

Cross section PR130 was established in 1975 on a curved reach of Powder River that is controlled by bedrock. The stability of the cross section is evidenced by the small amount of lateral erosion of the concave left-side cutbank: only 3.8 m in 38 years. A coal seam outcrops at the level of the river bed on the left bank, which can be seen at low, clear flows (see photos for PR130 in 1975, 1997, and 2012) and appears to dip slightly across the river as it has never been seen along the right bank. This cross section was resurveyed annually during the 4 consecutive years 1977-1980, resurveyed in 1982, resurveyed annually during the 18 consecutive years 1984-2001, and, after a 11-year hiatus, resurveyed in 2012 and 2013. In 2000, the cross section was extended across the valley to station 334.7 at a fence line.

The flood in 1978 eroded 2.4 m from the left bank and left some lee-dune-type deposits of new sand (Moody and Meade, 2008) on the right-bank flood plain (Meade and Moody, 2013, *their* Figure 6). No changes were measured for the next five years. A levee began to develop in the cross sectional profile along the right bank in 1982 and was the first evidence of the beginnings of a new inset floodplain similar to those described by Moody et al. (1999). This floodplain was built in three stages in 1982-1984, 1990-94 and 1995. Initially, the floodplain was narrow and only about 10 m wide in 1984, but additional sediment deposited in 1987 widened the floodplain to about 20 m and added ~0.30 m of height. In 1990, a little bench (~4m wide) was added on the riverward side of the nascent floodplain, and then in succeeding years (1991 and 1993) additional sediment was added on top of this bench until it was higher than the original floodplain deposited in 1982-1984. This new inset floodplain was about 28 m wide in 1994. During the last stage, a large and long snowmelt flood lasting from May through July 1995 deposited a wedge of sediment, which was about 0.5 m thick nearest to the river and tapered to about 0.05 m in the floodplain trough farthest from the river.

After 1995, essentially no change was measured in the cross section of PR130 until a new bench (~2 m wide) was evident in the 2012 cross sectional profile. Unfortunately, the 11-year hiatus in our survey record leaves us without the certainty of knowing the exact years of the creation of the bench. However, the flood in 2008 (peak discharge $> 200 \text{ m}^3 \text{ s}^{-1}$) was probably mostly responsible.

Moody, J.A., Pizzuto, J.E., and Meade, R.H., 1999, Ontogeny of a flood plain: *Geological Society of America Bulletin*, v. 111, p. 291-303.

Moody, J.A., and Meade, R.H., 2008, Terrace aggradation during the 1978 flood on Powder River, Montana, USA: *Geomorphology*, v. 99, p. 387-403.

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



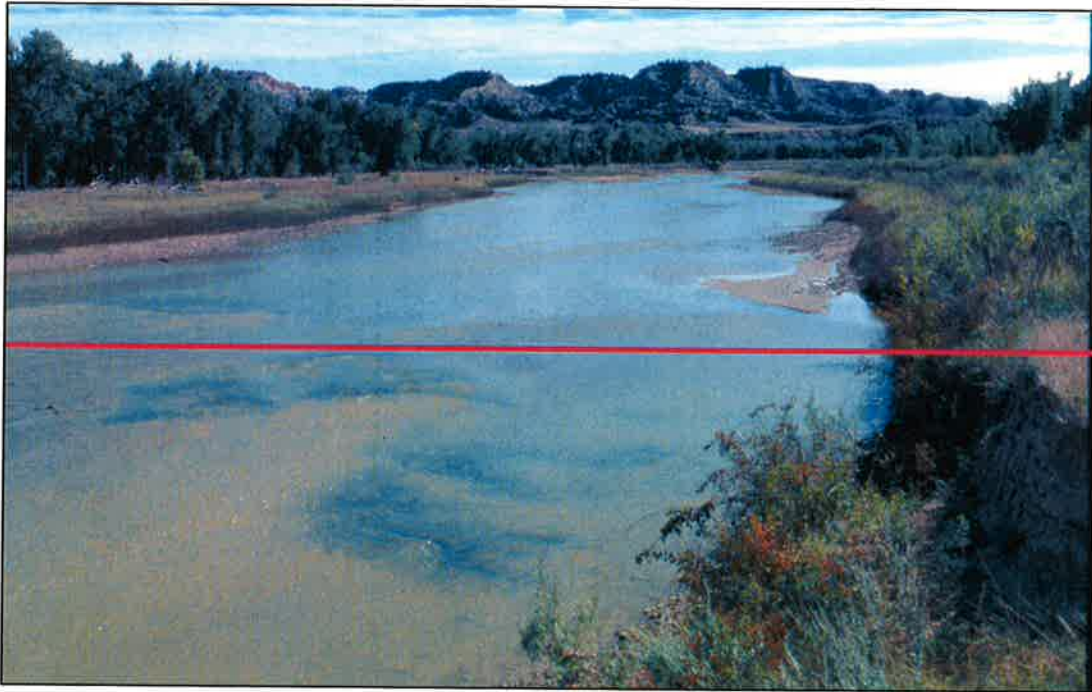
PR130. **Top.** 9 September 1975. View is of the left bank about 25 m upriver from section PR130. River is flowing from left to right, and coal outcrop is visible along the left bank. **Bottom.** 21 July 1977. View is upriver and E. Meade (~1.6 m tall) is standing on the coal outcrop. About 25 m upriver from section PR130. Red line is approximate location of the cross section.



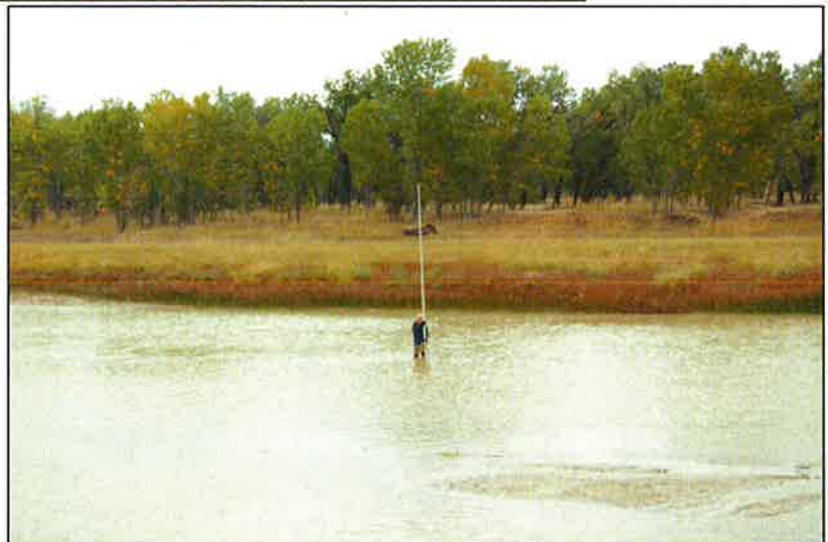
PR130. **Top.** 18 August 1986. View is downriver along the right bank, showing the new sand (0.1-0.3 m) on the point bar. J. Moody (~1.9 m tall) is standing at station 72. **Bottom.** 19 September 1988. View is upriver. J. Moody and tripod with level are just upriver from section PR130.



PR130. **Top.** 11 June 1993. View shows a new sand bench deposit on the right bank. **Bottom.** 24 September 1995. View is downriver, showing new sand deposited behind the berm crest and about 0.5 m thick on point bar.



PR130. **Top.** 19 September 1997. View upriver of section, showing coal outcrop in river bed. **Bottom.** 20 October 2012. View is downriver showing coal outcrop along the left bank just upriver from cross section PR130. Red lines are approximate locations of the cross section.



PR130. **Top.** 27 September 2013. View upriver. **Middle.** J. Moody (~1.9 m tall) is on section, and D. Martin is standing at the tripod on the left bank. **Bottom.** View of right bank with grass on point bar. J Moody is at station 45.

