

Skookumchuck Watershed Culvert Assessment

Water Resource Inventory Area 23



Lewis County Conservation District

Final Report

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Introduction

The Skookumchuck River basin, which is located in Lewis and Thurston Counties, Washington, WRIA 23, is an important stream for anadromous fish. Culverts, if improperly installed or deteriorated over time, can prevent or limit the ability of adult and juvenile salmonids to access all habitats. Mature chinook salmon spawn in the mainstem of the Skookumchuck, where there are no culvert crossings. Coho salmon, juvenile chinook, 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 Skookumchuck River basin. Above the Skookumchuck dam was excluded from the survey, due to it being an impassable barrier. However, steelhead are trucked around the dam. Areas where significant natural barriers blocked anadromous fish were also excluded (see map). This survey involved obtaining information from private landowners, timber companies, Lewis County Public Works, the Department of Natural Resources 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 Skookumchuck River Basin. 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. Stream flow velocities were estimated using the cork float method. Other data was obtained using normal field practices.

Level 'B' Analysis

A level B survey analysis was conducted when results 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 laser level mounted on a survey pole 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. In a few areas, the level B analysis could not be applied due to interior slope breaks within the culvert or an inaccessible downstream control. Sites where the level B analysis could not be applied were listed as unknown barrier 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. Thurston County road culvert data was out of date so the district resurveyed them. WDFW provided information on Washington State Department of Transportation culverts and additional data on Lewis County road culverts. Weyerhaeuser's Vail Operations provided information about culverts on their lands. Although, Weyerhaeuser provided the location of all culverts, not all culverts had been evaluated for fish passage status. An offer to survey the culverts for them was declined.

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. A few landowners stated that they had culverts but did not feel it was necessary for us to survey them. 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>Coffee Creek</i> | 10 | 2 | 0 | 12 |
| <i>Hanaford Creek</i> | 37 | 16 | 4 | 57 |
| <i>Johnson Creek</i> | 0 | 3 | 0 | 3 |
| <i>Thompson Creek</i> | 1 | 4 | 3 | 8 |
| <i>Unnamed mainstem tribs.</i> | 16 | 4 | 1 | 21 |
| Totals | 63 | 26 | 8 | 101 |

When culverts are evaluated they fall into the categories of impassable, passable or unknown, based on the ability to pass a 6 inch salmonid. 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.

Skookumchuck River Basin

Sub Basins

Coffee Creek

This left side tributary branches off the mainstem of the Skookumchuck at river mile 1.6. The short distance fish would have to travel from the Chehalis River up the Skookumchuck to reach this small tributary would indicate that it should be significant for fish. It is mapped as having both steelhead and coho usage. However, Coffee Creek has been ditched for most of its length. In the summer of 2002, the water was brown and stagnant. In some areas, lily pads were growing profusely. A significant portion of the stream has a grass buffer. No animal access was observed throughout the entire basin. Four impassable culverts existed along the length of Coffee Creek. Replacement of the culverts would be beneficial to any fish that are using the system.

Two small tributaries flow underneath Carson St. W. and into the creek. The outfall from both culverts prevents all fish passage. One tributary is less than .6 meters wide and replacing the culvert would not benefit fish. The other tributary has been ditched and the lower reach goes into Coffee Creek in a different area than originally mapped. If the culvert was replaced the stream might provide some rearing habitat. Lowery Lane Creek, which has been ditched for most of its length, had two impassable culverts. The stream was well shaded with shrubs but the substrate appeared to be mud. If the culverts were replaced then more rearing habitat would be opened up. Overall, the main limiting factor of the Coffee Creek basin is the ditching that occurred in the past. However, culvert replacement and habitat improvement would be beneficial to the system.

Hanaford Creek

Hanaford Creek and its tributaries make up the largest sub basin in the Skookumchuck. Historically, this sub basin was utilized by chum, coho and steelhead. In the lower reaches, the mainstem has an area where the stream flows through two separate channels. The more northern branch has been extensively ditched and provides no significant fish habitat. The more southern branch is the main stream that fish would utilize. Culvert 1501W35A, is an impassable barrier that is underneath Big Hanaford road. This culvert was blocking several miles of upstream habitat where the stream flowed through timberlands. Fortunately, it has been scheduled to be replaced by the Lewis County Road Department.

North Hanaford Creek, the first tributary to Hanaford Creek, flows through agricultural lands in the lowest reaches. The creek is only utilized by anadromous fish for approximately the first two miles.

The second tributary to Hanaford Creek, South Hanaford Creek, for most of its length flows through agricultural lands. It has been extensively ditched and has very little riparian cover. The upper reaches flow through timberlands where there was no apparent spawning areas. Culverts 1401W17B and 021(17190)(01708) are blocking the upper reaches. Seven of the small tributaries to South Hanaford are blocked near their confluence. Culvert replacements along with establishing riparian buffers would greatly benefit South Hanaford Creek.

The third main tributary is Packwood Creek, which flows almost entirely through the TransAlta coal mine. It had seven impassable culverts along its length. Culvert, 1501W29A, was of unknown barrier status due to the difficulty of surveying it. The road that it was under serves as the main haul road for the mine. This culvert would probably be passable at least most of the time. Historically, this creek was the primary spawning ground for chum but no salmonids seemed to be present. It is mapped as having both coho and steelhead usage although no spawning habitat seemed to be present in the lower reaches. Access to the upper Packwood Creek, which was in the active mining area, was completely blocked by culvert 1401W10A. TransAlta might be willing to remove some of the culverts, which would at least benefit resident fish.

The final tributary in this system is Snyder Creek, which is mapped as having both steelhead and coho usage. However, there was no evidence of fish usage and the stream substrate appeared to be mud. Four culverts were blocking approximately 5 miles of stream. The uppermost culvert, 1501W26A, belonged to a timber company which planned to replace or remove it in the next couple of years. The lower reaches of the stream were primarily in agriculture. The riparian corridor was poor with the primary streamside vegetation being grass. The upper reaches were in forestland with the riparian buffer being in much better condition.

Johnson Creek

Johnson Creek flows parallel to Johnson Creek Road. Most of the crossings were bridges and all culverts were passable. The main need in this basin is an enhanced riparian buffer. However, the proximity of the stream to the road somewhat limits the width.

Thompson Creek

No culverts were revealed in the lower reaches of Thompson Creek other than the passable one that flows underneath Thompson Creek Road. In the upper reaches on Weyerhaeuser property, three impassable culverts existed. The riparian buffer was adequate in most areas and spot checks revealed good quality spawning gravel. Thompson Creek is probably the most productive salmon spawning stream in the Skookumchuck Basin.

Unnamed mainstem tributaries

The Skookumchuck River has several unnamed tributaries. The first mainstem tributary parallels O'Conner Road in Thurston County. It had three impassable culverts in the lower reaches. According to a local landowner, coho had spawned in the area below Flumerfelt Road. He then observed that the juveniles were rearing upstream. It is uncertain however, if fish spawn in the upper reaches as it is mainly a swamp.

A small tributary just before the town of Bucoda had two impassable culverts. A larger tributary just past the town of Bucoda had two impassable culverts. However, this stream doesn't appear to have any spawning gravel. It was also completely dry at the time it was surveyed.

Four other small tributaries past Bucoda have impassable culverts. However, none of the culverts appeared to be blocking valuable habitat. Finally, a small tributary on the south side of the Skookumchuck just before the dam, had two impassable culverts. The tributary is completely on Weyerhaeuser property but it would likely contain valuable habitat.

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 select culverts in the Skookumchuck basin a full survey assessment was performed. A 20% sampling rate was used where 60 meters out of every 360 meters was 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 pools 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 1402W01A Priority Index 13

A priority index was calculated for culvert 1402W01A, which was blocking a small unnamed tributary to South Hanaford Creek. The culvert was made up of two pieces that had been placed together. The lower piece had shifted so it was at a significant slope. A large plunge pool had been created in which coho fry were observed. Downstream, the creek had some animal access and no riparian buffer. Above the culvert most areas were fenced off from the animals. However, a small tributary to the left had significant animal access. It also had a blocking culvert at the confluence. The mainstem has a good riparian buffer on the right side and a fairly narrow riparian buffer on the left. The channel is incised and only has moderate instream cover. The uppermost reach is a large beaver pond that would provide excellent rearing habitat for juvenile fish.

Conclusion

The culvert survey of the Skookumchuck River basin revealed that almost 65% 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. Private timberlands also contained several impassable culverts but they were mainly towards the headwaters. 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, especially in the low-lying agricultural areas, would be the most beneficial to this system. Spawning in this system appears to occur primarily in the mainstems. However, the smaller streams, which tend to have more blocking culverts, are utilized by juvenile fish for rearing habitat. Therefore, culvert replacement projects in the Skookumchuck River basin could open up significant rearing habitats.

References

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