LESSON 3

GEOMORPHIC FACTORS AND SCREENING
LEARNING OUTCOMES

• Define fluvial geomorphology

• Describe geomorphic factors

• Based on planform, classify a stream reach

• Determine potential for instability problems using planform classification
FLUVIAL GEOMORPHOLOGY

- GEO = earth
- MORPHOLOGY = study of form
- FLUVIAL systems are those systems related to streams and rivers
FLUVIAL GEOMORPHOLOGY

• Rivers are dynamic features
• Channel modifications affect channel characteristics
GEOMORPHIC FACTORS

- Common stream types are described
- Approach based on observed stream properties
- Geomorphic properties used as the basis of a valid stream characterization
- Facilitates assessment of streams regarding stability and scour
Potential scour depth increases with increasing stream size

Lateral erosion potential also increases with increasing stream size
FLOW HABIT

• EPHEMERAL – flows in direct response to rainfall (includes intermittent streams)

• PERENNIAL – flows all or most of the year
BED MATERIAL

- Silt, clay, sand, gravel, cobbles, boulders

- Streams can be classified by the dominant bed sediment size
VALLEY SETTING

• High relief
• Low relief
• Alluvial fans
FLOODPLAINS

- Alluvial lowlands bordering a stream
- Subject to frequent overbank flows
- Reworked by actively migrating streams
NATURAL LEVEES

- Form during overbank flooding
- May limit lateral migration
• Determined by bank height at normal stage relative to width

• Except for western arroyos, incised streams tend to be fixed in position
CHANNEL BOUNDARIES

- Alluvial
- Semi-alluvial
- Non-alluvial
CHANNEL BOUNDARIES

- Bank appearance is a good indicator of stability

- Types of bank failure dependent on bank materials: non-cohesive, cohesive, and composite
STREAM PLANFORM

- Stream planform is the shape of a stream when viewed from above.
- Stream planform is useful in understanding stream morphology and potential stream response to change.
MEANDERING STREAMS

- Thalweg
- Sinuosity
- Point bar
- Cutoffs and oxbows
STRAIGHT STREAMS

- Considered a transitional stage
- Even in straight channels, the thalweg will meander
BRAIDED STREAMS

• A braided stream consists of multiple and interlacing channels

• Braided streams are unstable and change alignment rapidly
ANABRANCHED STREAMS

- Individual braid channels
- Braid channels distinctly separated and more fixed in position
VARIABILITY OF WIDTH AND DEVELOPMENT OF BARS

- Equiwidth streams
- Variable width streams
SCREENING EXERCISE

• Screen the following channels in terms of relative stability

• If unstable, list the nature of instability
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