Soils in the Riparian Complex

Incorporating Soil Dynamics into Ecological Site Descriptions

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August 16, 2007
Water Changes Everything

- Water is the trump card over soils in riparian zones in arid climates
- Plant community may reflect dynamics of moisture conditions rather than soil characteristics
- Plant community may reflect recent conditions that may not be evident in the soil
Fourth Dimension of Variability

- Temporal (Seasonal) Variability
  - Depth to water table
  - Salt distribution (salt moves with water)
  - Anaerobic conditions
  - Ponding and flooding
Dynamics of Soil Wetness

- Episaturation
- Endosaturation
- Ponding
- Flooding
- Capillary fringe

- Depth
- Duration
- Frequency
Dramatic Changes over Short Distance

- Vertical stratification
- Channel cut and fill
- Recent deposition
- Nature (particle size) of sediments
Soil Impacts

• Fresh sediment addition and fine stratification common
• Clay and gravel lenses affect vertical and lateral flow
• Sediment may be from stream flow deposits or upland slope wash
• Soil particle size reflect the energy (velocity) of depositional environment
• Salinity is transient, but moves slowest through clayey sediments (as does the water)
• System may be accumulating or eroding soil sediments, often both occurring at same time
• Water table may act as restrictive feature to rooting on some plants
Soil Indicators of Wetness

• Redoximorphic soil indicators when observable usually indicate long term stable conditions, or long term fluctuations

• Wetness indicators (redoximorphic) may not be reflective of current moisture

• Relict redoximorphic features may persist after a site is drained

• Hydric Soil definition or criteria may or may not always be met in riparian areas
Soil Map Reliability

• Soils in riparian settings (level, near water) often dramatically manipulated by man for agricultural production over centuries of time

• Do not expect soil maps to reflect the full variability of conditions, nor be site specific

• Look for special features/spot symbols to reflect areas of observed deviation from named soil

• Read between the lines on soil reports and descriptions

• Look for small topographic changes  
  – terrace vs. flood plain vs. active channel

• Soils in riparian zones reflect changes in upland  
  conditions (sediment deposition, scouring, and changes in particle sizes)

• Get support from soil scientist