

# Flow: The Master Variable that Shapes, Maintains, and Supports Rivers



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# River Process-River Form

## Connectivity

## Physical Integrity





Water  
Transport

Sediment  
Transport

River  
Form

+

River Processes





**Connectivity** - movement of mass (water, sediment, nutrients, seeds, fish, bugs) and energy between components in a river environment.

upstream - downstream  
uplands - channel  
floodplain - channel  
groundwater - channel  
atmosphere - channel





Physical Integrity- an active system,  
transports, stores and remobilizes water,  
sediment, and nutrients





# Shape the Cache la Poudre

Geology

Climate





# Shape the Poudre River Watershed

Mountain



Transition



Plains

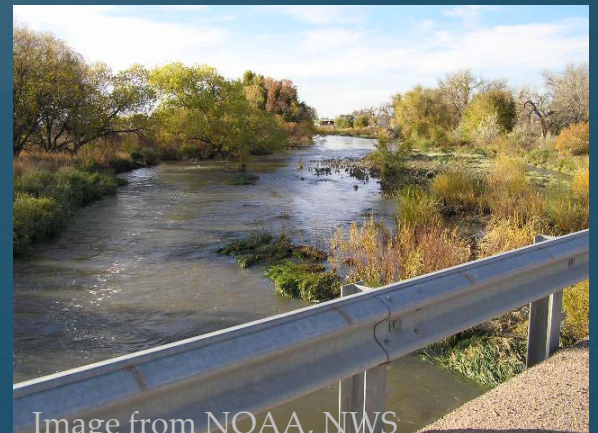


Image from NOAA, NWS



# Shape the Poudre River

## Human Influence





# Shape the Poudre River

## Disturbance





# River Process



~Water - How much, how frequent, when?

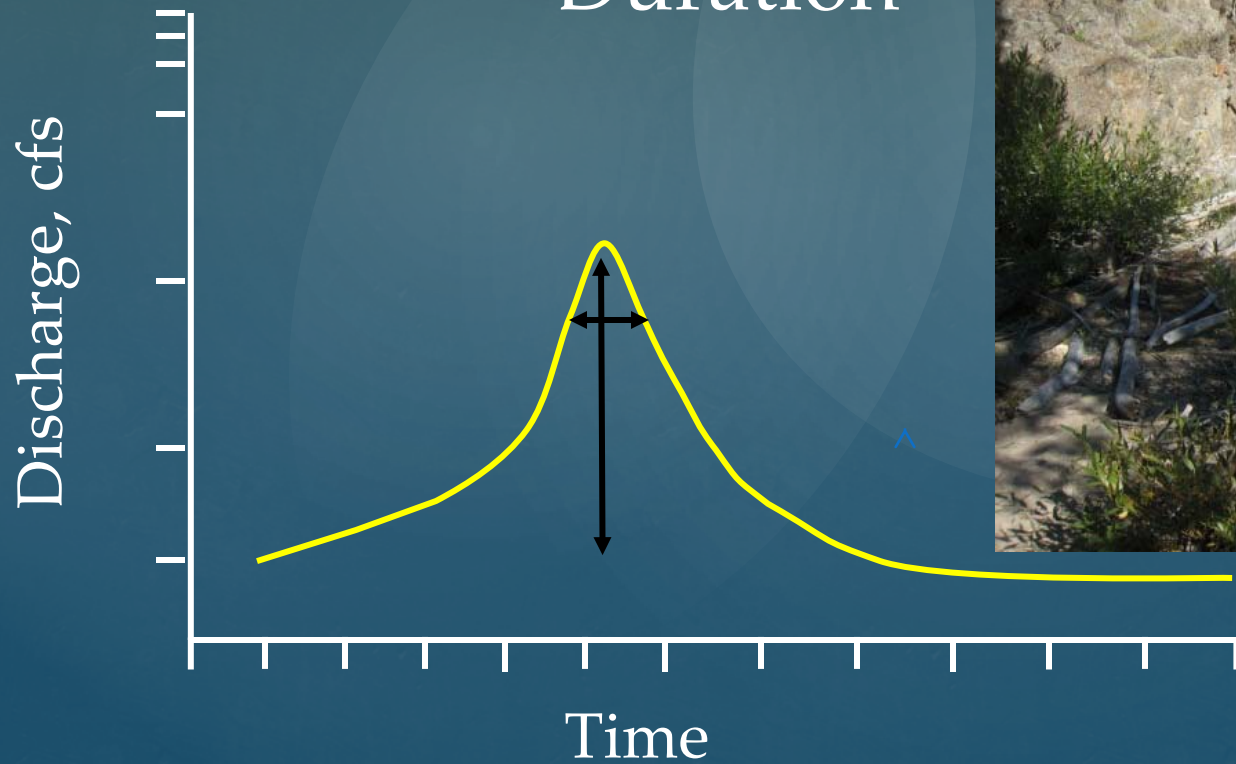




# Water

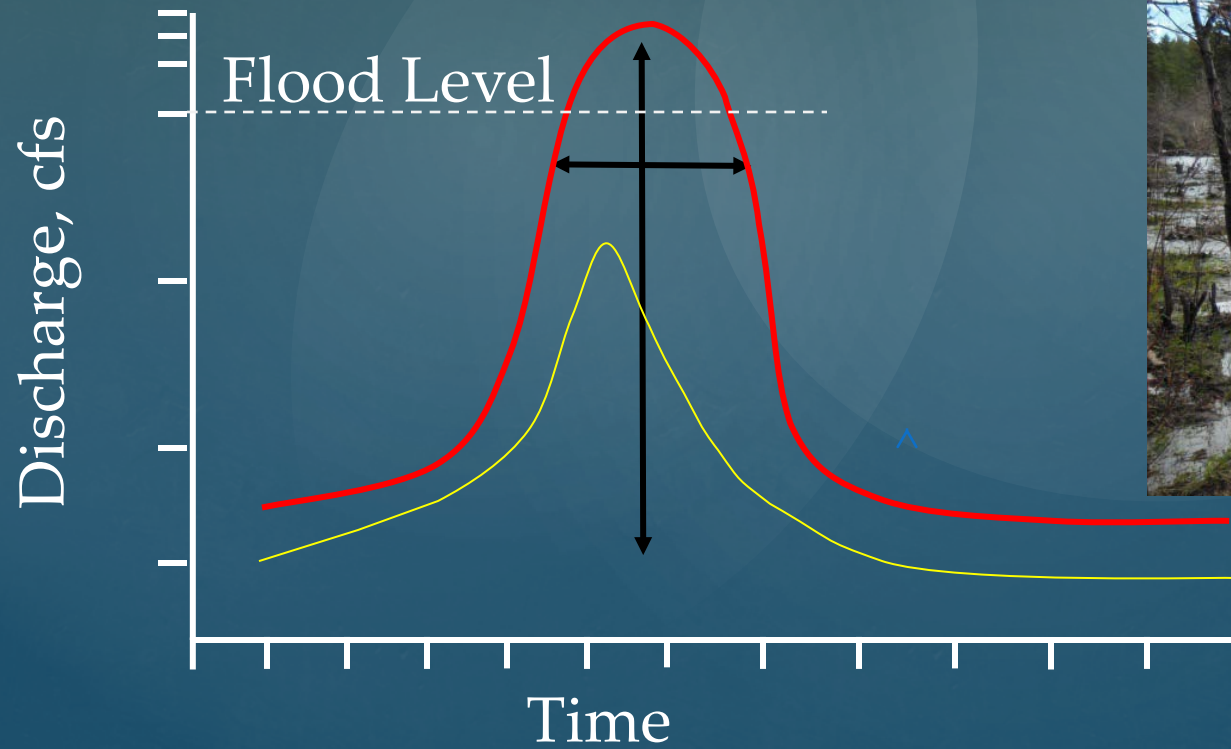
## Hydrograph

Magnitude  
Duration





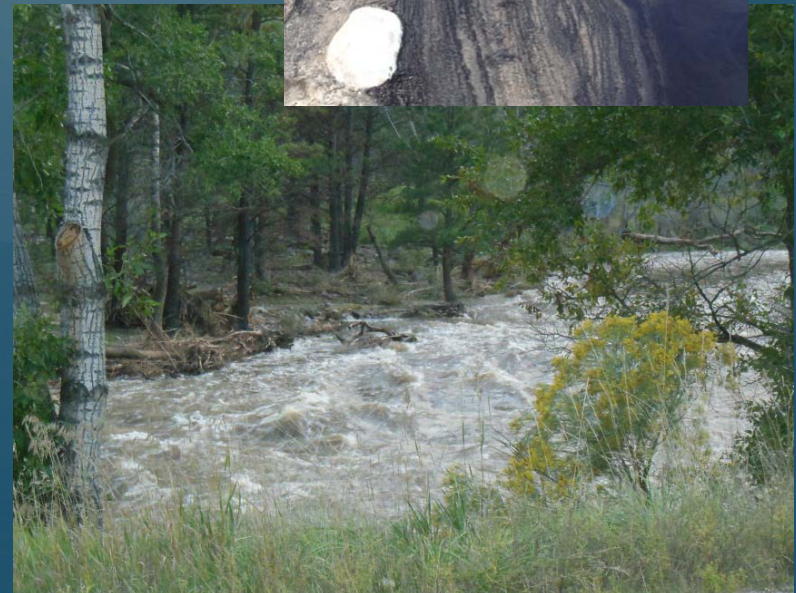
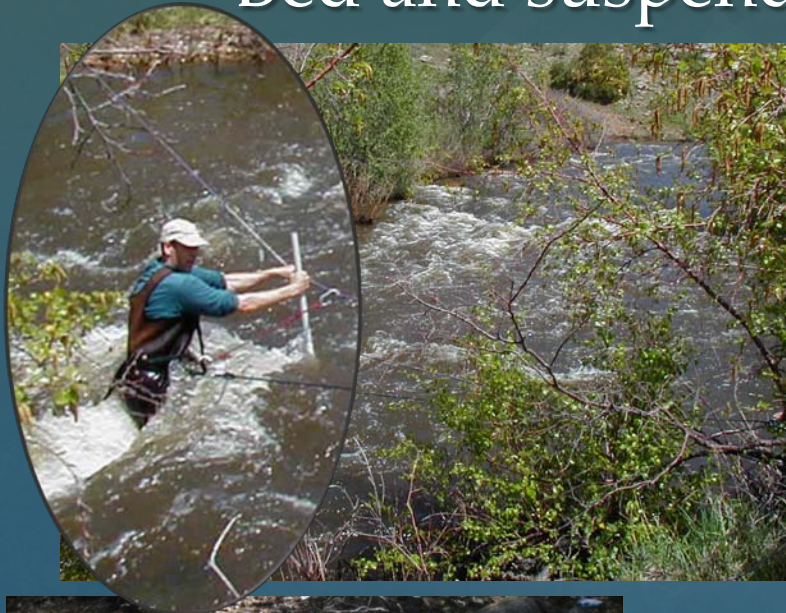
# Hydrograph





# River Process ~ Sediment

Bed and suspended sediment





# Sediment

Scrubbing agent

Good for streamside vegetation





# River Form

~ Planform— straight, meandering, braided

1937



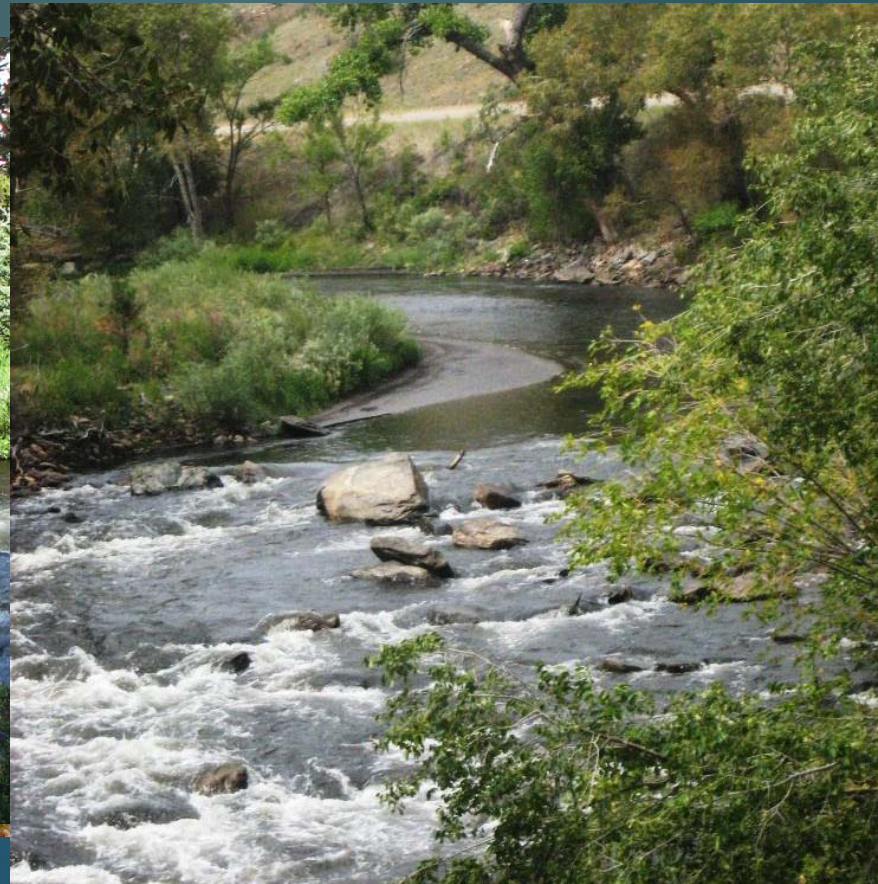
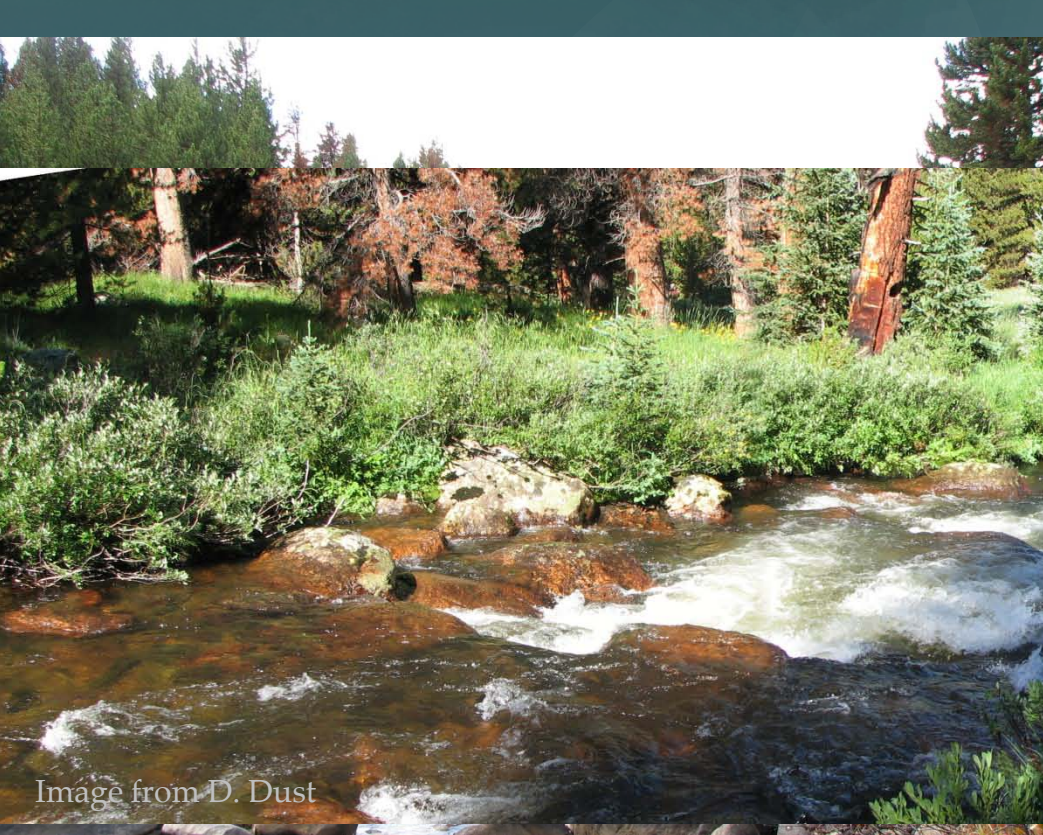
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# River Form

~ Bedforms – cascade, step-pool, pool-riffle





Physical Integrity — processes and forms maintain active connections under current flow and sediment conditions, and change within limits set by societal values





River Process-River Form

Connectivity

Physical Integrity







Thank you!