Changes in Patterns along the Dolores River Over 75 Years

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River Crossings Conference
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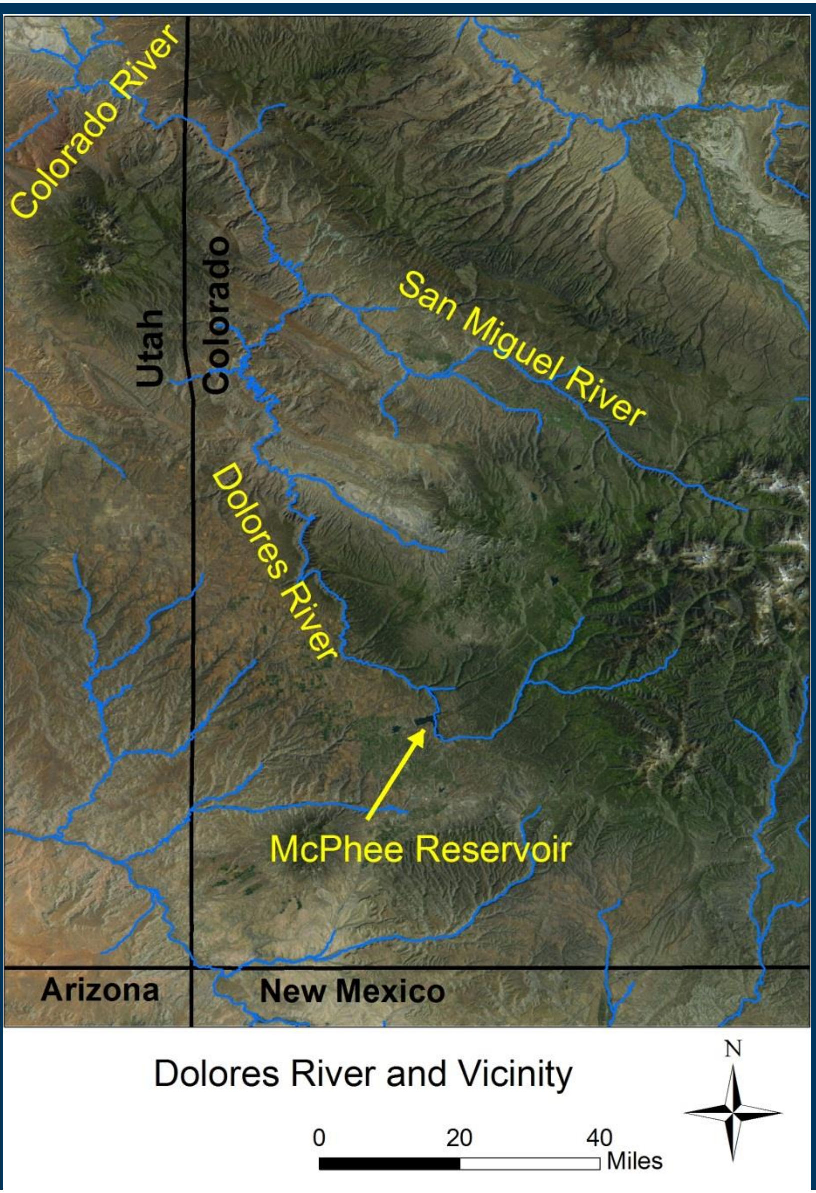
Study Area

Dolores River - from McPhee Dam to the confluence with the Colorado River (approx. 180 miles)



Peak flow reduction

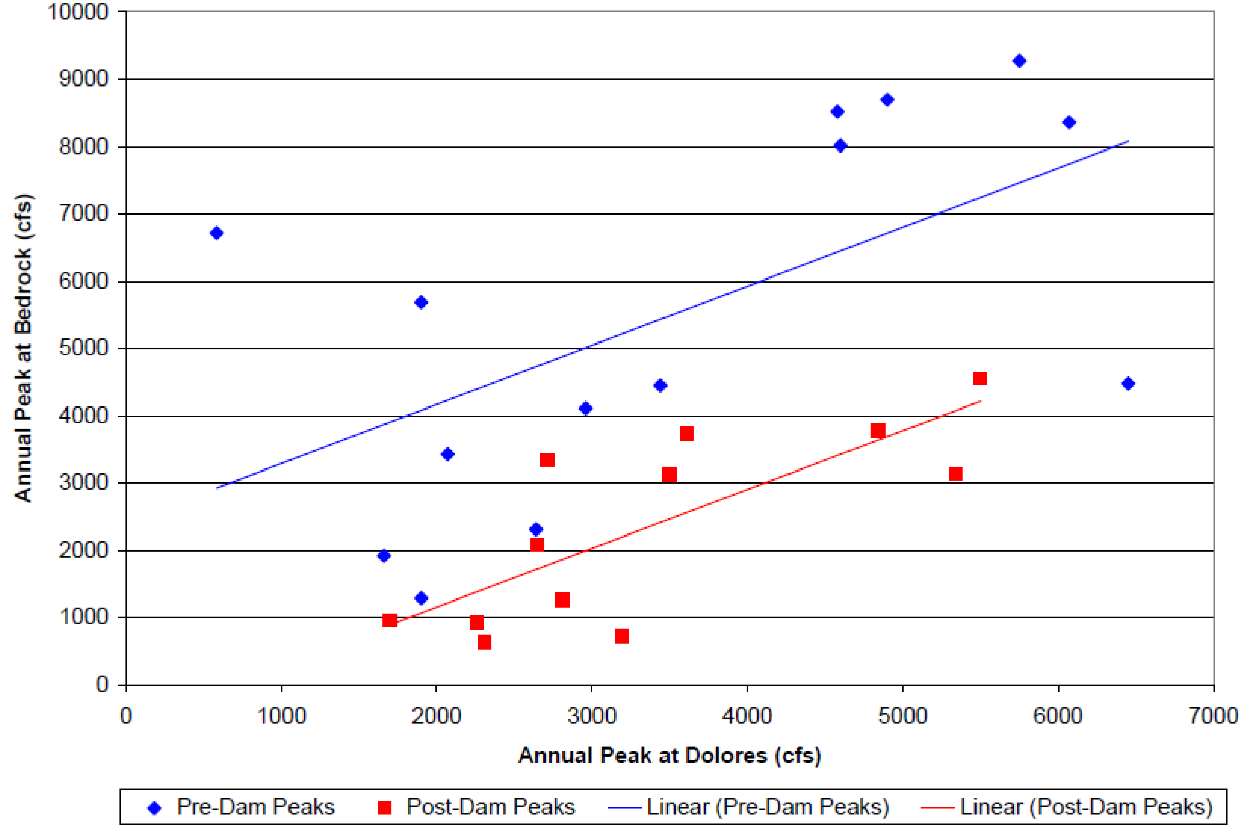


Figure 4. Dolores (upstream from McPhee Dam) versus Bedrock (downstream from McPhee Dam) peakflows 1971-1984 (Pre-dam) and 1990-2001 (Post-dam)

Storage in McPhee reduces peak flows approx. 3000 cfs

Peak flow reduction

@ Bedrock
Instantaneous peak flow: 5023 → 2595 (48% decrease)
Max pre-McPhee: 9280 cfs

@ Cisco
Instantaneous peak: 6900 → 5486 (14% decrease)
Max pre-McPhee: 17400 cfs

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Our questions

- What were patterns of cottonwood abundance and distribution in the first half of the 20th century?
- How do those patterns compare to current conditions?
- How has the river channel changed?
- How do patterns and change vary along the river?
- What might explain the observed patterns and change?
- How might these observations inform riparian restoration efforts?

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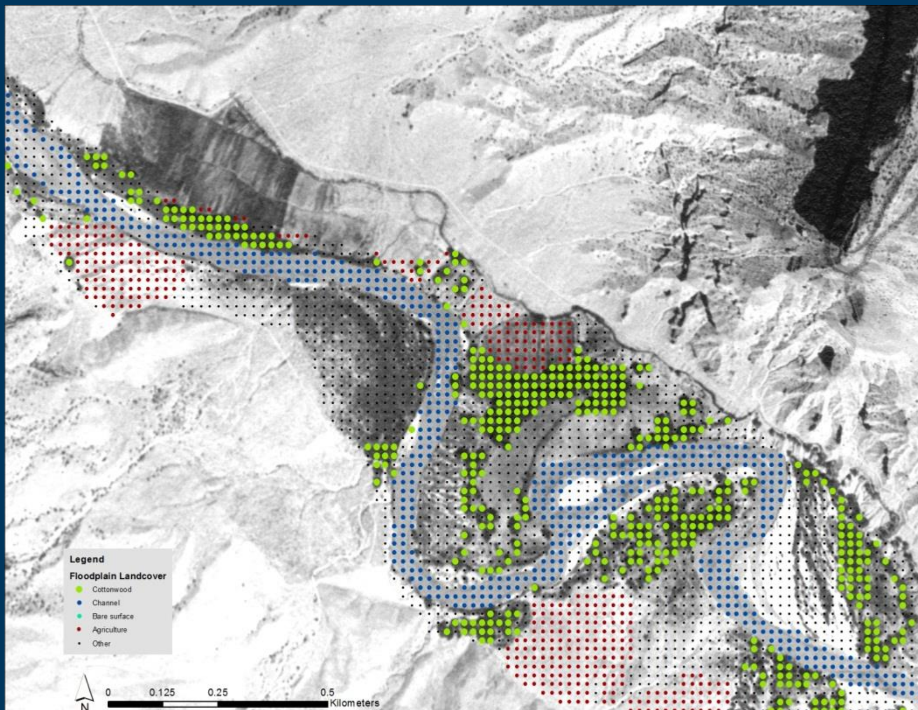
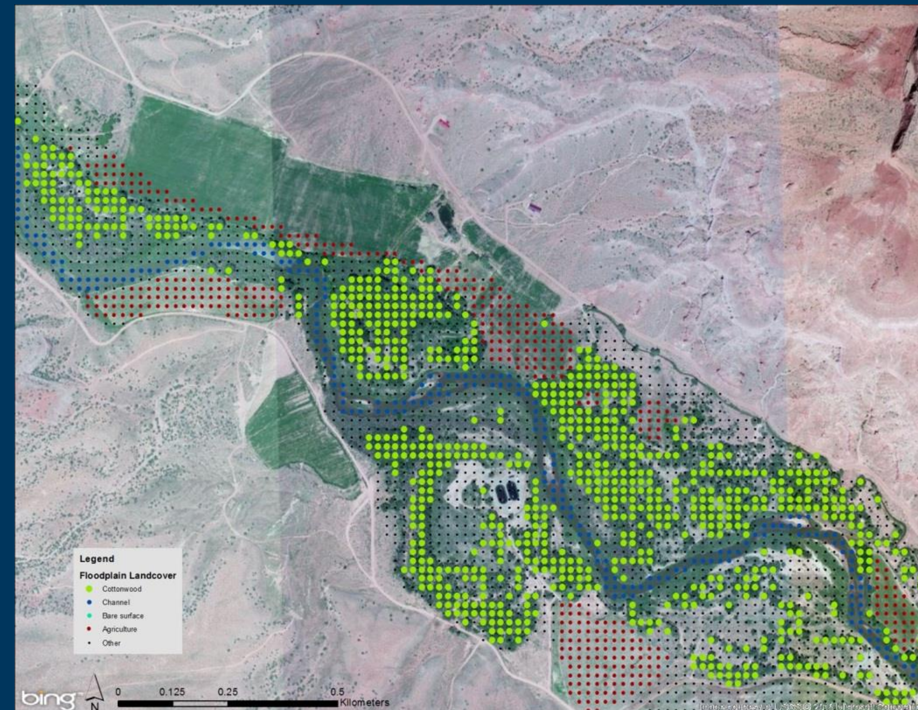
Methods





- Quantified cottonwood, bare surfaces, channel, ag lands, and other using a 20 m grid (point intercept)
- Compared 1937/1940 to 2009
- Analyzed relationship to physical descriptors (distance from McPhee, gradient, etc.)
- For select locations, compared 1937 v. 1980 v. 2009

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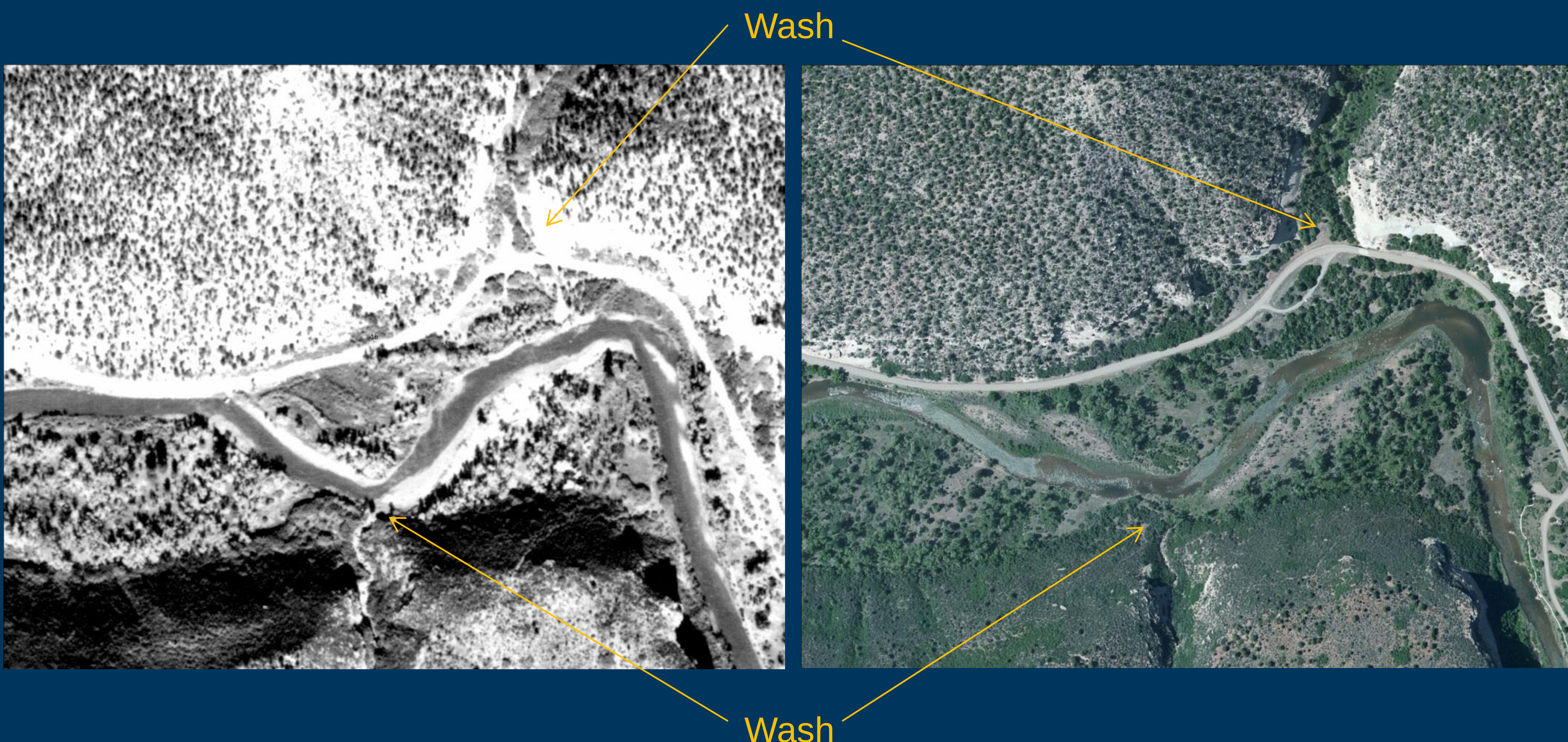
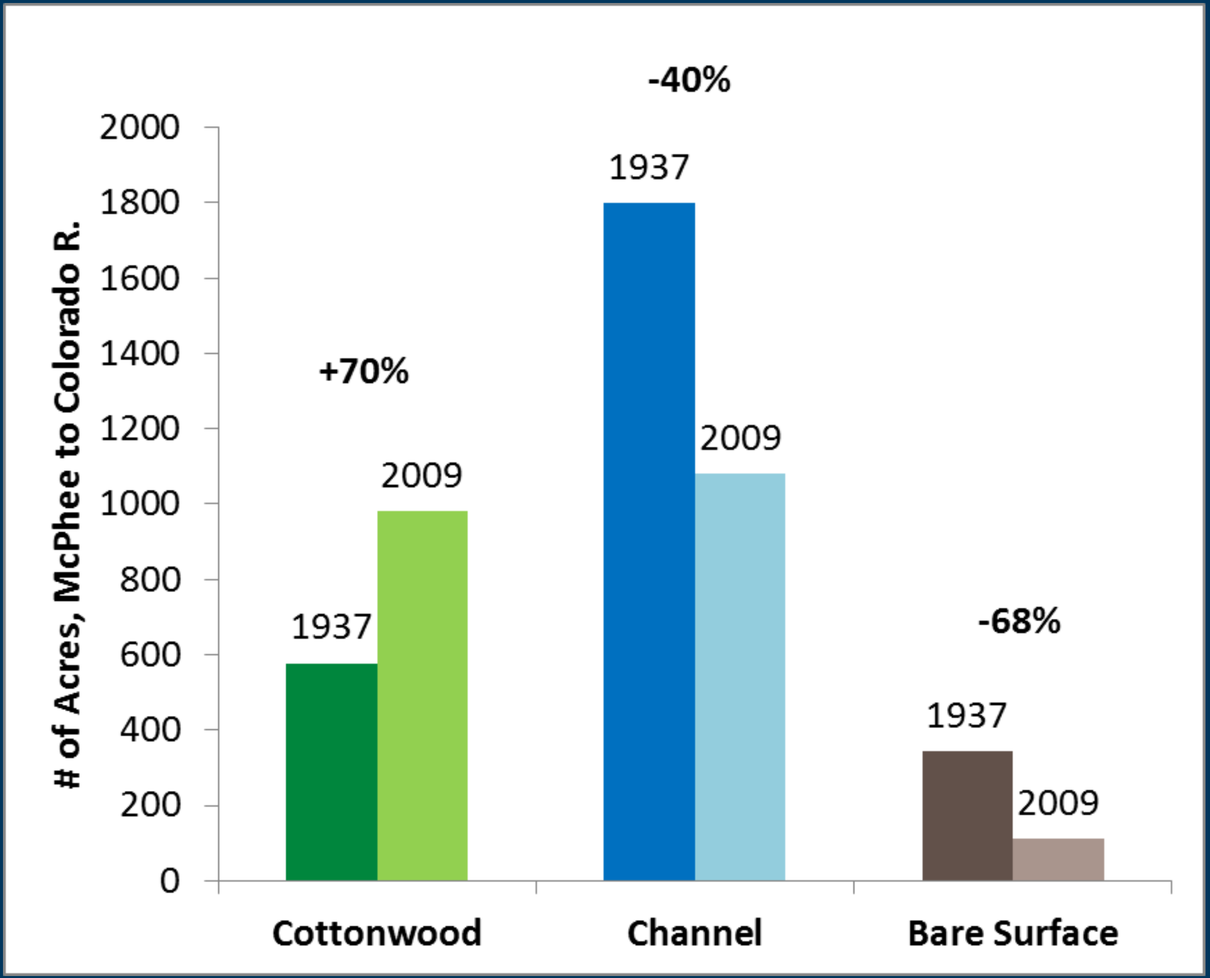
1937 v. 2009
Big Gypsum Valley

1937 v. 2009
Downstream of McPhee Dam



Total change in cottonwood, channel, and bare surface, 1937-2009



Vandas et al. (1990) estimated channel width decrease from -4% (near Bradfield Bridge) to -32% (above La Sal Creek)

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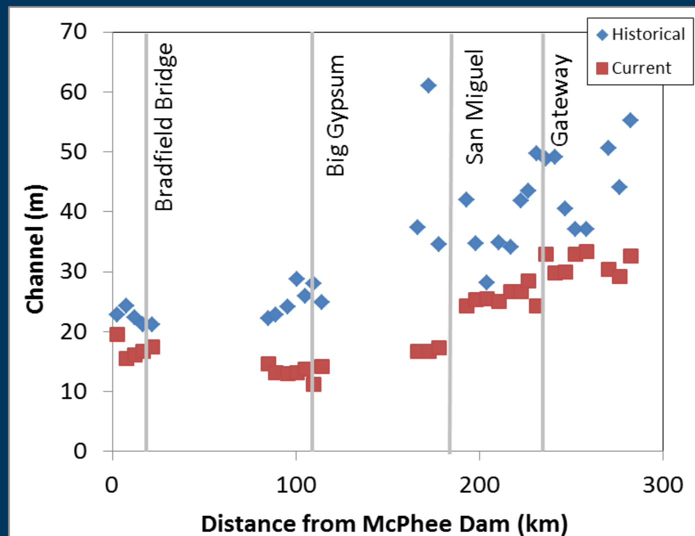
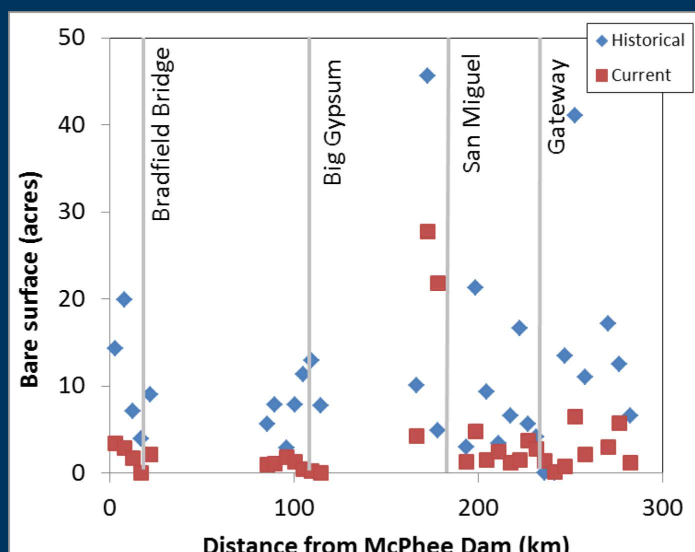
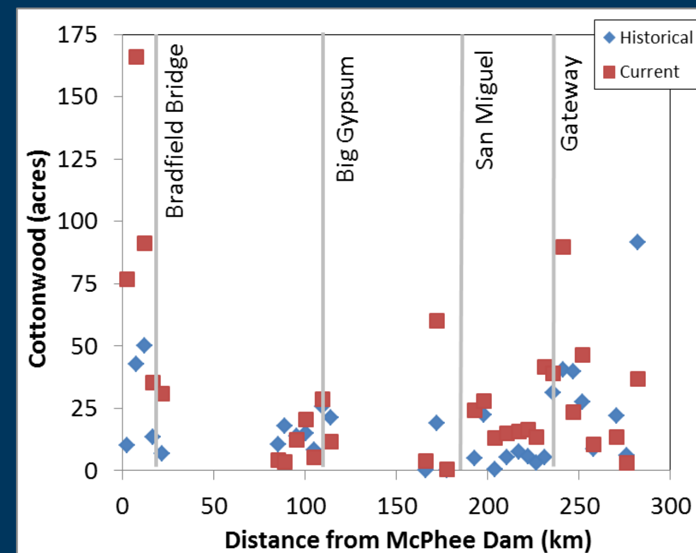
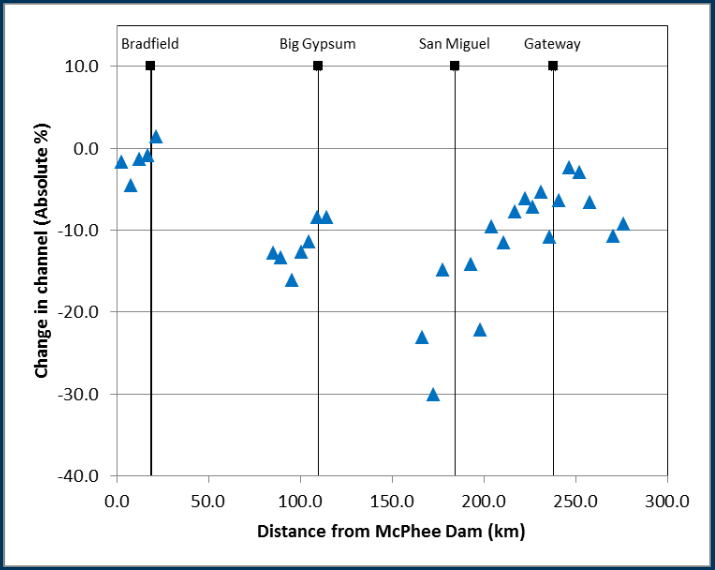
Channel width, bare surfaces, and cottonwood 1937-2009

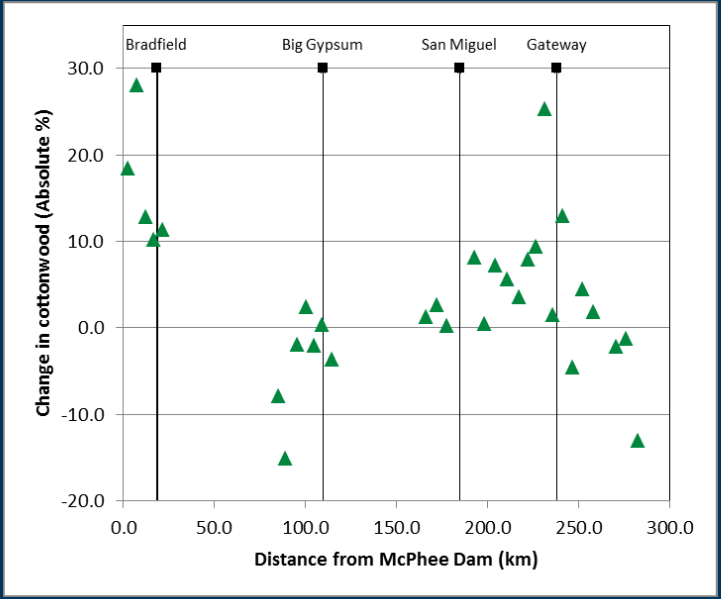


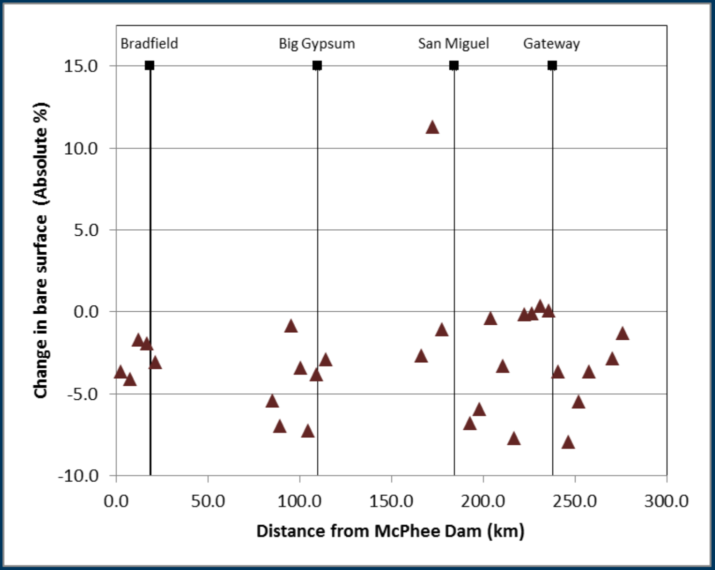




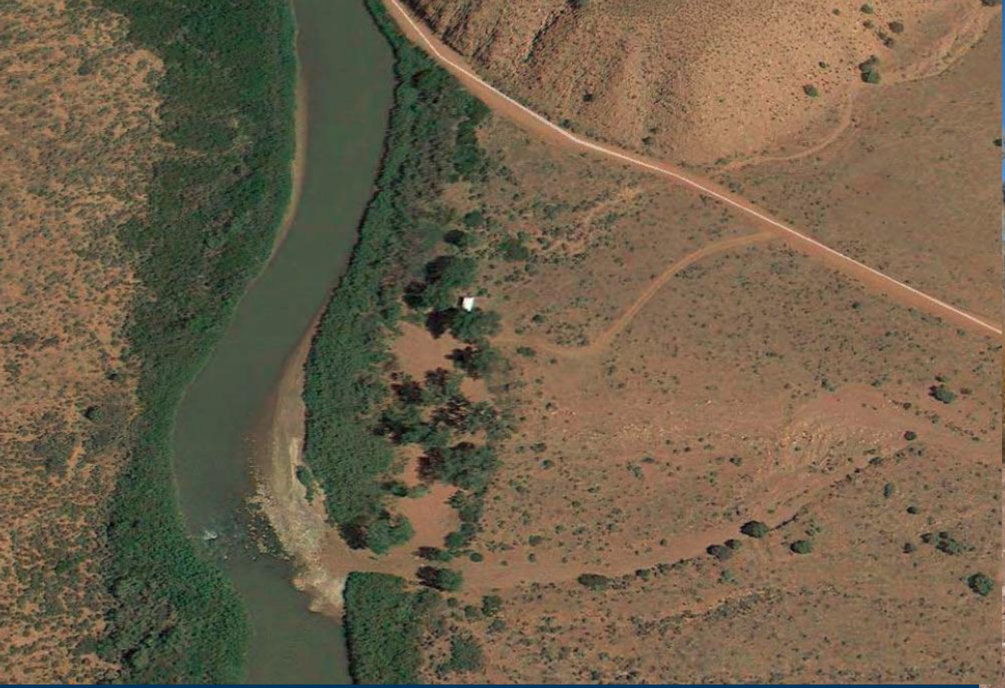
% change,1937-2009








0
0.25
0.5
Miles
N
Utah
Colorado



Where to from here?

Research

- Transects to monitor channel form
- Data collection around large flood
- Role of tributaries in maintaining dynamics

Restoration

- Allow passive restoration in dynamic sites
  - e.g., below San Miguel, and esp. below tribs
- Emphasize active restoration in static sites
- Consider channel restoration to restore disturbance
  - esp. when anticipating a flood?