

Initial Characterization of Sediment Quality and Water Toxicity in Westside Creeks, 2014



Presented by:
U.S. Geological Survey
in cooperation with the San Antonio River Authority
December 2016

Westside Creeks

- Project Overview
- Major Findings
- Report Products



Background

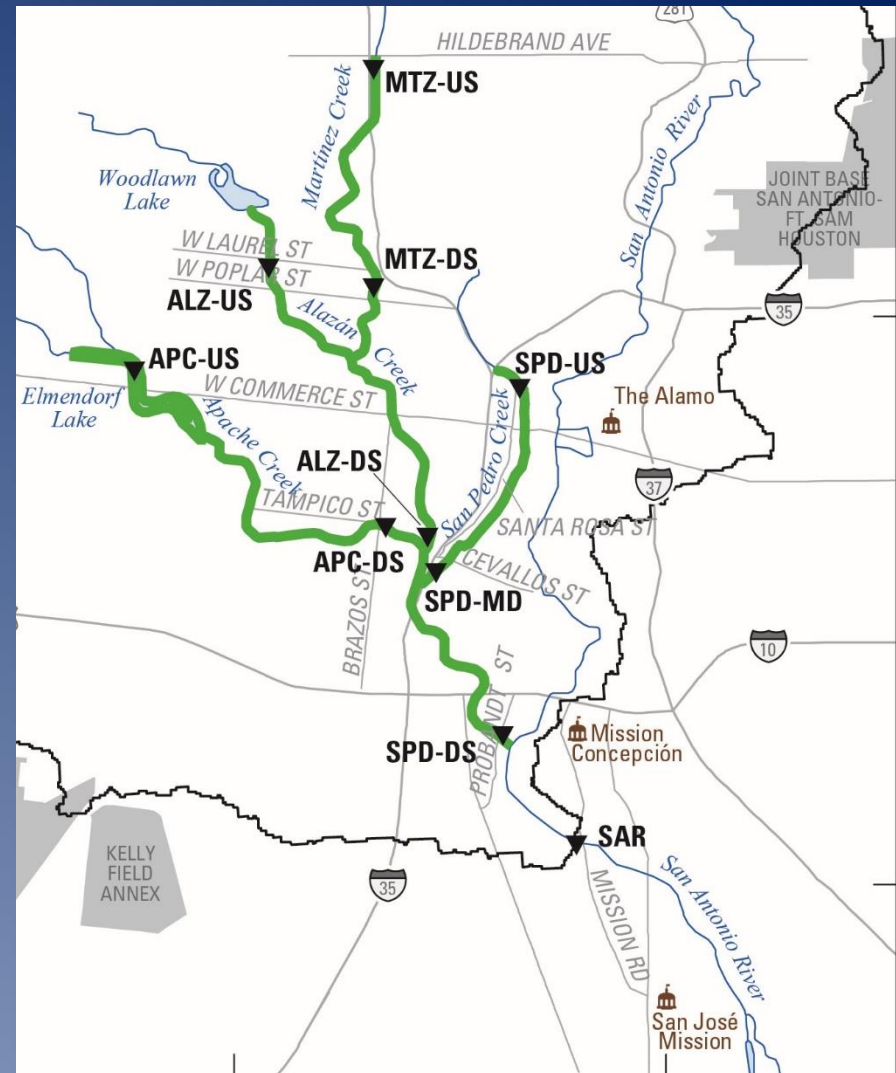
- Westside Creeks flow through historic neighborhoods
 - Urbanized for a long time
 - Potential contaminants washed off streets, yards, etc.
- Some contaminants attach to sediment rather than water
 - Hydrophobic, persistent in the environment
- Restoration efforts planned along the Westside Creeks
 - Could disturb sediment
 - Potential concern for aquatic life

QUESTION: What is in the sediment?

- Reconnaissance of sediment quality in the area
 - Snapshot of the current conditions at limited selected locations

Westside Creek Project Sampling Approach

- Sample locations: 10 sites
 - One sample at confluence with downstream creek
 - One sample farther upstream
 - Similar areas as the restoration project target areas
- Timing: sampled twice
 - Once during base flow (normal)
 - January 2014
 - Once after a storm event
 - May 2014



Westside Creeks Laboratory Analyses

- Sediment samples analyzed for:
 - Trace Elements
 - Can be naturally occurring or man made
 - Examples: lead, chromium, zinc, arsenic
 - Pesticides
 - Man made, both historical use (now banned) and current use
 - Example: DDT (historical)
 - Brominated Flame Retardants
 - Man made, now commonly occurring in the environment
 - Polychlorinated Biphenyls (PCBs)
 - Man made, used for plasticizers and hydraulic lubricants
 - Polycyclic Aromatic Hydrocarbons (PAHs)
 - Can be naturally occurring or man made
 - Sources include coal-tar-based sealcoats, auto exhaust, wood fires
- Water samples analyzed for:
 - Fish Toxicity - *Pimephales promelas* (fathead minnow)



Sediment Quality Guidelines

- Data were compared to sediment quality guidelines
 - Non-enforceable
 - Science-based
 - Useful for water resource managers to make informed decisions
- Trace elements, Pesticides, PCBs, and PAHs
 - Paired guidelines
 - Threshold Effect Concentration (TEC)
 - Probable Effect Concentration (PEC)
- Brominated Flame Retardants
 - Canadian guidelines
 - Federal Environmental Quality Guidelines

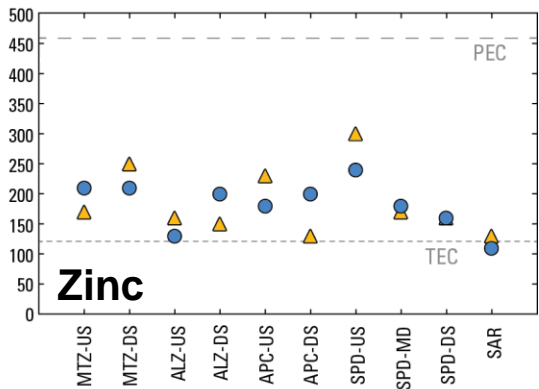
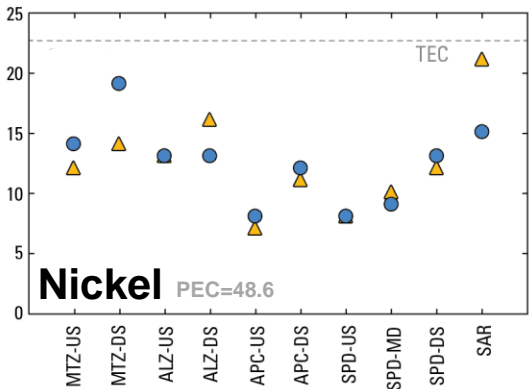
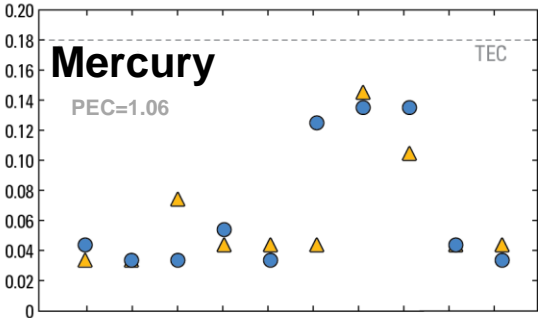
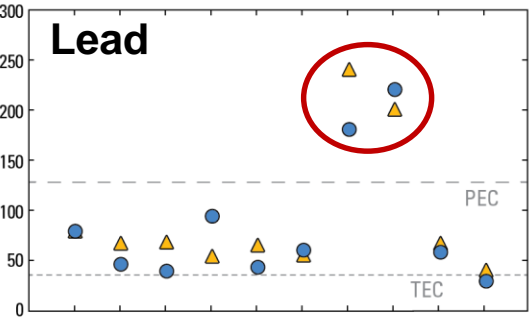
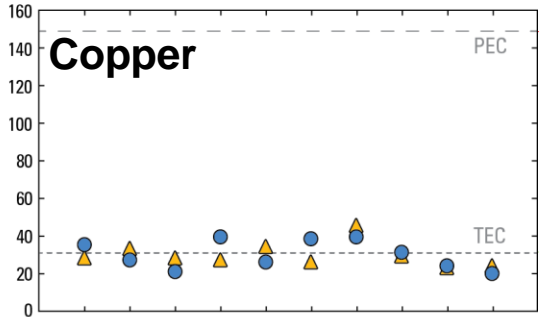
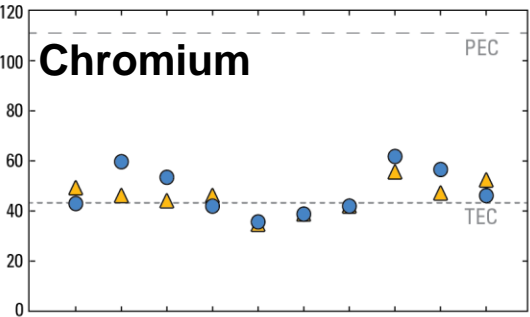
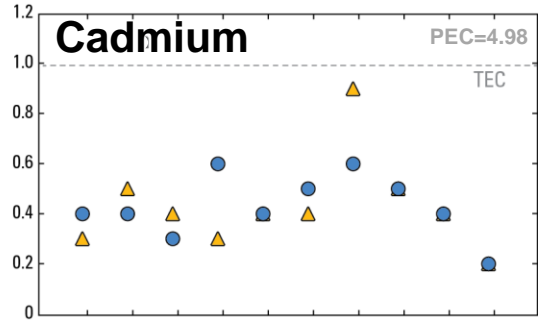
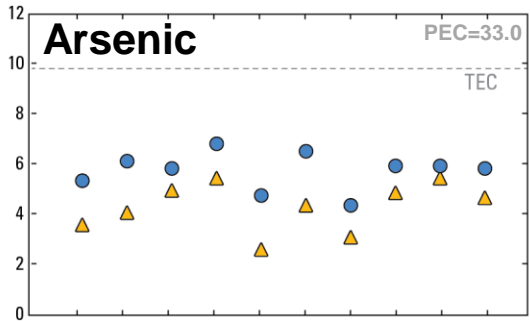
Trace Elements

- Base flow
- ▲ Post-storm

← PEC – Probable Effect Concentration

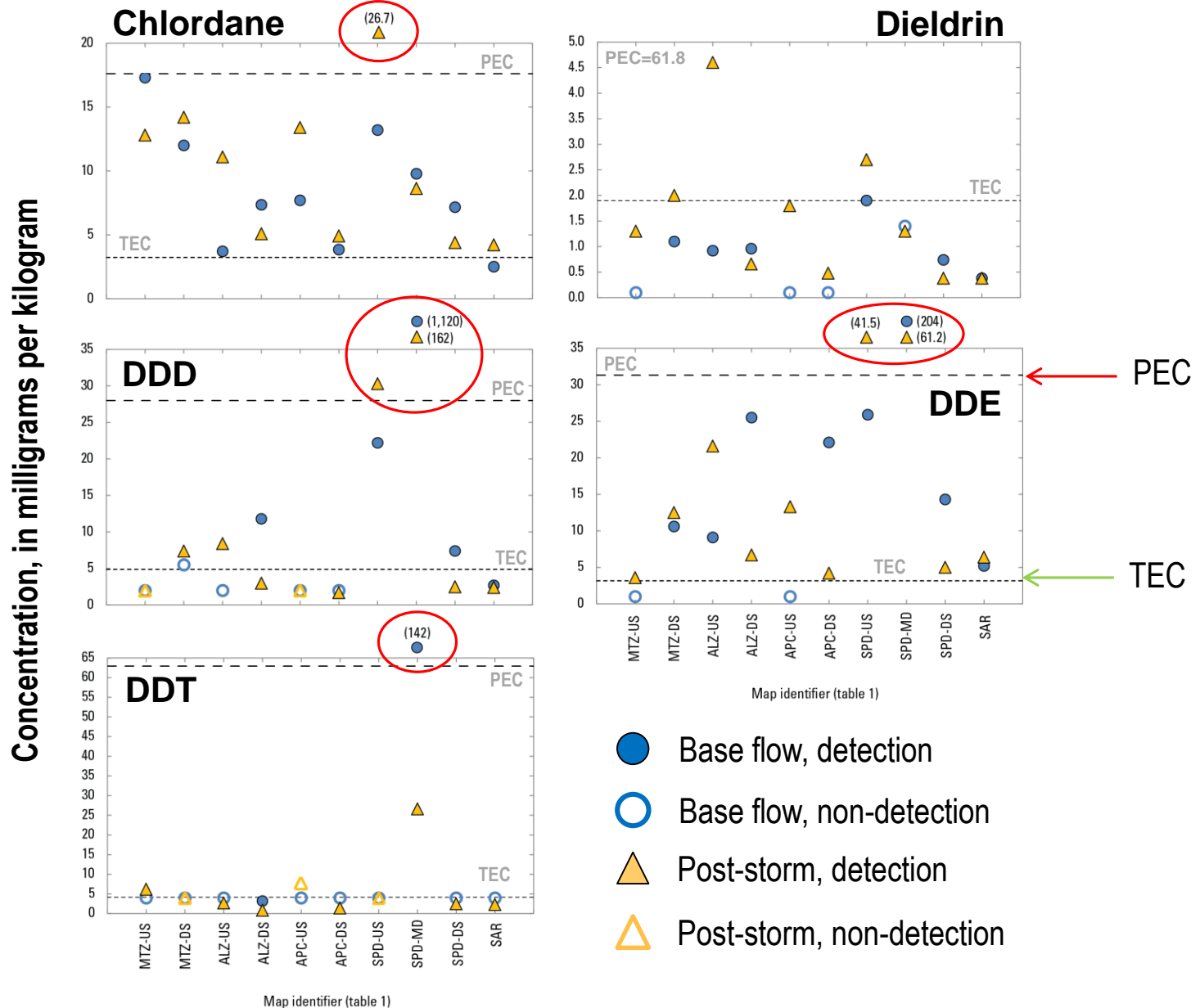
← TEC – Threshold Effect Concentration

Map ID	Short name
MTZ-US	Upstream Martínez
MTZ-DS	Downstream Martínez
ALZ-US	Upstream Alazán
ALZ-DS	Downstream Alazán
APC-US	Upstream Apache
APC-DS	Downstream Apache
SPD-US	Upstream San Pedro
SPD-MD	Middle San Pedro
SPD-DS	Downstream San Pedro
SAR	San Antonio River



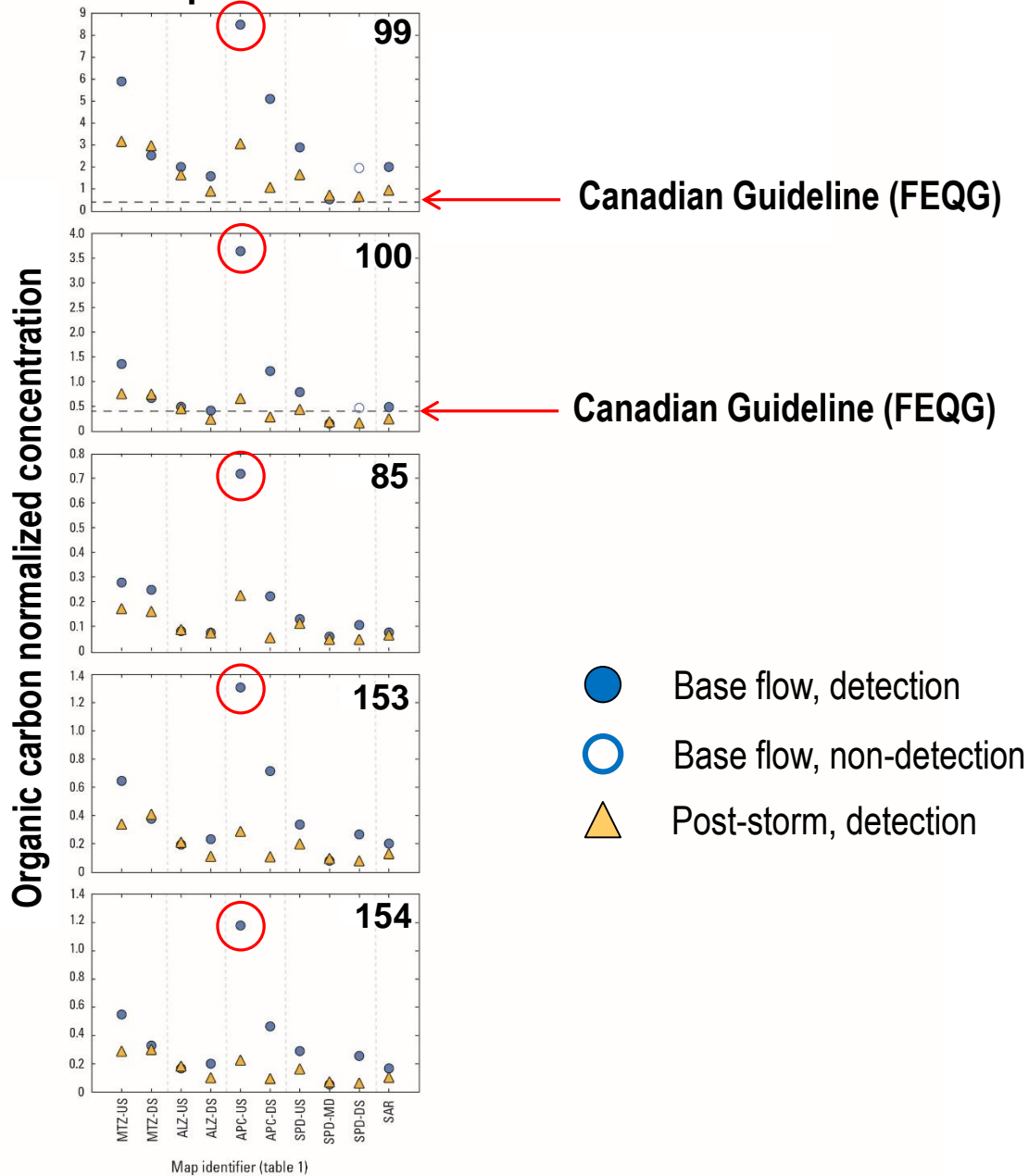
Concentration, in milligrams per kilogram

Pesticides - Historical Use

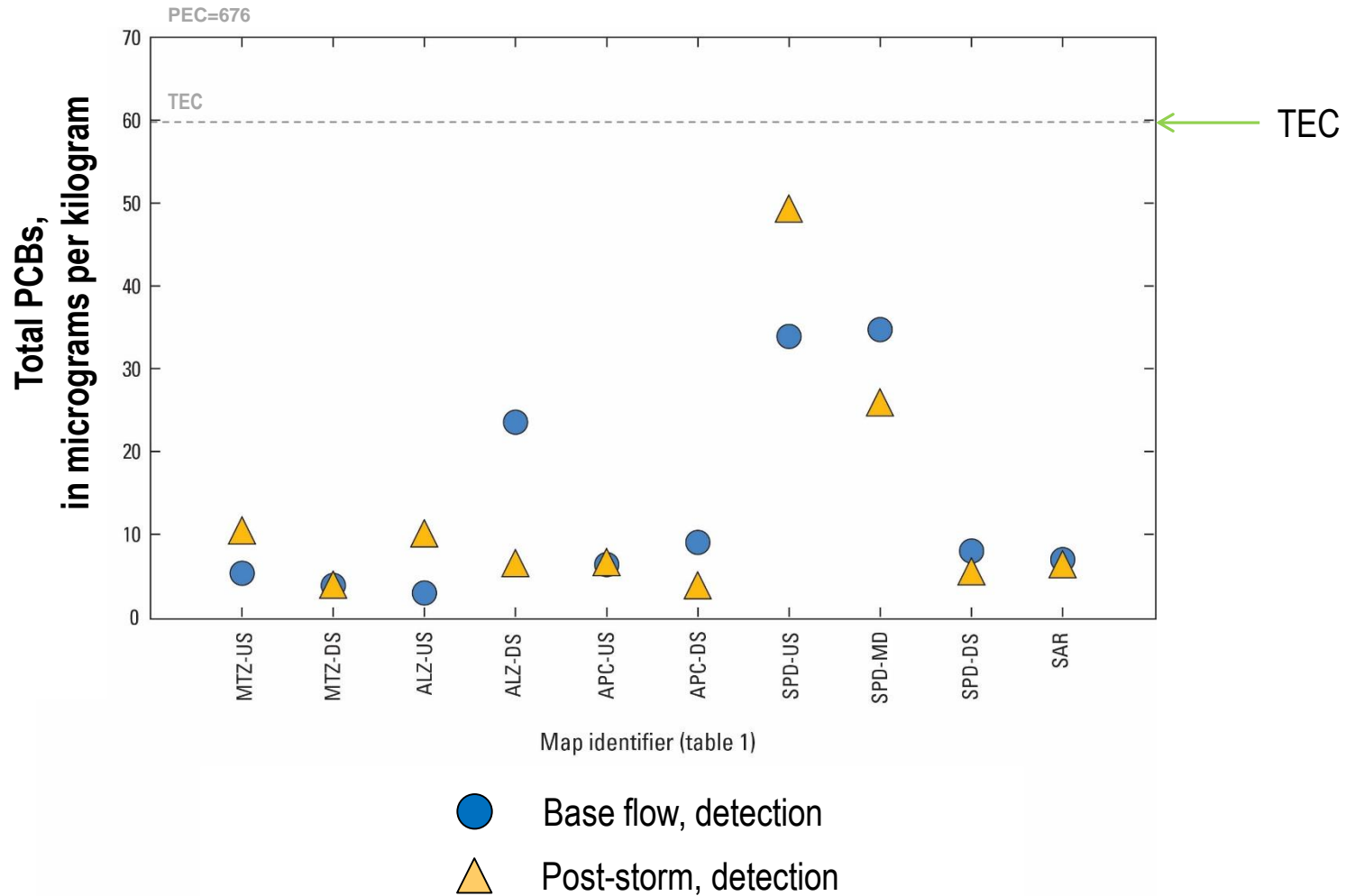


Brominated Flame Retardants

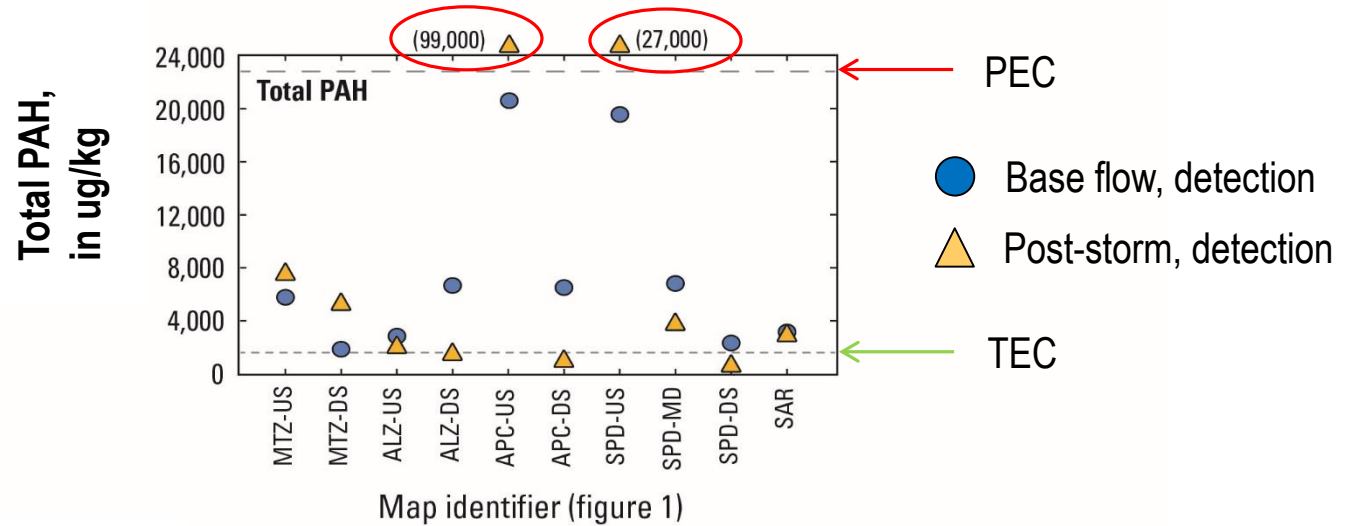
Compounds



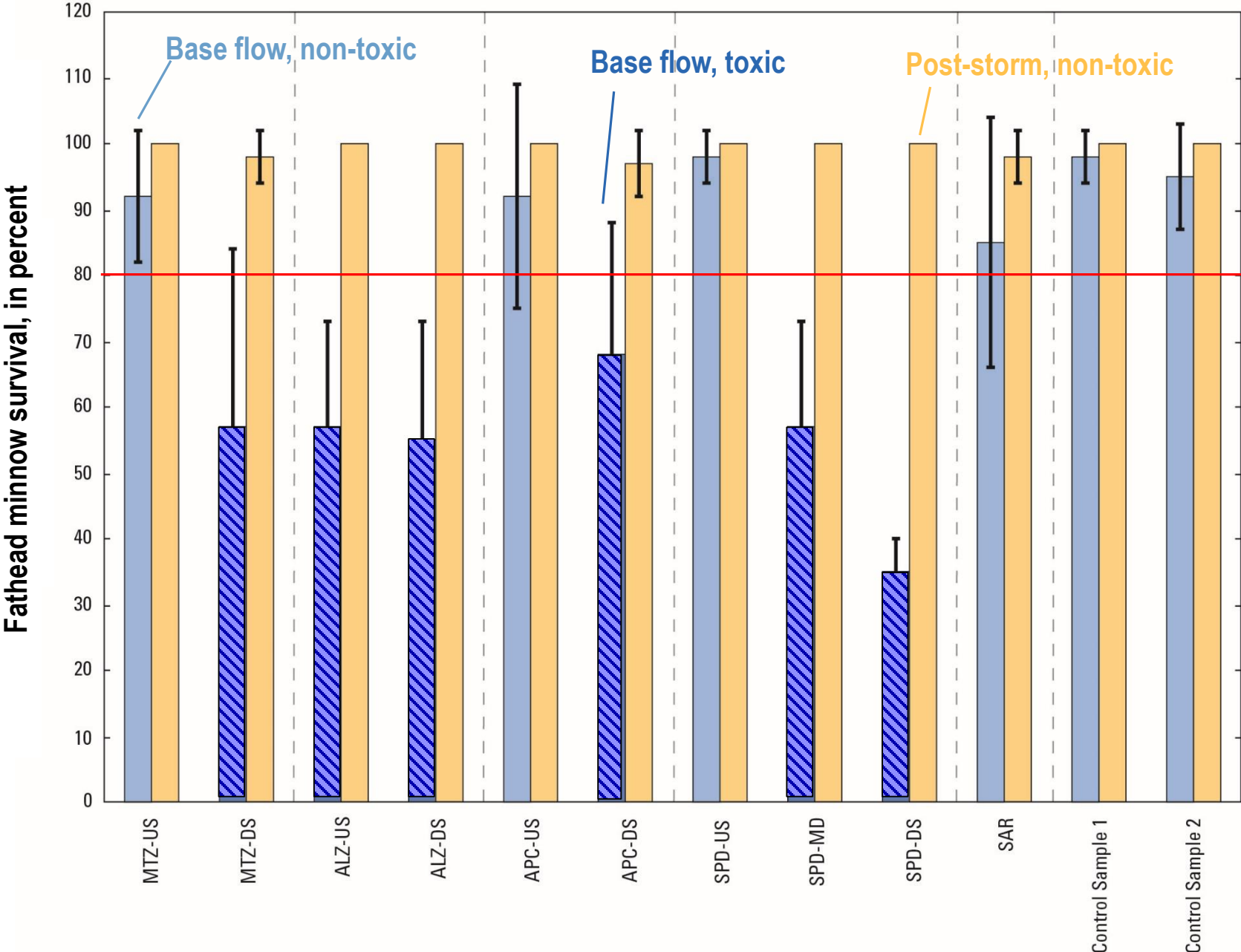
Total PCBs



Polycyclic Aromatic Hydrocarbons (PAHs)



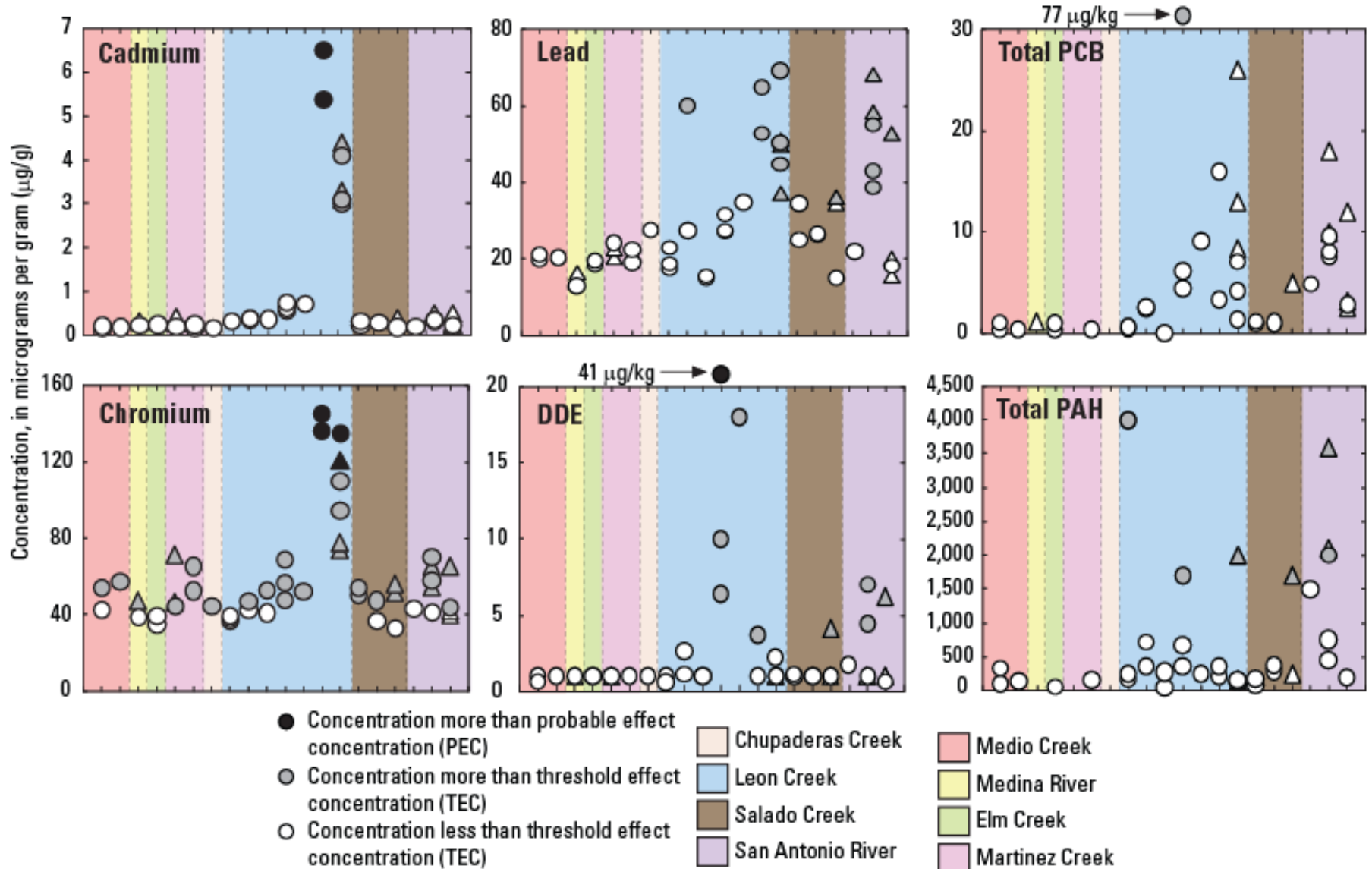
Fish Toxicity



Summary Conclusions

- Trace elements
 - Lead greater than PEC at Upstream and Middle San Pedro Creek sites
 - All the other trace elements (7) at the other sites (8 out of 10) were less than PEC
- Pesticides
 - Historical
 - Less than PECs at most sites
 - Greater than PECs at Upstream and Middle San Pedro Creek sites
- Brominated Flame Retardants
 - Elevated levels in all base-flow samples and most post-storm samples
 - Highest in base-flow samples from upstream Apache Creek site
- PCBs
 - Detected in all samples, but at levels less than the TECs
- PAHS
 - Most sites less than PECs
 - Upstream Apache Creek and Upstream San Pedro Creek greater than PECs post-storm
- Fish Toxicity
 - Six base-flow samples were toxic to fathead minnows
 - Did not evaluate possible causes

Bexar County Sediment Quality Study 2007–2009



Where to get the report

Scientific Investigations Report

- Download free online at
<http://dx.doi.org/10.3133/sir20165136>
- Data release at
<https://dx.doi.org/10.5066/F71R6NN5>
- Print versions available soon

Fact Sheets

- English & Spanish Versions
- Download free online at
<https://doi.org/10.3133/fs20163096>

Prepared in cooperation with the San Antonio River Authority

Occurrence and Concentrations of Selected Trace Elements, Halogenated Organic Compounds, and Polycyclic Aromatic Hydrocarbons in Streambed Sediment and Results of Water-Toxicity Testing in Westside Creeks and the San Antonio River, San Antonio, Texas, 2014



Scientific Investigations Report 2016–5136

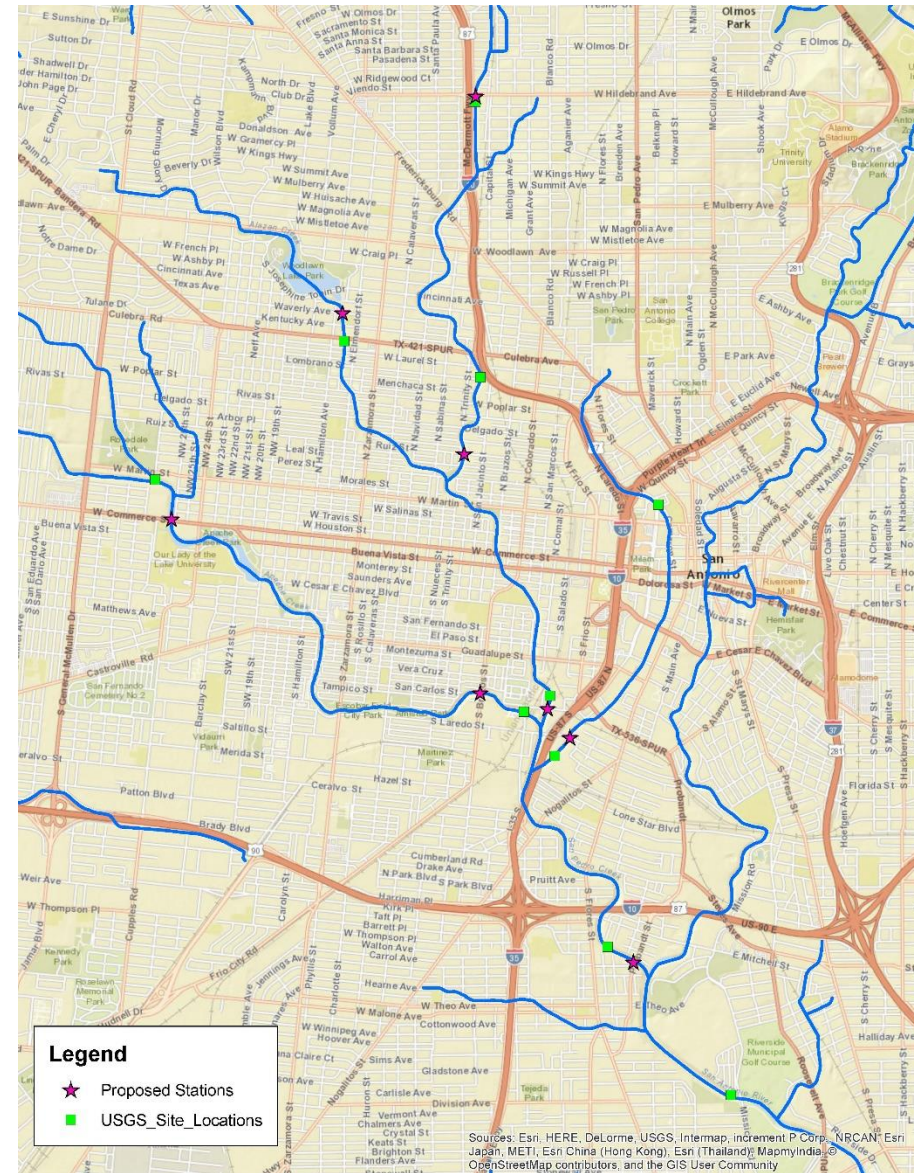
What we learned...

- There are questions moving forward that need to be looked into including elevated levels of metals, pesticides and polycyclic aromatic hydrocarbons (PAHs) and brominated flame retardants in the streambed sediment.



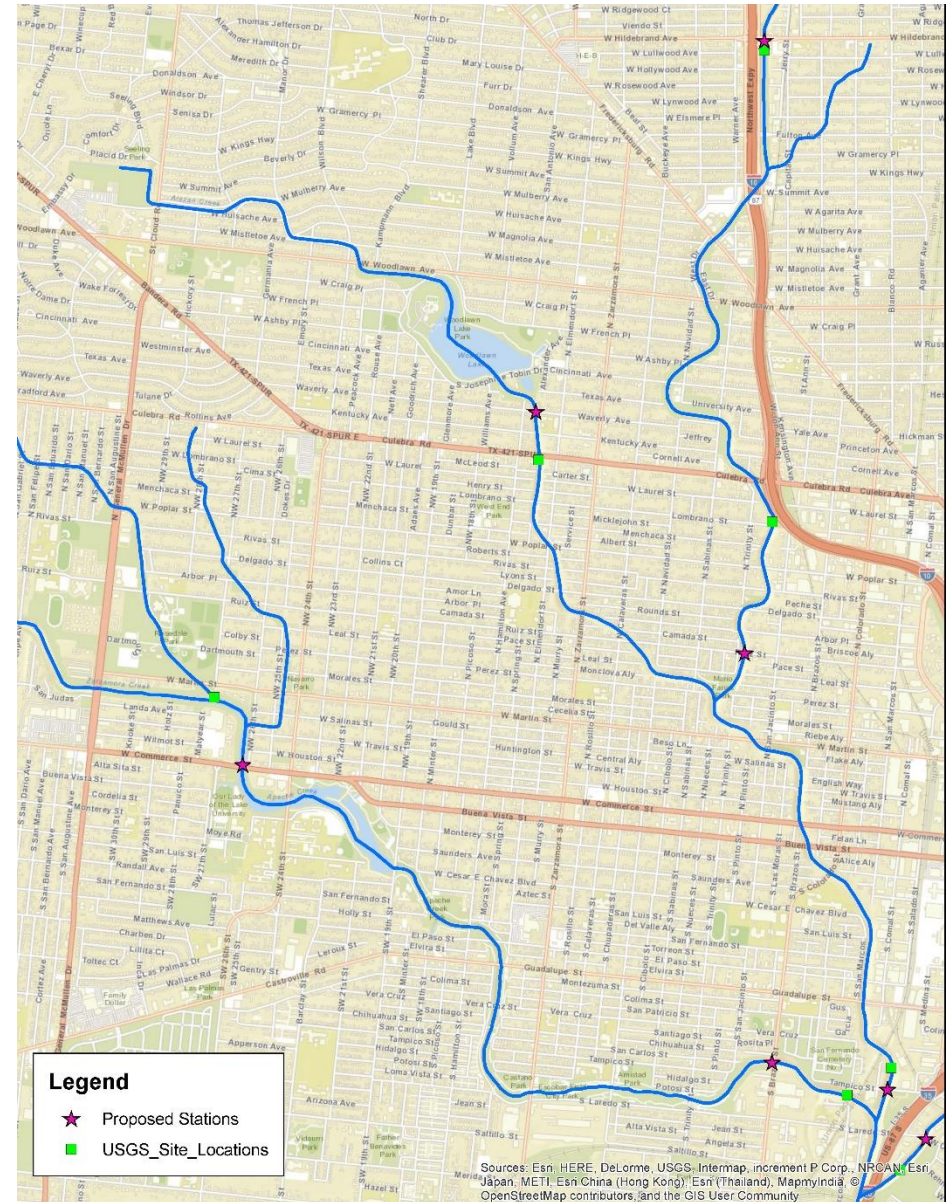
Proposed Future Sampling

- Select sample locations near USGS sample sites
- Water quality, sediment and fish tissue sampling for Pesticides, PAH monitoring will be proposed during the next budget cycle



Proposed Sampling Sites

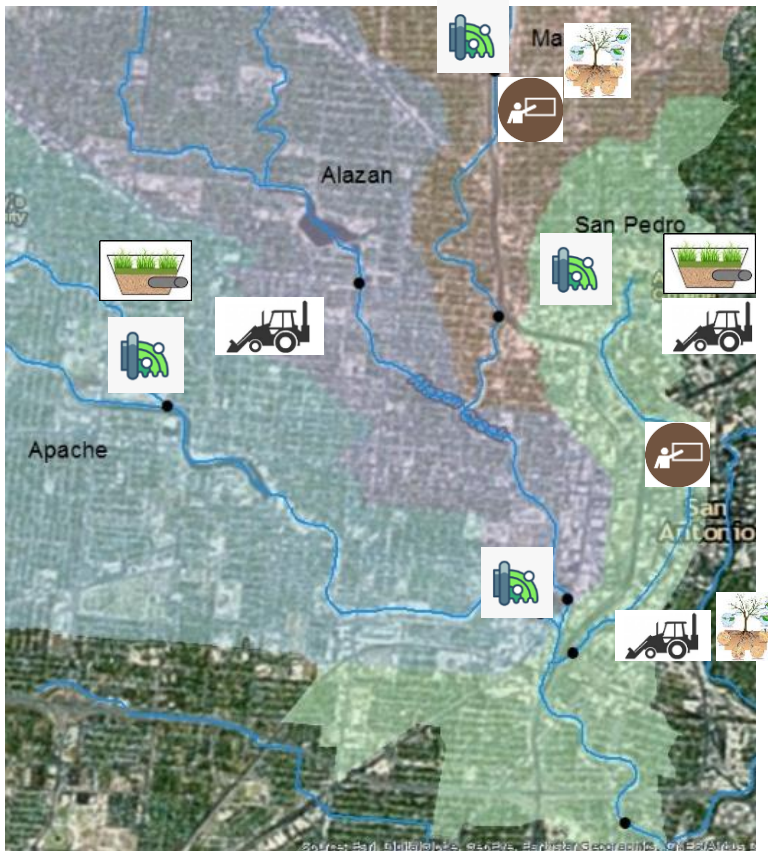
- Alazan Creek at Waverly
- Alazan Creek at Tampico
- Martinez Creek at Ruiz
- Martinez Creek at Hildebrand
- Apache Creek at Commerce
- Apache Creek at Brazos








Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri, Japan, METI, Esri China (Hong Kong), Esri (Thailand), Mapnylon © OpenStreetMap contributors, and the GIS User Community



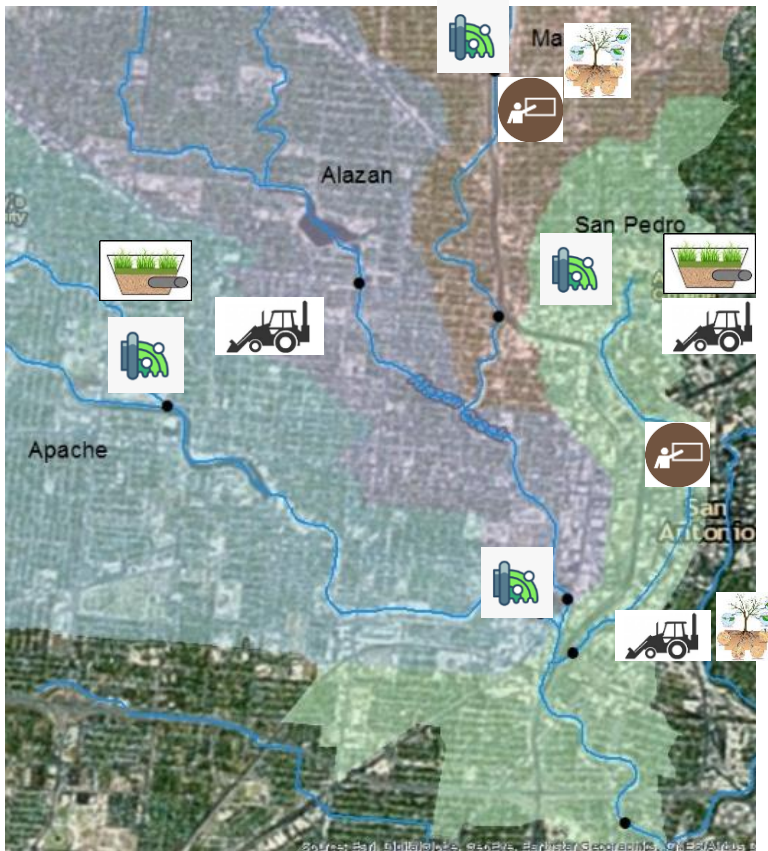
Future considerations to have future projects be successful



-  Construction Remediation
-  Stormwater BMPs
-  Phytoremediation
-  Source Controls
-  Outreach



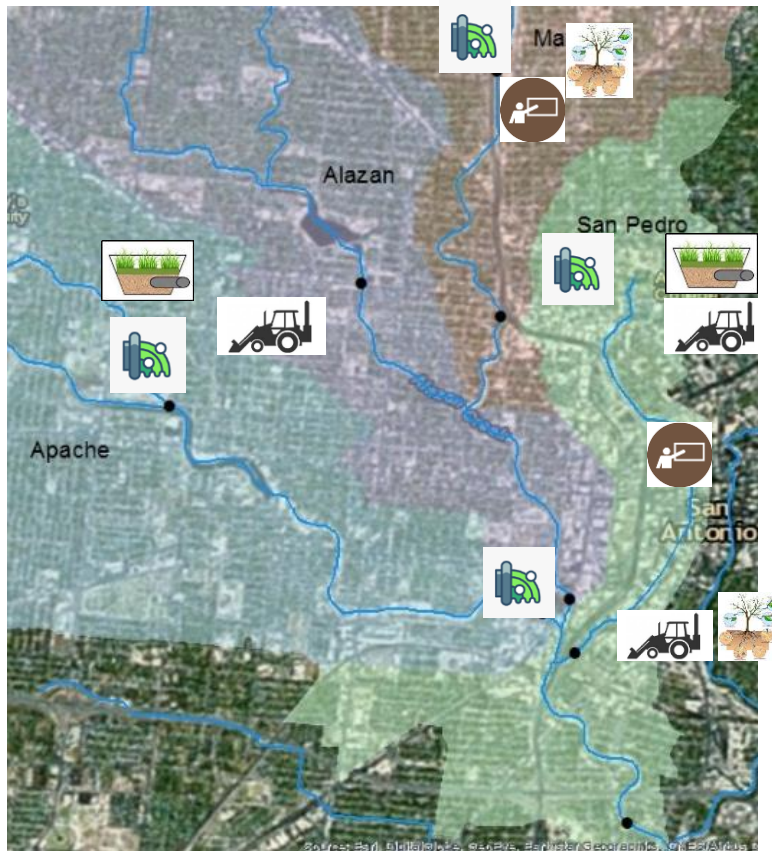
Future considerations to have future projects be successful



Construction
Remediation



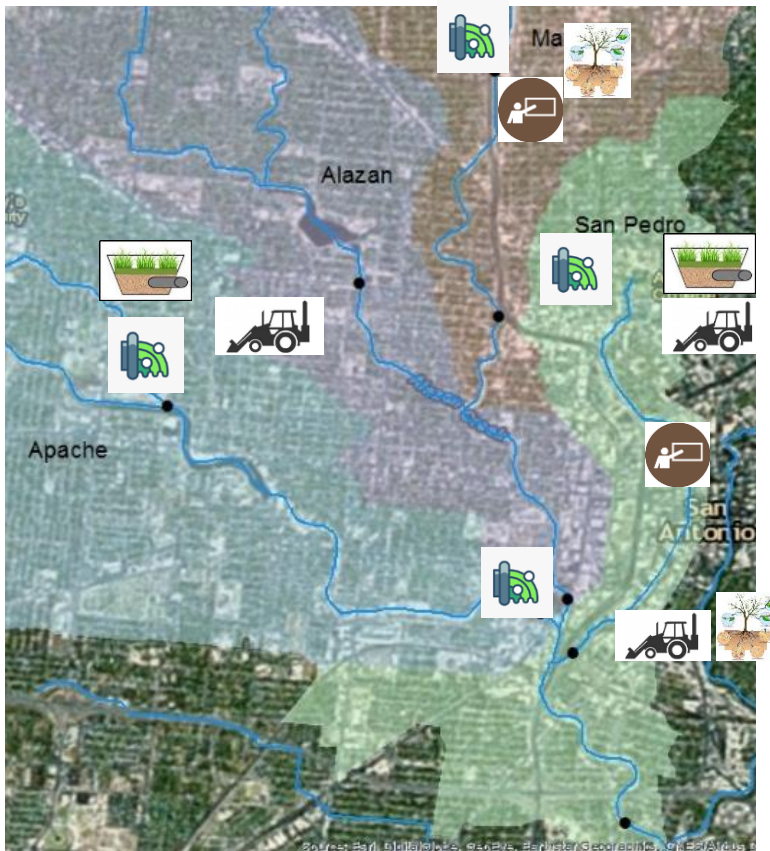
Future considerations to have future projects be successful



Stormwater BMPs



Future considerations to have future projects be successful

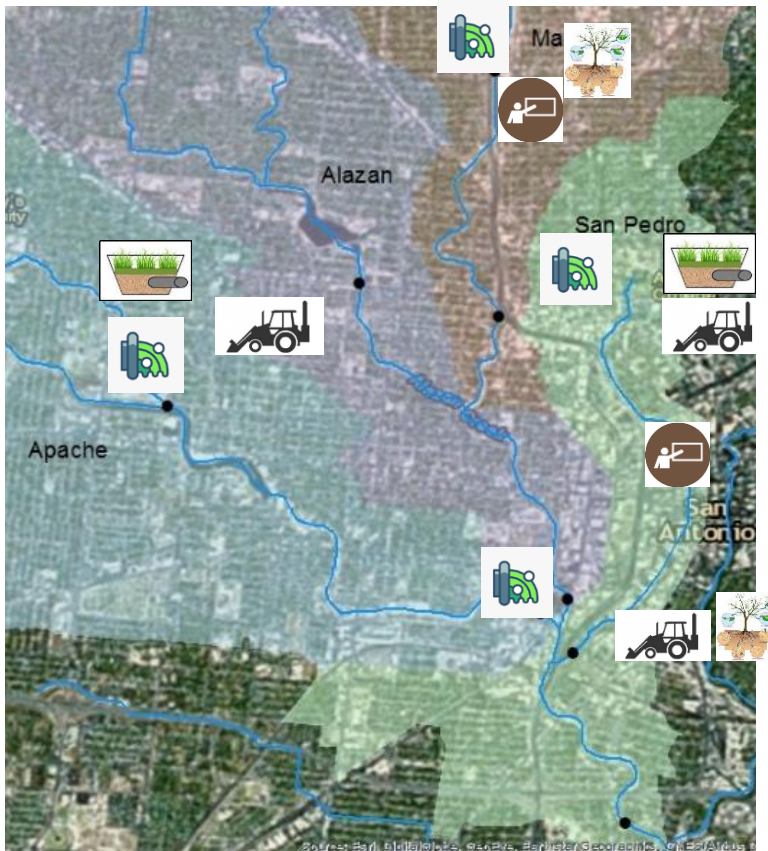


Phytoremediation

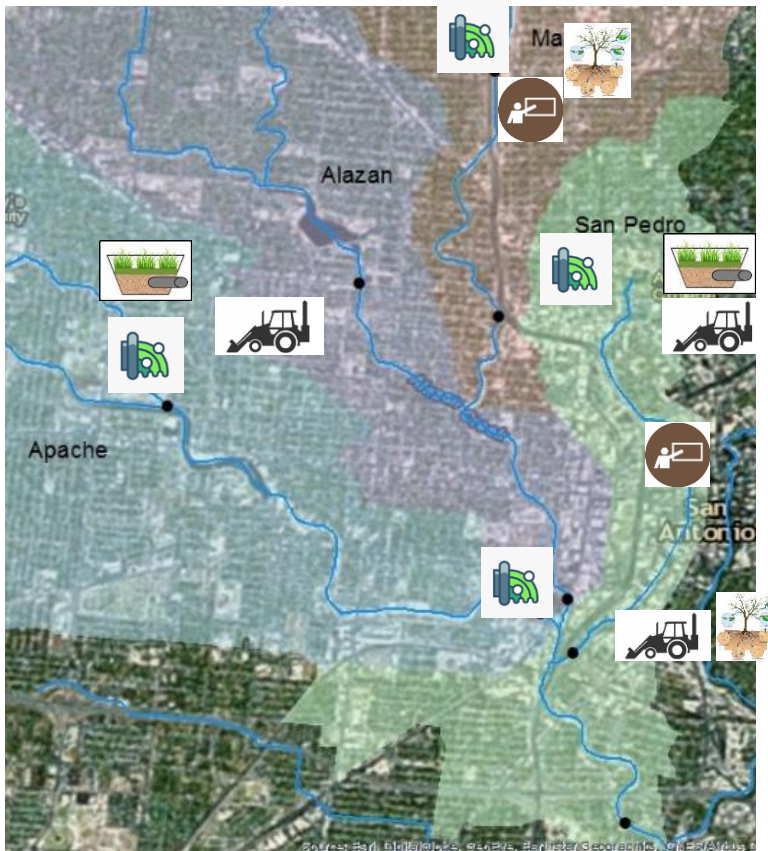


Future considerations to have future projects be successful

Source Controls



Future considerations to have future projects be successful



Questions?



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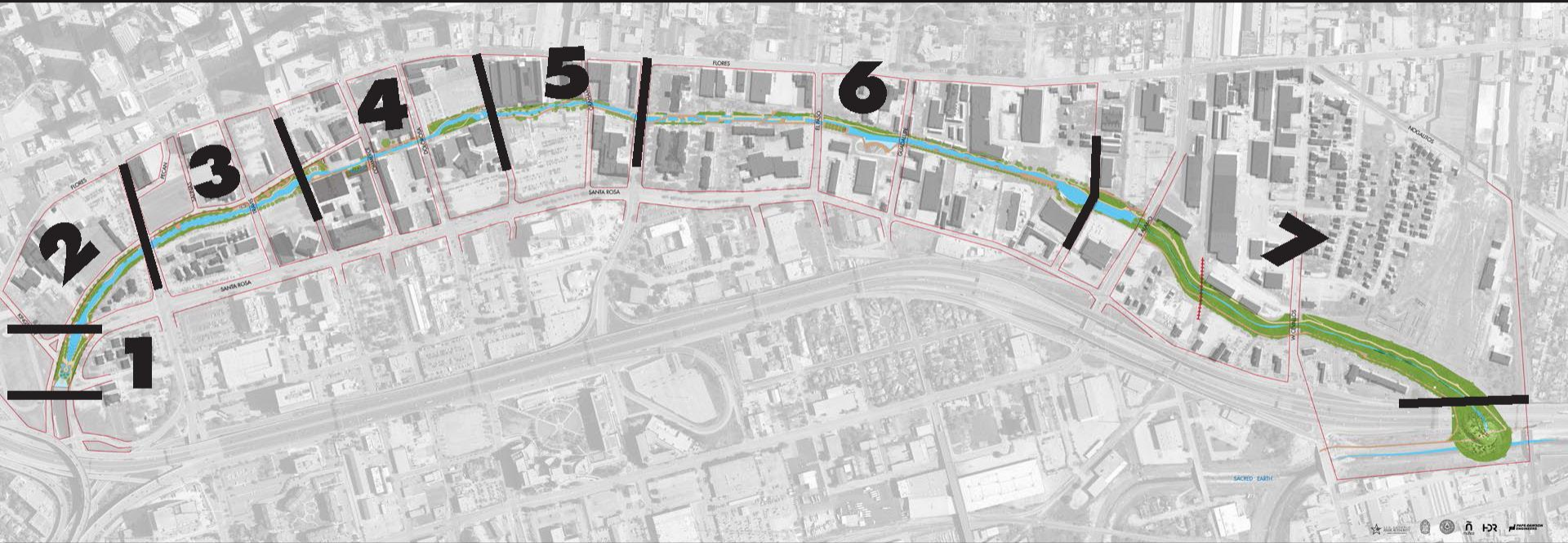


San Pedro Creek
improvements project
CONNECTING COMMUNITIES



Interpretive Plan

CAMP/ IH35 OVERPASS



VIDA DE ARROYO

SAN PEDRO CREEK WAS ESSENTIAL TO THE 18TH CENTURY LABORES DE ABAJO, WHICH WAS THE BREADBASKET SAN ANTONIO, AND FEATURED PECAN GROVES THAT SHAPED THE LIVES OF THOSE WHO PRODUCED, HARVESTED AND PROCESSED THE NUTS.

ELEMENTS FOR INTERPRETIVE THEMES AND TOPICS

The interpretive themes for each area reference the topics within each area that are specific historic sites, resources, people and events that exist or occurred within the immediate vicinity. The thematic and topical information is to be conveyed or communicated through various design elements, public art, programs, brochures and information technology platforms as follows:

Interpretive Signage

- Informational signage
- Wayfinding signage
- State of Texas Historical Markers

Architectural Design, Materials and Craft

- Form and shape of architectural components
- Mosaic tile benches
- Mosaic tile wall cladding
- Mosaic tile wall inserts
- Decorative metal panels at Inlet/Outlet structures
- Decorative metal panels at street bridges
- Special cast and sandblast treatment of channel walls
- Cast glass object inserts at walls
- Cast metal object inserts at walls

Public Art

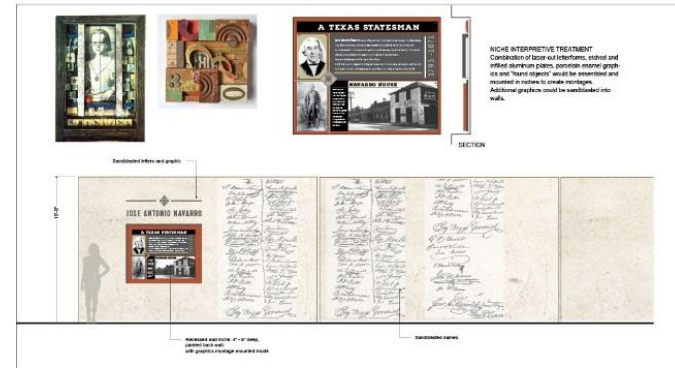
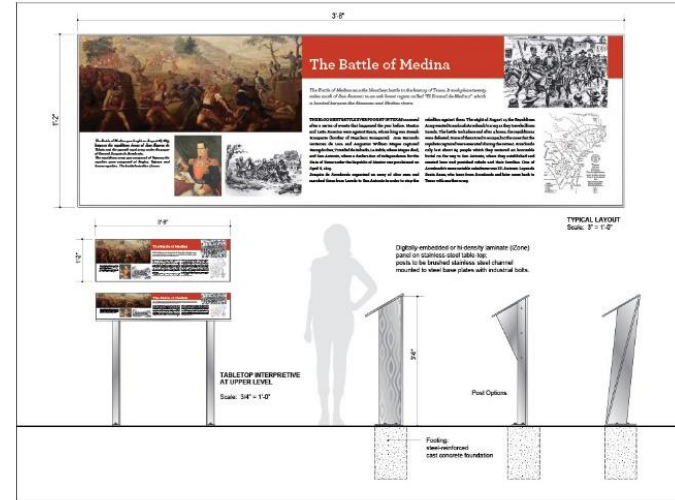
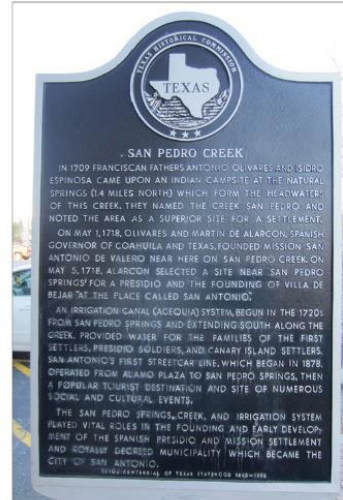
- Integrated with architectural design
- Permanent installations
- Rotating and temporary installations

Interpretive Programs

- Guided Tours
- Printed materials
- Website and IT platforms

Public Gathering

- Art & Entertainment venues and performances
- Festivities
- Observances



Public Art Program

San Pedro Creek Arts Goals

- Activate, celebrate and sustain an arts and culture experience
- Commission temporary projects and events, partner artists and arts organizations, collaborate with community entities, and engage adjacent property owners
- Encourage authentic and varied projects by local, national and international artists and arts organizations
- Integrate artwork into design

Organizational Structure

- San Antonio River Authority to launch, develop and manage San Pedro Creek Arts, a program fostered as a three to five year pilot while the park is under design and construction and the art program is established.
- Framework will support the production of a variety of temporary and permanent public art projects, performances and cultural events.

Organizational Structure





San Pedro Creek
improvements project
CONNECTING COMMUNITIES



Westside Creeks



City of San Antonio



SAN ANTONIO
RIVER AUTHORITY
Leaders in Watershed Solutions



Linear Creekway Trails Project and Elmendorf Lake Park

Jeff Tyler

December 20, 2016

Elmendorf Lake Park

Grand Opening

January 21, 2017

10:00 AM – 12:00 PM



City of San Antonio



SAN ANTONIO
RIVER AUTHORITY
Leaders in Watershed Solutions

MALCOLM
PIRNIE

ARCADIS

The Water Division of ARCADIS



Westside Creeks
Pascapacion Project



COMMERCE

S W 24TH

N W 21ST

N W 20TH

N W 19TH

BUENA VISTA

SHORE

MONTERE

OUR LADY OF THE LAKE UNIVERSITY

CESAR E. CHAVEZ

SAUNDERS















The Water Cycle

The Mighty Molecule

Water is everywhere, but it is far from ordinary. Its unique chemical and physical properties have shaped the land around you and are sustaining the life webs of you at the very minute. (Ale Hurdin body is about 70% water). It is the only substance on earth that naturally changes from a gas to a liquid to a solid, & constantly moves and recycles with evaporation, evapotranspiration, condensation, precipitation and runoff. Could you imagine life if water was all liquid or all ice or all water vapor?

How Does The Water Cycle Work?

The sun's rays heat the surface of water in ponds, rivers, oceans, and lakes and it evaporates, or rises, into the air as water vapor. (Water can also be released into the air by plants. Transpiration occurs when plants lose water from their leaves or stems.)

When water vapor rises up above the ground, it becomes colder and the water molecules stick together, forming condensation. This can be seen as clouds or fog. When enough water vapor sticks together, it becomes heavy and falls back to earth in the form of rain, hail, sleet or snow, as precipitation.

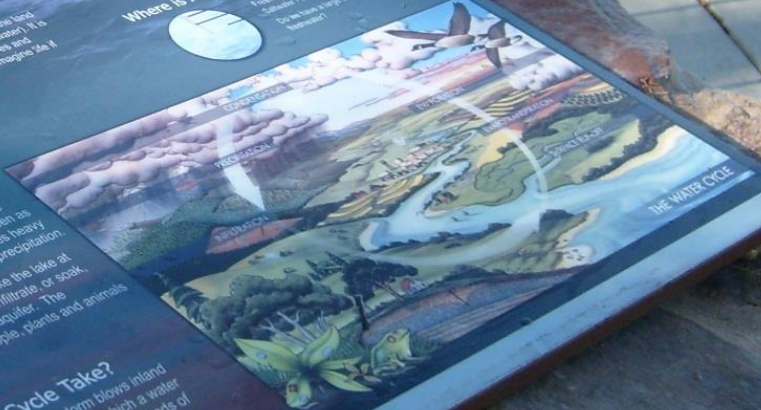
The precipitation that falls back to earth may land in water, like the lake at Elmsendorf Lake Park, or it may fall on land, where it can infiltrate, or soak, into the soil and become part of the groundwater in an aquifer. The groundwater eventually returns to the surface for people, plants, and animals to use until the cycle begins again.

How Long Does The Water Cycle Take?

"It ranges from minutes to hours, as when a rainstorm blows inland from the sea, to thousands of years, the time during which a water drop may be frozen in a glacier...given enough time-hundreds of thousands, or millions, of years-all water circulates."
- E.C. Pielou in Fresh Water

Where is All the Water in the World?

Estimated amount of water on Earth:
- Freshwater: 2.5%
- Saltwater: 97.5%
Do you think you're happy at 2.5%?



THE WATER CYCLE













Elmendorf Lake Park

















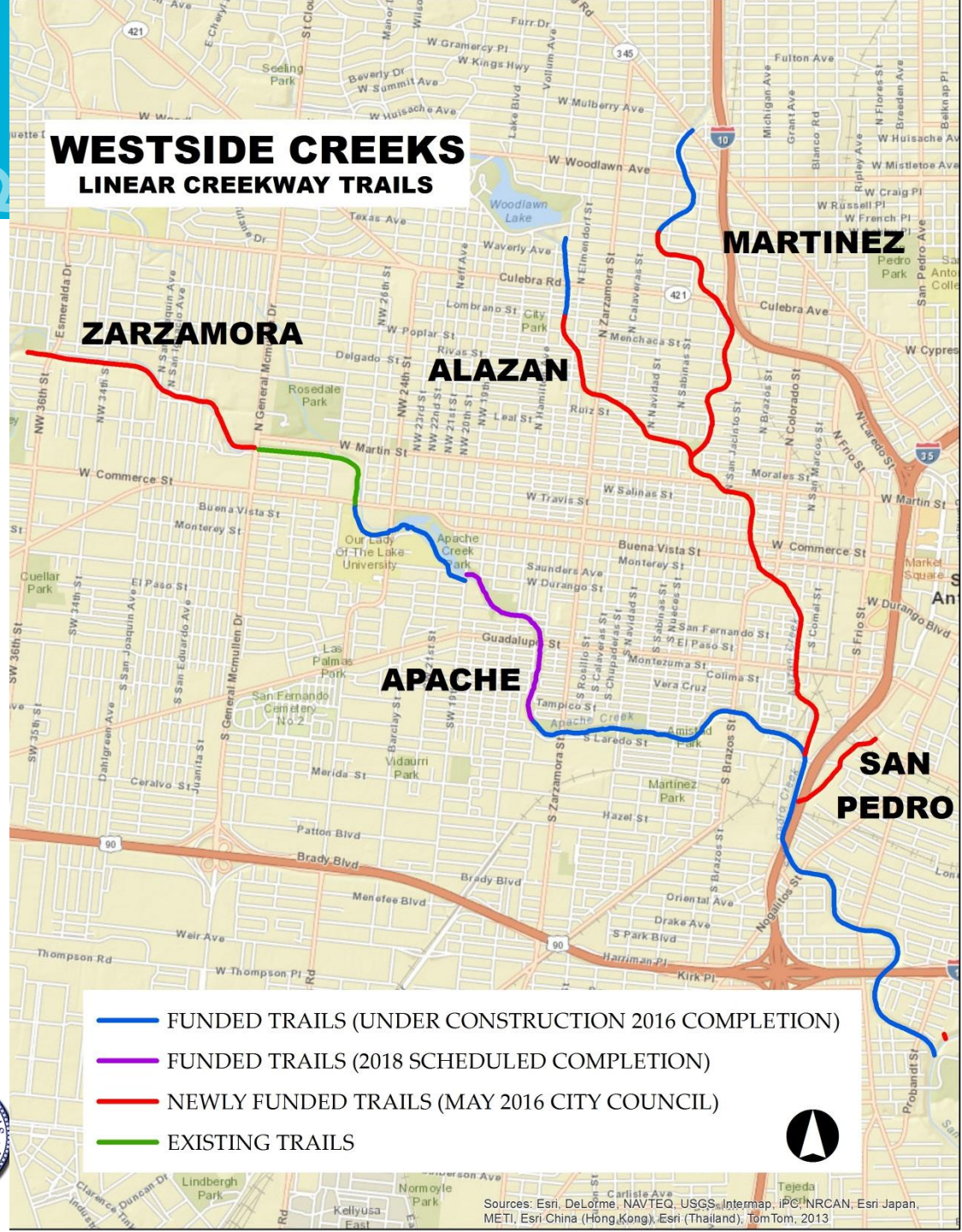




Trail Projects (Sales Tax Initiative)

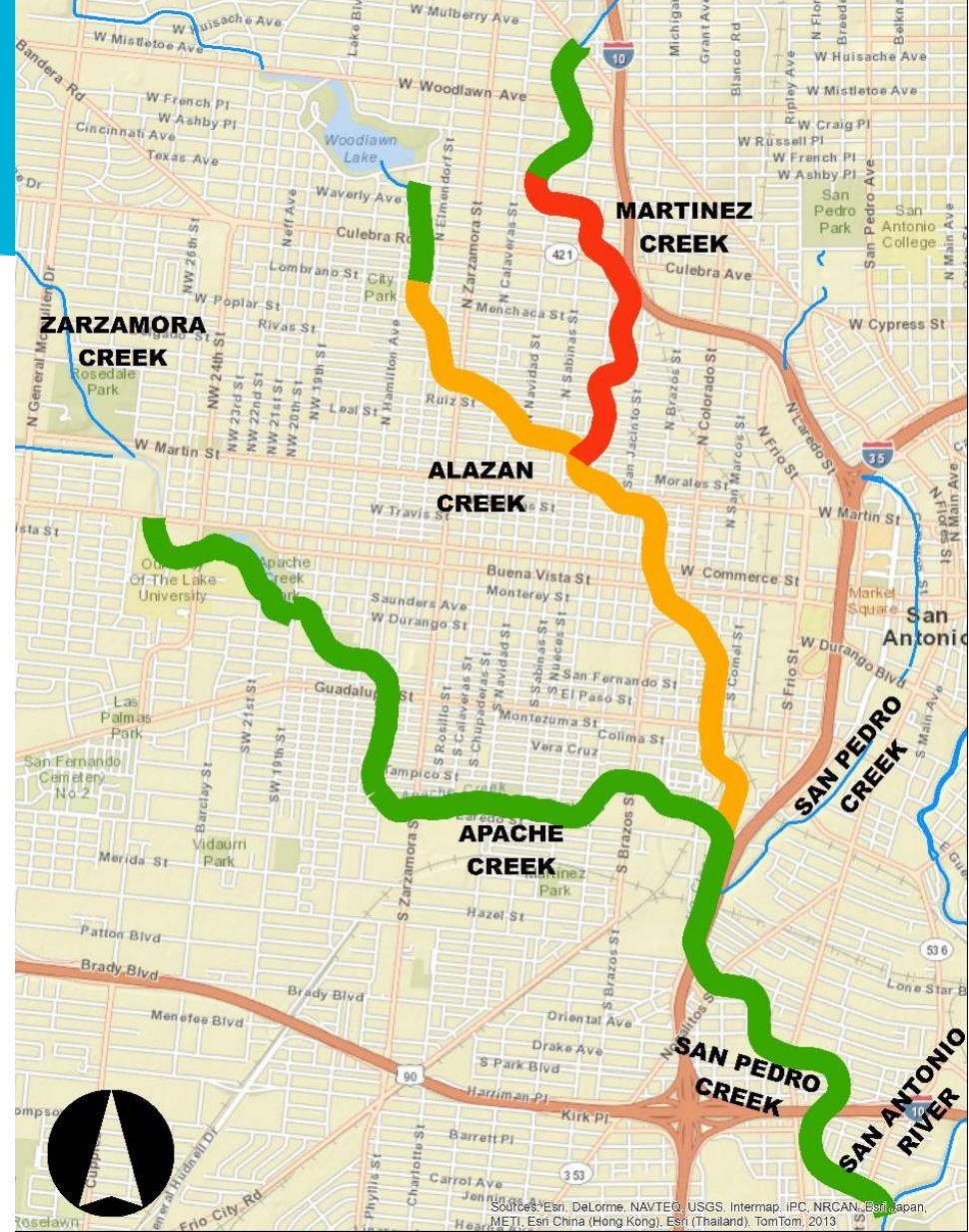
Schedule

- May 12, 2016 – Council Action
- June 2016 SARA board action
- August 2016 begin planning phase
 - Zarzamora Creek planned for design solicitation September 2016
 - Alazán/Martinez to follow



Alamo Area MPO Grant

- Approximately \$15,000,000 is available to program
- Projects would be programmed to let to contract in years 2017, 2018, 2019, or 2020
- Reimbursable program; not a grant program; all federal rules apply
- Commitment of all project development costs and local match by the implementing agency
- Minimum 20% local match for the construction cost
- Projects must be in areas that are open to the public



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



Westside Creeks



City of San Antonio



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Westside Creeks Ecosystem Restoration Project Update

Brian Mast

December 20, 2016

- March 2014, Westside Creek Ecosystem Restoration Project presented to U.S. Army Corps of Engineers' Senior Leaders for approval.
- May 2014, Director of Civil Works issues positive report.
- September 2014, Assistant Secretary of the Army (ASA) for Civil Works provides final approval and project authorization.
- September 2014, ASA Jo-Ellen Darcy presents the project to the Office of Management and Budget (OMB) and requests favorable budget consideration.



- San Antonio River Authority (SARA) staff and federal consultants have been working with US Army Corps of Engineers Assistant Secretary of the Army (ASA) for Civil Works and Headquarters staff to determine best tactics and strategy to get the WSC report released by the Office of Management and Budget (OMB). We have been advised that there are broader issues with OMB staff regarding ecosystem restoration, especially in regards to urban areas. We have also been advised that there are other projects, which have been under review at OMB for a while, which the ASA's office has not been able to dislodge for the same reason.



City of San Antonio



The Water Division of ARCADIS



Cont.

- We've been working with our Federal Delegation to push at high-levels of the Administration to move the project forward. We've requested they contact Ali Zaidi, Associate Director for Natural Resources, Energy and Science, who attends monthly meetings between the ASA's office and OMB.
- Also have requested several of our delegation to contact OMB Director Shaun Donovan directly.
- Spring 2016, SARA nominated the WSCs project for the Administration's celebration of World Water Day.
- July 2016, SARA hosted a senior OMB examiner and USACE team to discuss the Mission Reach and Westside Creeks ecosystem restoration projects.



Cont.

- In summary, the ASA Jo-Ellen Darcy and her staff continue to request OMB approve / release the WSC project report. Once the report is released by OMB the project would be eligible for the US Army Corps of Engineers to begin funding the Preliminary Engineering Design (PED).

