Stream Survey of the South Fork Newaukum River

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Abstract

Streams are very important to the health of rivers and their environment. The Washington state legislature declared “that the forestland resources are among the most valuable of all resources in the state” 1. To map out streams, the Washington Department of Natural Resources used a model to predict likely stream locations, however many streams are mapped incorrectly or aren’t even present on the maps. Field verification of streams and fish habitats is needed to correct the current water type maps. Wild Fish Conservancy conducts surveys to map out stream locations, fish bearing streams, and fish passage barriers.

Introduction

Stream quality is important to the overall health of rivers this project looks at the South Fork of the Newaukum River.

In 1974, the Forest Practices Act was passed as Washington’s first law addressing the impacts of forest practices on the environment 1. The Salmon Recovery Act of 1999, ESHB 2091, adopted the goals of the Forests and Fish Report into the State Forest Practices Rules 2. The Forest Practices Board was established with RCW 76.09.030 and was charged with adopting forest practice rules to establish minimum standards for forest practices 3,4.

Water typing is the classification of streams and other waterbodies into groups of fish habitat. A fish bearing stream is defined as a channel that has a bankfull width of 2 feet wide or greater and a gradient of 16% or less or if there is fish presence during some life stage 5. The Washington Department of Natural Resources developed maps based on a multiparameter model using basin size, gradient, elevation, and other indicators, however the modeling process was designed for 95% accuracy in separating fish and non-fish habitat streams 6. The maps that the WDNR made are oftentimes inaccurate or missing streams, this may be because the maps were hand drawn using topographic maps and aerial photos, because streams may avulse during a flood event, may be diverted or blocked.

Streams are important for the health of the rivers as they are the main spawning habitat for a variety of species of fish, however the streams are being influenced by practices such as diverting for drainage and improper management of surrounding land. A study looking at basin wide restoration efforts in northeast Oregon found that a combination of riparian restoration and channel narrowing could reduce the peak summer water temperatures and could increase chinook salmon parr abundance 7. Fish passage barriers, such as man-made culverts and natural barriers like waterfalls and beaver dams, 8 can also have an impact where a study showed that around 10% of recaptured fish had negotiated barriers and that the other 90% of recaptured fish may have readjusted their life history to become more residential 9.

Wild Fish Conservancy has many projects for correcting water typing maps for showing accurate stream locations and whether a stream is fish bearing. This can also help to increase stream quality in the Newaukum river basin that flows into the Chehalis River, potentially increasing fish abundance.

Materials & Methods

Streams and culverts of interest were located on existing GIS databases and modeled possibilities for streams. Landowner permission was obtained to enter private properties.

Streams or culverts were located on ground and GPS points were taken to map out later. Data was taken on if there is a barrier and what type of barrier it is.

Physical data was taken for the stream such as bankfull width, wetted width, substrate composition, pools, shade, and gradient using a stadia rod and a clinometer. Physical data for a culvert was taken such as span, type, if there is substrate throughout, if there is drop measure the height, and take data for the stream both upstream and downstream outside of the culvert’s influence using a stadia rod. Fish presence was sampled for using a dipnet or an electroshocker. Photos were taken of the culvert’s inlet and outlet, if there is a culvert, of the channel upstream and downstream, and of any fish caught.
Water type change modification forms were filled out and submitted to WDNR for review and map corrections.

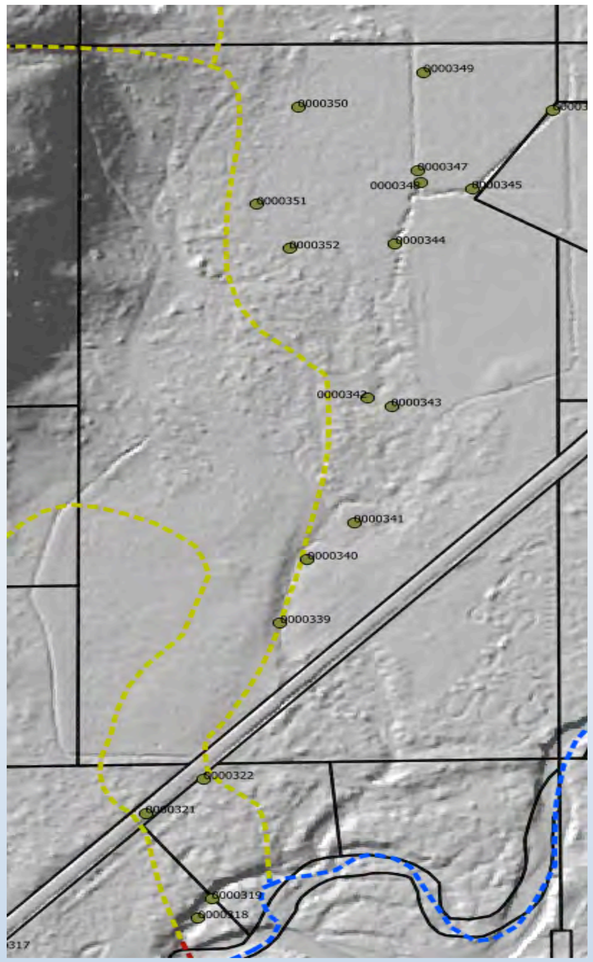

Fig. 1: Case study stream

Results

Using one stream system as a case study, this stream was originally modeled by the WDNR and is shown in the yellow dashed line indicating that it is a non-fish bearing stream. The landowners allowed us on their property, but had to restrict some area due to livestock presence. The landowners had said that they were doing some restoration work on the stream and noted that the WDNR map had the stream mapped wrong.

The LiDAR layer in this GIS showed that there were some channels running through the property. The WFC model showed them as potentially being fish bearing streams. The interior area of the property was heavily forested which made identifying potential streams using LiDAR difficult. In field observations found that it was a stream that had been channelized. In the northern middle section of the property, another channel that appeared to be an old drainage ditch was found.

On each GPS point taken, physical data about the stream was taken and was sampled for fish presence. On this stream at point 339, a juvenile sculpin was found which makes it fish bearing, however further up the stream on the east side of the property, the field call for the water type classification had to be made by physical characteristics. On the northern middle section of the property, the channel had intermittent flow which at the time made the call to be a non-fish seasonal stream.

Fig. 2: Taking data on a stream.

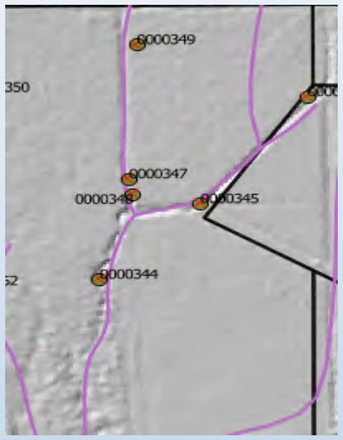

Fig. 3: Zoomed in portion of case study stream showing WFC model

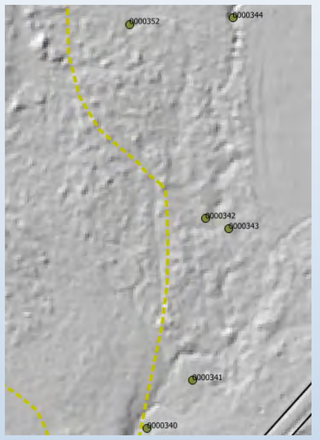

Fig. 4: Forested area interfering with LiDAR DEM

Conclusion

All the data taken will be entered into Wild Fish Conservancy’s database and will be open for access. Along with this, water type modification forms will be filled out to correct the WDNR map.

Correcting the WDNR layer can give more protection to a stream by increasing the amount of buffer area that the stream needs to have as a riparian area. This riparian area can work to increase stream quality by the temperature and increase dissolved oxygen levels, doing so can help fish populations increase. As part of the survey was to map out fish passage barriers, including permanent barriers such as deteriorating culverts or temporary barriers such as beaver dams, this can help to get them on a priority list and possibly fixed in the case of a man-made barrier or to have a reason as to possibly why there isn’t fish upstream.

By updating the WDNR layer with accurate stream locations, this can aid in the permitting process by helping a landowner wanting to build in a location historically not where a stream has been located, but where the WDNR had the stream mapped as, get quicker approval for building.

References

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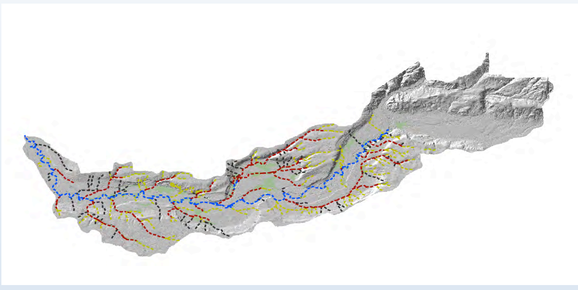

Fig. 5: Existing South Fork Newaukum River Basin water type map

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