Seepage Loss Study Summer – August 10, 2016

CONDUCTED BY

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PURPOSE AND METHODS

The purpose of the seepage loss study was to provide information regarding potential ditch losses along the conveyance of Cascade Orchard Irrigation Company's surface water right on Icicle Creek. On August 10, 2015, representatives from Washington Water Trust, Washington Department of Fish and Wildlife, Aspect Consulting/Anchor QEA, and Chelan County Natural Resources joined COIC president Dan Wilkinson to determine potential ditch losses on this system. The team used flow meters using the cross sectional method. In this method, technicians determine overall flow in cfs by dividing the stream channel into numerous cross sections and measuring the area as width of the each subsection and multiplying it by the depth. Flow meters determine the velocity of the water, with the discharge of each subsection calculated as the produce of the subarea and the measured flow, with the total discharge equaling the sum of all the subsection's flows. The technician from Anchor QEA also determined elevations and GPS points for all points of the COIC system, which will be used to map points in later reports. This information will all be included in a preliminary draft report for the project, anticipated on September 21st. All water users were notified by letter to turn off their system, though it is possible that some use was still in place, especially if some users had their sprinkler systems on timers.

RESULTS

Though all of the researchers had experience doing cross-sectional flow measurements, we were using different types of flow meters, which meant that we couldn't compare readings between teams. It should be noted, however, that the weir at the top of the COIC system, which is periodically calibrated, was measuring 6.0 cfs during the study, or about the average amount between the two sets of readings. Therefore, it is likely that the flows at each point in the system were within .4 cfs of the actual reading, or about a 7% error. However the purpose of the exercise was to determine ditch loss vs overall flow, so discussion of ditch loss can be understood by comparing the numbers from the same team down the canal. As can be seen in the Table below, both the WDFW and the Chelan County team only saw .26 - .32 cfs of loss from the top of the system down to Dan's property and the site just above Shore street. We noted that the ditch was overflowing at Shore street, indicating that the 5.36 cfs measured just above there was just a more than the ditch capacity at that point. This is reasonable considering that

the ditch would be tapered at the lower end based on the assumption that some water use would be occurring. This is borne out by the measurements closer to 4.6 – 4.8 cfs at the bottom of the system.

Table: Measured flows at COIC by team (in CFS)

	Top - Weir	Bayne	Dan's	Shore	Bottom
WDFW	5.61		5.35	5.36	4.8
Chelan Cty	6.47	6.45	6.15		4.57

DISCUSSION

The results of the seepage loss study suggest that ditch loss in the bottom of the system are very minimal throughout the system, 4.94% for the Chelan County data and 4.63% for the WDFW data. This are within the margins of error of the measuring devices, and represent only very small losses. Though the final alternatives analysis will provide additional discussion, this study support the theory that simply piping the existing ditch is likely to yield only .5 cfs of less of improved efficiency. The COIC ditch, even though earth lined, is operating at a high level of efficiency.