed excellent spawning substrate with a high quality riparian zone. Numerous juvenile coho were observed in the pools. Culvert 1505W05B, on an unnamed tributary, was primarily a juvenile barrier. Upstream of the culvert appeared to be swampy which might make it an important tributary for rearing.

Kellogg Creek, a north bank tributary, paralleled Brooklyn Road for most of its length. Two tributaries were blocked near their confluence by barrier culverts. Outfall drops caused both culverts 1505W07A and 1505W08A to be complete barriers. Numerous juvenile coho were observed below both culverts.

The South Fork of Garrard Creek was the most substantial tributary in this basin. The stream flowed in close proximity to Garrard Creek Road. The riparian zone in the agricultural area was narrow with primarily deciduous cover. The stream banks were gently sloped which allowed cattle free access. Only two barrier culverts were discovered in this area. Culvert 1505W16A was blocking over one mile of an unnamed tributary to South Fork Garrard Creek. On another unnamed tributary in this system, Culvert 1505W21A was a complete barrier. The headwaters of the South Fork Garrard Creek originated in timberlands.

Unnamed Tributaries

Culverts were impacting an unnamed tributary located near Mattson Road. Culvert 1504W06A was an unusual barrier that was only partially blocking. The undersized crossing had washed out but the culvert was still lying in half the stream. The landowner did not want to remove the culvert because that lessened his chances of getting the crossing replaced. Just upstream, Culvert 1504W06B was a partial barrier. The stream in the lower reaches had a poor riparian buffer. Above Mattson Road was an area where animals had denuded the stream banks. The headwaters originated in timberlands. The proximity of the tributary to the Chehalis River would make it a valuable stream for refuge, rearing, and possibly spawning.

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 two culverts on Independence 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.

Culvert 1504W30A

Priority Index 25.03

This 33% passable culvert was located on the mainstem of Independence Creek at river mile 5.79. A total of 10,666.06 linear meters of the mainstem and its tributaries were surveyed above this point. Tributary A flowed through timberlands and had a primarily deciduous riparian. Abundant beaver activity had created a series of large ponds throughout the tributary. Barrier Culvert 021(91009)(02925) was blocking most of Tributary B, which contributed rearing habitat. Spawning habitat existed primarily in the upper reaches of Independence Creek with a total of 3267.97 square meters present above the culvert. Rearing habitat was abundant with a total of 15,878.28 square meters present.

Culvert 1505W25A

Priority Index 21.68

Just upstream from culvert 1504W30A at river mile 6.41 this 33% passable culvert was impacting Independence Creek. The bottom of the culvert was almost rusted through. A total of 4175.9 linear meters of stream was surveyed above this culvert including the mainstem and Tributary B. Spawning occurred primarily in the headwaters with a total of 1878.81 square meters present. Rearing habitat was more abundant with a total of 6145.48 square meters present.

Conclusion

The culvert survey of the Independence and Garrard Creeks basin revealed that almost 59% of culverts were impassable. The most significant impassable culverts existed underneath public roads and small forest landowners. 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 Independence and Garrard Creek basin would significantly improve habitat for anadromous fish. At least one of the small forest landowner culverts would likely be replaced by the summer of 2005. The majority of landowners in this basin were cooperative and helpful. This will facilitate the District in going back into the basin to prioritize culvert replacements. In conclusion, culvert replacement projects in the Independence and Garrard Creek basin would open up significant habitat for anadromous fish.

References

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