



Evaluation of North Platte River Flow Measurement Sites near the Wyoming-Nebraska State Line

WEST, in association with Aqua Engineering, was selected by the State Line Gage Subcommittee of the North Platte Decree Committee to evaluate the existing discharge measurement sites on the North Platte River in the vicinity of the Wyoming-Nebraska State Line. The overall objective of the project was to evaluate the existing hydraulic characteristics at each site and to recommend improvements to each site that will increase the stability of the rating curve and the accuracy of discharge measurements.

Flows at the State Line are measured using frequent current-meter discharge measurements. On days that current-meter discharge measurements are not performed, flow is estimated using a shift-corrected stage-discharge relationship. An analysis was performed to estimate the uncertainty associated with the current-meter discharge measurements and the computed flow estimates. The uncertainty analysis indicated that applying a correctional shift is appropriate for the State Line site. However, shifts less than the current meter discharge measurement uncertainty should not be implemented because the



accuracy of the discharge measurement is not sufficient to support the adjustment. A geomorphic analysis was also performed on the State Line site. This analysis indicated that the site has been relatively stable until 2006. After that time, severe erosion has occurred upstream of the control along the south bank. In addition, a large sand bar has formed near the north bank, immediately upstream of the control.

The Tri-State Canal ramp flume appears to be a stable, accurate flow measurement structure. The existing structure has a number of variances from the design drawings, but these departures are consistent with the hydraulic requirements and limitations of ramp flumes and the rating curve should simply be adjusted to incorporate these changes. The Passing Tri-State site is an uncontrolled stream gage in a shifting, sand bed channel. As a result, annual channelization is required to eliminate the braided channel morphology and force flows through the channel in the vicinity of the bubble gage. Frequent current meter discharge measurements are required to establish and check the annually-derived rating curve. The gage installation and operations are adequate, but the overall approach is significantly less accurate than discharge measurements made at the other sites included in the study.

Project Owner:

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