Development and assessment of freshwater mussel growth-increment chronologies in the Pacific Northwest

OWEB progress report

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To date, four freshwater mussel chronologies have been completed. As described in our earlier report, three of these chronologies are "Bryant Park" near Albany, Oregon directly upstream of the confluence of the Calapooia River; the "Dexter" chronology in the Middle Fork of the Willamette River at Elijah Bristow State Park; and the "Steamboat" chronology for Steamboat Creek at a sample site located below the Canton Creek confluence. The three chronologies positively correlate with on another and strongly and negatively relate to river discharge. For example, in a regression between annual discharge and the Steamboat chronology, the R^2 is 0.67.

Since our last update, we have completed a manuscript describing these three chronologies as well as their interrelationships with one another and climate. The manuscript by BA Black, J Dunham, B Blundon, M Raggon, and D Zima, Freshwater mussel growth-increment chronologies and relationships with stream discharge and temperature in the Pacific Northwest, USA, is currently in internal review through the USGS and will soon be submitted to *Marine and Freshwater Research*. A copy of the manuscript is included with this report. Please note that this manuscript cannot be distributed as it has not yet completed USGS internal review.

In early June, BA Black participated in the 19th annual North American Dendroecology Fieldweek held at Hampshire College and the Harvard Forest in western Massachusetts. During that ten day workshop, Black taught a sclerochronology section in which the group developed a freshwater mussel chronology for Bear Valley Creek in central Idaho. The chronology was the longest yet developed, extending back to 1965. Interestingly, the chronology strongly related to the Steamboat and Dexter chronologies, and to a lesser extent, the Bryant Park chronology. In a principal components analysis, the Bryant Park chronology was an extreme outlier while the other three chronologies tightly clustered. The main differences between Bryant and the other chronologies is that Bryant represented a major river, the Willamette. The other three chronologies were developed in much smaller rivers. Although two of these smaller rivers were from the western Cascades and the third from central Idaho, they were all much more closely related to one another than the chronology from the Willamette River. From these results it would appear that river order is much more important to mussel growth, and presumably river ecology, than geographic proximity.