SOUTH FORK REPUBLICAN RIVER RESTORATION FEASIBILITY ASSESSMENT

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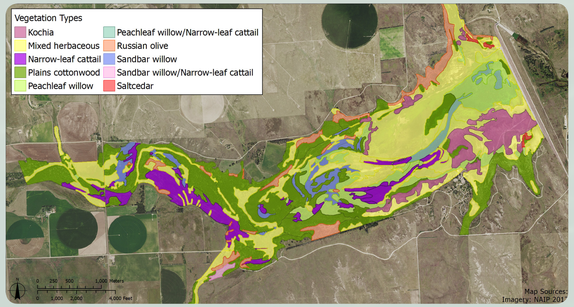
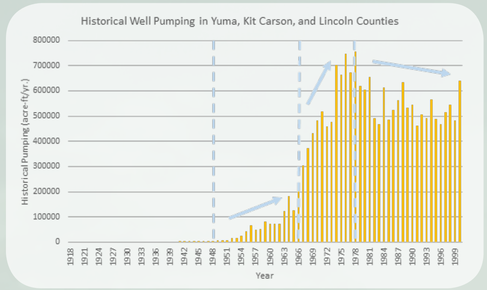
VEGETATION

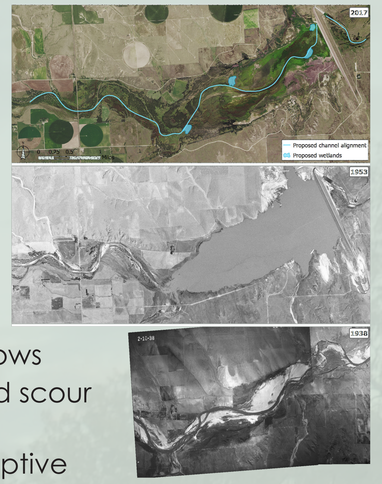
- Riparian forest dynamics altered by land & water use changes
- Rapid revegetation in former reservoir bed
- Vegetation mapping to identify:
  - Species composition, spatial distribution
  - Successional patterns



Narrowleaf cattail

CURRENT VS. HISTORICAL RIVER HYDROLOGY



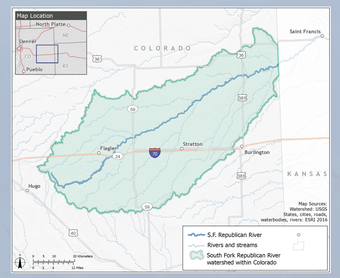


- Reduced precipitation
  - Reduced base & peak flows
    - No major flooding/flood scour since 1935
      - Increased consumptive water use

CHANNEL RESTORATION & ECOLOGICAL ENHANCEMENT ARE FEASIBLE IN A FORMER RESERVOIR

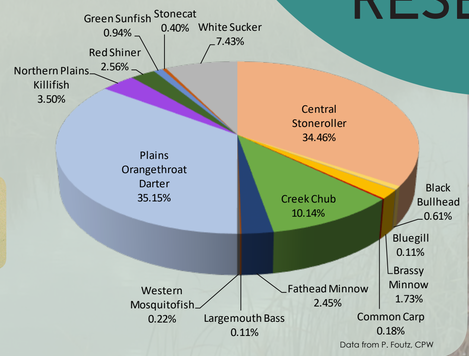
PROJECT SETTING

- Bonny Reservoir drained in 2011 to help meet water compact shortfalls
- Bonny Dam remains in place, creating a seasonal wetland lacking recreational opportunities
- Ponded water percolates to aquifer with little downstream delivery or habitat value for native species
- Stakeholder objectives in 5.5-mile focal reach:
  - restore the river channel
  - enhance ecological & recreational benefits
  - maximize downstream water delivery
- Full 52-mile project reach: assess restoration/conservation hot spots



RIVER & RIPARIAN ECOLOGY

- Mature riparian forest established after 1935 flood[1]; little recruitment since
- Invasive vegetation removal & maintenance needed to improve riparian & terrestrial habitat, aid revegetation of natives
- Native fish will recolonize from upstream and downstream of former reservoir[2]
- Native riparian forest will re-establish in focal reach via active & passive revegetation



[1]Katz G.L., J.M. Friedman, and S.W. Beatty. 2005. Delayed effects of flood control on a flood-dependent riparian forest. Ecological Applications 15: 1019-1035.

[2]CPW (Colorado Parks and Wildlife). 2019. South Fork Republican River stream surveys. Briefing report of 2018 stream surveys completed by CPW, Southeast Region Aquatics, Native Aquatic Species Team. Prepared by Paul Foutz, Native Aquatic Species Biologist.

SHALLOW GROUNDWATER

- Seasonal ponding, slow infiltration to groundwater
- Native riparian trees and other phreatophytes thriving in former reservoir
- Maximum spring-summer depth of shallow groundwater is likely ≤ 15 ft, based on rooting depth of existing obligate phreatophytes
- Water table may change with restoration

IMPLICATIONS

- With dam in place the former reservoir is suitable for channel and ecological restoration (dam outlet modifications required)
- Iterative stakeholder input to select & help refine final restoration concept
- Steps to restore ecological function & habitat for native species:
  - remove/control invasive vegetation
  - excavate new multi-stage channel, modify dam outlet works
  - sediment source control & maintenance
- Ecohydrological approach works with current flow & sediment regime to improve habitat value for native fish & wildlife, provide socioeconomic benefits

ACKNOWLEDGMENTS

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