Friant-Kern Canal Subsidence

May 18, 2017
Discussion Items

1. Friant-Kern Canal Subsidence Issues
2. HEC-RAS Model Update
3. Existing Conditions Model
4. Preliminary Results
5. Next Steps
Friant-Kern Canal Subsidence Issues

- History of Subsidence
- Continued Subsidence
- Other Issues
1 Friant-Kern Canal Subsidence Issues

- January of this year 1,900 cfs saw water on 5 county bridges in area
- Water surface above bridge low chord at Ave 96, Rd 208, Ave 88, Ave 80, Rd 192

January high flows
HEC-RAS Model Update

- HEC-RAS Model prepared for Capacity Restoration Feasibility Study
- Adjusted for subsidence based on survey information from 2010
- Goal was to determine corrective actions to bring flow to Design Normal Capacity and Design Maximum Capacity
- Determined the locations that required raising the lining
HEC-RAS Model Update

- 2017 Benchmark survey completed by Reclamation
- Using 2017 Benchmarks, Friant Water Authority surveyed canal inverts and points of interest between Fifth Avenue and Poso Creek Check
- Approximately 3.25’ of subsidence in some areas since 2010 survey
3 Existing Conditions Model: Update and Assumptions

- Added bridge decks into the model based on drawings from Reclamation
- Adjusted cross sections for subsidence based on survey information
- Linear Interpolation for subsidence between surveyed points
- Steady-state flow model
4 Existing Conditions Model: Calibration

- Input gate operations, and flows from January 18th, 2017 SCADA reports
- Adjusted loss factors at each check structure
- Adjusted friction factor in the canal
- Visual Inspections at Check Structures to validate results
3 Existing Conditions Model: Calibration

Error in Model Calibration at Upstream Ends of FKC Structures (Simulated - Actual)
Existing Conditions Model: Calibration

Error in Model Calibration at Upstream Ends of FKC Structures (Simulated - Actual)
5 Preliminary Results

- Using January 18th Data approximately 1,900 cfs through Deer Creek Check
- Water on 5 bridges below Deer Creek Check
- Using calibrating model tried to push the design normal flows in the canal with all gates open
- Reduced flows until passed from Rocky Hill to Shafter Check
~ 1,900 cfs
Design Normal Flow and Required Lining Raise

3,000 cfs

Adjusted Invert Elevations (NGVD 29)
Adjusted Canal Lining Elevations (NGVD 29)
WS Elevation
and Required Lining Raise

Adjusted Invert Elevations (NGVD 29)

Adjusted Canal Lining Elevations (NGVD 29)

WS Elevation

~ 2,250 cfs
6 Next Steps

• Short-term solutions
  • Reoperation
  • Recirculation
  • Tulare County Coordination

• Long-term solutions
  • Bridge Modifications
  • Phased Capacity Correction
Questions