VERDE RIVER RIPARIAN ECOLOGY: STATUS OF OUR KNOWLEDGE

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PURPOSE: HIGHLIGHTS

- State-of-the-knowledge synthesis of Upper Verde River Ecology
- Long-term History
- Vegetation
- Geomorphology
- Hydrology
- Soils
- Fish Fauna
- Recommendations and Conclusions
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BACKGROUND

• 1993 PNF requests technical assistance *
• 1994 Rinne – fish; Medina – monitoring plan
• 1994 Medina/Turner – Morphology/hydrology
• 1996 Medina – Vegetation
• 1998 Medina – Photo documentation
  – * grazing ceased; research unsupported
• 2001 Medina – Water Quality
• 2003 Baker/Neary/Long – Watershed condition Synthesis
• 2008 Medina – Data synthesis/write
• 2009-2011 – Departmental Level Peer Review
• Dec 2012 - Published
1993 ASSUMPTIONS
PNF RIPARIAN MANAGEMENT-UVR

- UVR Sediment Enriched
- Impaired Water Quality
- Woody Vegetation Lacking
- Manage for cold water fauna

- Cattle Grazing Principal Source of Degradation
- Need to Protect Spikedace
HIGHLIGHTS

• Historical Influences
  ▪ Paleofloods likely sustained UVR in meadow-E type and C-type channels
  ▪ Upper Verde River - very likely sedge meadows habitat [Webb et. al – “Ribbon of Green”]
  ▪ Sullivan Dam is single most influential factor causing ecosystem changes
HIGHLIGHTS

• **Hydrology** [morphology surveys, photos]
  • Extensive lateral erosion of 2nd-3rd order terraces
  • Extensive channel incision
  • Extensive levy building; braided tree-levy networks
  • Deprivation of essential bedload is likely single most interactive factor sustaining ecosystem change

• **Vegetation**
  • Extensive loss of sedge/rush habitat
  • Dense tree/shrub overstory
  • Extensive tamarisk stands
  • Composition shift from aquatic graminoids to forbs
  • Reduced herbaceous ground cover
  • **Woody vegetation, a recent (1993) component, is 2nd most interactive factor sustaining ecosystem change**
HIGHLIGHTS

• Fish
  – Spikedace likely extirpated
  – Alteration of the natural hydrographs through natural climatic factors and human-induced impacts such as dams, diversions, pumping, and land use, and introduction of nonnative species of fish appear to interact to affect stability and integrity of native fish populations
  – “Flooding is very important for sustaining native fish assemblages”
  – 75+ years, 21 nonnative fish + 4 other species introduced;
  – 12 native fishes = 6 extirpated + Spikedace? + 5 remaining
PALEOFLOODS – 1580 -1980

VERDE RIVER BELOW TANGLE CREEK OCTOBER - APRIL DISCHARGE

RECONSTRUCTED

ACTUAL
Peak flow events greater than 10,000 cfs at Verde River-Tangle Creek Gage #09508500. Winter storms are depicted in red, spring in yellow, summer in green, and fall in orange. Data points between 1891 and 1932 are estimates. Data source from USGS National Water Information System.
1920’s
1938-1940
1979 – stable, sedge meadow wetland

2001 – unstable, deeply incised, woody dominant (Sago/Tara-Typha)
1979 – PNF Wetland photo point

2008 – PNF Wetland photo; beaver ponding

2008 – PNF Wetland repeat photo
VERDE RIVER @ BEAR SIDING
May 1979 VS. May 2002
1979 – Quality native fish habitat
1993-2008
1993 – post flood

1999
* 1993 ASSUMPTIONS

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SULLIVAN DAM 1936-2008
1993 - The Search for "Who Dun It -- on the Verde" began.

Metaphorically - "A crime reported on UVR, but after extensive diagnostics, no evidence was found to substantiate allegations, rather other causative factors were exposed."

Crime = cattle destroying habitat, killing fish

Evidence = no cattle links, but lots of human links to habitat destruction, ecosystem transformations, and predation of native fishes

Substantiate = no smoking GUNS found, only spent cartridge shells of past human influences, and reloading with new vegetation and hydrology components.

Influences = Sullivan Dam, long term stocking of exotic fishes, unknowingly changing the riverine-riparian ecosystem from meadow warm-water to gallery woodland cool-water, deprivation of bedload require for hydrologic equilibrium, and more …

2013 → Ample management information to implement management

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