7-19-2006

Evaluating Diversion Alternatives Affecting Environmental Flows and Temperatures

Michael E. Barber
Washington State University

Robert J. Bower

Abstracts of presentations given on Wednesday, 19 July 2006, in session 19 of the UCOWR Conference.

EVALUATING DIVERSION ALTERNATIVES AFFECTING ENVIRONMENTAL FLOWS AND TEMPERATURES

Michael E. Barber, Director, State of Washington Water Research Center and Associate Professor of Civil and Environmental Engineering, Washington State University, PO Box 643002, Pullman, WA 99164-3002, meb@wsu.edu, 509-335-5531
Robert J. Bower, Hydrologist, Walla Walla Basin Watershed Council, PO Box 68, Milton-Freewater, OR 97862, bob.bower@wwbwc.org

Surface water diversions for irrigation demands are necessary for sustaining agriculture in arid and semi-arid climates throughout the western United States. In many places, however, these diversions have created low flow conditions that make resident and anadromous fish rearing and passage impossible because of either physical constraints caused by flow depths or thermal blockages due to increased stream temperatures. The two particular temperature thresholds that are of most concern occur when the 7-day maximum stream temperatures increase above the inhibition temperature of 20oC (68oF) and the lethal temperature of 24oC (75oF). In order to increase water supplies for improving bull trout, chinook, and steelhead habitat, the impacts of modifications to irrigation district diversions in June and August were completed as part of a habitat conservation plan (HCP) for the Walla Walla River in Oregon and Washington. HeatSource 7 was used to evaluate the impacts of various flow bypass scenarios on flow and thermal regimes of the Walla Walla River system. Based on streamflow analysis, water years 2002 and 2003 were selected representing low and average flow conditions in the watershed. Analyses indicate that maximum stream temperatures routinely exceed both threshold values in the lower reaches of the river under existing flow and diversion conditions particularly in the late summer time frame. For August 2002, the maximum daily temperature variations were generally less than 4oC under scenarios ranging from existing diversion conditions to complete bypass of agricultural water demands. June results are expected to show similar variations. The results indicated that flow augmentation alone will not be economically effective in terms of mitigating temperature. Investigations are continuing to determine the impact of riparian restoration impacts.

Contact: Michael Barber, State of Washington Water Research Center, meb@wsu.edu, Washington State University, PO Box 643002, Pullman, WA 99164-3002, 509-335-5531, 509-335-1590