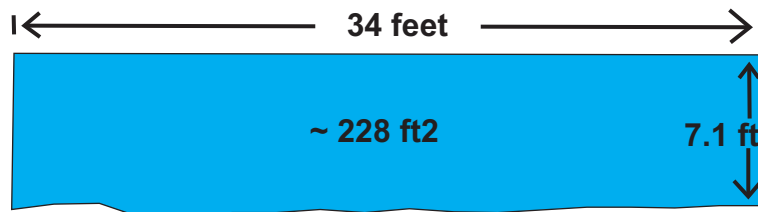


Channelization of Humbolt and Upper Flat Rivers: Lateral and Vertical Hydraulic Constraints



Channel cross-section 59.5 ft upriver
of the Steelhead Ave bridge
[Tr: Flood return interval]



2007 overbank floodwater height
~ 6.3 ft above 1936 laid stone wall



Channel cross-section beneath
Cascade Park foot bridge deck

Historic flooding in Humbolt dates back to at least 1877.
A 1868 map shows both the railroad and Verdent Avenue
bridges in place at that time.



Channel cross-section beneath the Verdent Ave bridge

Significant portions of both the Upper Flat and Humbolt rivers have been extensively channelized coincident with building and bridge construction. This has reduced the areal extent of the natural floodplain and increased river velocity. Riprap and cement walls now laterally constrain river flow until floodwater flows overbank into adjacent areas. Low bridges have served to both laterally and vertically constrain channel cross-sectional areas. The hydraulic response to this is back flooding upriver of low bridges, inclusive of the Verdent and Silver avenue bridges. Calibration against flood levels depicted in 2011 and 2007 photographs reveal the damming effect of such bridges (e.g., Verdent Ave. above). Flood levels artificially elevated behind bridge dams compound upriver flooding impacts above normal flood levels. Flood level reduction requires increasing channel cross-sectional areas, especially under bridges, to accommodate flood flows. HydroQuest graphic.