San Joaquin River Major Tributaries Sediment Transport Study

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Importance

- Cottonwood and Little Dry Creeks are the two largest tributaries entering SJR below Friant Dam
  - Cottonwood Creek: enters ~0.35 km downstream of Friant Dam
  - Little Dry Creek: enters ~10.8 km downstream of Friant Dam

- Not much known about the sediment load or composition from the creeks
  - Have the potential to be an important sediment source

- Likely sediment load: (weathered granitic source rock)
  - Large amounts of fine sediment and sand (detrimental to salmonid habitat)
  - Some amount of gravel (beneficial to salmonids)
Major tributaries:
Large watersheds, enter SJR just below Friant Dam

Cottonwood Creek: 95 km²
Little Dry Creek: 189 km²

Methods

Surveying and Monitoring
- Ground-based LiDAR
- Photo points
- Hobo pressure transducers

Sediment
- Grain size
- ISCO autosamplers
- Bunte traps, BLH-84

Modeling
- USGS iRIC hydrodynamic model
Methods

Ground-based LiDAR

- rapid 3D acquisition, range of 1.5km but we typically only use points within 100m

GB LiDAR on Little Dry Creek

Methods

Ground-based LiDAR data:
(looks like photo but they are points)
Methods

Sediment sampling and monitoring:
- ISCO autosamplers
- Hobo water level recorders
- Bunte traps*, BLH-84
- Surface grain size

Bunte traps

Cottonwood Creek

Cottonwood Creek
Bureau Road Bridge
Friant Dam

image from Google Earth
Cottonwood Creek

Circles = GB LiDAR locations,
Star = ISCO location

Cottonwood Creek

CDEC_CTK_hourly

Discharge (ft³/s)
Cottonwood Creek

View from Bureau Rd bridge, October 2011,
Following ~1,004 ft³ s⁻¹ flow in March, 2011

Cottonwood Creek

April 2012, vegetation recovering
Cottonwood Creek

October 2011, view looking downstream towards Bureau Rd bridge. Note large amounts of vegetation, likely helped by canal seepage.

Little Dry Creek

North Friant Rd
San Joaquin River
‘Main’ gravel pit
Cemex intake canal
Gage weir
Cemex settling pond
Cemex plant

Image from Google Earth
Little Dry Creek

Looking upstream at North Friant Rd Bridge. Note cobble and gravel bed

Little Dry Creek

Looking upstream at confluence of LDC and gravel pit return flow. Note large amount of sand stored in channel.
Little Dry Creek

'Low flow' mouth Cemex intake

Little Dry Creek

'High flow' mouth

Road weir
Little Dry Creek

Circles = GB LiDAR locations, Star = ISCO location

Little Dry Creek: summer months
Little Dry Creek: High LDC flows

- San Joaquin River
- Cemex intake canal
- Cemex plant
- Road weir
- Gage weir
- Cemex settling pond
Little Dry Creek

Jan 2011, large amounts of sand deposition, sand splays

Little Dry Creek

Oct 2011, large successful recruitment of cottonwood seedlings
Little Dry Creek: Low LDC flows

Little Dry Creek

Preliminary draft, subject to revision
Mainstem sediment monitoring locations
Suspended load, bedload, bed material size

Preliminary draft, subject to revision

WY10 and 11 flows

WY10

WY11