

Cross section PR147 was established in 1975 on a straight reach of Powder River that is stabilized, to a significant degree, by sandstone bedrock. Ledges of sandstone have been seen cropping out in the bed of Powder River, both upstream and downstream (within distances of 100-200 m) of section PR147. These ledges served, decades earlier, as crossing places in the river (e.g., Hubert Gay and his sister, in the 1920s and 1930s, fording Powder River to attend Huckins School). Section PR147 was re-surveyed annually from 1977 through 1980, not again until 1984, and then every following year through 1998. Because it had shown so little channel change over the years, it was not surveyed again until 2013.

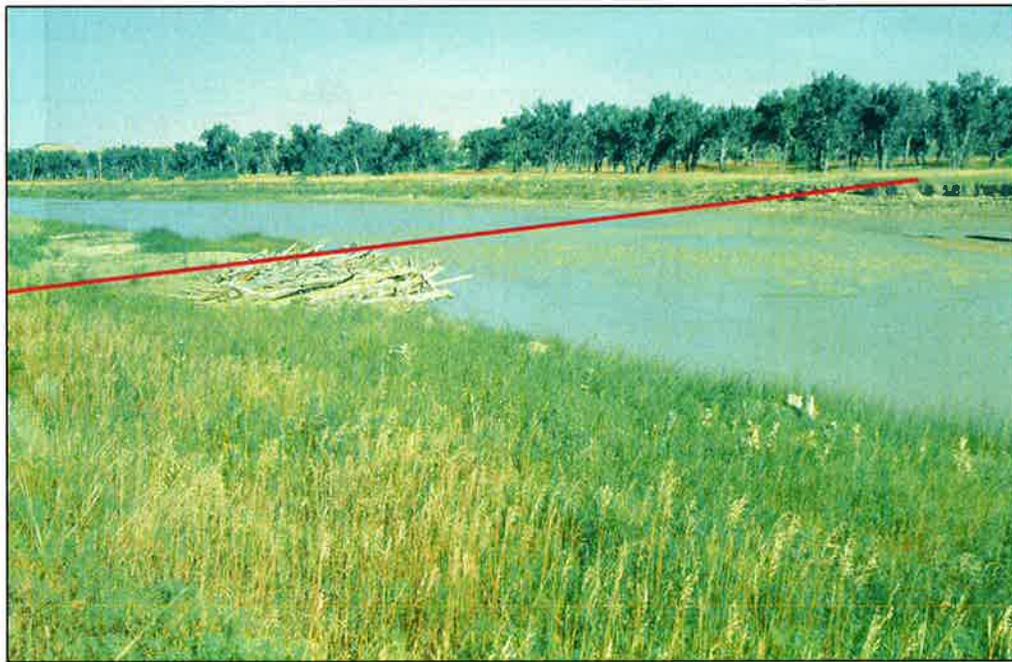
Cross section PR147 was both widened and deepened by the flood of 1978 (see Figure 5 of Meade and Moody, 2013). The right bank was eroded laterally by 5 m. The left bank developed a 6-m-wide scour hole, probably dug during the flood by the turbulence that must have been induced by the presence of a large pile of flood-deposited woody debris.

Change came slowly to section PR147 after the flood of 1978. During the next 35 years (1979-2013), the right bank was eroded by another 5.5 m -- 3.3 m of which happened during a single year, 1995; and 1.1 m of which happened two years earlier, in 1993. The left-bank scour hole was refilled, mostly during 1991 and 1993, until, by 1995, a new flood plain had developed between stations 15 and 27. The riverward bank of the new flood plain was eroded laterally during 1996 and at some other time(s) after 1998, so that by year 2013 (when the next re-survey was completed), the edge of this bank had retreated to station 22. At some time between 1998 and 2013, a 6-m-wide bench of new (flood-plain?) sediment was deposited under the right bank, adding to the cross section a volume of new material approximately equivalent to the volume removed from the left bank during the same 15-year period.

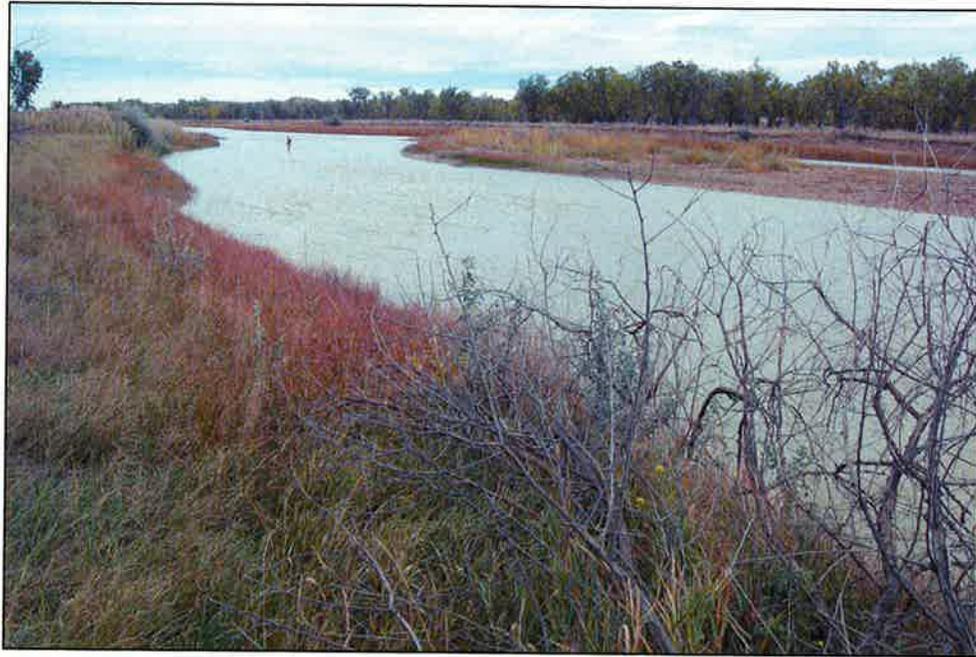
The other notable feature of cross section PR147 is a mid-channel sandbar that developed on the downslope of a gravel-bedded riffle whose crest intersected the section between stations 32 and 40, as it extended from the right bank of the river ~150 m above the section to the left bank of the river ~ 30 m below the section. After the 1995 flood, this sandbar began to emerge when about 0.2 m of new sediment was left on top between stations 57 and 79, and by 1996 it was populated with cottonwood seedlings growing in an additional 0.5 m of sediment between stations 62 and 72. This was probably the foundation on which a larger island evolved in the middle of the channel between 1998 and 2013, and had increased in elevation by about 0.7 m during this period.

During year 2000, the leveling survey of section PR147 was extended on the right bank to station 594, which was the location of the high water mark for the flood of 1978.

Meade, R.H., and Moody, J.A., 2013, Erosional and depositional changes wrought by the flood of May 1978 in the channels of Powder River, southeastern Montana: *U.S. Geological Survey Scientific Investigations Report* 2013-5035, 28 p., 1 pl.



PR147. **Top.** 23 July 1977. View is downriver. E. Meade inside red circle is about 1.6 m tall is standing on the line of section on the right bank. **Bottom.** 28 August 1993. View is downriver from the left bank showing debris pile on section and new sand bar. Red line indicates the approximate line of section.



PR147. **Top.** 29 September 2013. View is downriver. J. Moody (~1.9 m tall) in the river is on the line of section. Mid-channel island is in the upper right of the photo. **Bottom.** 29 September 2013. View is upriver similar to photo in 1977. J. Moody (inside red circle) is on the line of section at station 39. Small island at right center is just below the pile of debris in the 28 August 1993 photo.