Watershed Science, Partnerships, and Restoration Planning in the San Juan Basin of New Mexico

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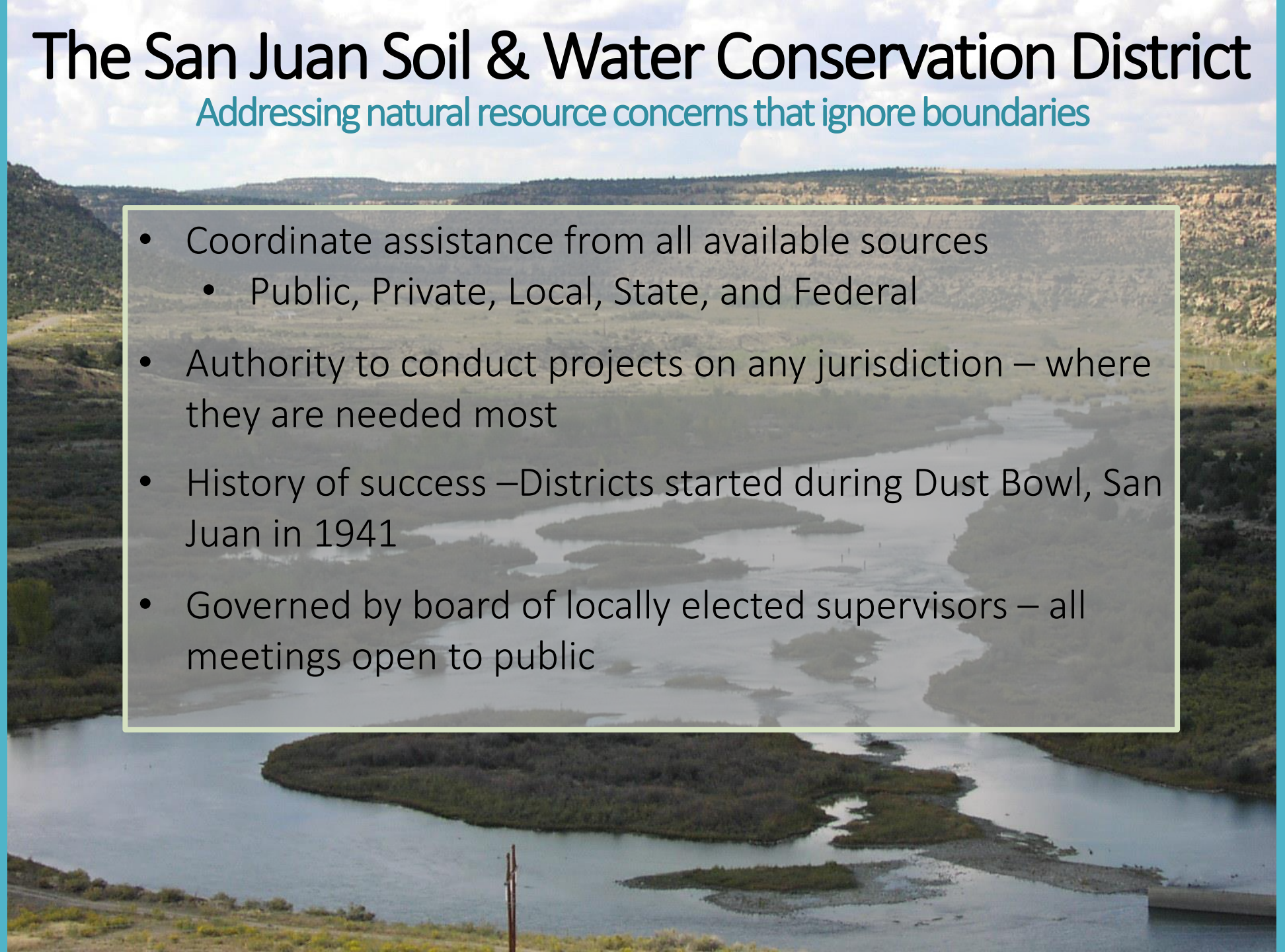
The San Juan Soil & Water Conservation District

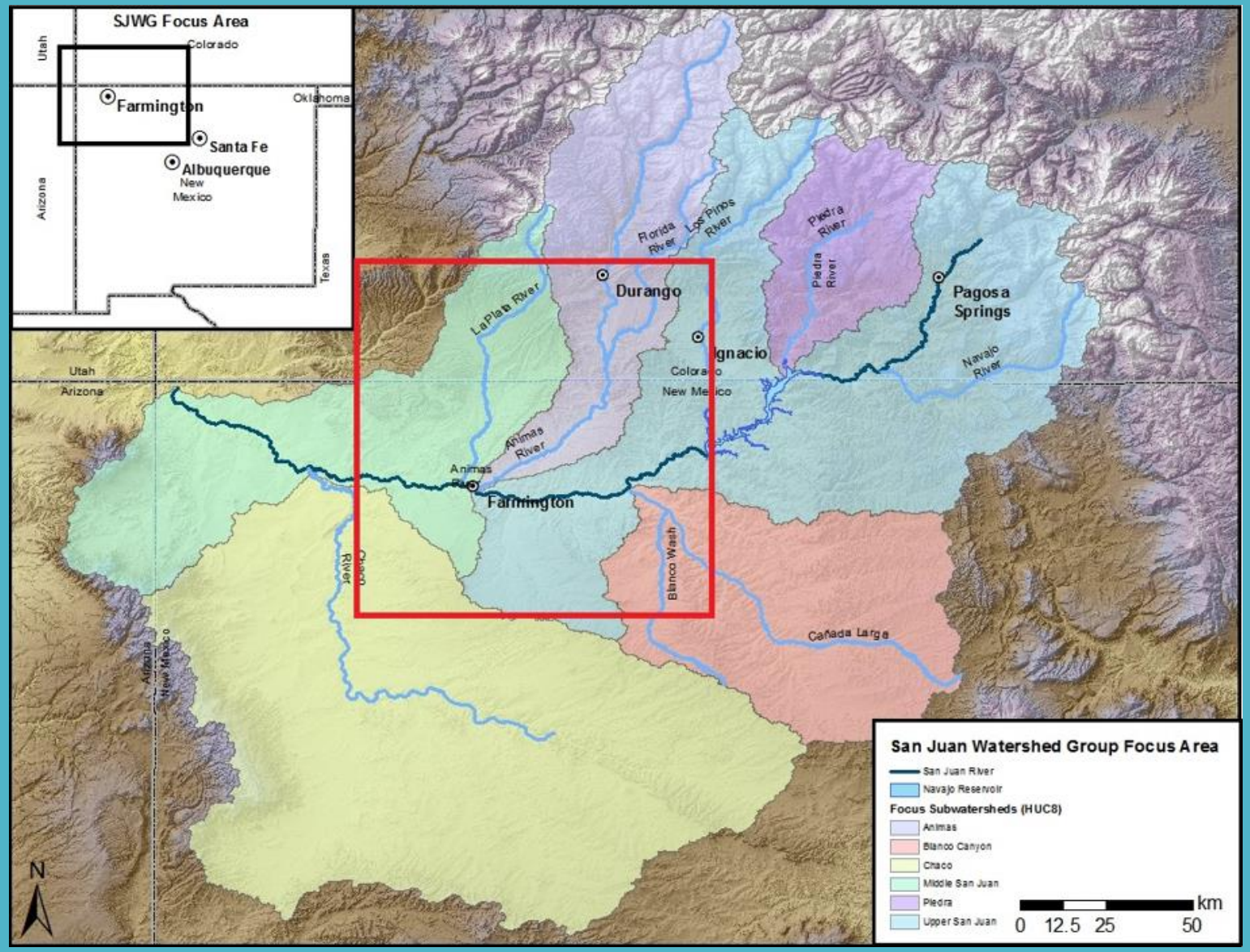
Addressing natural resource concerns that ignore boundaries



- Coordinate assistance from all available sources
  - Public, Private, Local, State, and Federal
- Authority to conduct projects on any jurisdiction – where they are needed most
- History of success –Districts started during Dust Bowl, San Juan in 1941
- Governed by board of locally elected supervisors – all meetings open to public

The San Juan Watershed Group

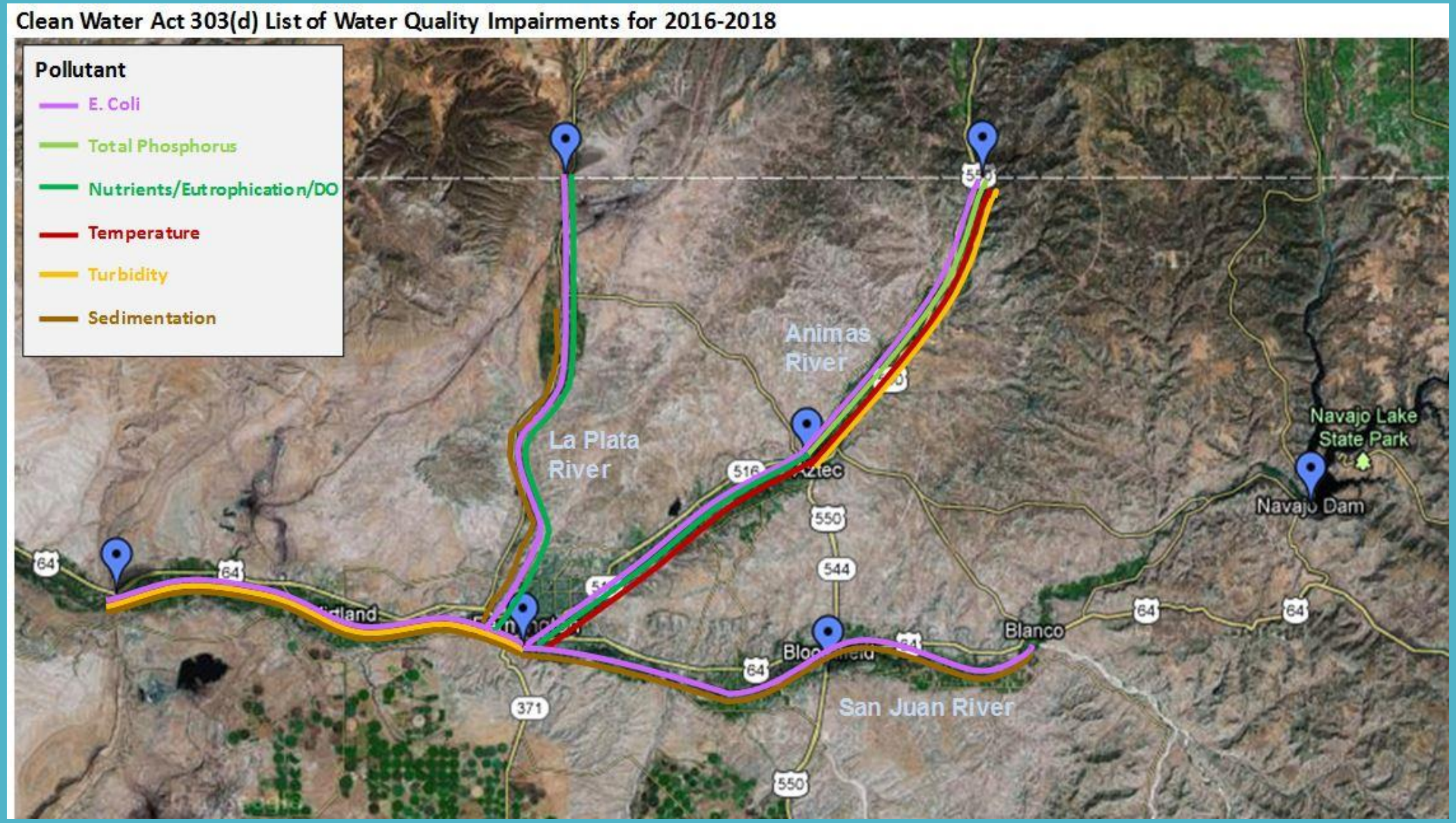
Mission: To find collaborative solutions to protect and restore water quality in the San Juan River Watershed



First convened with help from NMED in 2001 to address worsening nutrient, sediment, and bacteria impairments in the Animas and San Juan Rivers

- Water Quality Research
- Implementing Projects to Improve Watershed Health and Water Quality
- Community Outreach and Education

Water Quality Impairments as per NM Surface Water Quality Standards



The Lower Animas Watershed Based Plan

Identify Water Quality Problems

Impaired for E.coli, Nutrients, and Sedimentation (+ others)

High levels of human fecal bacteria

Identify Sources

Livestock with direct access to waterways, pastures without buffers, poor soil health, lack of vegetation in riparian areas, faulty/illegal septic tanks …..

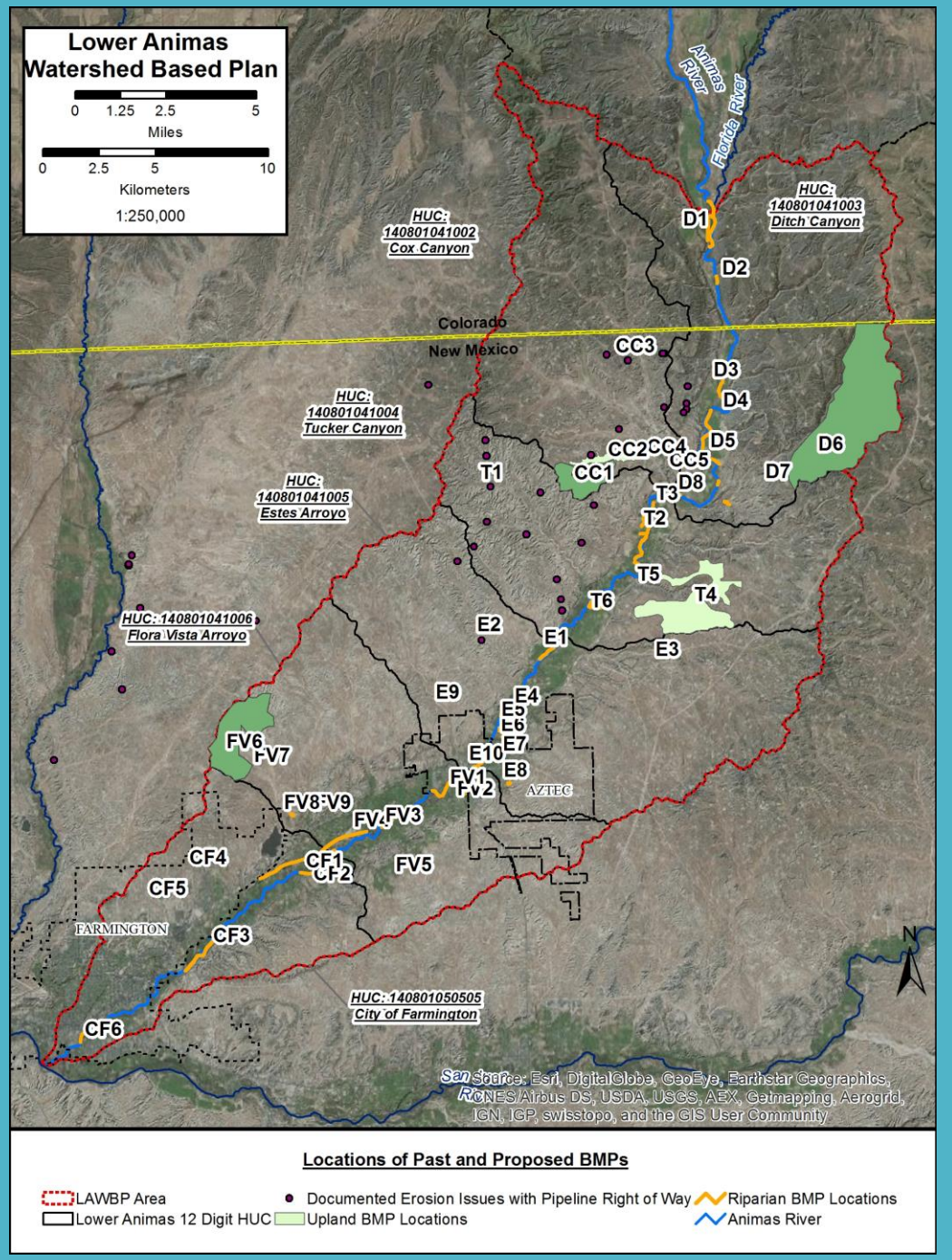
Identify Solutions

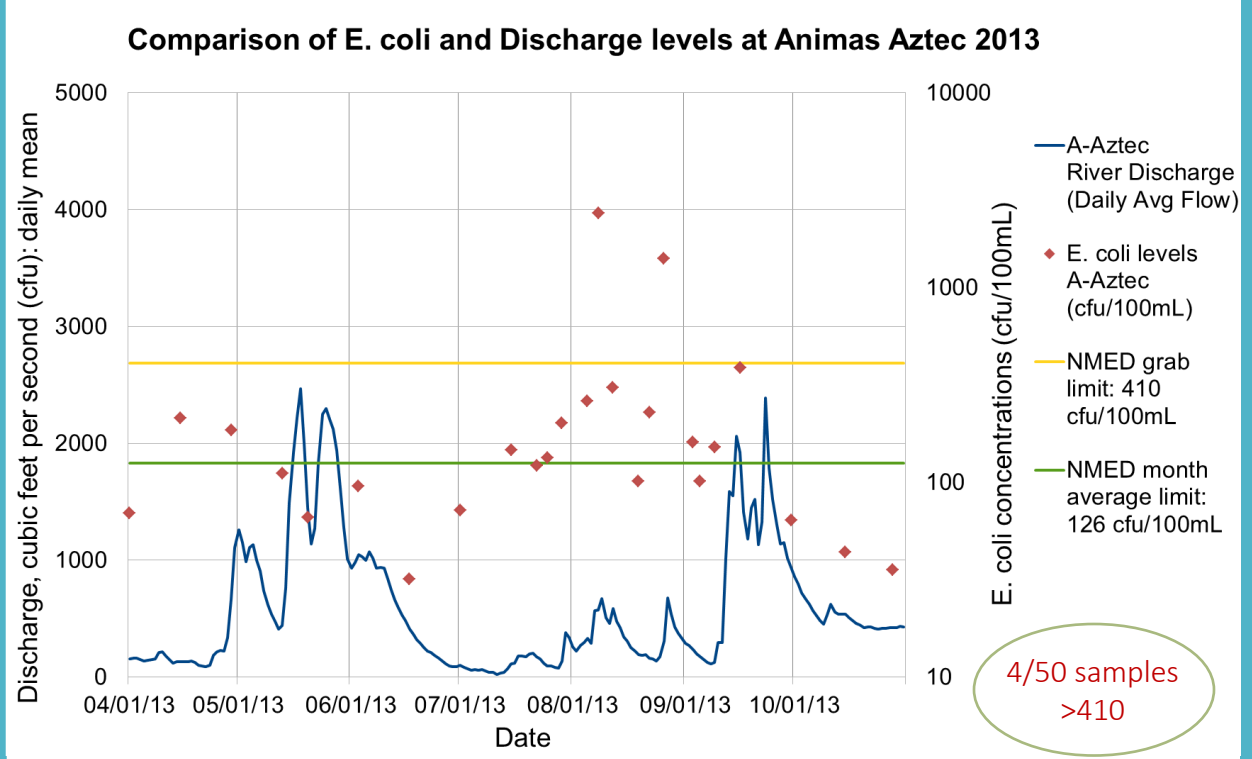
Agriculture and livestock Best Management Practices, invasive removal and restoration, low impact development, outreach ….

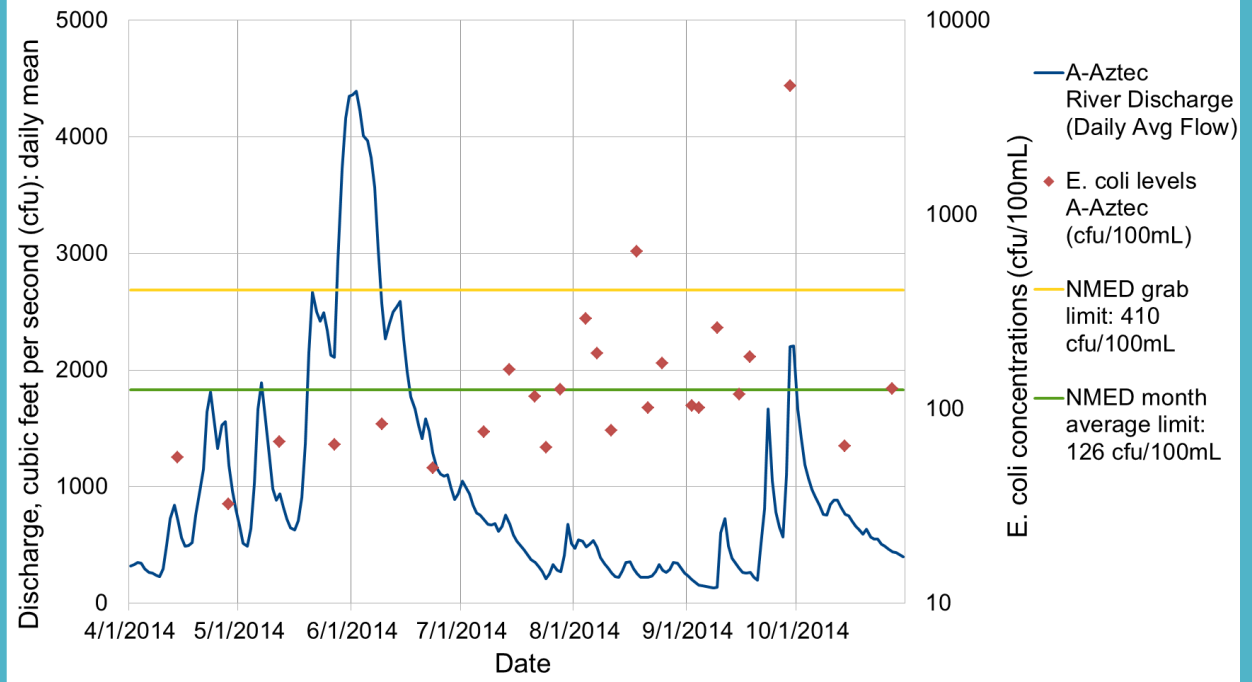
Implement Solutions

Develop partners, find funding, and implement solutions at the most cost-effective method for the biggest impact

Monitor → Plan → Implement → Monitor → Plan → Implement




Comparison of E. coli and Discharge levels at Animas Aztec 2013
Discharge, cubic feet per second (cfu): daily mean
5000
4000
3000
2000
1000
0
04/01/13
05/01/13
06/01/13
07/01/13
08/01/13
09/01/13
10/01/13
Date
10000
1000
100
10
E. coli concentrations (cfu/100mL)
A-Aztec River Discharge (Daily Avg Flow)
E. coli levels A-Aztec (cfu/100mL)
NMED grab limit: 410 cfu/100mL
NMED month average limit: 126 cfu/100mL
4/50 samples >410


Discharge, cubic feet per second (cfu): daily mean
5000
4000
3000
2000
1000
0
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
Date
10000
1000
100
10
E. coli concentrations (cfu/100mL)
A-Aztec River Discharge (Daily Avg Flow)
E. coli levels A-Aztec (cfu/100mL)
NMED grab limit: 410 cfu/100mL
NMED month average limit: 126 cfu/100mL

Addressing Livestock, Stormwater, and Runoff

- Agriculture and livestock BMPs identified as a priority early on
- Multiple studies confirm importance of stormwater sources
  - Ruminant fecal bacteria (cattle, sheep, goats, elk, deer) present >90% of samples
  - Bacteria and nutrient loads 10x higher after storm events
  - High correlation between turbidity, TP, organic N, E.coli
  - Long river stretches with minimal assimilative capacity to reabsorb nutrients and sediment

- **Prioritize project implementation that addresses all these factors and more**

This interactive map is available to explore at
https://sjswcd.maps.arcgis.com/apps/MapSeries/index.html?appid=713f3b0f200f440c9714ffb1306bc40c

Working Towards Implementing Solutions: Agriculture Best Management Practices

- Partner with landowners to install livestock exclusion/rotational grazing fencing to reduce livestock disturbance in riparian corridors and assist in land management goals
- Coordinate seeding/plantings to improve habitat, soil health, and ability to filter nutrients/bacteria
- Assist landowners in waste management to improve composting capacity and reducing bacteria mobility

2018 Riversbend Ranch Riverside Livestock Exclusion Fencing

2019 Bandy Ranch Livestock Exclusion Fencing and Filter Strip

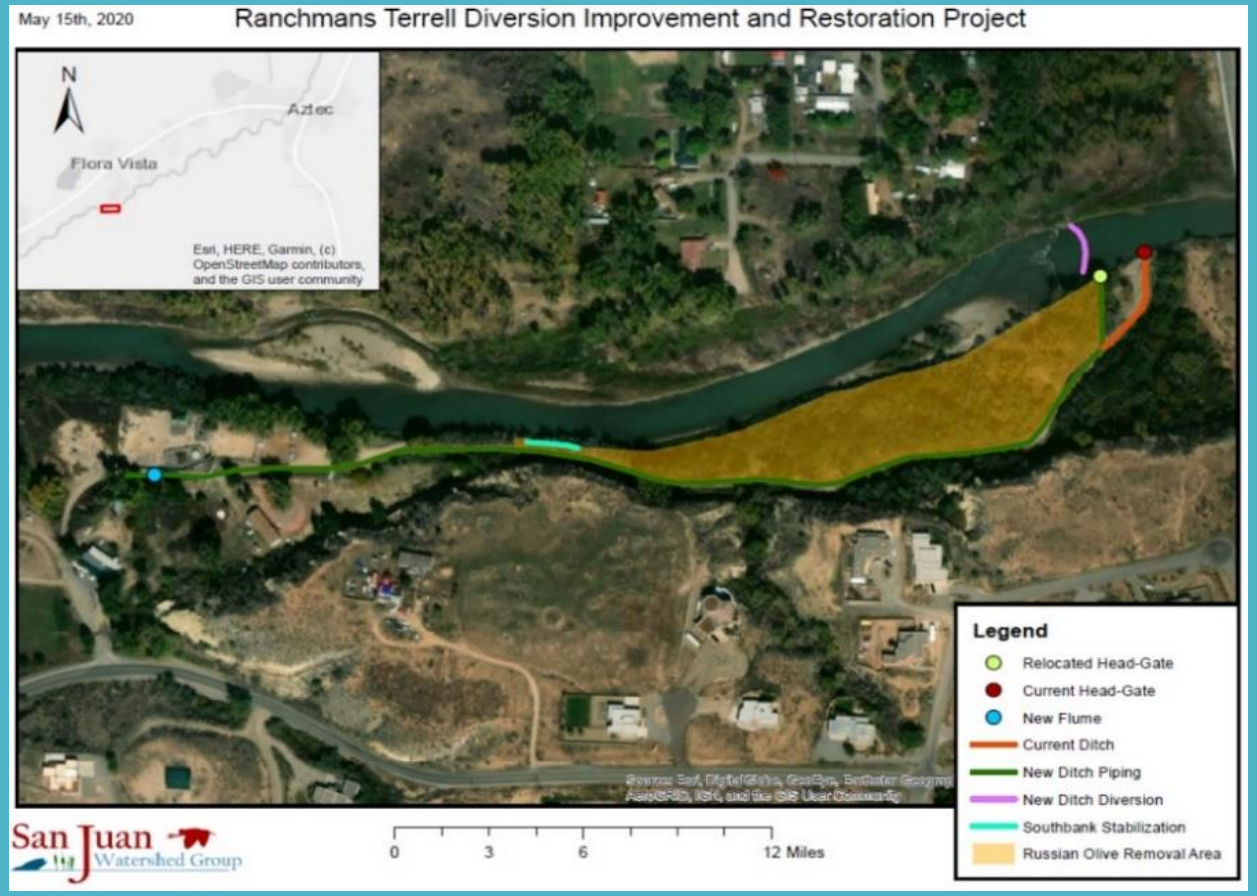
2020 Four Corners Equine Rescue Waste Containment Facilities

Addressing Nutrients, Erosion, and Assimilative Capacity: Ranchmans Terrell Diversion Improvement and Restoration Project

- At the same time, we implement other non-bacteria focused projects that leverage areas of concern for water quality, water quantity, watershed health, multiple land manager goals, and partnerships

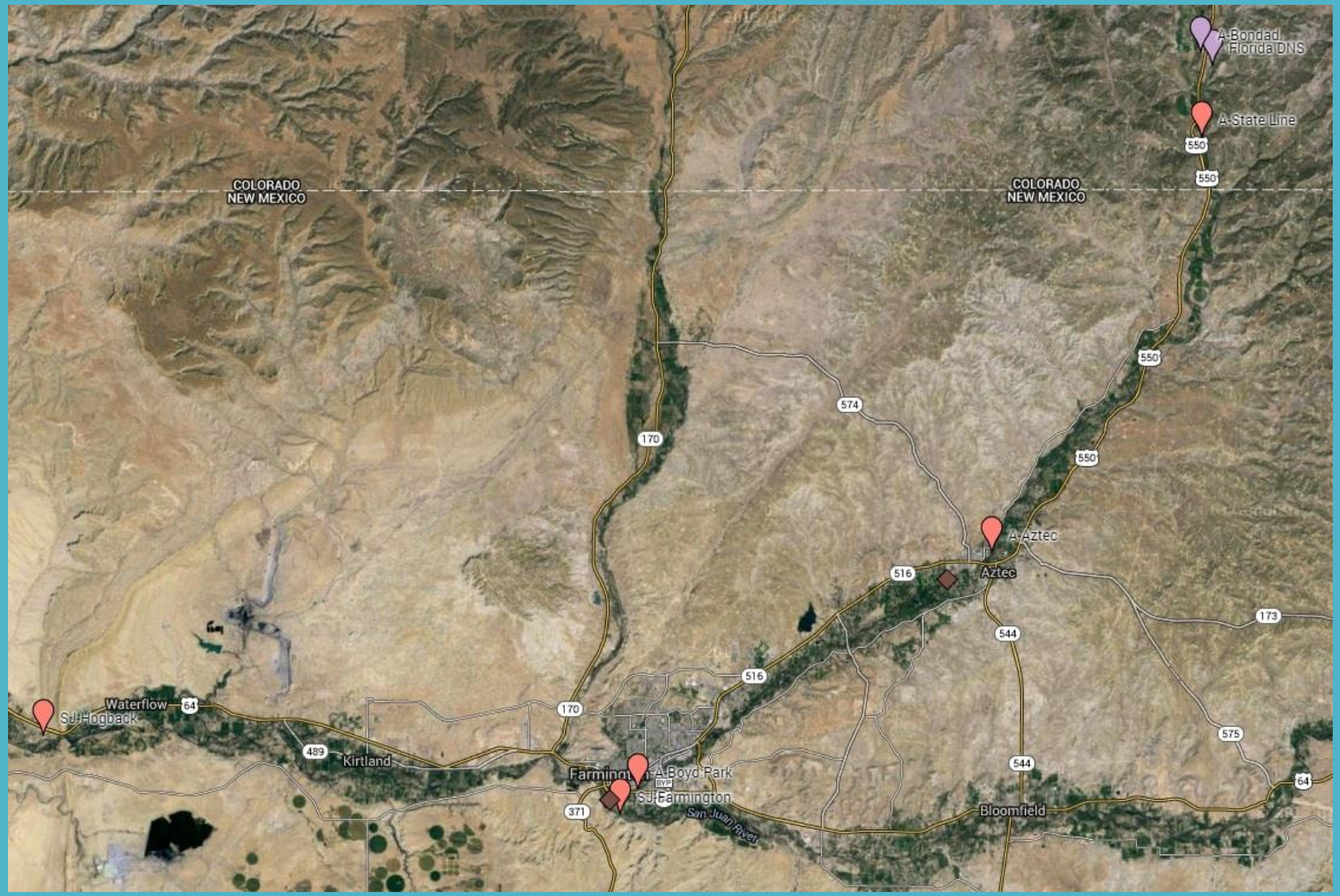
This interactive map is available to explore at https://sjswcd.maps.arcgis.com/apps/MapSeries/index.html?appid=713f3b0f200f440c9714ffb1306bc40c

- Countless Partners
  - San Juan SWCD, Ranchmans Terrell Ditch, NRCS, Office of State Engineers (OSE), Interstate Stream Commission (ISC), USFWS, The Nature Conservancy, the Animas Watershed Partnership, and more …
- Several Funding Sources
  - Clean Water Act (319), Bureau of Reclamation WaterSMART, ISC Acequia 90/10 Cost Share Program, NRCS Regional Conservation Partnership Program (RCPP), and more …
- Interconnected Project Components

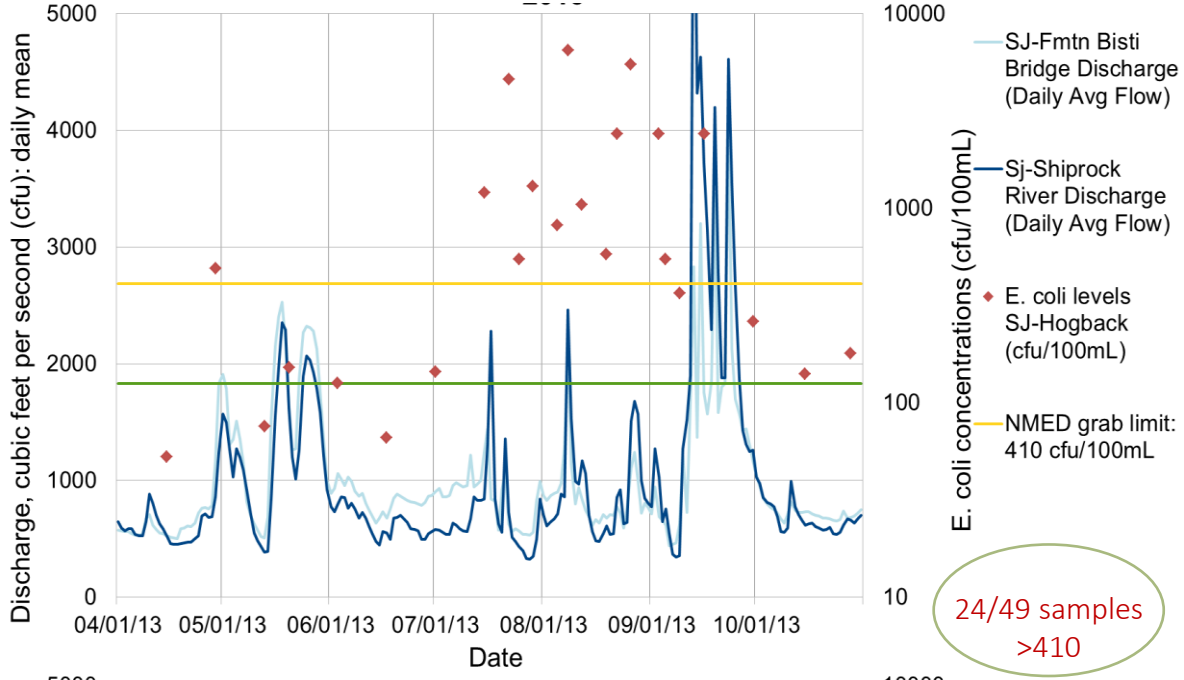


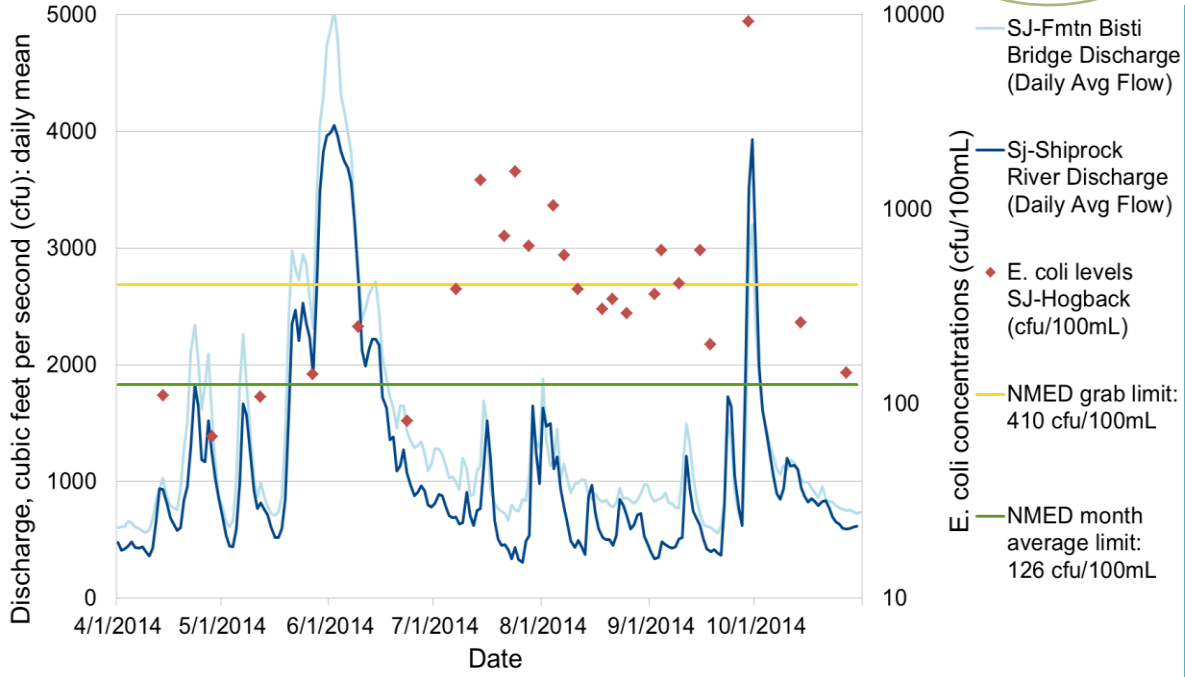
Who Pooped in the River?
2013-14 Microbial Source Tracking (MST) Study

- Characterization of source hosts of fecal bacteria – we need to know where it's coming from to know where to start watershed planning and implementation
- Some projects were identified as beneficial with or without doing a study first. The MST study redirected our focus to addressing human source bacteria.
- MORE DATA = MORE STRATEGIC PROJECTS AND OUTREACH

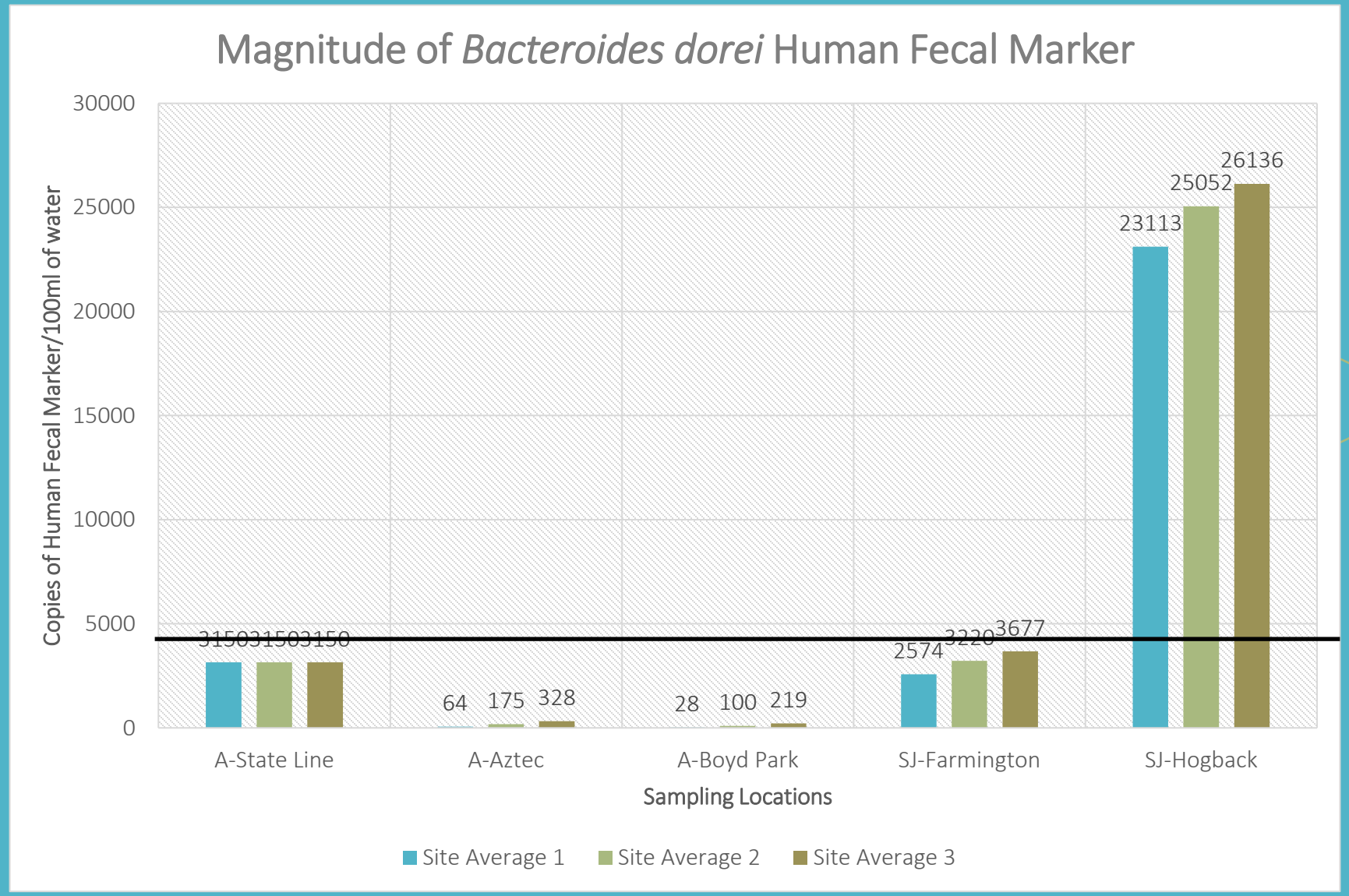


Comparison of E. coli and River Flow in San Juan at Hogback





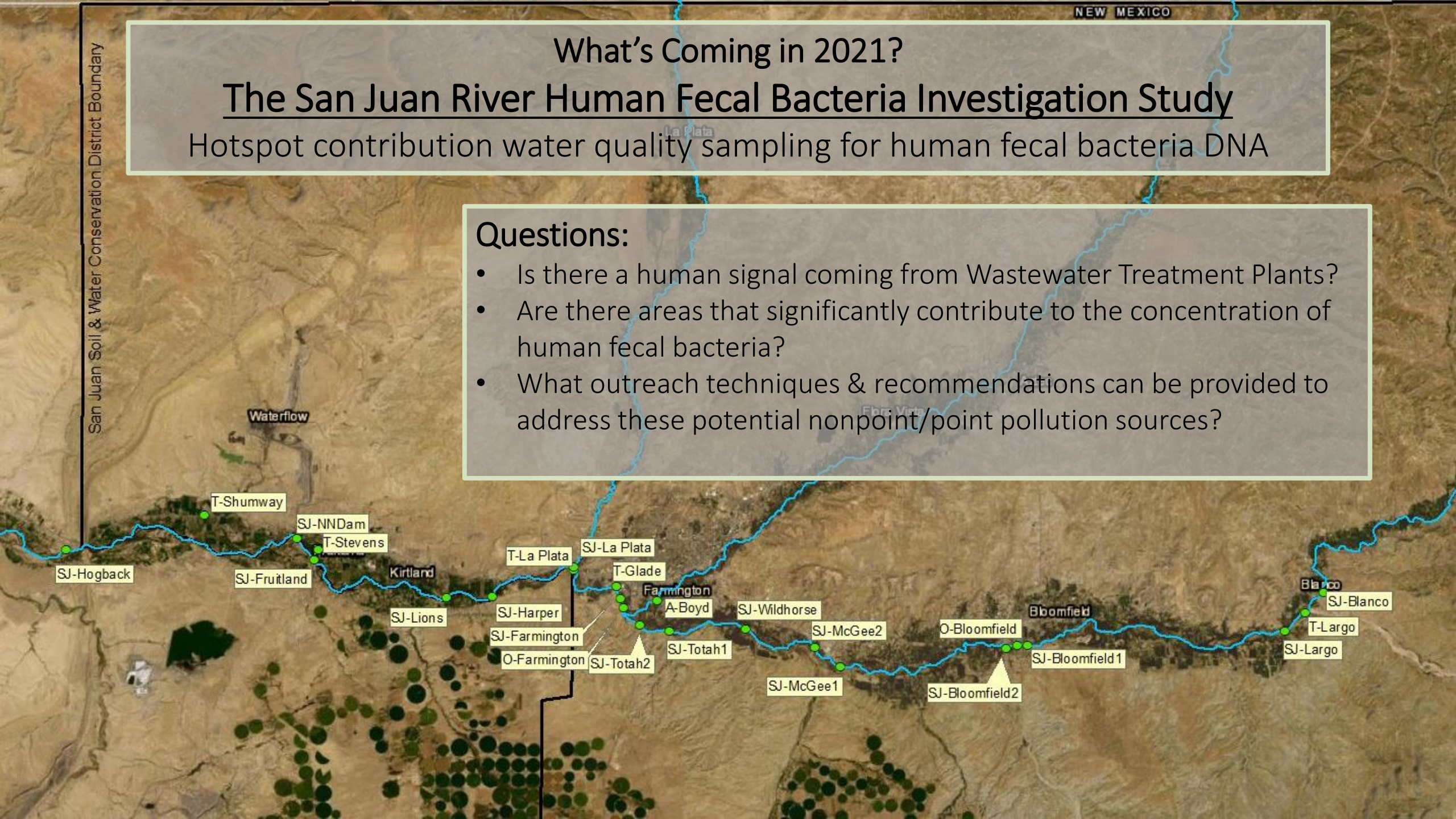
How Much Are Humans Contributing *Bacteroides dorei* to Animas and San Juan Rivers?



4200 copies/100ml is a benchmark illness rate of 30 illnesses per 1000 swimmers

Keeping Our Poop in the Public's Mind: Septic Outreach

- **Sources for human fecal bacteria are hypothesized to be from:**
  - Faulty/illegal septic tanks
  - Illegal dumping of septage waste
  - Wastewater treatment plants (minimal)
- Connect with local plumbers and septic professionals to learn their needs and concerns
- Public education on the importance of methods of septic system maintenance and NM Health Dept. regulations/contacts for further information
- Start reducing occurrences of illegal dumping by improving signage and awareness of RV Waste Dump Stations already in San Juan County
- **THINK BIG**: Develop a Septic Cost Share Program that offers financial assistance for landowners who require septic maintenance and replacement



What's Coming in 2021?

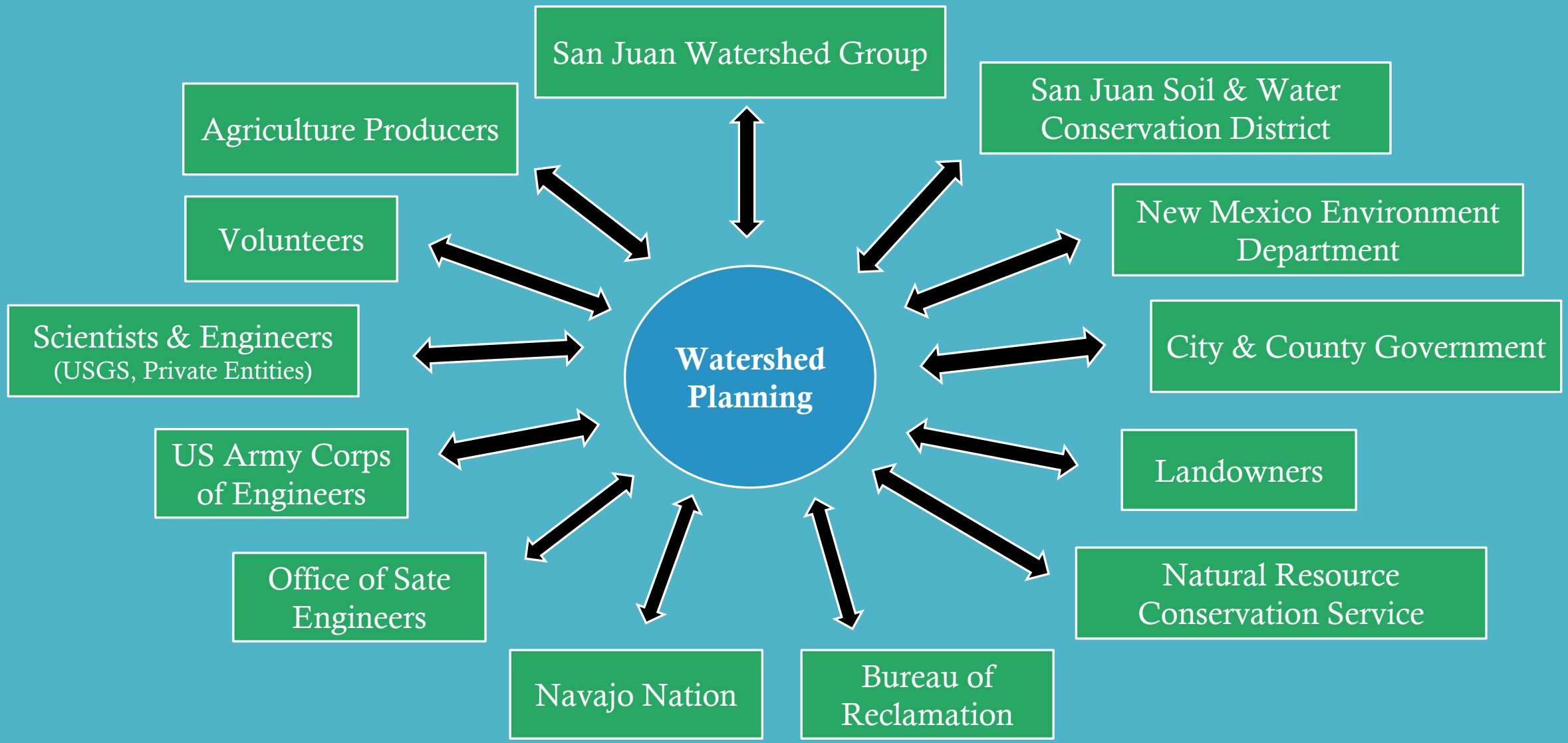
The San Juan River Human Fecal Bacteria Investigation Study

Hotspot contribution water quality sampling for human fecal bacteria DNA

Questions:

- Is there a human signal coming from Wastewater Treatment Plants?
- Are there areas that significantly contribute to the concentration of human fecal bacteria?
- What outreach techniques & recommendations can be provided to address these potential nonpoint/point pollution sources?

Assembling the San Juan Squad for the San Juan Restoration Plan



Thank You!

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Special Thank You to Our Funders: