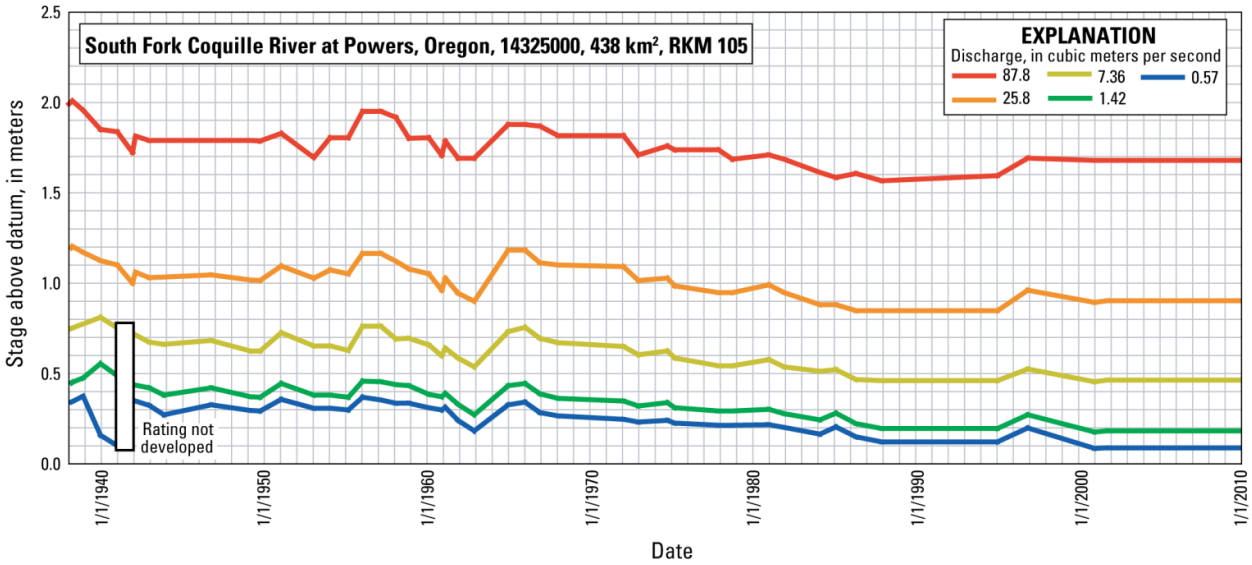
Stage-Discharge Rating Curve for Specific Discharges at the U.S. Geological Survey Streamflow-Gaging Station on the Coquille River at Powers, Oregon (14325000).



The figure above and following text are from Jones, K.L, O'Connor, J.E., Keith, M.K., Mangano, J.F., and Wallick, J.R., 2012, Preliminary assessment of channel stability and bed-material transport in the Coquille River basin, southwestern Oregon: U.S. Geological Survey Open-File Report 2012–1064, 84 p. [Available at *http://pubs.usgs.gov/of/2012/1064/*]

Specific Gage Analysis Following the approach of Klingeman (1973), a specific gage analysis was conducted for the USGS streamflow-gaging station on the South Fork Coquille River at Powers, Oregon (14325000; RKM 105; fig. 1; table 1). Of the available gaging stations (table 1), the gaging station at Powers was selected for this analysis because it has a long-term period of record and is operational as of 2011. The specific gage analysis enables the detection of changes in streambed elevation by assessing changes in water elevation (stage) over time for specific discharge values. At USGS streamflow-gaging stations, discharge is related to stage by a stage-discharge rating curve, which is based on multiple, paired stage and discharge measurements that are taken at a range of streamflows. New rating curves are developed if the channel conditions change substantially (as shown by consistent offsets of newer measurements from the established rating curves) or if a station is relocated. The specific gage analysis evaluates trends in downstream hydraulic control as indicated by the sequence of rating curves; hydraulic control, is in turn a function of bed elevation.

The USGS has collected streamflow records at the Powers gaging station on the South Fork Coquille River (RKM 105) since 1917 (table 1). Because the datum for stage measurements made prior to November 1939 cannot be reliably verified, the analysis period for the specific discharge analysis was November 1939–January 2010. Changes in stage were assessed for low to moderate flows (0.57–87.8 m3/s) because these flows are more sensitive to minor adjustments in bed elevation and are less likely to be influenced by temporal changes in bank vegetation or bank shape.

From November 1938 to January 2010, the stage-discharge relations for the five analyzed discharges show variations spanning as much as 0.5 m, but all lowered by a net 0.27–0.31 m over the analysis period (fig. 20). Although in-channel bedrock immediately downstream of the gage (such as near RKM 103.6; fig. 8) would serve as a local barrier preventing substantial channel incision from propagating up- or downstream, this general trend of a reduction in stage for specific discharges, indicating either channel incision or widening, is consistent with the channel incision evident in repeat channel cross sections up- and downstream of the gage at RKM 106.1 and 89.4 on the South Fork Coquille River (table 9; figs. 15B and 16A).

Over the period of record, the overall declining stage trend has been interrupted by short periods of rising stage during three periods (1955–1956, 1963–1965, and 1995–1997; fig. 20). These episodes coincide with the floods exceeding a 10-year return period on December 21, 1955, December 22, 1964, and November 18, 1996 (fig. 4B), and perhaps indicate bed-material transport and channel aggradation associated with these relatively large floods. Future review and analysis of station notes, historical cableway surveys, and individual discharge measurements could provide additional information on trends in channel geometry and bed-material at this station