



Applications of bacterial source tracking data in the San Antonio River Basin

Friday, April 1, 2022



San Antonio River Watershed

- Drains ~4,180 mi.²
- Main stem ~240 mi.
- 13 classified segments



Adaptive Three-Pronged Approach

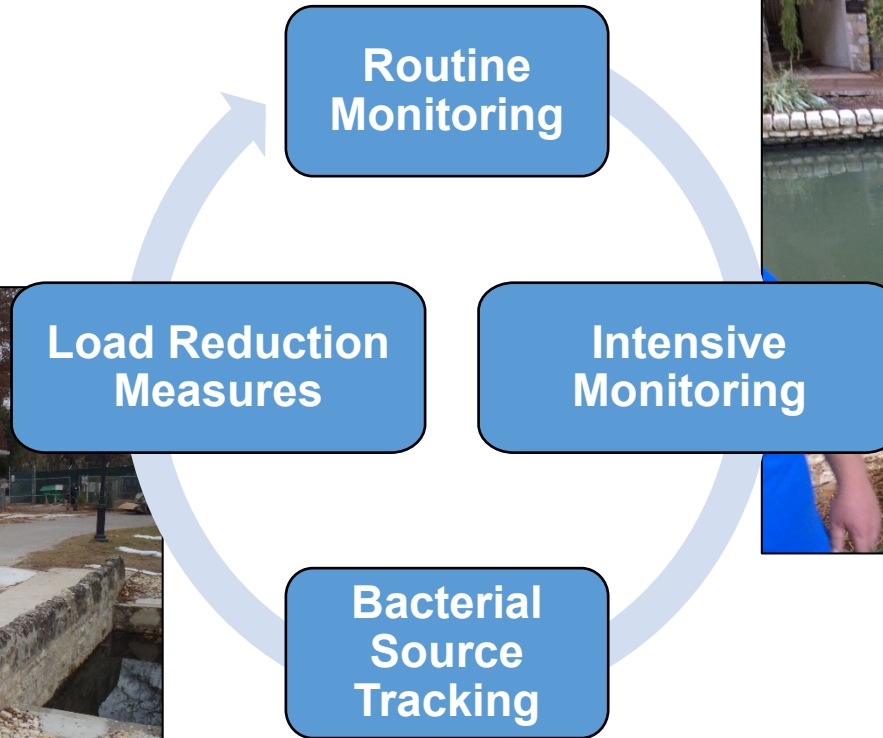
Routine
Monitoring

Intensive
Monitoring

Bacterial
Source
Tracking



Adaptive Three-Pronged Approach



Adaptive Three-Pronged Approach Time

Routine Monitoring

Load
Reduction
Measures

Intensive
Monitoring

Bacterial
Source
Tracking



Adaptive Three-Pronged Approach Money



Routine
Monitoring

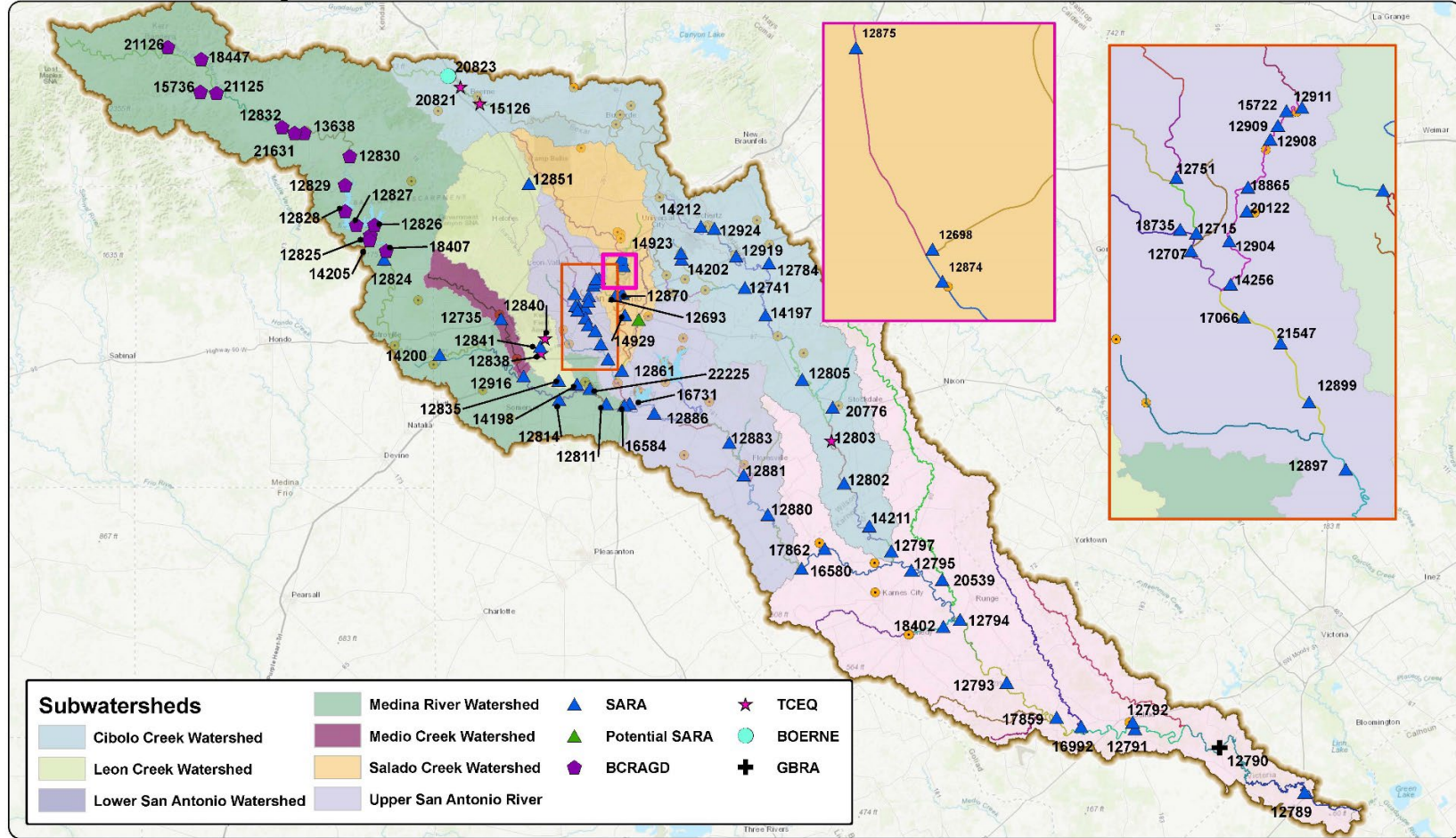
Load Reduction
Measures

Intensive
Monitoring

Bacterial
Source
Tracking



2022 Coordinated Monitoring Schedule



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River Authority Case Studies

- 1) Lower San Antonio River Implementation Plan (LSAR I-Plan)
- 2) San Pedro Creek Culture Park
- 3) Mid/Lower Cibolo Creek Watershed Protection Plan
- 4) Pollutant characterization assessment (Medina River)



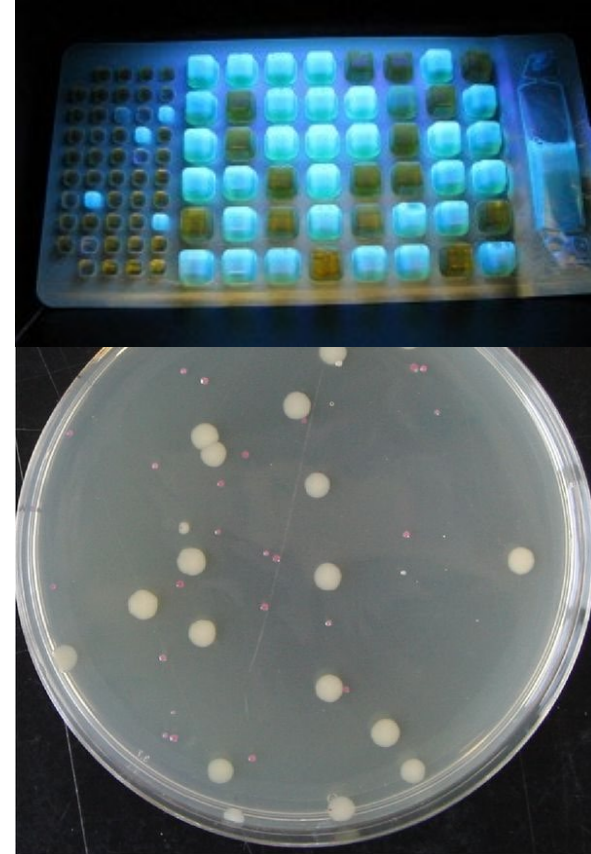
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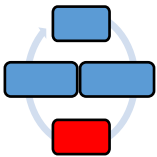
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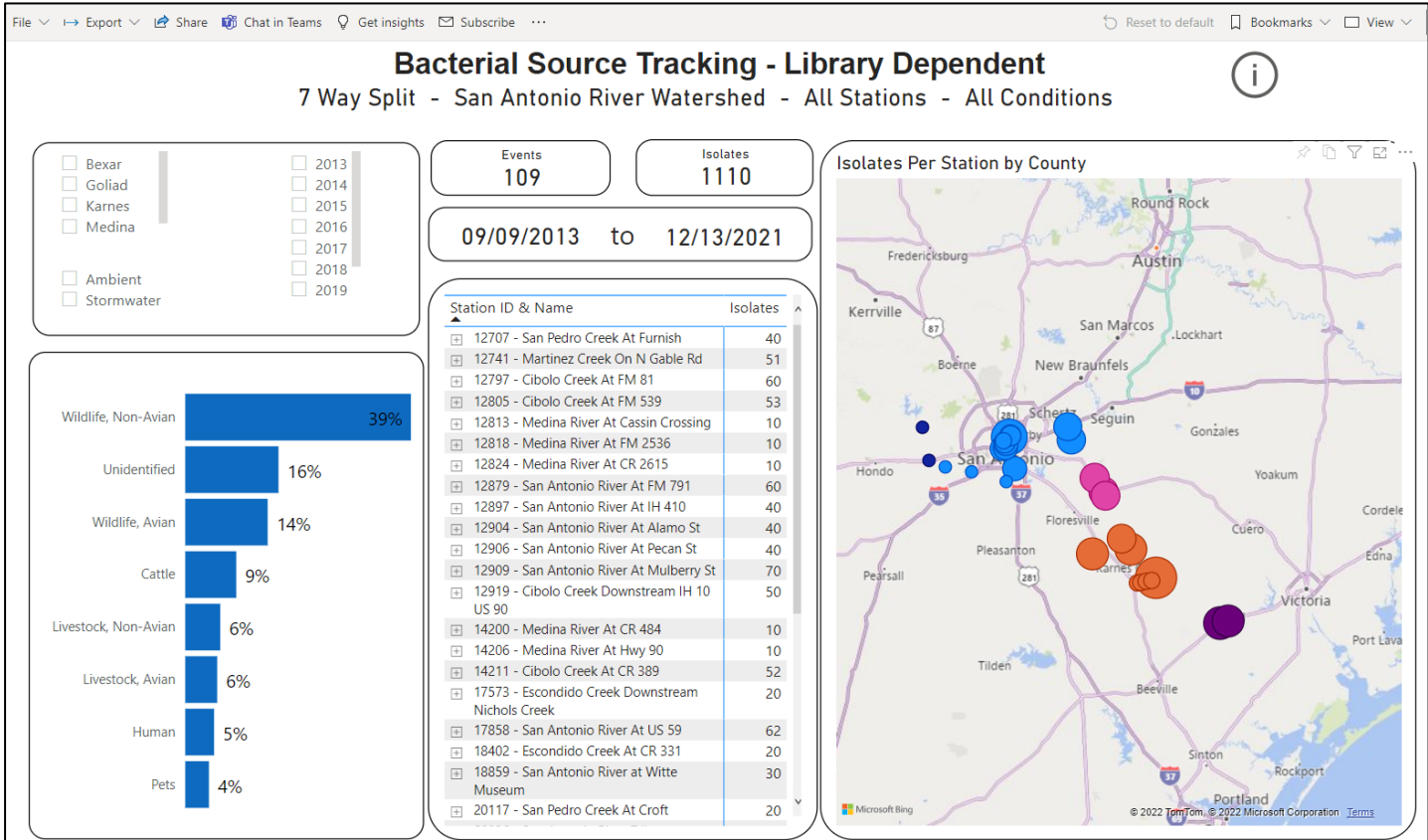
River Authority and AgriLife

- River Authority
 - Presence/absence only
 - HF183 method to identify human source
 - Bacteroides
- AgriLife
 - Determines **source** of *E. coli* through DNA fingerprinting
 - 3-way and 7-way splits



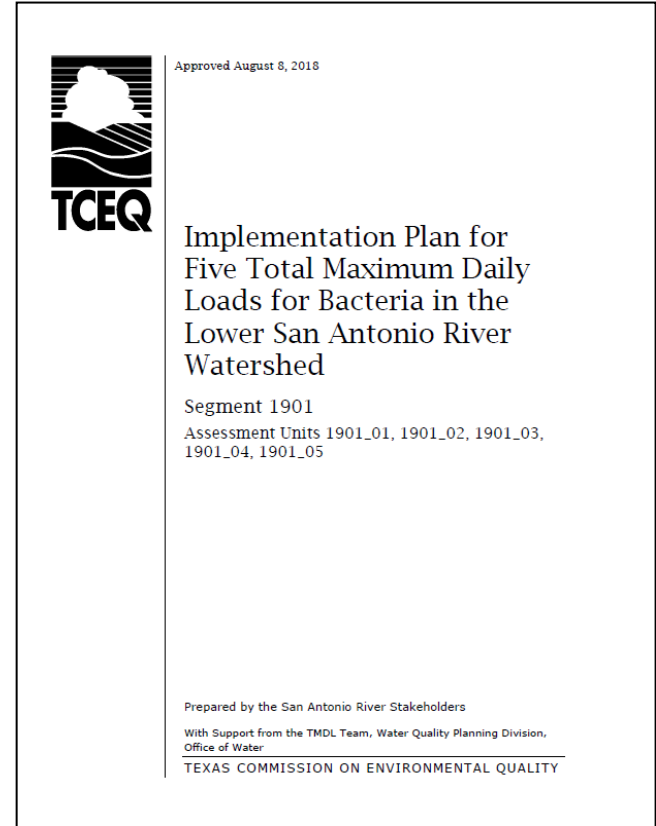


Internal BST Dashboard



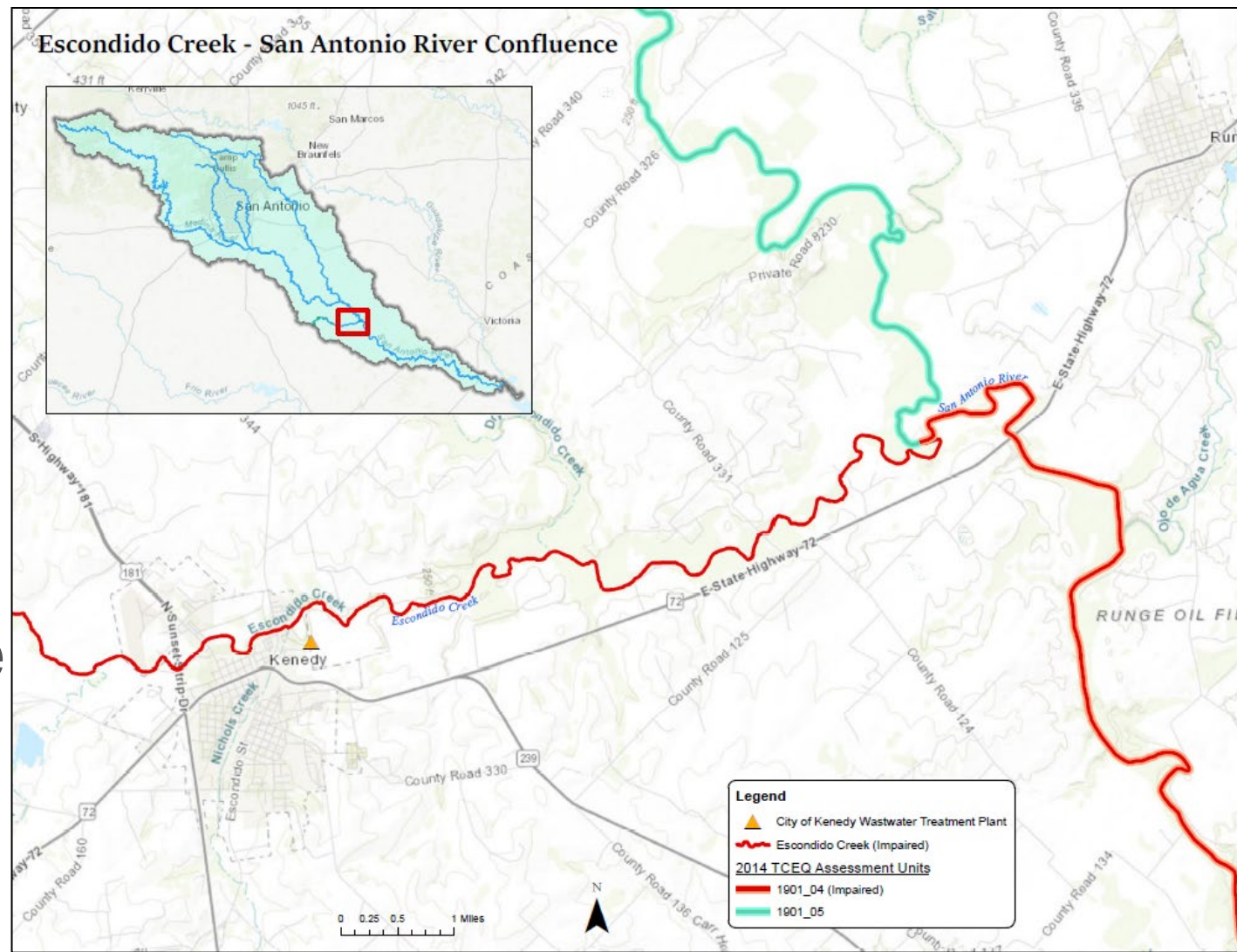
LSAR I-Plan

- Approved August 8, 2018
- Extensive stakeholder involvement
 - 9 management measures
 - 2 control actions

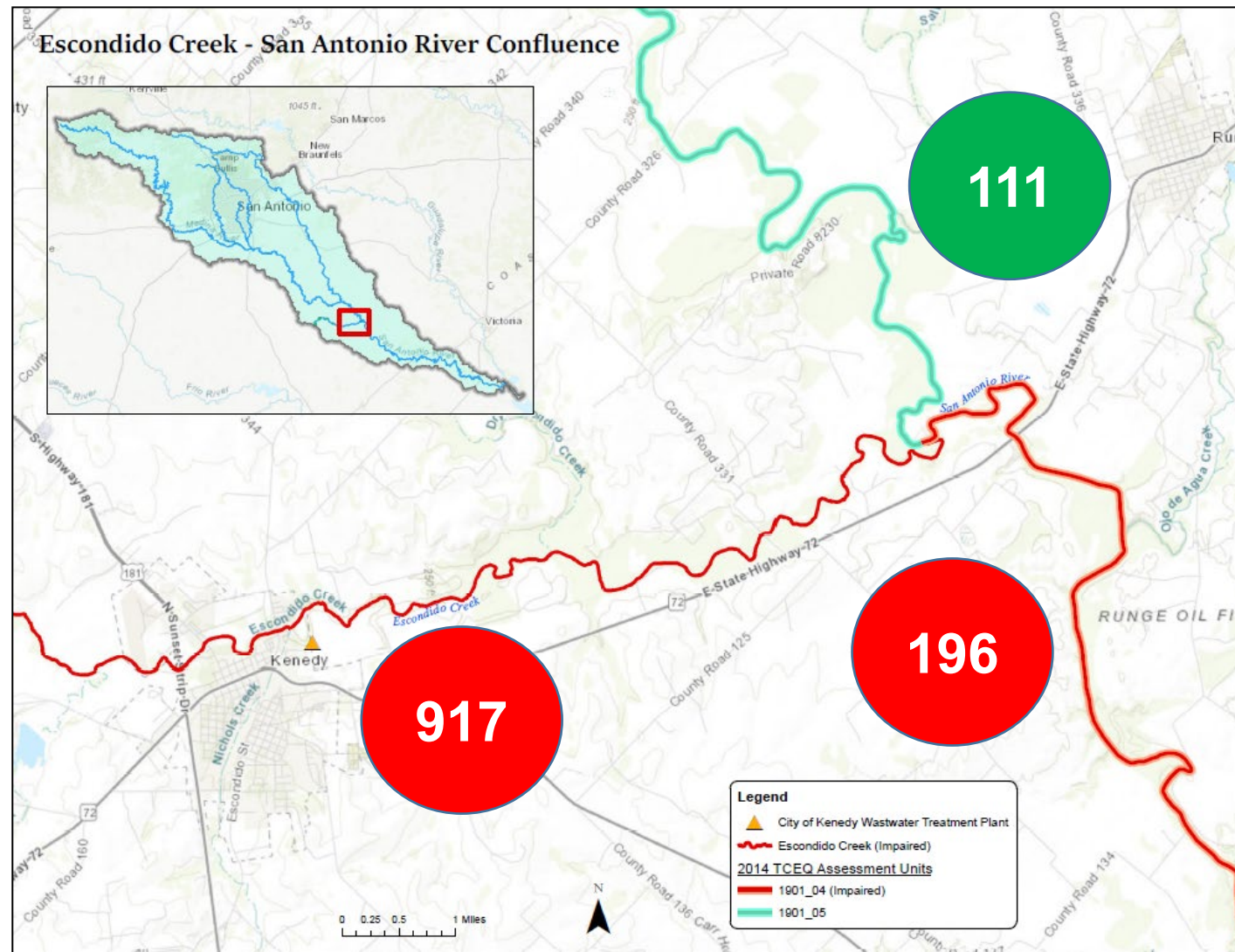
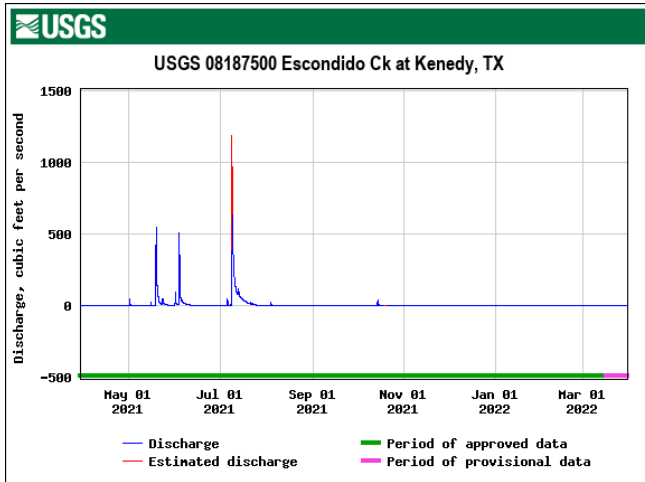


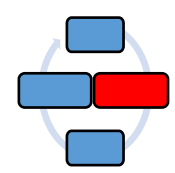
Escondido Creek

- ~11 mi. long
- Bacterial impairment since 2010
- WWTP discharge receiving stream



Escondido Creek

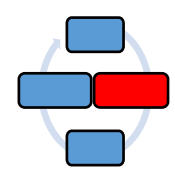




Escondido Creek

FLOW ↓	Station	Flow	<i>E. coli</i> (MPN)	Days Since Last Precip.
	Escondido at FM 792	0.1	140	5
	Immediately upstream of Nichols Creek Confluence	0.0	96	5
	Nichols Creek	0.1	220	5
	TCEQ_17573 Downstream of Nichols Creek Confluence	0.1	210	5
	8 miles upstream SAR Confluence	0.1	240	5
	7 miles upstream SAR Confluence	0.1	1600	5
	6 miles upstream of SAR Confluence	0.7	520	5
	5 miles upstream of SAR Confluence	1.6	460	5
	4 miles upstream of SAR Confluence	1.3	770	5
	3 mi. upstream SAR Confluence	2.0	610	5
	2 mi. upstream SAR Confluence	1.6	410	5
	1 mi. upstream SAR Confluence	1.2	520	5
	Confluence	1.1	650	5

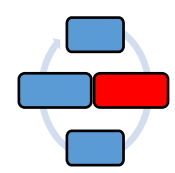




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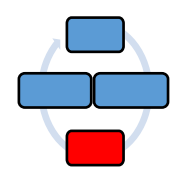




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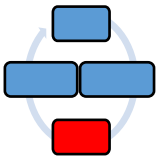




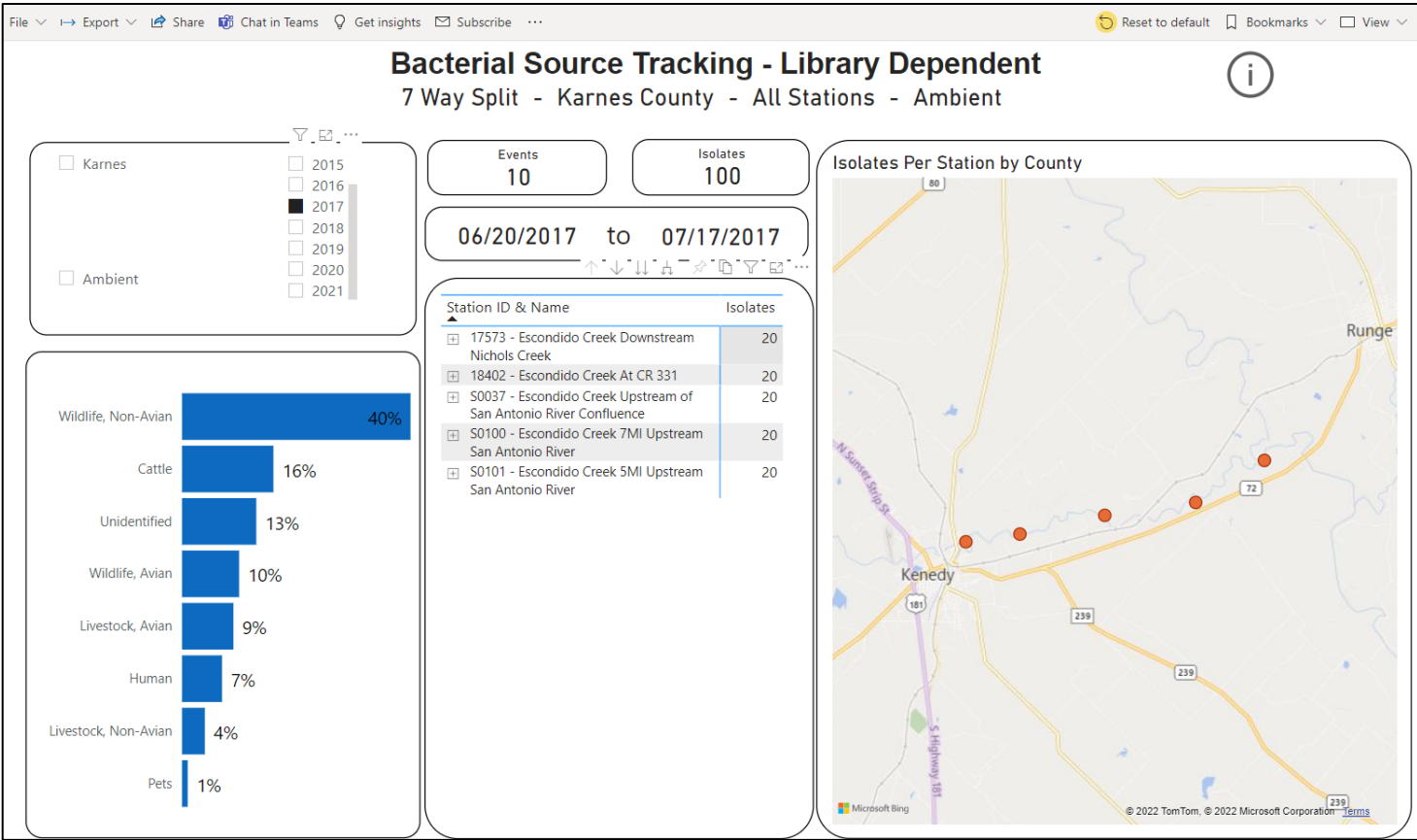
Escondido Creek

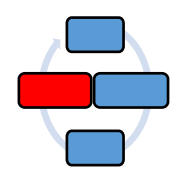
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LSAR I-Plan





LSAR I-Plan

- Management Measures:
 - Remove and manage feral hogs.
 - Restore and repair riparian zones; emphasize protection of riparian zones; advocate for educational and outreach materials.
 - Coordinate and expand existing water quality monitoring in the watershed.*

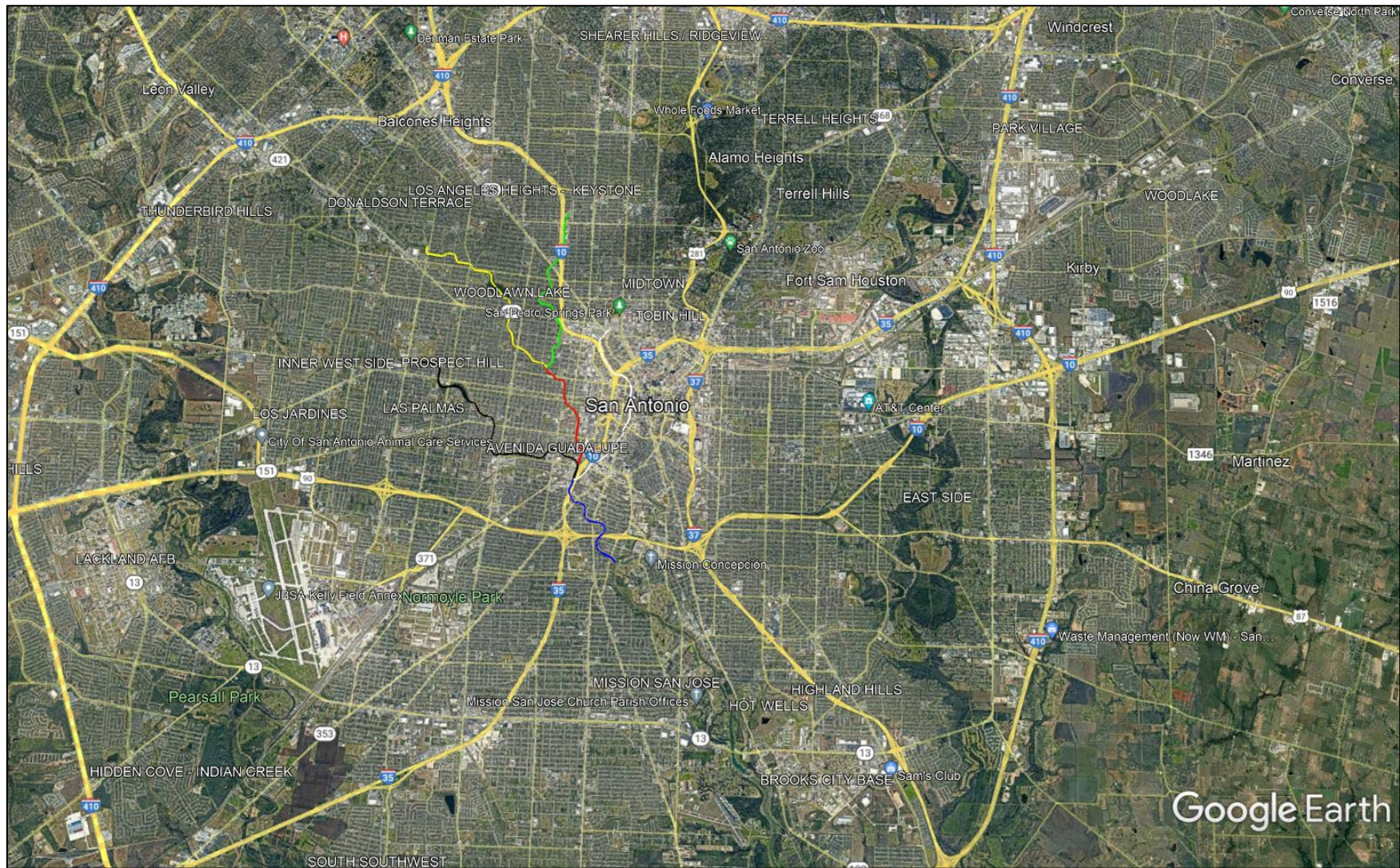


LSAR I-Plan

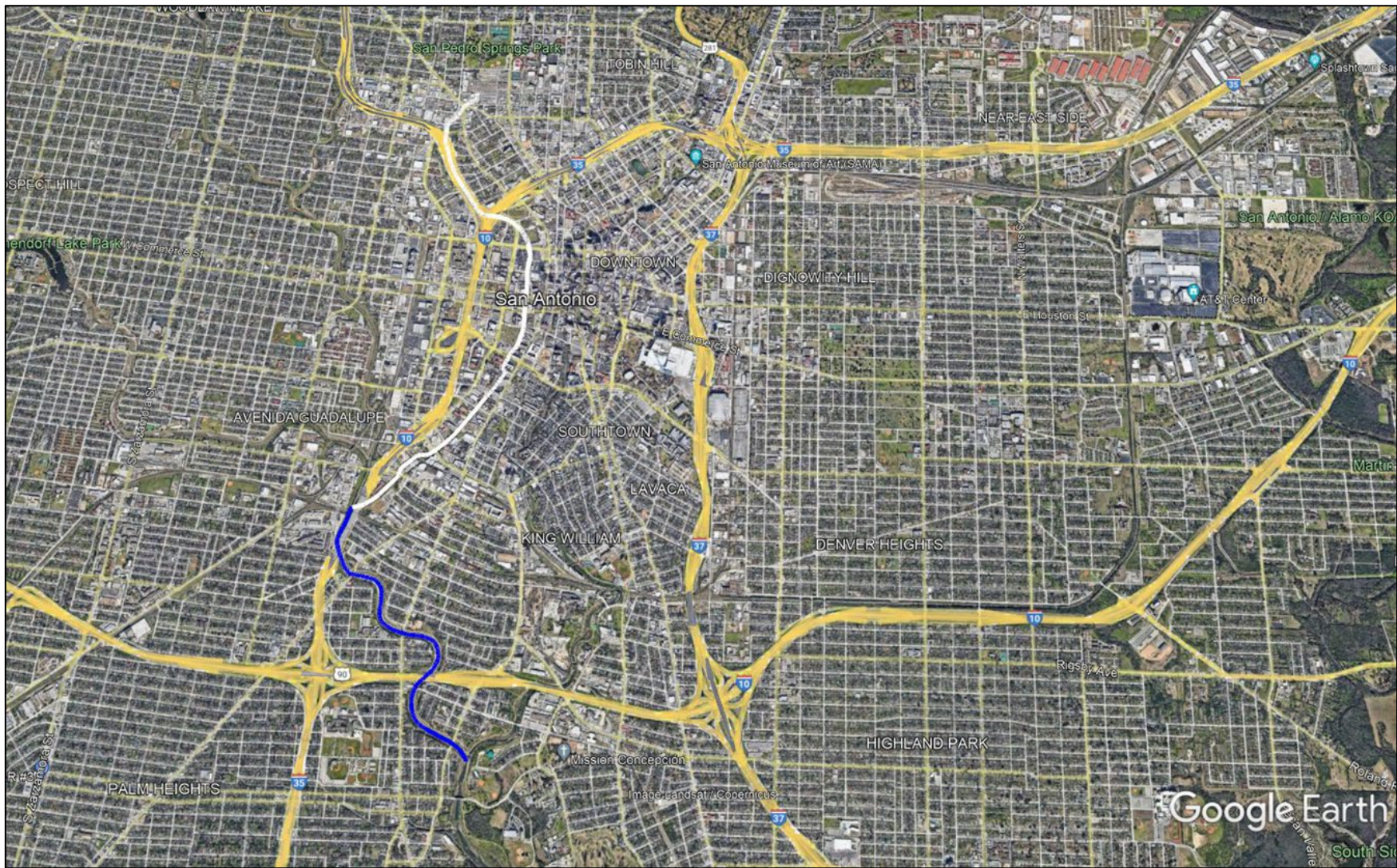
Assessment Unit	2014 IR Geomean	Draft 2022 IR
1901_05	110.67	105.6
Escondido Creek	916.85	515.03
1901_04	195.75	135.31

LSAR I-Plan adopted August 8, 2018





Committed to Safe, Clean, Enjoyable Creeks and Rivers.



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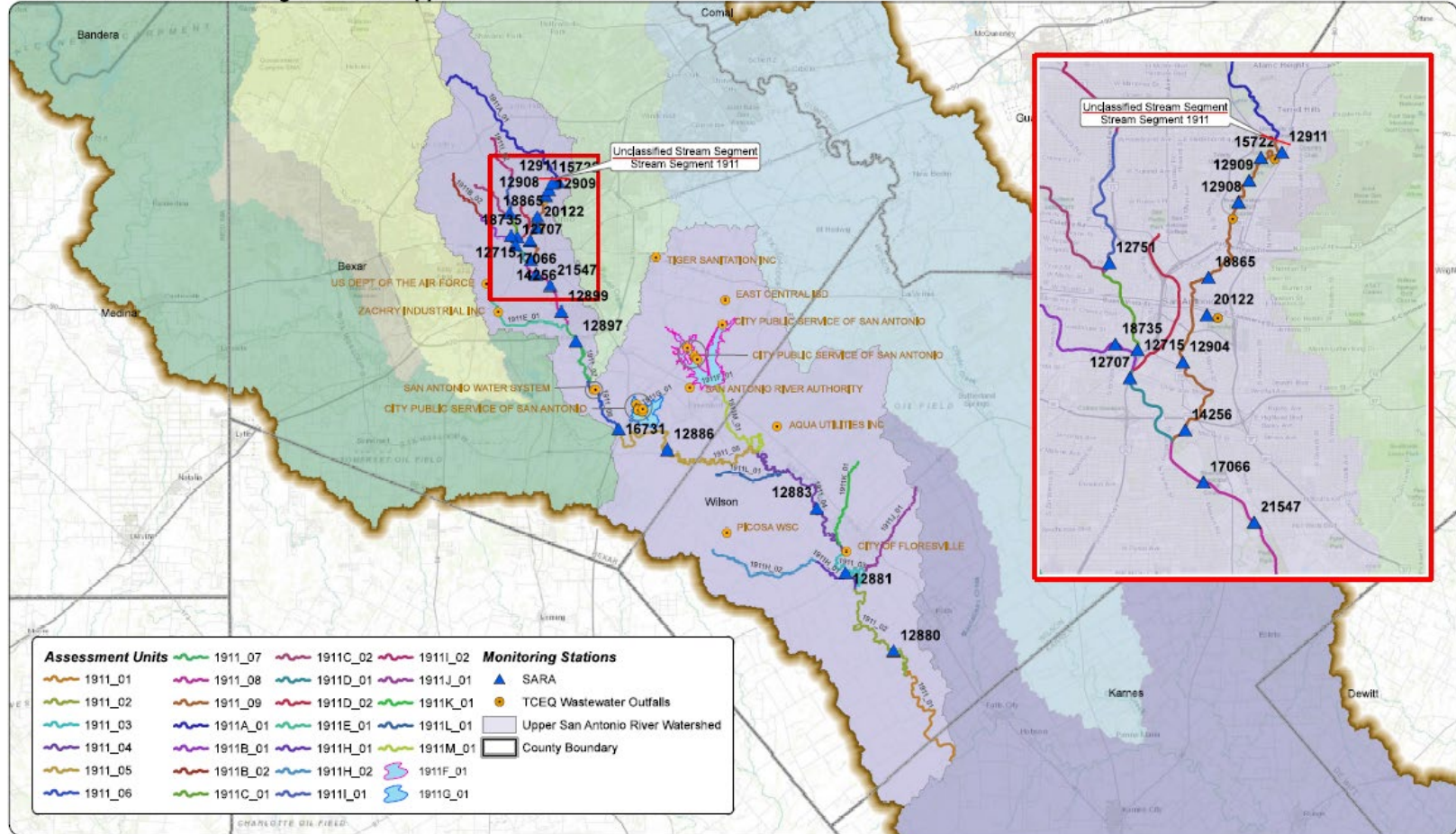
San Pedro Creek



San Pedro Creek



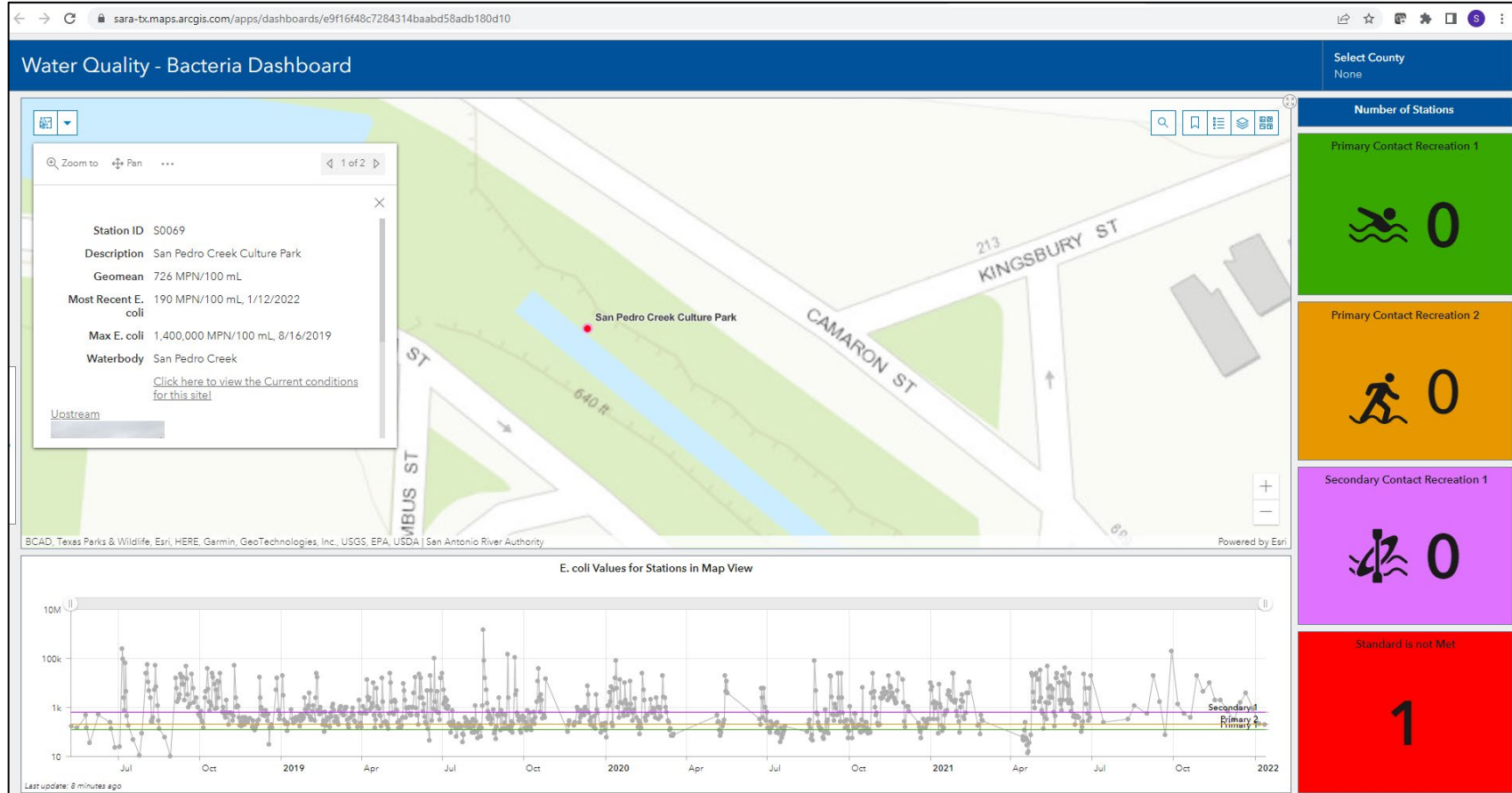
2022 Coordinated Monitoring Schedule - Upper San Antonio River Watershed

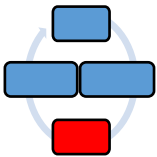


0 50 100 150 Miles

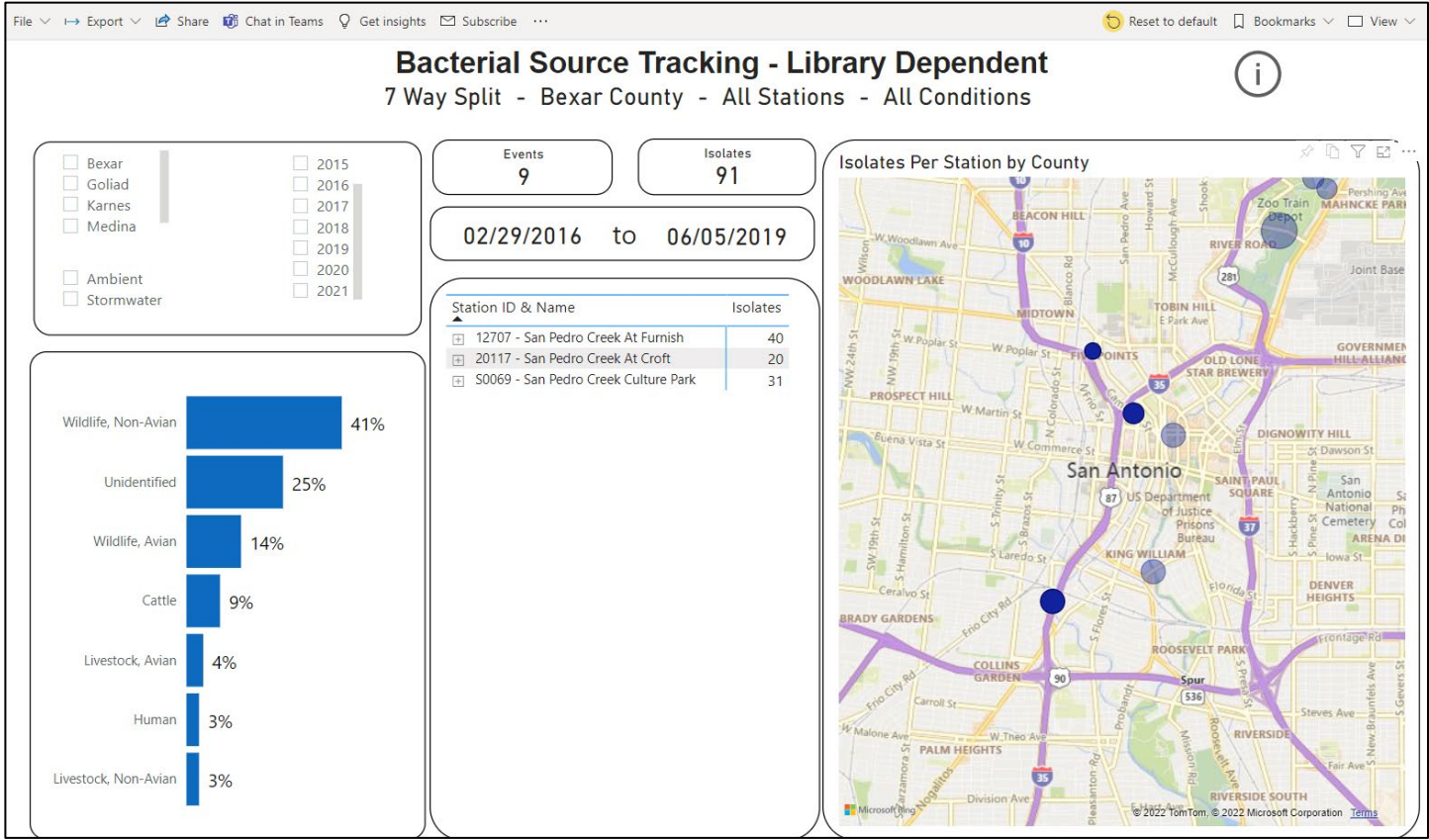
The data presented on this map is for informational purposes only and is not intended to be used for legal or engineering purposes. It does not represent an official survey and represents only the approximate relative location of property boundaries. The data was obtained from public records and is not guaranteed to be accurate. The San Antonio River Authority, its officials and employees have no liability arising out of the use of the data or information presented. If there are any questions about the accuracy of the data, please contact the San Antonio River Authority.

Bacteria Dashboard





San Pedro Creek



San Pedro Creek



WADE IN THE PLAZA DE FUNDACIÓN AT YOUR OWN RISK VADEA EN LA PLAZA DE FUNDACIÓN A TU PROPIO RIESGO

The Plaza de Fundación may be used for responsible water contact – shallow wading only. Caution, wading area may be slippery, there is no lifeguard on duty, and the creek water may occasionally contain high bacteria levels. By entering the Plaza de Fundación wading area, you take full responsibility for your protection and safety.

The San Pedro Creek Culture Park and the Plaza de Fundación are operated and maintained for public use and enjoyment. It is important to remember that the San Pedro Creek is a natural water body that has not been chlorinated, like a swimming pool, or treated to drinking water standards. Being situated in a highly urbanized area of downtown San Antonio, when it rains, the rainwater goes over parking lots, roof tops, and other impervious (hard) surfaces and into storm drains, picking up pollutants before discharging directly and untreated into the San Pedro Creek. This may cause *Escherichia coli* (E. coli) bacteria levels and other pollutants within the creek to become elevated. According to the Centers for Disease Control and Prevention, most strains of E. coli are harmless and naturally occur in the intestines of people and animals. However, some kinds of E. coli can cause illness in humans.

The San Antonio River Authority conducts water quality tests of the Plaza de Fundación and posts the results on the River Health page of its website. To see the latest water quality test results and learn how you can help protect the water quality of San Pedro Creek and the San Antonio River, please visit sariverauthority.org.

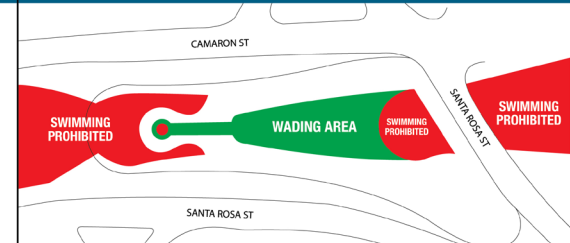
Given the potential water quality risks in an urbanized creek, when wading in the Plaza de Fundación, please do not ingest the creek water and wash your hands after recreating in the creek. This is good advice not only for enjoying the San Pedro Creek Culture Park, but also for any time you recreate in an outdoor body of water, be it a creek, river, lake, ocean, or even a swimming pool. Additionally, wading is not recommended in the Plaza de Fundación for at least 72 hours after the most recent rainfall as this is when E. coli levels are likely to be high.

El público puede tener contacto con el agua de la Plaza de Fundación responsablemente – al vadear en las áreas llanas. Se recomienda precaución ya que el área puede estar resbalosa, no hay salvavidas y el agua del arroyo puede tener altos niveles de bacteria ocasionalmente. Al entrar al área para vadear de la Plaza de Fundación, el público asume responsabilidad de su protección y seguridad.

El Parque Cultural del Arroyo San Pedro y la Plaza de Fundación son operadas y mantenidas para el uso y disfrute del público. Es importante recordar que el Arroyo San Pedro es un cuerpo de agua natural que no ha sido clorado como una piscina o ha sido tratado al nivel del agua potable. Al estar ubicado en un área altamente urbanizada del centro de la Ciudad de San Antonio, la lluvia que cae en los estacionamientos, techos y otras superficies impermeables va a los alcantarillados, recogiendo contaminantes, antes de descargarse directamente y sin tratamiento al Arroyo San Pedro. Esto puede causar que los niveles de bacteria como *Escherichia coli* (E. coli) y otros contaminantes dentro del arroyo se eleven. De acuerdo con el Centro de Control y Prevención de Enfermedades, la mayoría de las cepas de E. coli son inofensivas y ocurren naturalmente dentro de los intestinos de los humanos y animales. Sin embargo, existen algunos tipos de E. coli que si pueden causar enfermedad en los humanos.

Personal de San Antonio River Authority hacen pruebas de calidad acuática en la Plaza de Fundación y publica los resultados en la página "River Health" de su sitio web. Para ver los más recientes resultados de las pruebas de calidad acuática y para aprender cómo puedes ayudar a proteger la calidad acuática del Arroyo San Pedro y el Río San Antonio, visita sariverauthority.org.

Dado al potencial de riesgo debido a la calidad acuática en un arroyo urbanizado, al vadear en la Plaza de Fundación, favor de no ingerir el agua del arroyo y de lavarse las manos después de recrear en el arroyo. Esto es un buen consejo, no solo al disfrutar del Parque Cultural del Arroyo San Pedro, también al recrear en cualquier cuerpo de agua en las afueras, sea un arroyo, río, lago, océano, ¡hasta en una piscina! También se recomienda no vadear en la Plaza de Fundación 72 horas después de una reciente lluvia ya que es muy probable que los niveles de E. coli estén elevados.



SWIMMING PROHIBITED:
CITY CODE SECTION 22-88

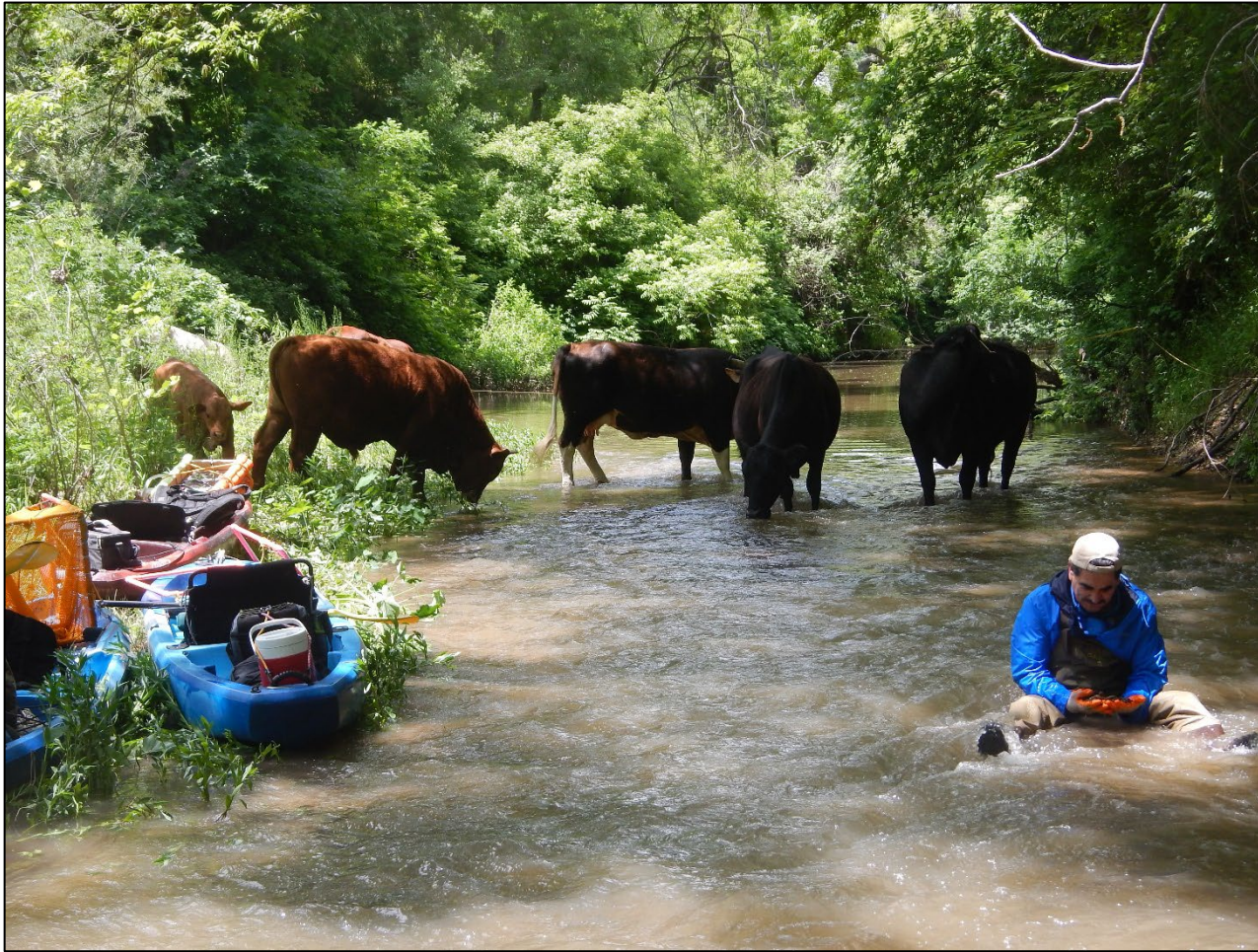
PROHIBIDO NADAR:
SECCIÓN 22-88 CÓDIGO DE LA CIUDAD



Lessons Learned

- Wildlife may dominate, but we can still act
 - Human, pets and livestock categories
- You can assume, but always verify
- BST is a powerful tool when properly contextualized





Questions?

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