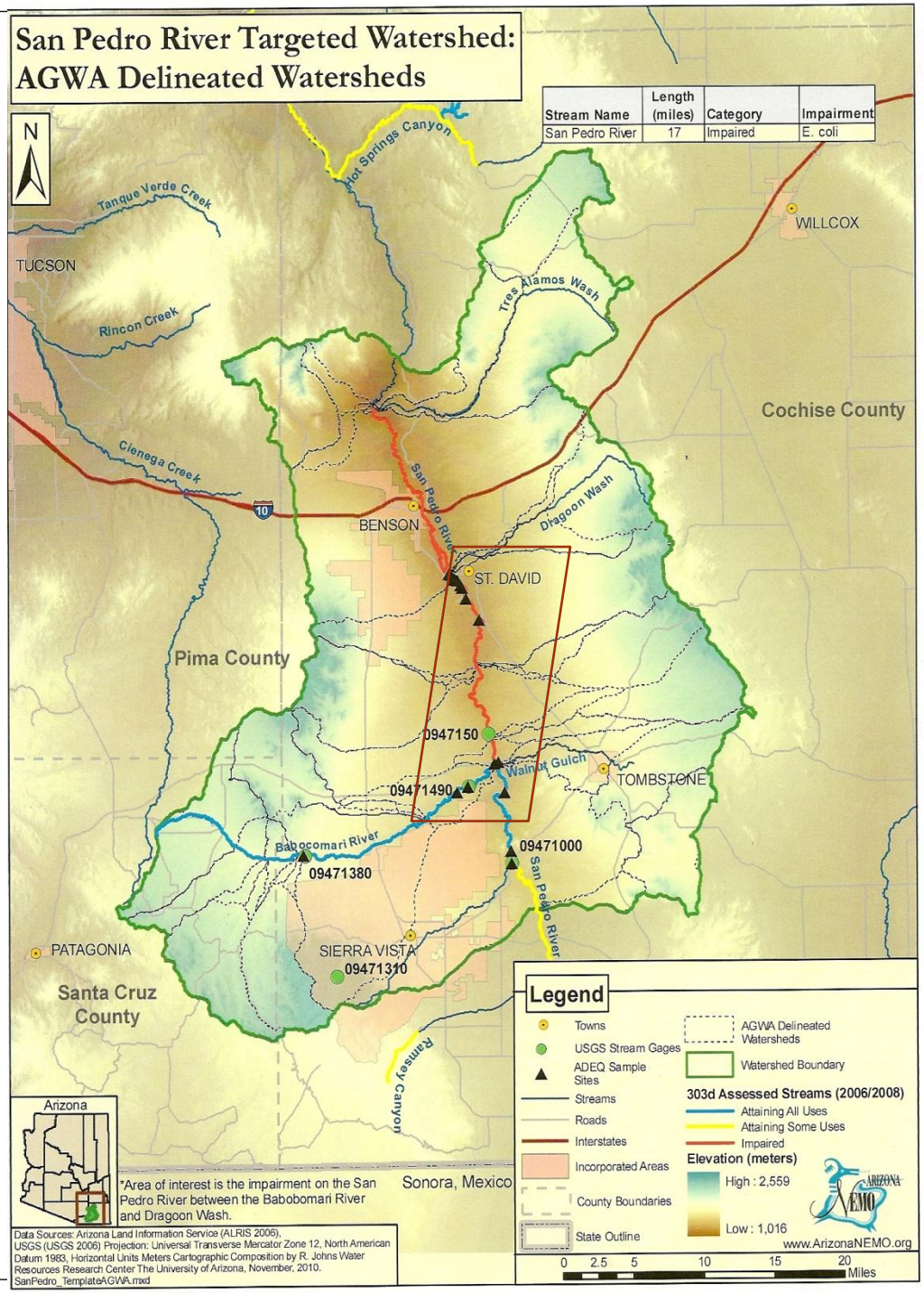
San Pedro Targeted Watershed *E. coli* Reduction Project

Background

- The San Pedro River had six exceedances of *E. coli* in one sampling cycle from February 1 to August 17, 2006.

- EPA listed the reach of the San Pedro River from the mouth of the Babocamari River to the Dragoon Wash as impaired for *E. coli.*

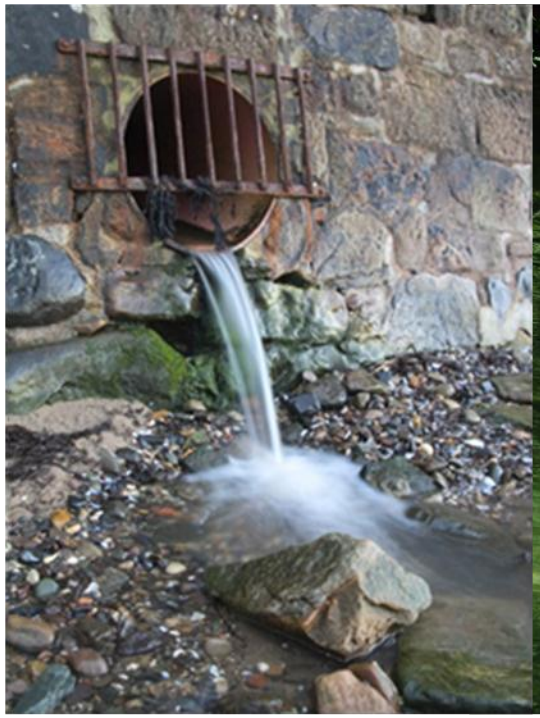
- To remove the impairment is to show a minimum of 3 non-exceedances in one sampling cycle under the same conditions as the original sampling collection.


San Pedro River Targeted Watershed:
AGWA Delineated Watersheds
Stream Name | Length (miles) | Category | Impairment
San Pedro River | 17 | Impaired | E. coli
N
Hot Springs Canyon
Tanque Verde Creek
TUCSON
Rincon Creek
Cienega Creek
10
WILLCOX
Tres Alamos Wash
Cochise County
San Pedro River
Dragoon Wash
BENSON
ST. DAVID
Pima County
0947150
Walnut Gulch
TOMBSTONE
09471490
Babocomari River
09471380
09471000
San Pedro River
PATAGONIA
SIERRA VISTA
09471310
Santa Cruz County
Ramsey Canyon
Sonora, Mexico
Arizona
*Area of interest is the impairment on the San Pedro River between the Babobomari River and Dragoon Wash.
Legend
Towns
USGS Stream Gages
ADEQ Sample Sites
Streams
Roads
Interstates
Incorporated Areas
County Boundaries
State Outline
AGWA Delineated Watersheds
Watershed Boundary
303d Assessed Streams (2006/2008)
Attaining All Uses
Attaining Some Uses
Impaired
Elevation (meters)
High : 2,559
Low : 1,016
www.ArizonaNEMO.org
0 2.5 5 10 15 20
Miles
Data Sources: Arizona Land Information Service (ALRIS 2006), USGS (USGS 2006) Projection: Universal Transverse Mercator Zone 12, North American Datum 1983, Horizontal Units Meters Cartographic Composition by R. Johns Water Resources Research Center The University of Arizona, November, 2010.
SanPedro_TemplateAGWA.mxd

What the heck is *E. coli?*

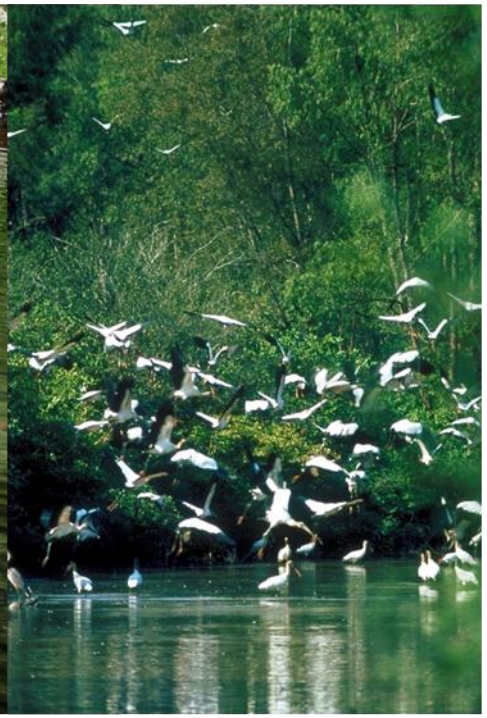
- Escherichia coli (*E. coli)* is a bacterium naturally found in the intestines and feces of warm-blooded animals.
- E. coli is commonly used as an indicator of fecal pollution of water.
- There are many different types of *E. coli,* most harmless, but some may cause illness.

Potential Sources



Wastewater

Recreation



Wildlife

There is *E.coli* in the water, but where did it come from?

- Volunteer Assisted Monitoring

- Microbrial Source Tracking uses laboratory tests to determine if *E. coli* (or other fecal bacteria) in water samples come from animal or human feces.

Goals of the Sampling Team

- Estimate fecal bacteria contributions from three categories – human, cattle, and all others.
- Examine the distribution of bacterial populations during different hydrological conditions and seasons.
- Identify specific sources of the pollutants
- Identify sites and document conditions at these sites

Summary of Project Sampling

- April 17th, 2011, the SPR was exhibiting base flow conditions (0.021 -5.317 cfs). This served as the sampling team's baseline and practice run.
- The sampling team sampled four locations: Fairbanks, Highway 80 at St. David Bridge, North BLM, and the Babocamari.
- All Colilert results from each of the four locations were negative.

Summary of Project Sampling

- July 22nd, 2011, the SPR experienced the first monsoon.
- Samples were collected at the same four locations during flood stage conditions.
- The following locations experienced exceedances: Fairbanks, Highway 80 at St. David Bridge, and North BLM.
- The Babocamari did not exceed.
- An exceedance is > 235cfu/100mL

San Pedro Targeted Watershed
E. coli Sample Results 2011

Location	04.17.11 (CFU/100mL)	07.22.11 (CFU/100mL)	07.23.11 (CFU/100mL)	08.02.11 (CFU/100mL)	09.10.11 (CFU/100mL)	12.11.11 (CFU/100mL)
HWY 80 at St. David Bridge	0	> 2419.6	> 2419.6			No Flow
North BLM	0	> 2419.6	816.4			4.1
Fairbanks	0	> 2419.6	312.3	> 2419.6	> 2419.6	1
Babocamari	0	18.1	3			No Flow
Palominas				2419.6		
Charleston				> 2419.6		
Border					> 2419.6	

San Pedro Targeted Watershed
E. coli Sample Results 2012

Location	01.19.12 (CFU/100mL)					
HWY 80 at St. David Bridge	10.9					
North BLM	6.3					
Fairbanks	5.1					
Babocamari - Bowers Crossing	0					

Sampling Results

- Of the total 7 samples that were analyzed , 3 of the samples showed the Human molecular marker was apparent.

- Sample locations positive for Human molecular marker:
  - HWY 80/St. David
  - North BLM
  - Fairbanks

- The presence of Human molecular marker indicates that human recreation, residuals from recreation, illegal traffic, waste water disposal systems, or possible flow from the border may be impacting water quality in the river at the locations mentioned above.

Sampling Results

- Of the total 7 samples that were analyzed contributions of Bovine molecular marker were apparent.

- The remaining samples showed high levels of *E.coli:*
  - North BLM
  - Babocomari
  - Fairbanks
  - Palominas
  - Border

- The presence of Bovine molecular marker indicates that it may be impacting water quality in the river at the locations mentioned above.

Challenges

- Throughout the initial study period, E. coli has been detected within the study area indicating fecal contamination within the watershed.
- Microbial levels seem to fluctuate throughout the watershed indicating that potentially little die-off is occurring.
- Initial analysis suggests that these fluctuations coincide with extreme storm events and thus are a result of increased overland flow.

What does this mean?

- There is fecal contamination in the water during storm events and high flow conditions.
- Water coming into our watershed is impaired.
- There are potential risks associated with partial body contact with the impaired reaches.
- Additional analysis is needed to confirm additional source of fecal contamination in the watershed.

Next Steps

- Look for patterns
  - Storm Flow Conditions
  - Base Flow Conditions
- Look for repeat “offenders”
- Overlay land use information + water quality data + modeling results
- Identify Best Management Practices (BMPs)
- Schedule additional meetings for 2012.


Questions?