ECOLOGICAL SITES IN RIPARIAN AREAS
ALBUQUERQUE, NEW MEXICO
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Bob Leinard
NRCS (Retired)
91 First Road
Whitehall, Montana 59759
(406) 287-5321
ECOLOGICAL SITES

- Landform / Physiographic Features
- Soil Properties
- Average Annual Precipitation

To Describe

- Plant Community Composition & Production
- Interpretations for use & management
Ecological Sites
Riparian Areas

- Landform / Geomorphic Features (Rosgen Stream Type)
- Soil Properties
- Climate

- Plant Community Composition & Production
- Interpretations for use & management
**WIDE VALLEY BOTTOM STREAM**
- slope less than 2%
- point bars, riffles, pools
- flood flows spread over broad floodplain and riparian area
- sinuous
- wide, shallow
- horizontal (lateral) erosion

**MEANDERING MEADOW STREAM**
- slope less than 2%
- flat-bottomed valley
- narrow, deep, sinuous channel
- little sediment load
- accessible floodplain
- well-vegetated banks

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**C TYPE CHANNEL**

**E TYPE CHANNEL**
E Channel Type
SOILS

C Stream Type

- Textures vary:
  - Mainly loamy or sandy
- No salts
- May exhibit gleyed colors

Ground Surface:
- About 110 cm
- Redoxomorphic features (mottles)
- Permanent water table
SOILS

**E Stream Type**

- Water table will be within 60 cm. of surface.
- Textures tend to be fine family.
- Will exhibit gleyed colors.
- Gravel layer may or may not be present.

Ground surface
NEEDS OXYGEN

WATER
ABSORPTION
ROOT GROWTH
AERATED SOIL

OXYGEN

SATURATED SOIL
(Poorly aerated)
ECOLOGICAL SITES

PERCENT COMPOSITION

C CHANNEL TYPE
RIPARIAN SUBIRRIGATED

- PURPLE = WILLOWS
- RED = TREES
- GREEN = OTHER SHRUBS
- YELLOW = GRASSES
- BLUE = SEDGES

Leinard, unpublished data
SCHUMM'S MODEL

I
Floodplain
Q_2
Terrace_1
STABLE

II
(Headcutting)
Q_{10}
UNSTABLE

III
(Bank Failure)
+ Q_{10}
WIDENING

IV
+ Q_{10}
STABILIZING

V
Terrace_2
Q_2
New Floodplain_2
Terrace_1
STABLE

Schumm, Harvey, & Watson 1984
EXAMPLES OF SCHUMM'S MODEL

HOW IT STARTS (THRESHOLD)

STAGE II

STAGE IV

STAGE V
CHANNEL EVOLUTION MODEL COMPARISON

STAGES

I

STABLE

II

INCISION

III

WIDENING

IV

STABILIZING

V

STABLE

ROSSEN CLASSIFICATION

TERACE 1

h < \( h_o \)

TERACE 2

h = \( h_o \)

h > \( h_o \)

(hiscut)

(gc)

(bank failure)

(REFF)

SCHUMM (1984)

STATES

A

Wet Meadow/Marsh

E to C

B

Mesic/Wet Meadow

C

C

C

C

MESIC MEADOW

MESIC MEADOW

MESIC MEADOW

MESIC MEADOW

MESIC MEADOW

JENSEN (1992)

ROSSEN CLASSIFICATION

TERACE 1

TERACE 2

h = \( h_o \)

h > \( h_o \)

h = \( h_o \)

h < \( h_o \)

TERACE 1

TERACE 2

F

C to E

E

E

E

E

E

ROSSEN (1994)

PLAN VIEW

CHANNEL ADJUSTMENT STAGES

WID RATIO 3.3

SINUOSITY 2.3

WID RATIO 2.8

SINUOSITY 1.9

WID RATIO 3.5

SINUOSITY 1.3

WID RATIO 4.0

SINUOSITY 1.7

WID RATIO 5.5

SINUOSITY 1.5

(W ater surface slope .008)

(Cross section view)(Valley slope .026)
Succession of states for alluvial/nongraded valley-bottom type.

A: Wet Meadow/Marsh

B: Mesic/Wet Meadow

C: Sagebrush Meadow

D: Sagebrush Meadow

E: Sagebrush Meadow

F: Wet Meadow/Marsh
Hydraulic mining at Confederate Gulch. —Montana Historical Society, Helena
INCREASED DISTURBANCE

- Converted to hay
- "new" Ecological site
- NPG w/ W.T.
- S
- S, RH
- $$$
- Schumm's STAGES II-IV
- "E" type channel
- STREAM DEGREDATION
- "F" or "G" type channel

- Large sedges
- Kentucky bluegrass
- Baltic rush
- PrG w/ Rest
- W.T. lowers
- USDA NRCS

- Sedge
- Rush

- S

- NPG

- PrG w/ Rest
A. (Historic Climax/Potential Plant Community): Tall and Medium Willows, Tall and Medium Grasses & Sedges, Rushes, Forbs (Obligate and Facultative Wetland)

B. Willows, Sedges, Mid Grasses, Rush, & Forbs (Facultative Wetland / Obligate)

C. Medium and Short Sedges & Grasses, Rushes, Forbs, Mature Willows (Facultative Wetland, Obligate)

D. Non-Native Short Grasses, Rush, Forbs, Shrubs, Sedges (Facultative and Facultative Wetland)
   May be a temporary drop in water table level, no change in stream type

(1a) HCPC (at a lower elevation in narrower riparian area)

With Adequate Sediment, etc.

Advanced Channel Recovery Stages *

Extended Rest, PG

(2) Non-Native Short Grasses, Forbs, Shrubs (Facultative and Facultative Upland)
   May be a permanent drop in water table level, no change in stream type

Extended Rest, PG

Advanced Channel Recovery Stages *

Channel Incision, Overwidening and Braiding (Rosgen F, G, or D)

(3) Early Seral Community within a smaller riparian area at lower elevation
   Colonizing grasses, spikerushes, rushes, and willow

NPG, Upland Degradation**

NPG, Restored to Pre-disturbance Conditions***

(4) “Upland” ecological site (e.g., Sandy, Silty), or may be a Subirrigated Site (depending on resulting depth to water table), or other
   Mainly upland species, often with remnant wetland species widely dispersed

NPG, Restored Site and/or Watershed Hydrology***

* Refer to the appropriate channel evolution/recovery model (e.g., Schumm et. al., 1984, Jensen 1992) for details. This recovery may occur over many years.

** Upland degradation may occur from de-watering, lack of fire, conifer encroachment, or drought.

*** Restore hydrology by prescribed fire, timber harvest/thinning, adjust irrigation system or change in grazing management with accelerating and/or facilitating practices.
SCHUMM'S MODEL

I

Floodplain

Q₂

STABLE

II

(Headcutting)

Q₁₀

UNSTABLE

III

(Bank Failure)

+ Q₁₀

WIDENING

IV

STABILIZING

V

Terrace ₂

Q₂

STABLE

New Floodplain ₂

Terrace ₁

Schumm, Harvey, & Watson 1984
For More Information:
State Range Mgt. Specialist
Bozeman, Montana
(406) 587 6790

QUESTIONS ?