Stehekin River Corridor

River Mechanics Concepts Stream Dynamics Wood Debris & Sediment Impacts Management Options

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Stream Characteristics

Diagnostic Stream Pattern	Vertical Behavior	Horizontal Behavior	Stream Response
	Erosional	Structurally Controlled	More Erosional
	(Degrading)	"V" Shaped Valleys Minor Shifting	
Stable	Stable	Flat-Bottomed Valleys	Peak
	Slowly Shifting Meanders		
	Transitional	Double Channels One Dominant	Increase Gradient
	(Slight Filling)	Short Reach	(Energy)
		Stable Islands	
and the	Depositional	Flat-Bottomed Valleys	Decrease Sediment
300	(Extensive Filling)	Shallow, Unstable Braided Channels	Supply
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Deposition

Some Common Causes

Sediment Transport

(Highly Sensitive To Local Flow Velocity (Turbulence)



Surface Material Types







Alluvial Fan Development (Sediment Loads Exceed Stream Transport Potential)



Sediment Deposition

Potential Impacts

Lateral Replacement Example



Channel Carries Considerable Large Woody Debris (LWD) & Bedload





Log Jams

Large Woody Debris (LWD)

Provides Stream Nutrients & Cover

Types Of Log Jams Snag Jams LWD Catches On Obstruction Span Jams LWD Bridges Across Channel Shoal Jams LWD Catches On Shoaling Bed

Snag Jam Causing New Gravel Bar

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Snagged LWD

Snag Jam Protects Island From Scour



Span Jam Slows Flow Into Channel



A.T.S.

Smaller Side Channel





Span Jam Enlarging As More LWD Caught

LWD Spans Channel

Small Side Channel Entrance

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Shoal Jam Causing Out-Of- Channel Flow



Gravel Buildup

Overflow

Path

Shoal Jam Causing Channel Change

Flow Diverted To New Channels

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Overland Flow

Management Considerations



Overbank Flow Shallow, Low Velocity Often Beneficial



Floodplain Management



Sheet Flow Is Manageable Big Wood River Flood -- June 1986

Stream Corridor Management Philosophy

Development Encouraged In Floodprone Areas Bank Degrades

Stream

Channel

No Flood Storage

Blocked Side Channel Water Table Lowered

> Downstream Velocity, Erosion & **Sediment Movement** Increase

Flood Levels Raised

Dike

Boundary

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Floodplain

C

Quick Flush

Poor Management Technique

Shifts Problems To Others

Encourages Unsound Development



Good Management Technique

Helps Protect Downstream Reaches

Increases Base Flow

Encourages Sustainable Development

Boundary Undeveloped Floodpain **Temporary Flood Storage** Sediment **Cross Valley Dike** Trapped Overflow Channel Groundwater Recharged **Grade Controls** Channel Stabilized Downstream

Flood Peaks Lowered

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Long Range Floodplain Management Goals

Competing Approaches

Quick Flush

Higher Downstream Flood Peaks

Stream Channelized

High Stream Velocities

Heavy Bank Armoring

Sediment Flushed Downstream

Low Water Table

Minimum Overbank Flow

Floodplain Dryed

Base Flow Diminished

Sparce Floodplain Vegetation

Floodplain Utilization

Lower Downstream Flood Peaks Stream Develops Pools & Riffles Moderates Stream Velocities Grade Control In Steep Sections Sediment Movement Minimized Stabilize Or Raise Water Table

Frequent Overbank Flow

Wetlands Maintained

Base Flow Stabilized Or Increased

Considerable Riparian Vegetation

?? Best Path For Community Development ??