Assessment of Riparian Restoration Potential on the Lower Gila River

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Thanks to the Nature Conservancy

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Background

- Goal: Find sites for preservation, re-creation, and enhancement of native riparian and marsh communities on LGR
- Opportunities likely exist because:
  - Remnant native riparian vegetation
  - Reliable presence of river flow in some reaches
  - Perennial flood events
  - Shallow groundwater
  - Within MSCP authorized mitigation area
- Restoration challenges:
  - Shallow, saline groundwater
  - Damage from flooding
  - Presence of fine-grained saline soils
  - Regular human caused wildfires

Project Tasks

- Review riparian and marsh re-vegetation on LGR and LCR
- Provide an overview of ecological and non-ecological drivers for the project area
- **Assess and prioritize "reaches" of the river using existing data**
- **Assess and prioritize sites of an appropriate size for management based on perceived restoration potential**

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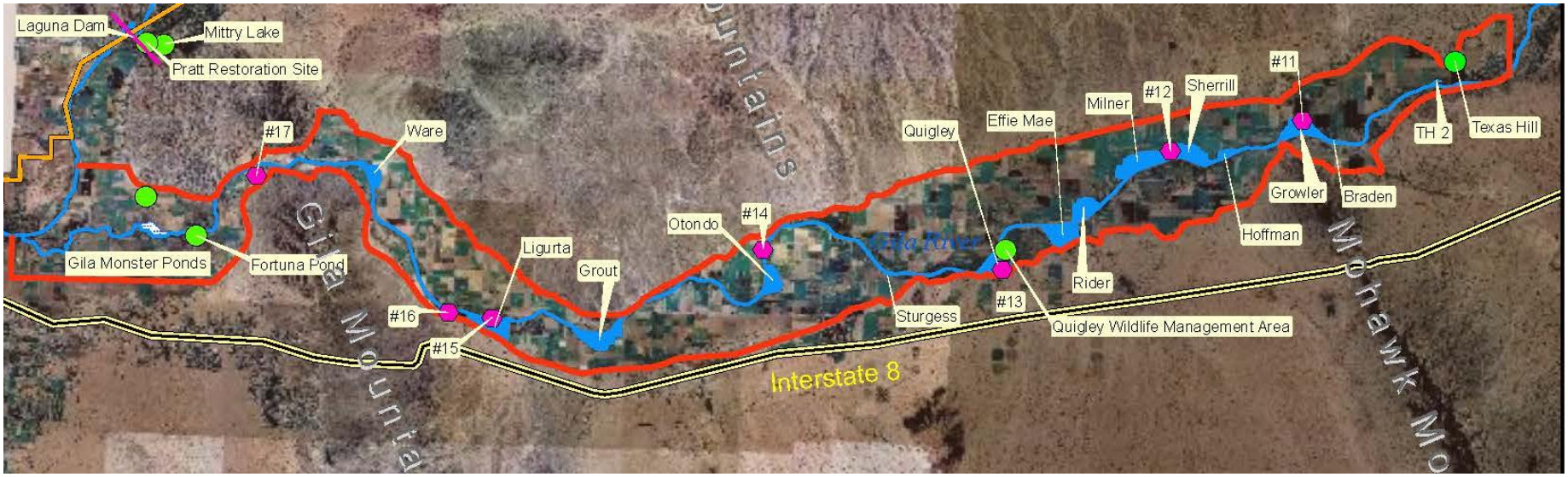
Study Area

- Approximately 70 river miles and 105,200 acres along the historic LGR floodplain from confluence with the LCR to Texas Hill
- Majority of land is privately owned (76%)
- Remaining: USBR(11%), BLM (8%), AZ State Land Trust (4%), and the AZGFD (1%)



Data Collection

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Data Wanted

1. Geomorphology
2. Hydrology
3. Soils
4. Disturbance
5. Biotic Factors
6. Non-Ecological Factors

Agencies contacted: AZGFD, USACE, BLM, USBR, USGS, ADWR, AZMET, USDA-NRCS, Yuma County, Irrigation Districts - North Gila, Yuma, and Welton-Mohawk

Data Shortfalls

Unable to obtain all of the desired data because:

- Not available: inundation, soil moisture
- Limited in scope: vegetation
- Older data:
  - GW depth (1988-2008)
  - Land use: Vegetation and open water (2002-2004)

Reach Analysis

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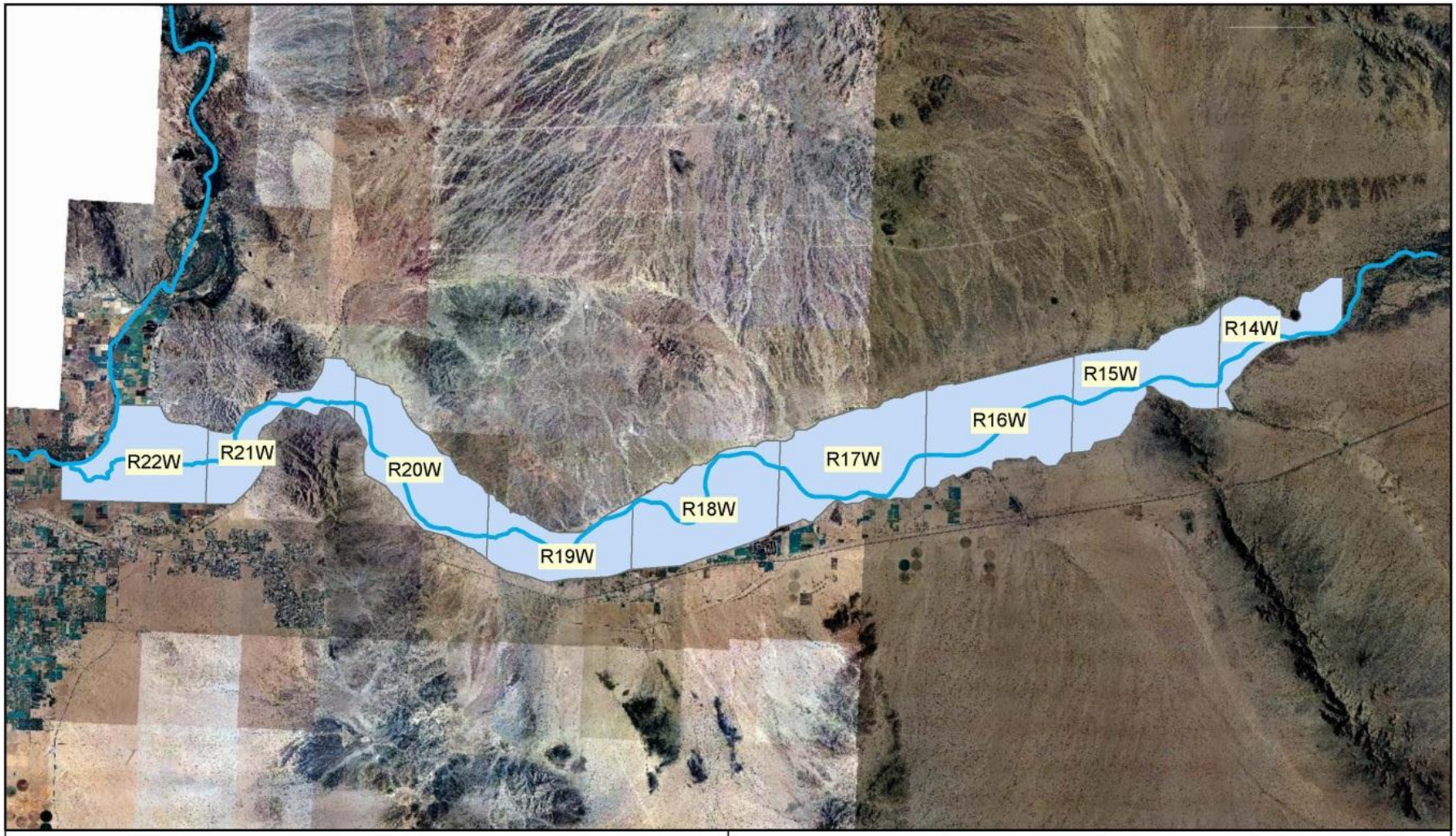

Legend

Reach

N

0 6 12 18 24 Miles

Reach layout

Drawn	Date
RK	12/14/2011
Checked	**Job Number**
MG	1130
Approved	**File**
MM	E:\jobs\1130 - TNC\ figure X.mxd

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Multiple Account Analysis (MAA)

- Rank and prioritize alternatives
- Use GIS data, georeferenced point data, and satellite imagery
- Logical sequence of analysis
- Certain attributes and indicators are more important/ relevant than others
- Subjective process: weighting values and attributes are based on the experience and professional criteria

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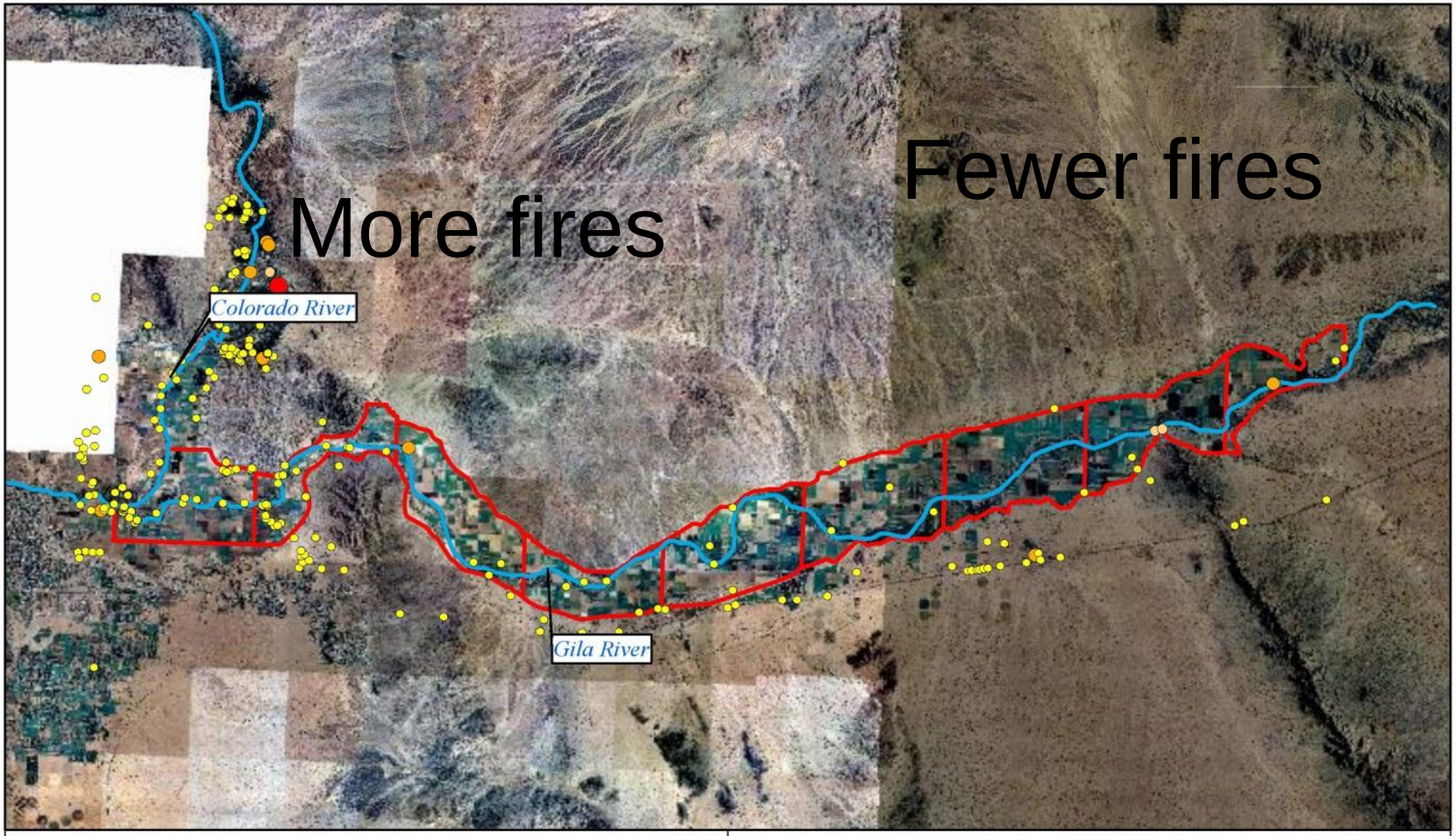

Legend

- < 50 acres
- 51 - 100 acres
- 101 - 500 acres
- 501 - 1000 acres
- > 1000 acres
- Study Area Boundary Separated by Reach

N

0 6 12 18 24 Miles

Figure 6

Fire Locations for the Lower Gila River Basin. From BLM - Arizona State Office, 1996-2007

Drawn RK	Date 1/6/2012
Checked MG	Job Number 1130
Approved MM	File E:\jobs\1130 - TNC\ figure X.mxd

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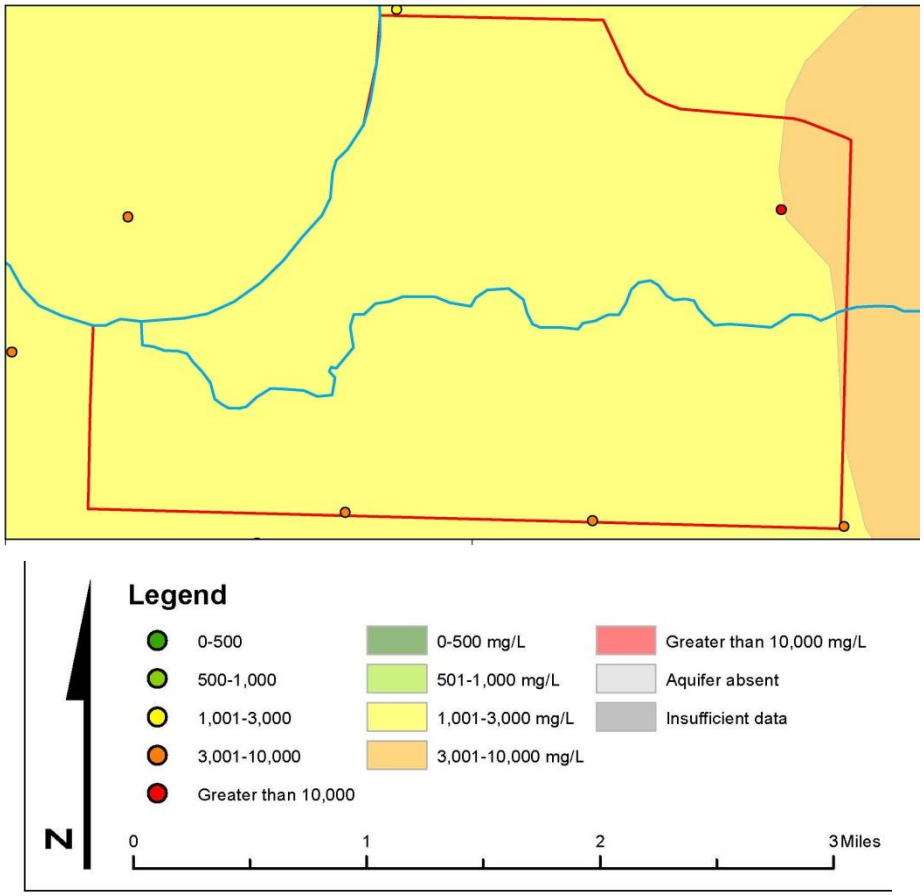
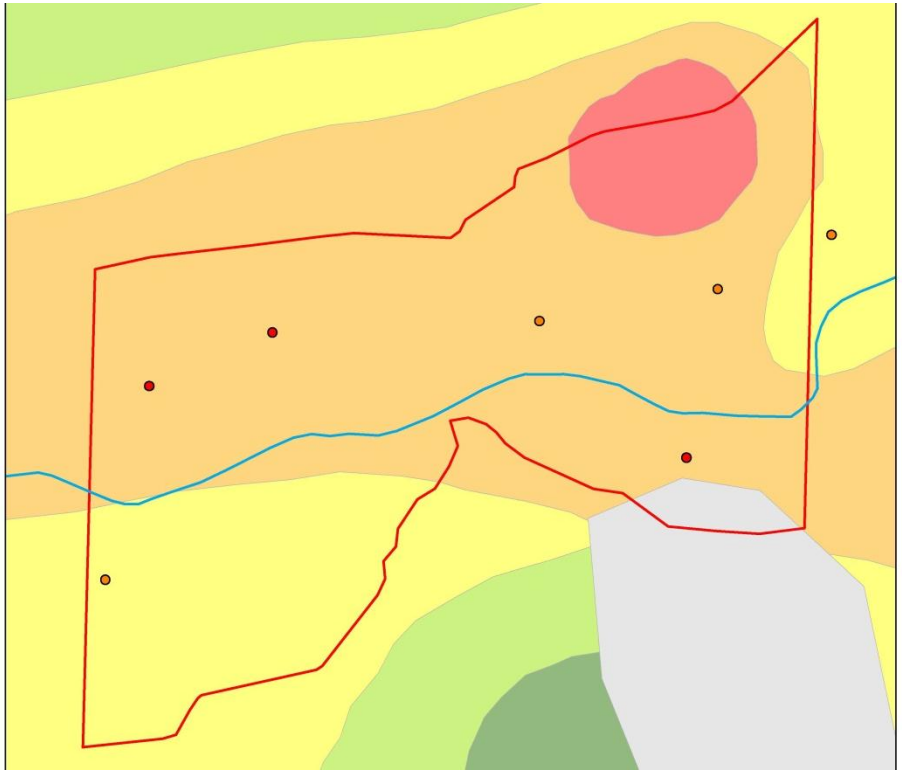
Water Quality

Reach 22W



Reach 15W



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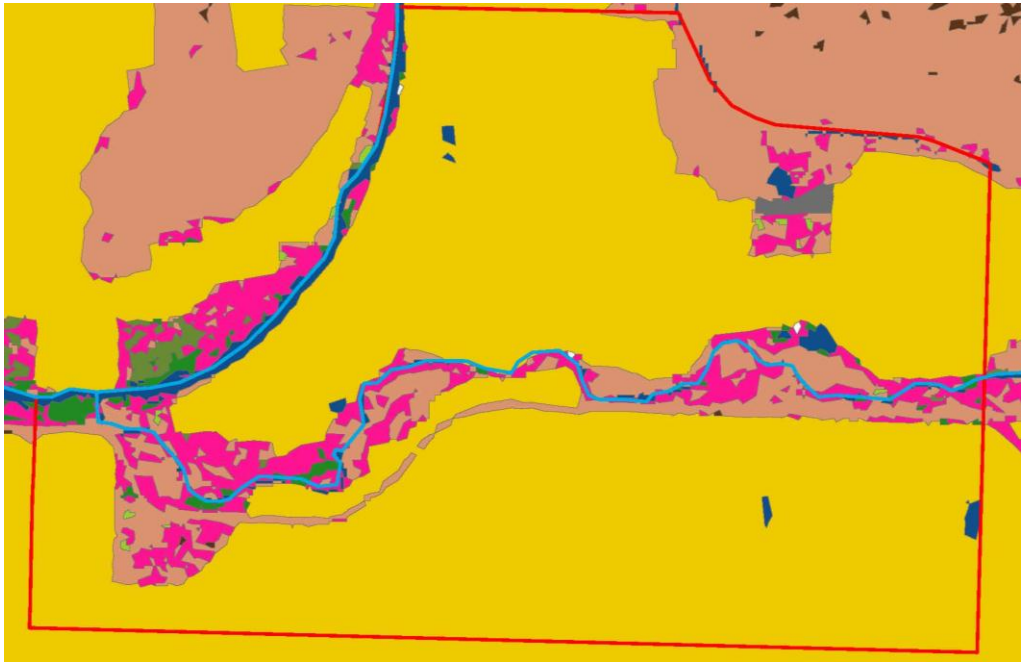
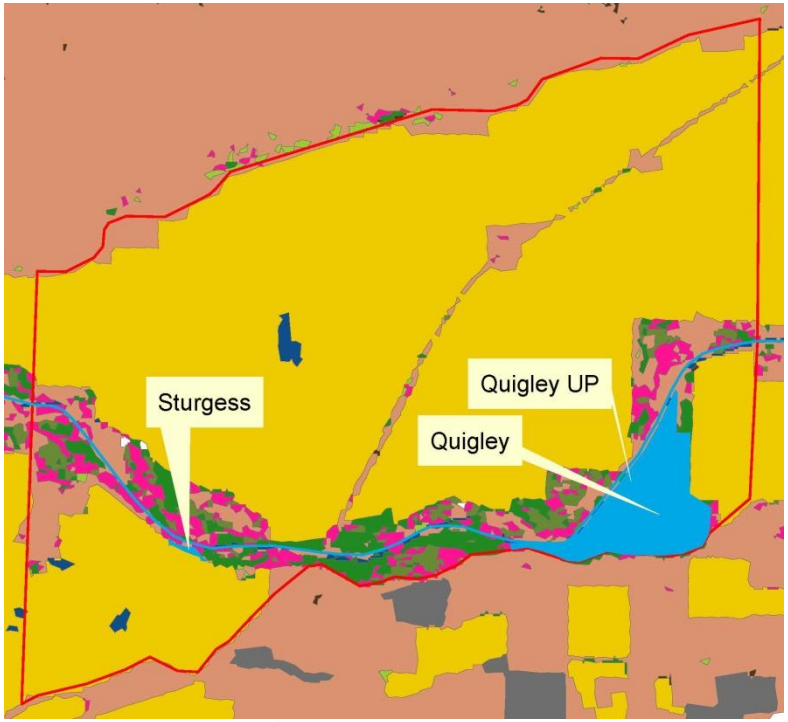
Vegetation and Open Water

Reach 22W



Reach 17W



Legend

- Open Water
- Agriculture
- Barren Lands, Non-specific
- Desert Scrub
- Developed
- Invasive Southwest Riparian Woodland and Shrubland
- North American Warm Desert Bedrock Cliff and Outcrop
- North American Warm Desert Riparian Mesquite Bosque
- North American Warm Desert Riparian Woodland and Shrubland
- North American Warm Desert Wash

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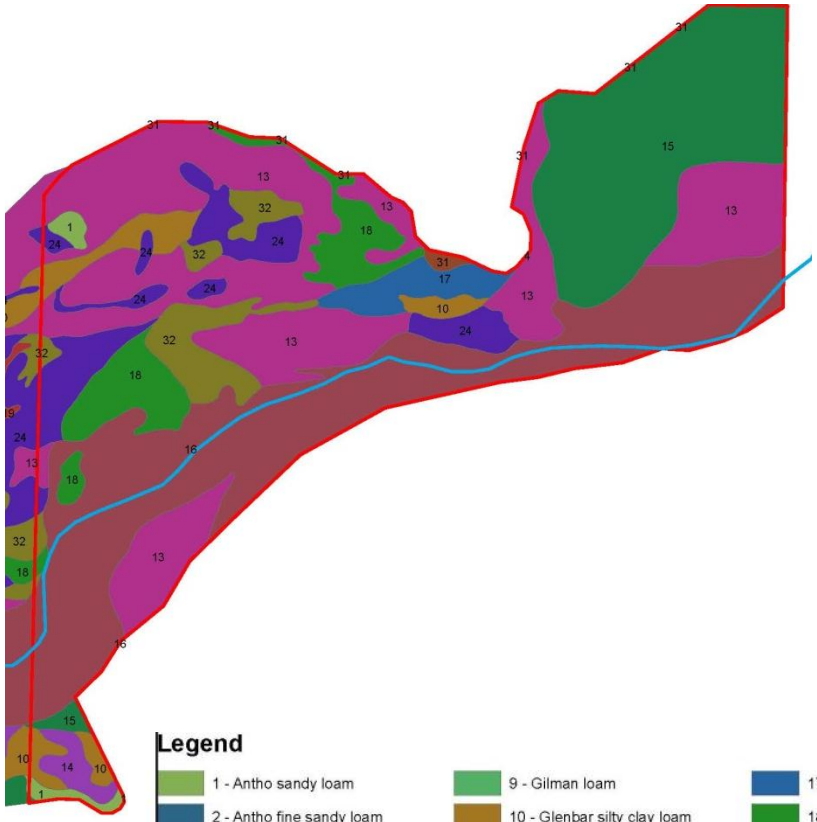
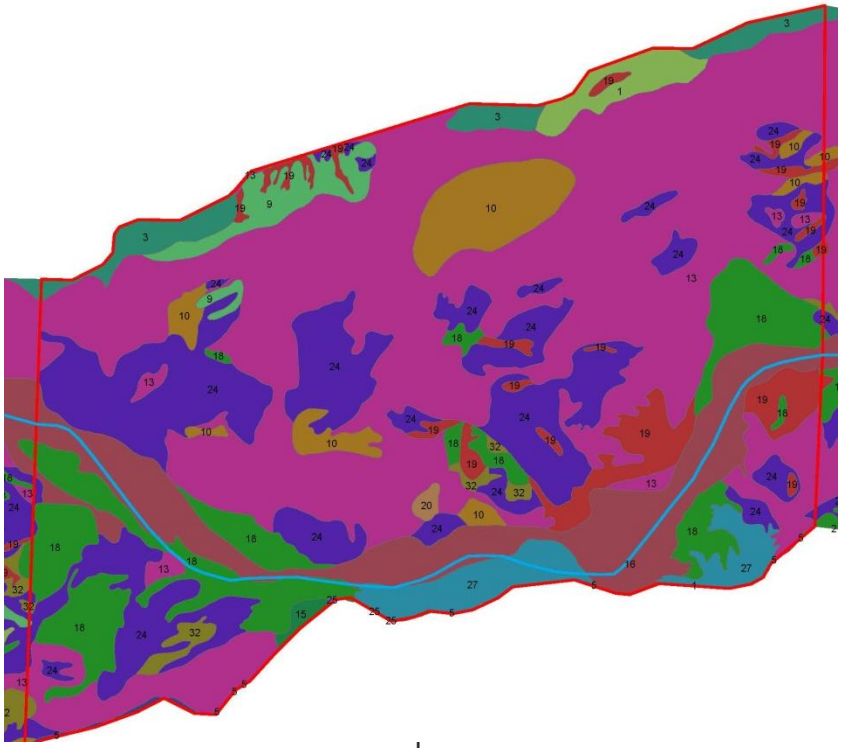
Soil Texture/ Quality

Reach 14W



Reach 17W



Legend

- 1 - Antho sandy loam
- 2 - Antho fine sandy loam
- 3 - Carrizo very gravelly sand
- 4 - Cherioni-Rock outcrop complex
- 5 - Dateland loamy fine sand
- 6 - Dateland fine sandy loam
- 8 - Gadsden clay
- 9 - Gilman loam
- 10 - Glenbar silty clay loam
- 12 - Holtville clay
- 13 - Indio silt loam
- 14 - Indio silt loam, saline
- 15 - Indio silt loam, strongly saline
- 16 - Indio-Lagunita-Ripley complex
- 17 - Kofa clay
- 18 - Lagunita loamy sand
- 19 - Lagunita silt loam
- 20 - Laposa-Rock outcrop complex
- 21 - Ligurta-Cristobal complex
- 22 - Pits, borrow
- 24 - Ripley silt loam
- 25 - Rositas sand
- 27 - Salorthids, nearly level
- 30 - Torriorthents-Torrifluvents complex
- 31 - Tremant-Rositas complex
- 32 - Vint loamy fine sand
- 35 - Water

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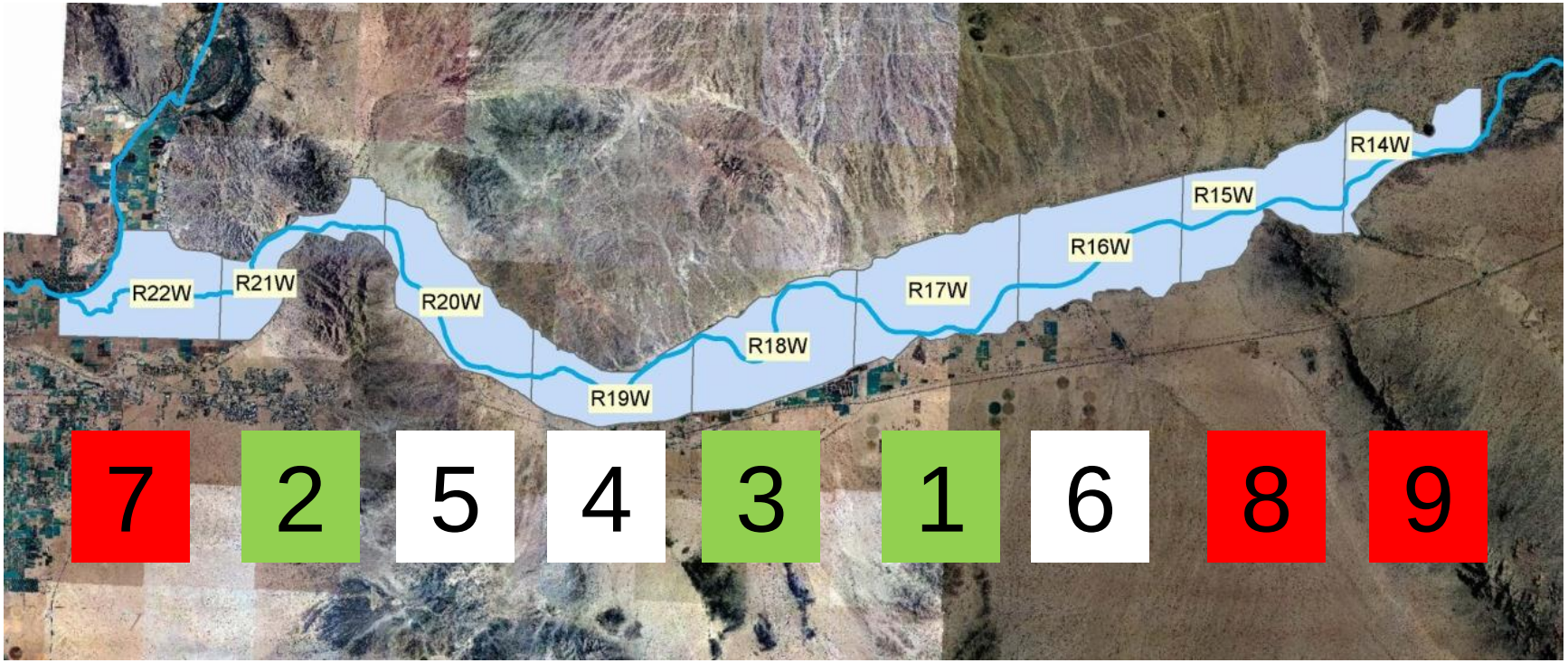
Reach Analysis



Attributes: Geomorphology, land cover, open water, groundwater salinity, oxbows, soil texture, soil salinity, fire

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Site Selection

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Site Selection

- Three categories of restoration opportunities:
  - Oxbows
    - Open water
    - Existing water control devices
    - Hydrologically connected to river
  - Native riparian areas (>30%)
    - May be affected by flooding events
    - Likely to provide favorable ecological conditions for desired species
    - Proximity to seed source
  - Invasive riparian areas
    - Require more intensive restoration effort
    - Existing conditions *may* support native riparian vegetation

Sub-reach Analysis Summary

- Best oxbows: Quigley, Effie Mae, and Otondo
- Best riparian areas: one in Reach 17W and one in Reach 18W.
- Best invasive riparian areas: in Reach 22W
- Any restoration action will incorporate lands currently owned by irrigation districts, the U.S. government, the Arizona state government, and/or various private parties
- Many of these sites include WMIDD lands which were set aside for mitigation, but which lack dedicated funding for riparian restoration or management

Site Analysis Summary

Site	Otondo Oxbow	Quigley Pond	Effie Mae Oxbow	Riparian Area A	Riparian Area B	Invasive Area
Reach	18W	17W	16W	17W	18W	22W
Parcels	14	11	20	29	19	16
Acreage	300	525	600	950	525	450

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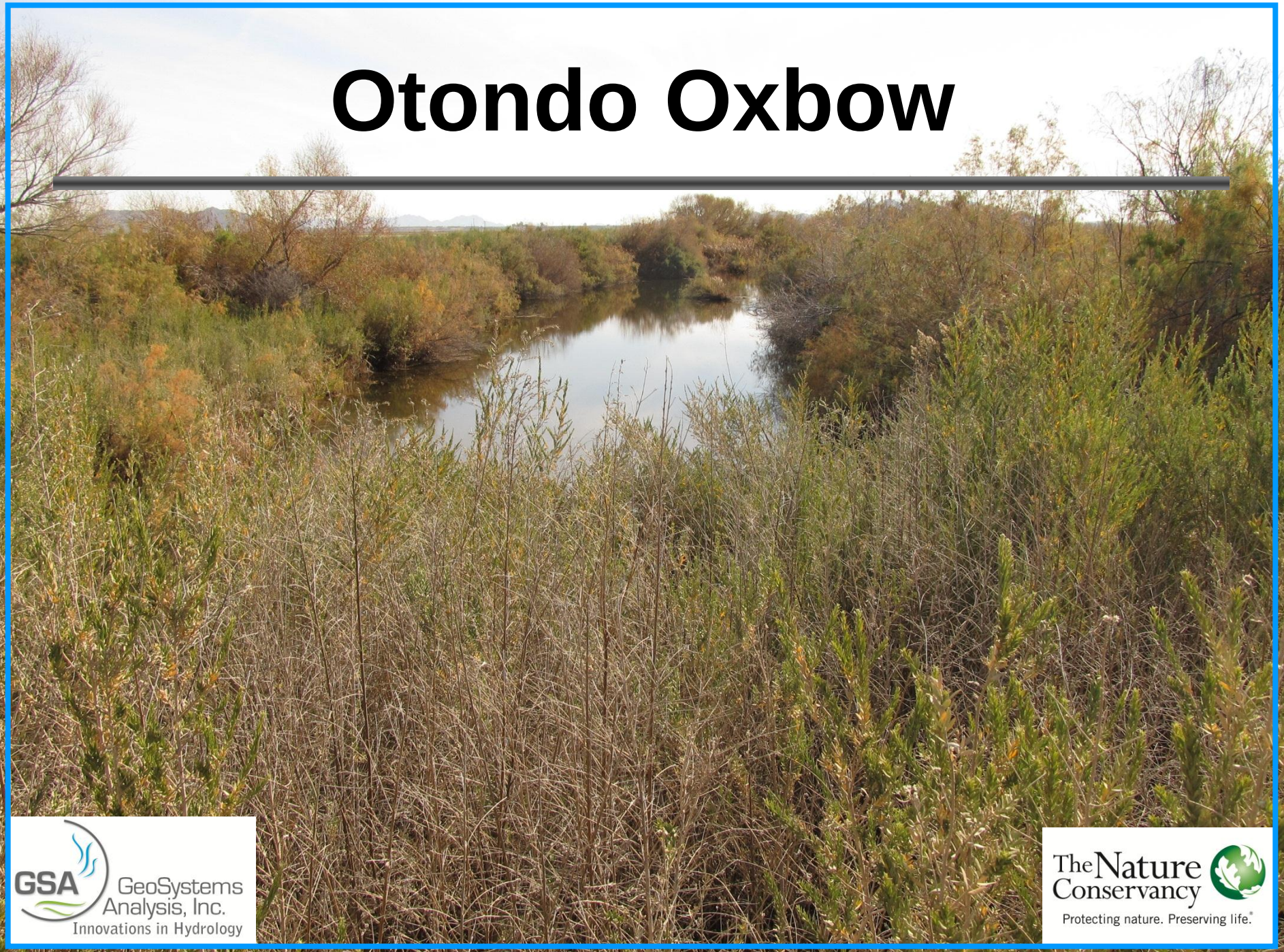
Otondo Oxbow



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Quigley Pond

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Conclusions

- Opportunities for restoration, enhancement, and preservation exist on the LGR
- Differences between data analysis and site visit emphasize need for site characterization prior to restoration
- Long-term sustainability of riparian restoration projects on the LGR will be impacted by future flood events, irrigation management, and groundwater pumping
- TNC can provide data to anyone looking for mitigation opportunities

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THANK YOU!

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