Overview of Fundamental River Functions
(and a little climate change, and a little resilience)

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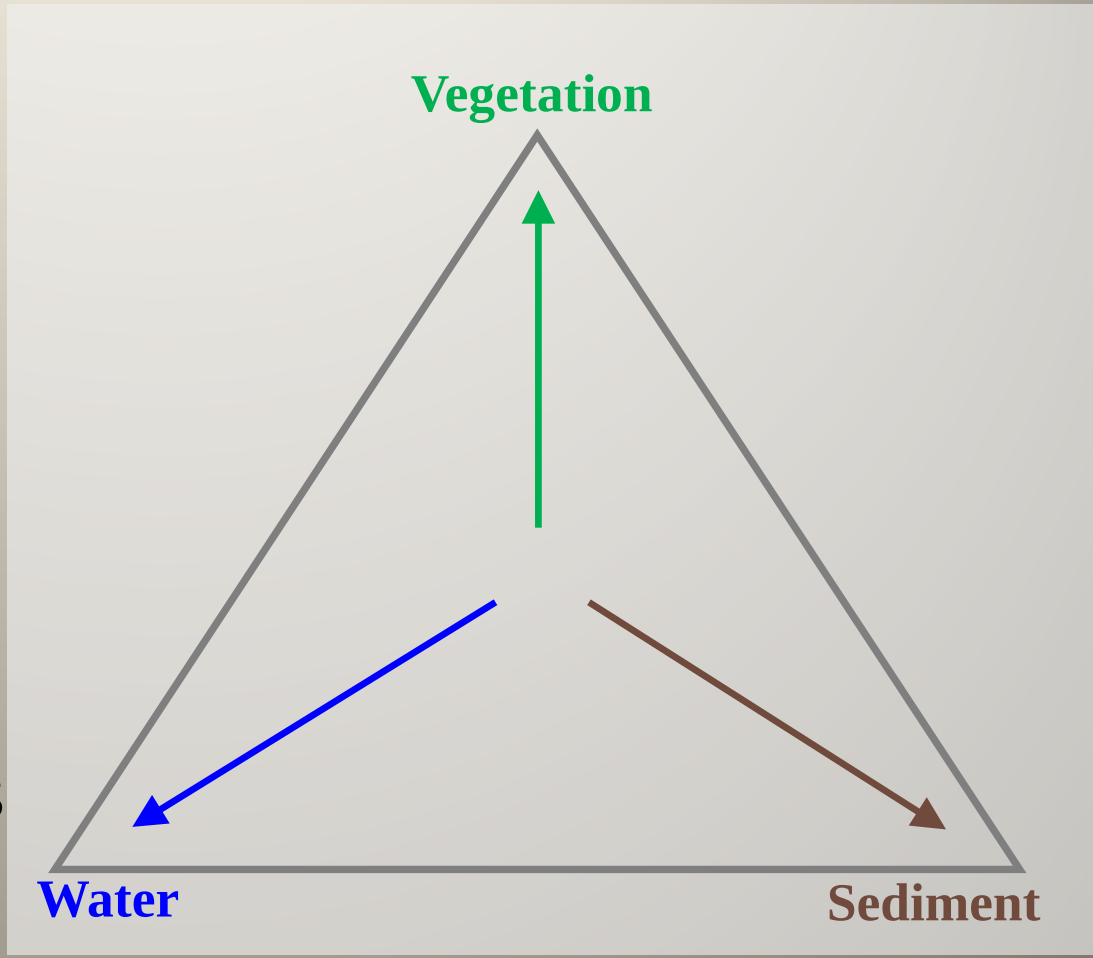
Outline

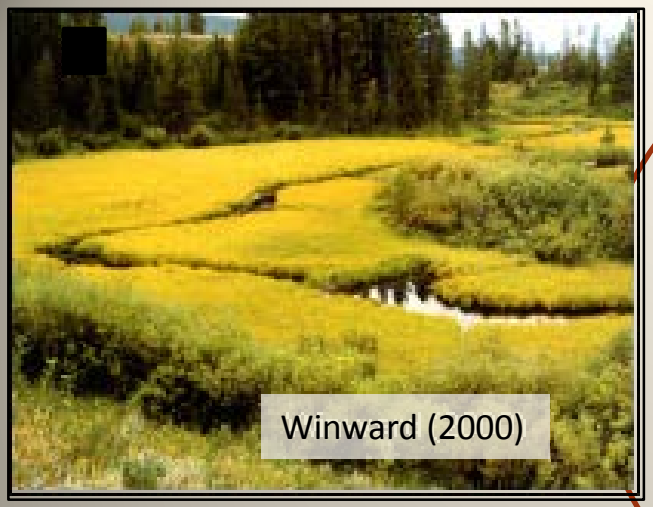
- Physical form and function
- River processes that make (and unmake) habitats
- Climate change
- Resilience

Physical Function – Brown, Green, Blue

- Three co-equal components
- Always changing
- Points more simple; center more diverse
- Interplay creates channels, floodplains, habitats for fish and wildlife



Vegetation



Roots

Wood

Roughness

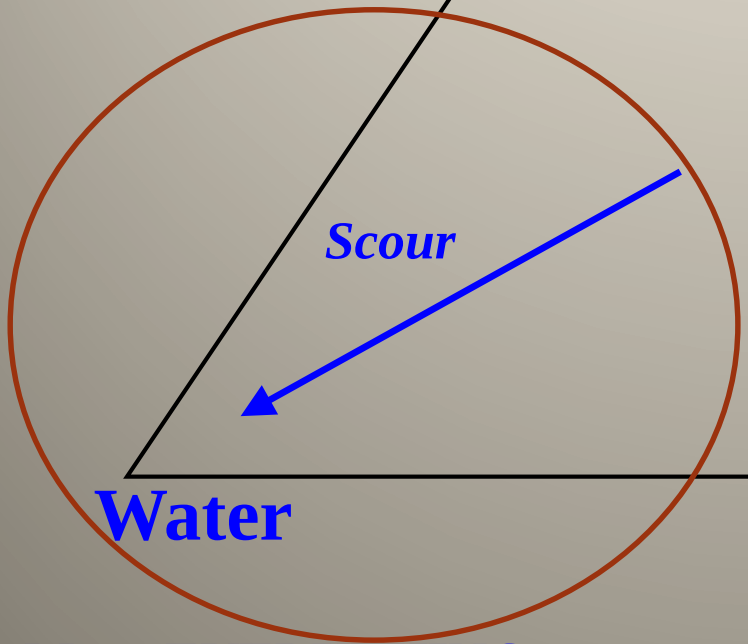
Slowing water and Holding soil

Dune 2014

Volume (mobility)

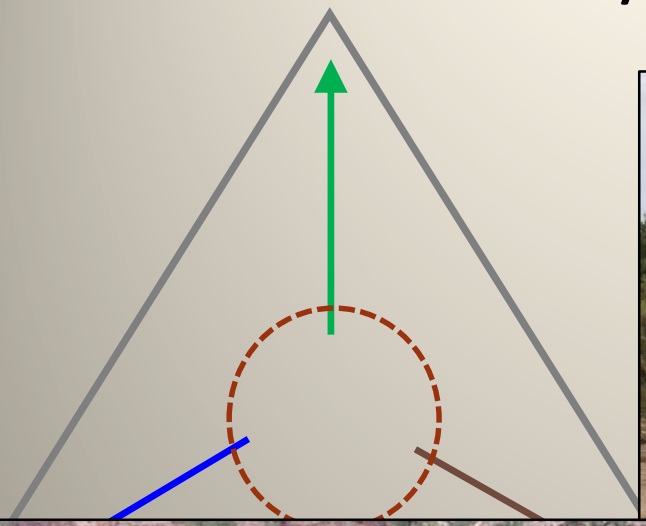
Sediment

Fill in channels



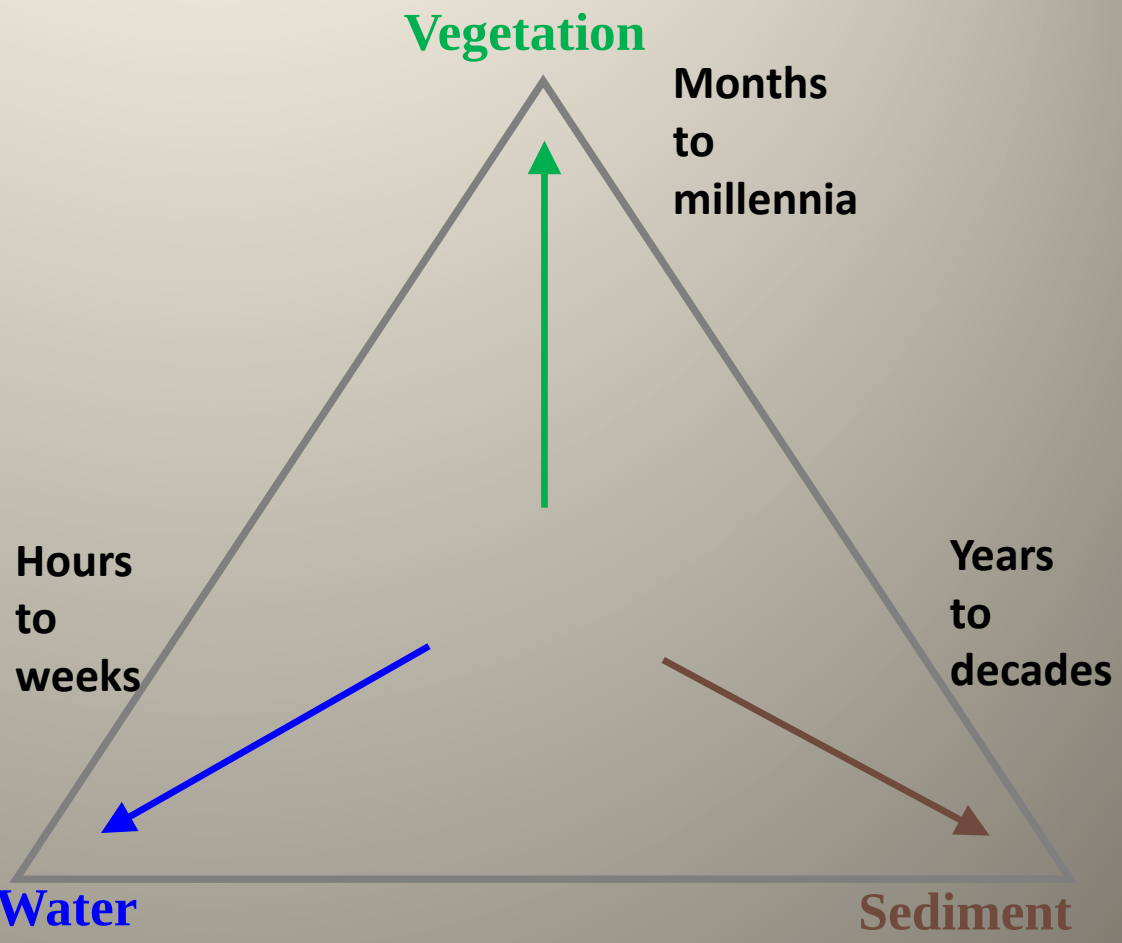
Move EVERYTHING

All three present, none dominant



Physical Function – Brown, Green, Blue

- Which is in control and why?
- Always changing
  - When does it change?
  - Seasonal, big event?
  - How much?
- ‘Tug-of-war’
  - ‘Pull’ then relax
  - Length of ‘pull’



Sediment

Lockhart Basin, Bear's Ears Monument. Photo by Eric Head

Rio Blanco R., San Marcos, TX

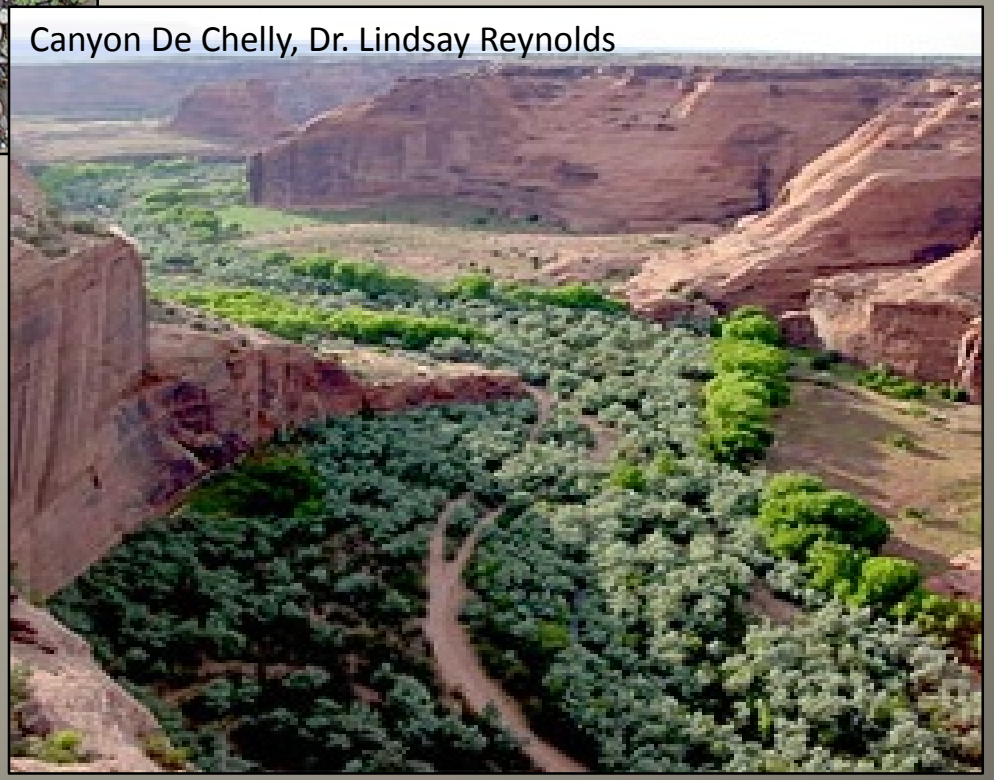
Water


Cape York, Australia
www.capeyorkwaterquality.info


Tularosa Creek, NM

Vegetation


SW Oregon Coast, feet by H. Hoogesteger


Canyon De Chelly, Dr. Lindsay Reynolds

Changing Times – Climate

- In Nevada by 2100*
  - Temperatures up 3-4° F in spring and fall; 5-6° F in summer and winter
  - Heat waves
  - Less precipitation in summer (~10%), more in other seasons (15-40%)
  - More frequent El Nino years
  - Erratic summer precipitation
  - Feast AND Famine


Sept 2014 storm, Moapa and I-15; John Locher/AP

*Parra, N., Williamson, S., Ruth, M., Ross, K. and Irani, D. 2008. Economic Impacts of Climate Change on Nevada: A Review and Assessment Conducted by The Center for Integrative Environmental Research, University of Maryland.

On the Ground

- What about the Brown, Green, and Blue of Clark County?
  - More floods
  - Heat tougher on native vegetation
  - More wildfires
  - More sediment moving
  - More weeds

sigh

Building Resilience

- Think MESSY
  - Vegetation structure
  - Topography
  - Channels
  - Debris
- Think DIVERSE
  - Vegetation species
  - Age classes
  - Surfaces
  - Channel types
- Think ADEQUATE
  - Bridges
  - Culverts
  - Dams
  - Storm water runoff

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Physical Function – Change Over Time

Vegetation

Water

Sediment