Muddy Creek Monitoring

Looking upstream from UMC6

ROD Performance Goal - Muddy Creek
"maintain adequate water quality, water quantity, species distribution, and aquatic habitat components"

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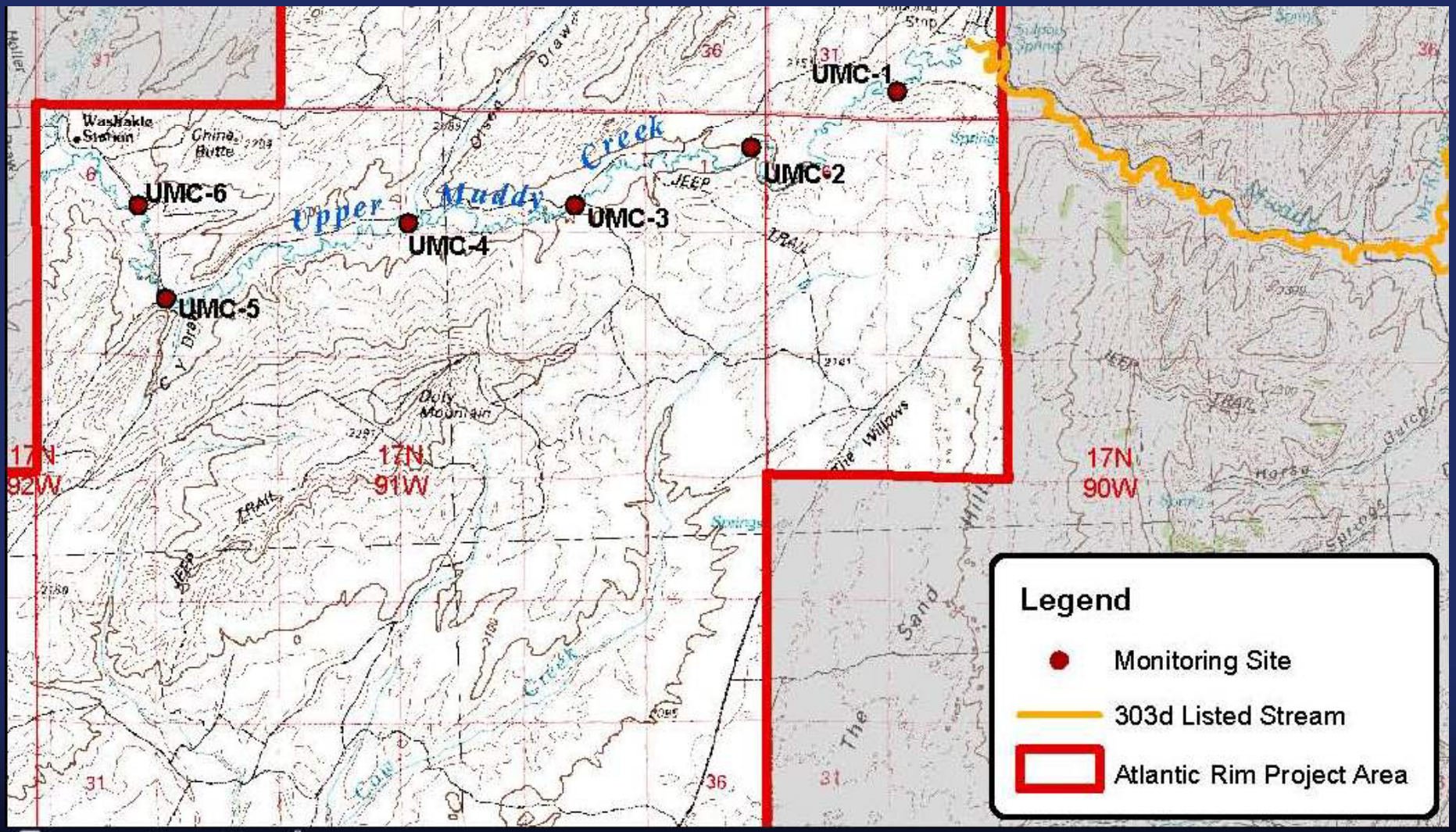
Rawlins, Wyoming – November 10, 2010

Map Overview of Sampling Locations



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Upper Muddy Creek Monitoring

- **3rd annual report is now complete (2010 data)**
- **After three years of <u>baseline</u> data collection within upper Muddy Creek (i.e., the project area) the following observations can be made:**
  - *Water quality shows very limited variability in Ca, Mg, and Na concentrations and indicate very low natural salt loading during the end of summer sampling period*
  - *Upper Muddy Creek is a highly erosive system*

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Upper Muddy Creek – A Highly Erosive System

- **Observational evidence:**
  - *BEHI Measurements*
  - *Patterns of fresh erosion and deposition documented at the reference x-sections*

UMC2 XS-6, 2009

UMC2 XS-1, 2009

UMC5 XS-4, 2009

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Upper Muddy Creek – A Highly Erosive System

Looking upstream from UMC 5, cross-section 1 - 2009

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Upper Muddy Creek – A Highly Erosive System

Panorama of upper portion of UMC6

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Upper Muddy Creek – Stable sections exist

Panorama of upper portion of UMC 1

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Upper Muddy Creek

Panorama of mid-section of UMC 6

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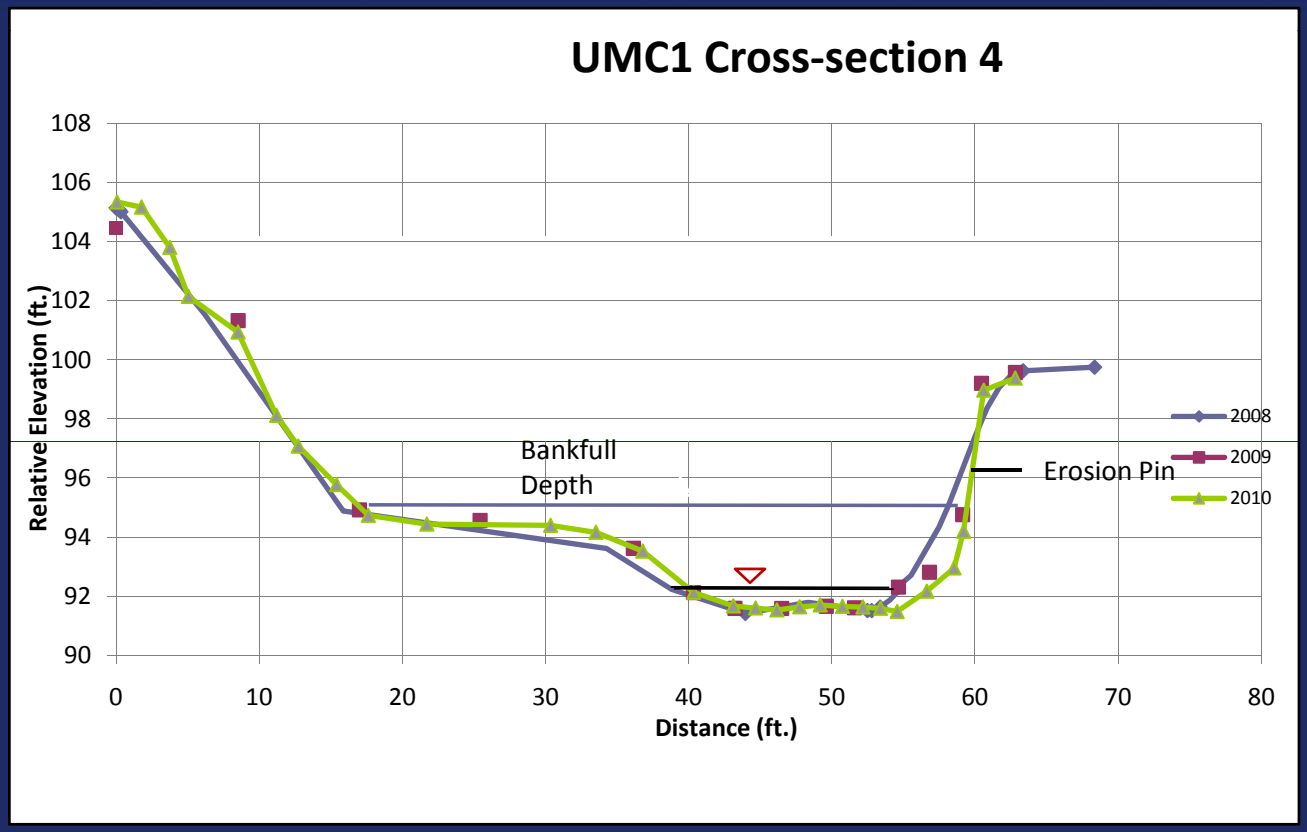
Review of Reference X-sections – UMC1(#4)



- No change in bed level/down cutting over 3-year period of observation
- Gradual widening of the stream on the right bank (when looking downstream)

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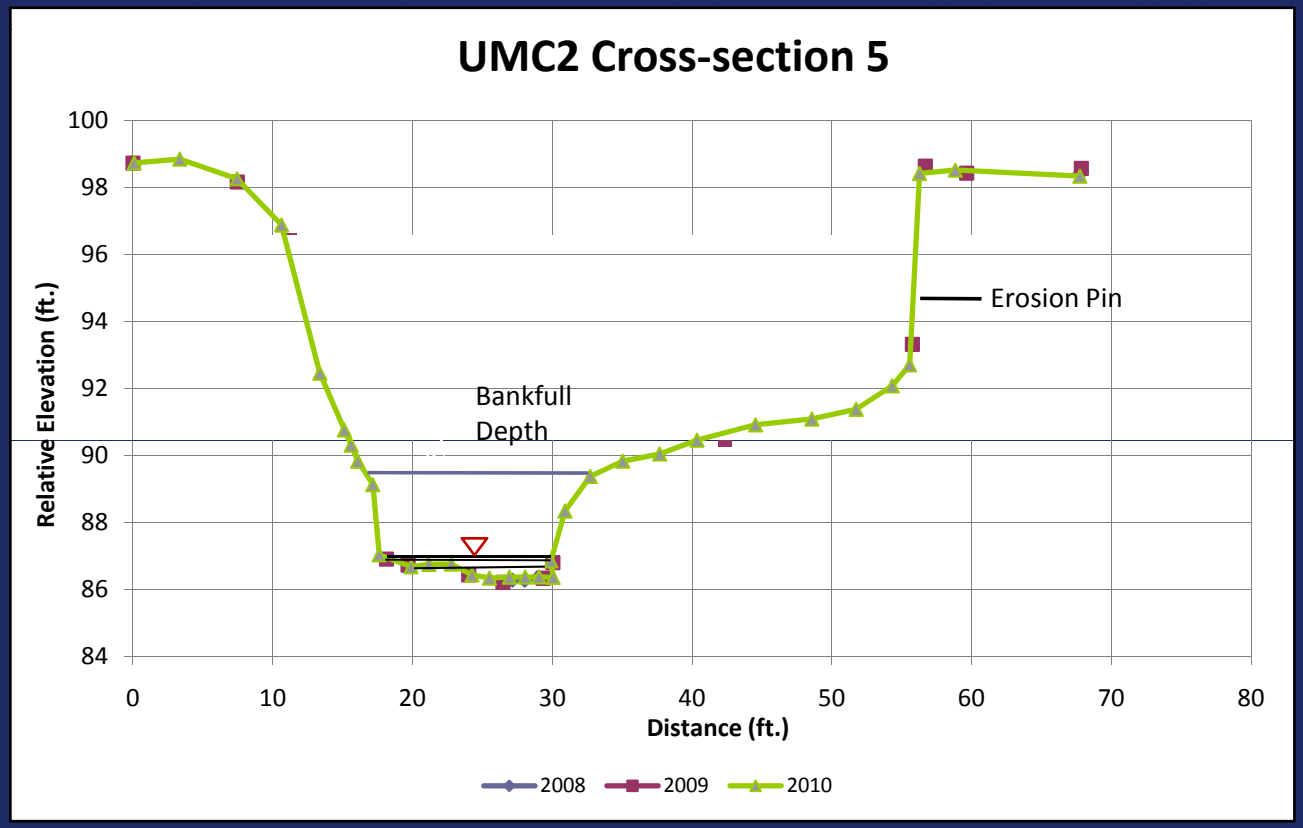
Review of Reference X-sections – UMC2(#5)



- No change of bed level/down cutting over 3-year period of observation
- Signs of sediment deposition on the right bank in 2010

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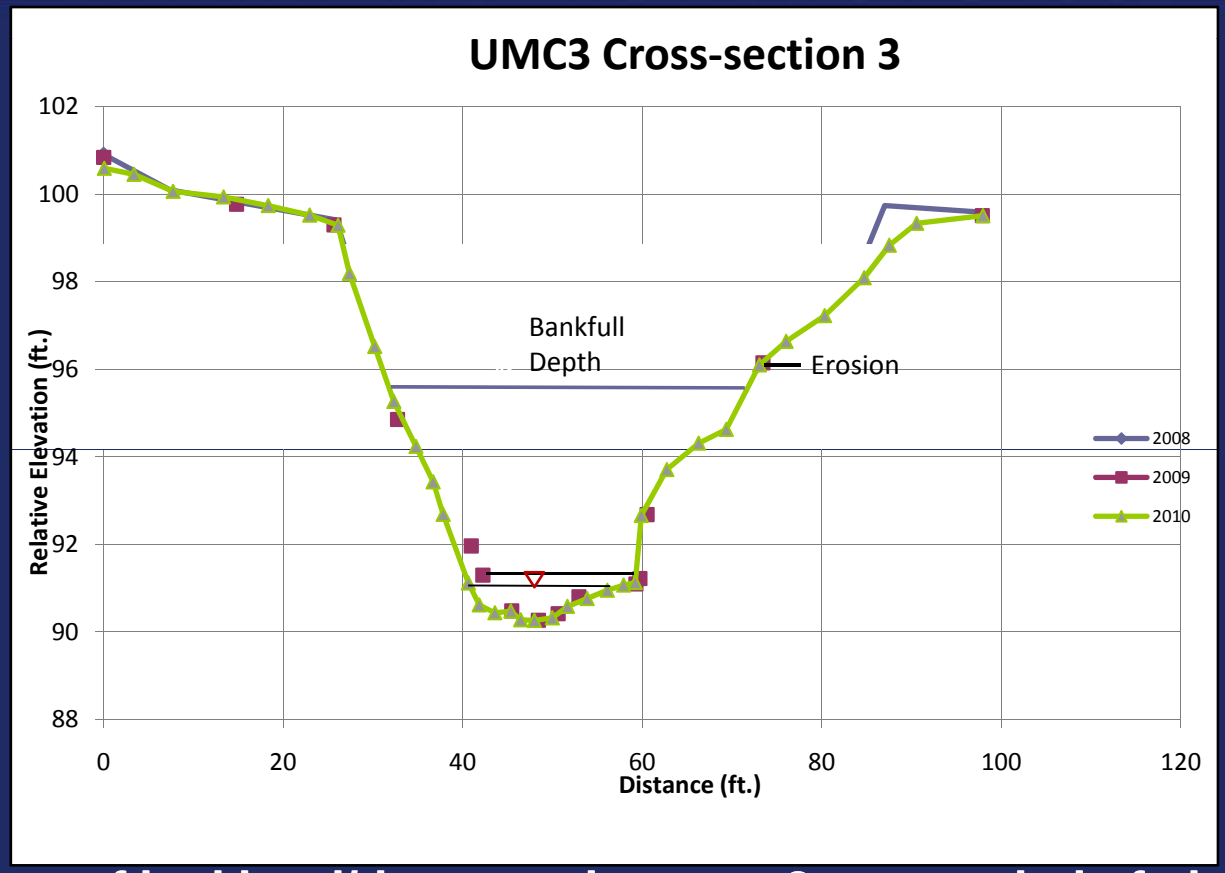
Review of Reference X-sections – UMC3(#3)



- No change of bed level/down cutting over 3-year period of observation
- Indication of significant sediment transport during 2009 on the left bank
- Gradual widening of the stream on the left bank in 2010

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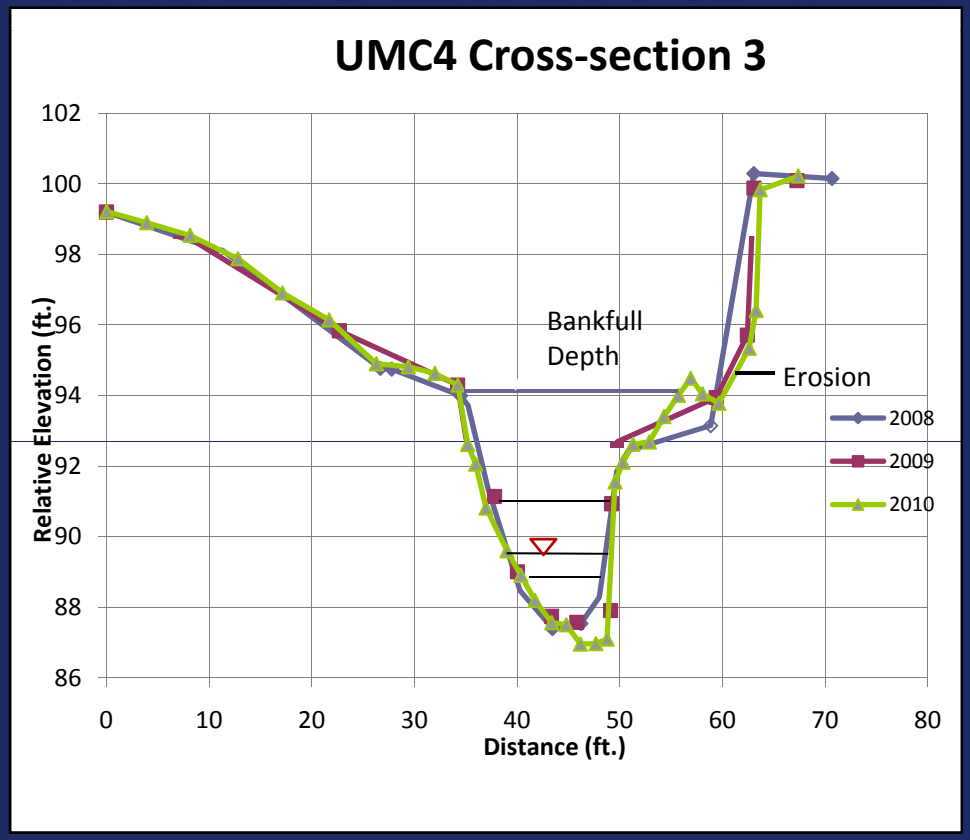
Review of Reference X-sections – UMC4(#3)



- Some change in bed level/down cutting in 2010
- Signs of bank sloughing on the upper right bank in 2009 and 2010

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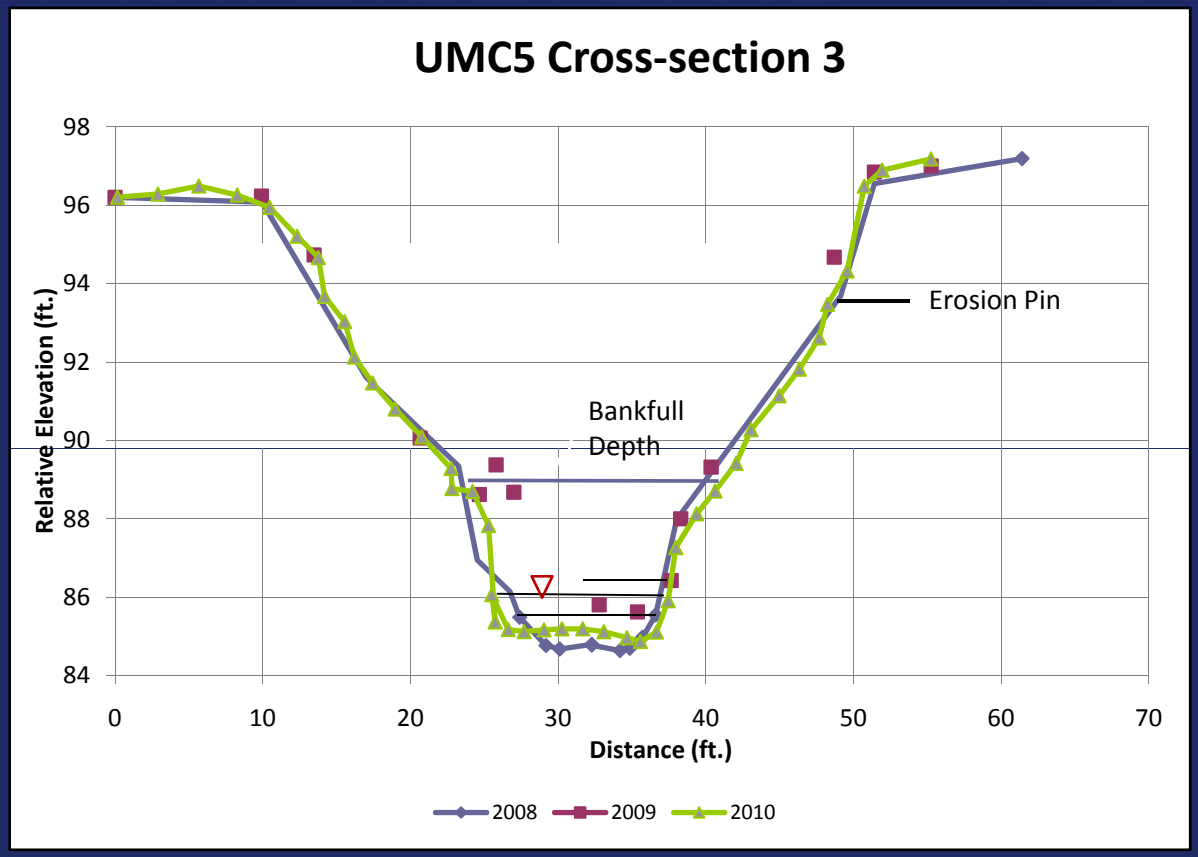
Review of Reference X-sections – UMC5(#3)



- No change of bed level/down cutting over 3-year period of observation
- Significant sediment deposition on the left bank in 2009
- Significant sediment removal on the left bank in 2010

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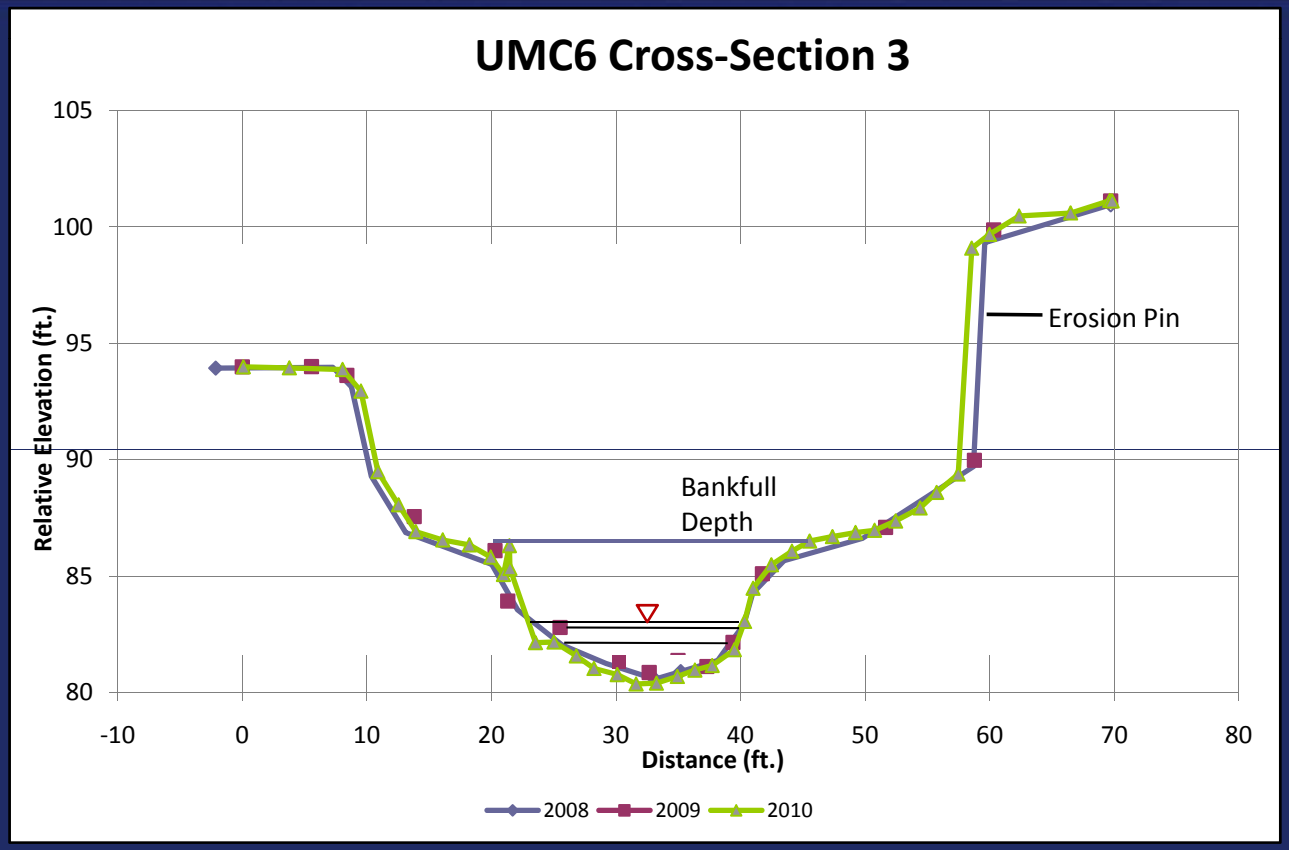
Review of Reference X-sections – UMC6(#4)



- No change of bed level/down cutting over 3-year period of observation
- No indication of stream widening over the 3-year period of observation

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CDM suppositions/recommendations

- **Suppositions:**
  - *Sediments from erosion are generally being moved downstream each year – system may be close to an equilibrium transport situation*
  - *Stream has possibly achieved a somewhat stable vertical profile – it at least appears that the stream is not degrading on a year to year timeframe*
  - *A slow rate of lateral migration is suggested by:*
    - Reference x-sections and the limited changes in bank profiles
    - Generally slow rate of upper bank movement as measured by erosion pins
- **Recommendations**
  - *Suspend baseline data collection given the slow rate of geomorphologic change as indicated by 3-years of data*
  - *Consider monitoring when development begins in the Upper Muddy Creek drainage*
  - *Evaluate monitoring frequency if monitoring is re-initiated*

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