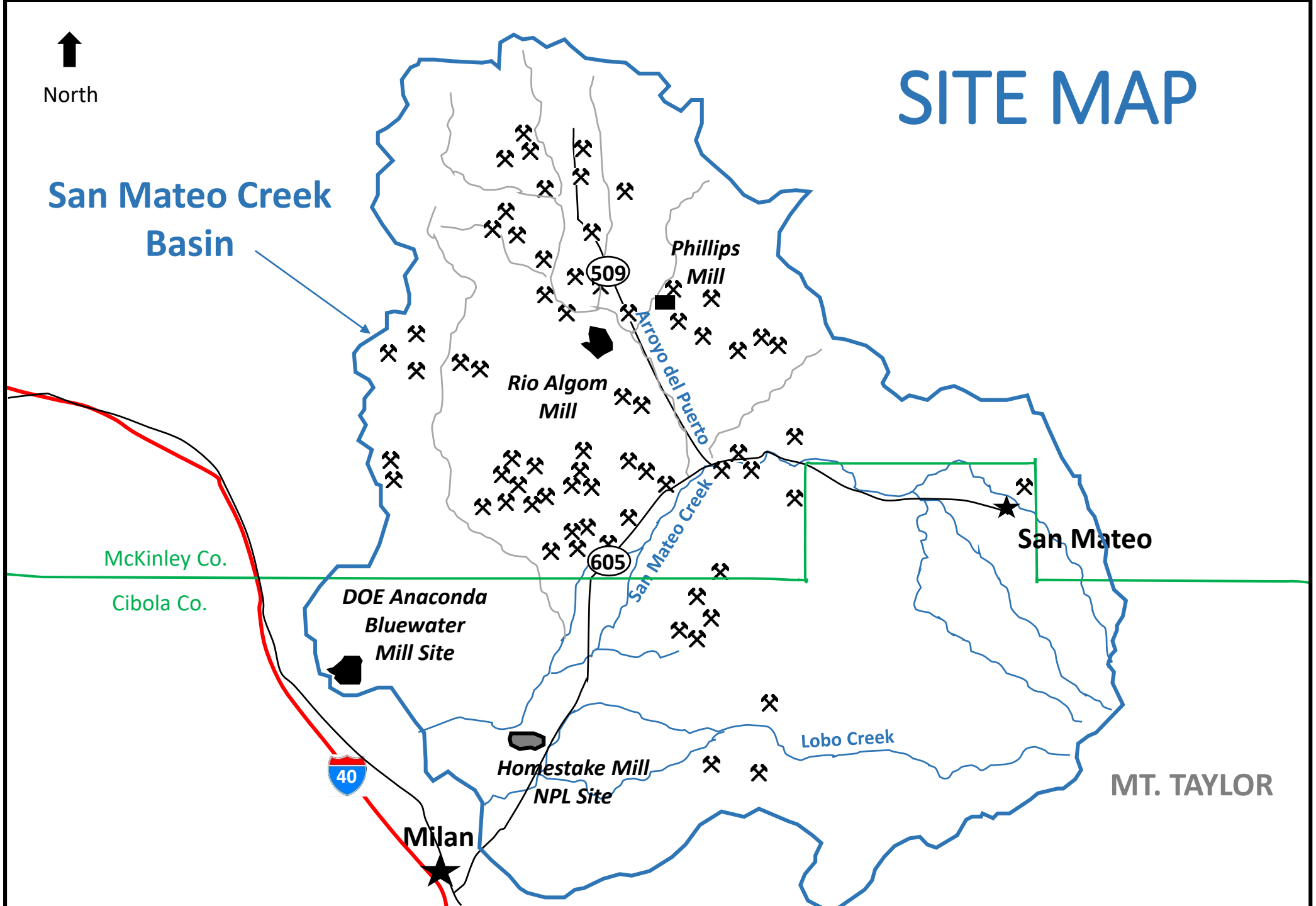
GROUND WATER INVESTIGATION

San Mateo Creek Basin Uranium Legacy Site

9881835

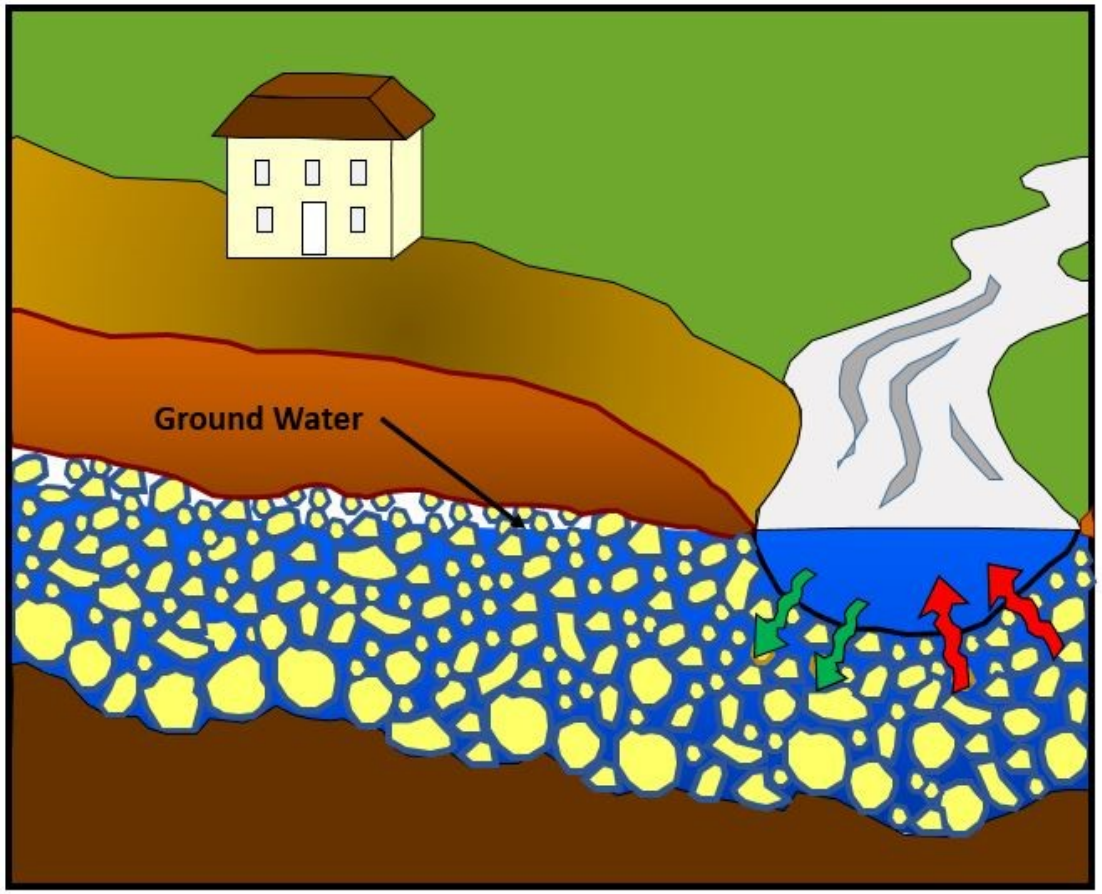

SITE MAP
North
San Mateo Creek Basin
Phillips Mill
509
Arroyo del Puerto
Rio Algom Mill
San Mateo Creek
605
San Mateo
McKinley Co.
Cibola Co.
DOE Anaconda Bluewater Mill Site
Lobo Creek
Homestake Mill NPL Site
40
Milan
MT. TAYLOR

PROJECT OBJECTIVE

Characterize ground water quality and impact by legacy uranium mining and milling activities

WHERE IS THE GROUND WATER?

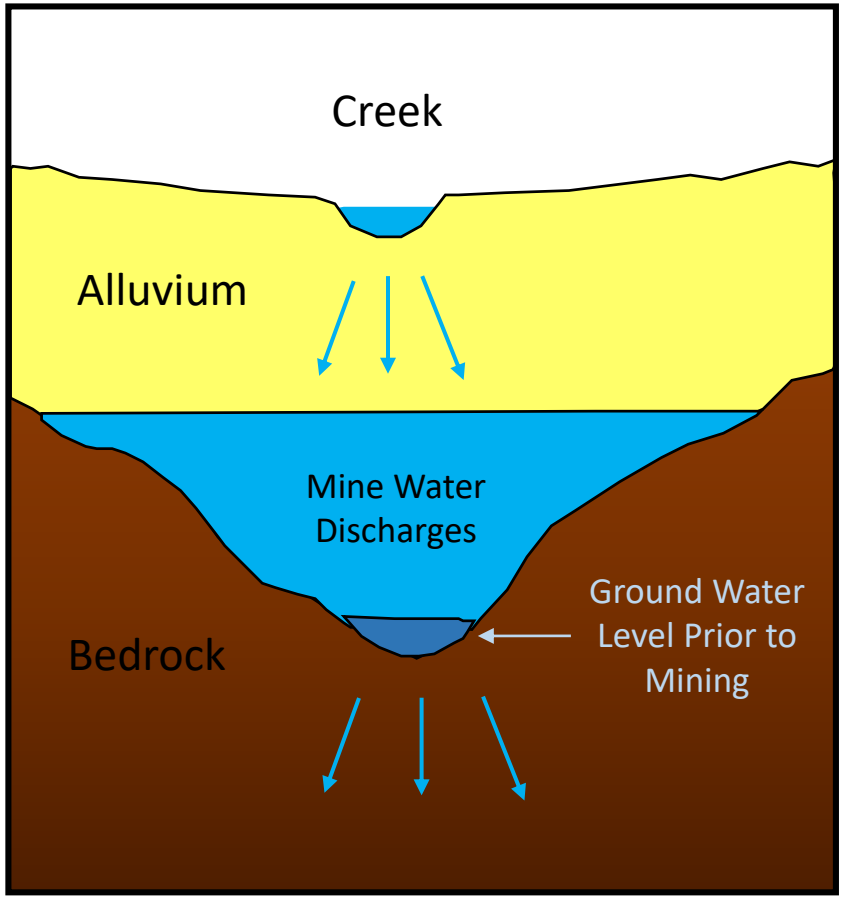
- Alluvial Ground Water
  - Shallow ground water
  - At depths reaching about **120 feet** below ground surface
  - In sediments at base of drainage channels (arroyos, creeks)
- Bedrock Ground Water
  - Deeper ground water
  - Hundreds of feet below ground surface
  - In rock formations



Modified from City of Las Cruces
Poster Display

HOW DID MINING OPERATIONS AFFECT GROUND WATER?

- ***Discharged billions of gallons*** of mine water to creeks and arroyos
- ***Created continuous flow of water*** in creeks and arroyos all year
- ***Water infiltrated*** into ground
- ***Increased amount of ground water*** in alluvial sediments and bedrock
- ***Changed quality*** of ground water



MINE WATER DISCHARGE

Artificially Created Perennial Flows Observed to Reached Homestake Impoundment (EPA 1980)

⚒ Wet Mine

MULTI-PHASED INVESTIGATION

Phase 1

Shallow Alluvial Aquifer
2012 – 2016

Phase 2

Bedrock & Alluvial Aquifers
2015 – 2017

Phase 3

Develop Conceptual Site Ground Water Model
2016 - 2018

Wet Alluvial Sediments

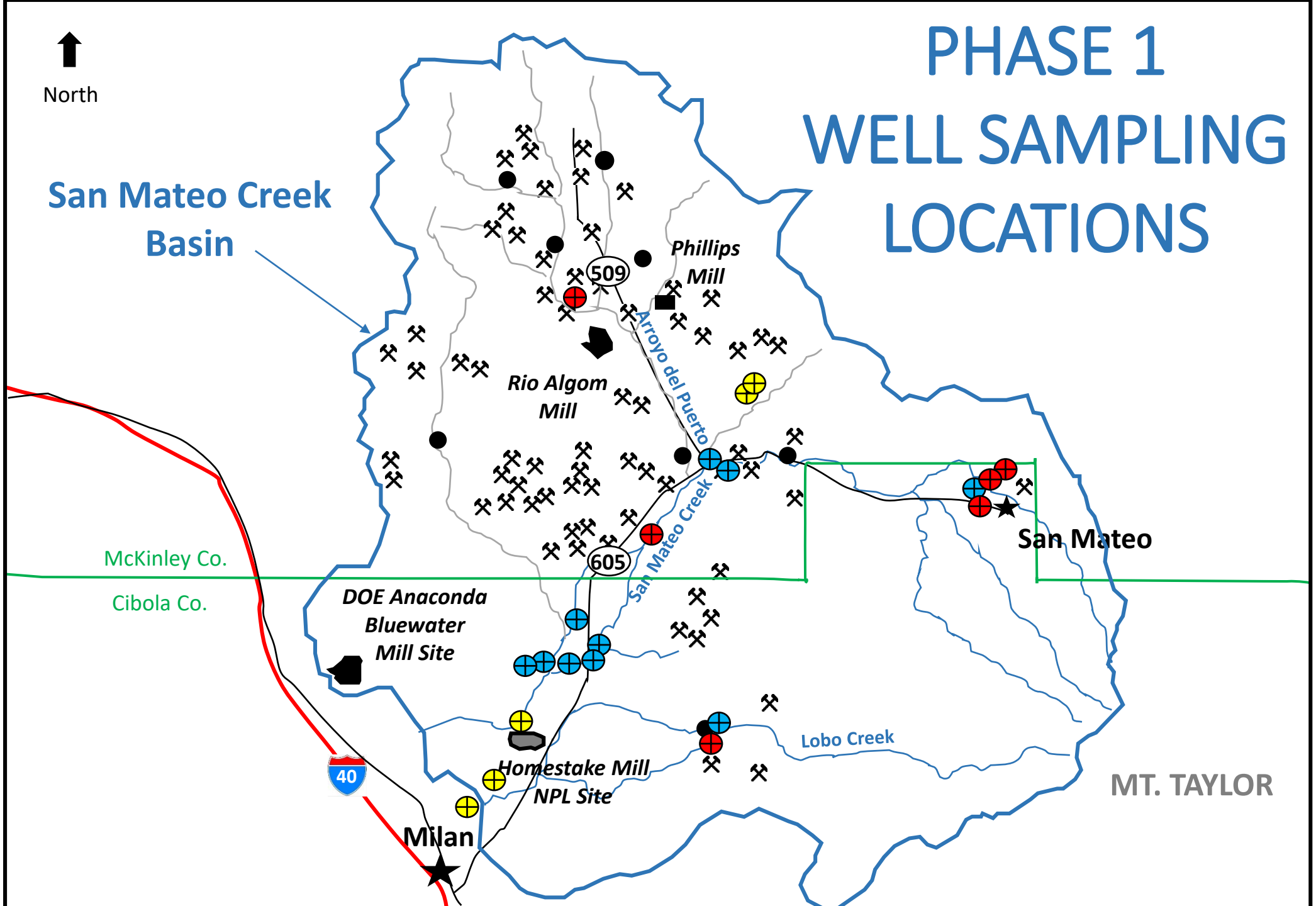
Bedrock Sandstone

Drill Bit and Piping

PHASE 1 ACTIVITIES COMPLETED

- 30 Boreholes Drilled
  - 6 monitoring wells installed where water encountered
  - 24 boreholes dry
- 15 Existing Wells Sampled
  - 10 private wells
  - 5 industry monitoring wells
  - Includes both alluvial and bedrock wells

Core Sample


PHASE 1
WELL SAMPLING
LOCATIONS
North
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Basin
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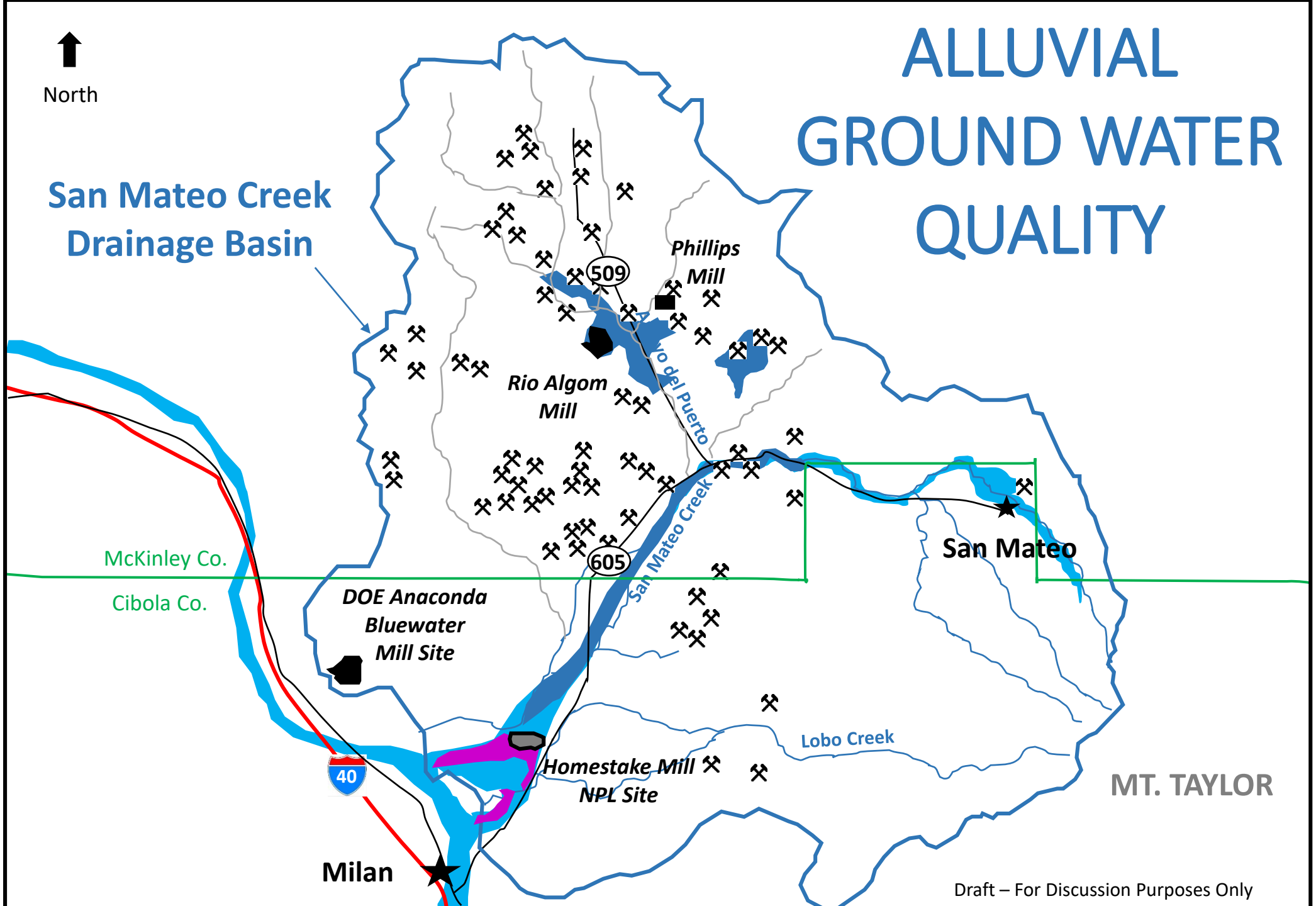
Lobo Creek
Homestake Mill
NPL Site
40
Milan
MT. TAYLOR
EPA Alluvial
Monitoring Well
Industry
Monitoring
Well
Private Well
Dry Borehole

PHASE 1 RESULTS SUMMARY

- Attempt to Characterize Alluvial Water Quality had **Mixed Results**
  - Lack of Natural Saturation in Many Areas Investigated
- Alluvial **Water Quality Varies** Across Basin
  - Good quality upgradient of mines and mills
    - ✓ Meets standards
  - Poor quality downgradient of mines and mills
    - ✓ Exceeds standards
    - ✓ Similar to mine discharge water quality in some areas
- Mine Discharge Water **Increased Saturation** in Alluvium
- Mine Discharge **Water Draining Out** of Alluvium Today


ALLUVIAL GROUND WATER QUALITY
North
San Mateo Creek Drainage Basin
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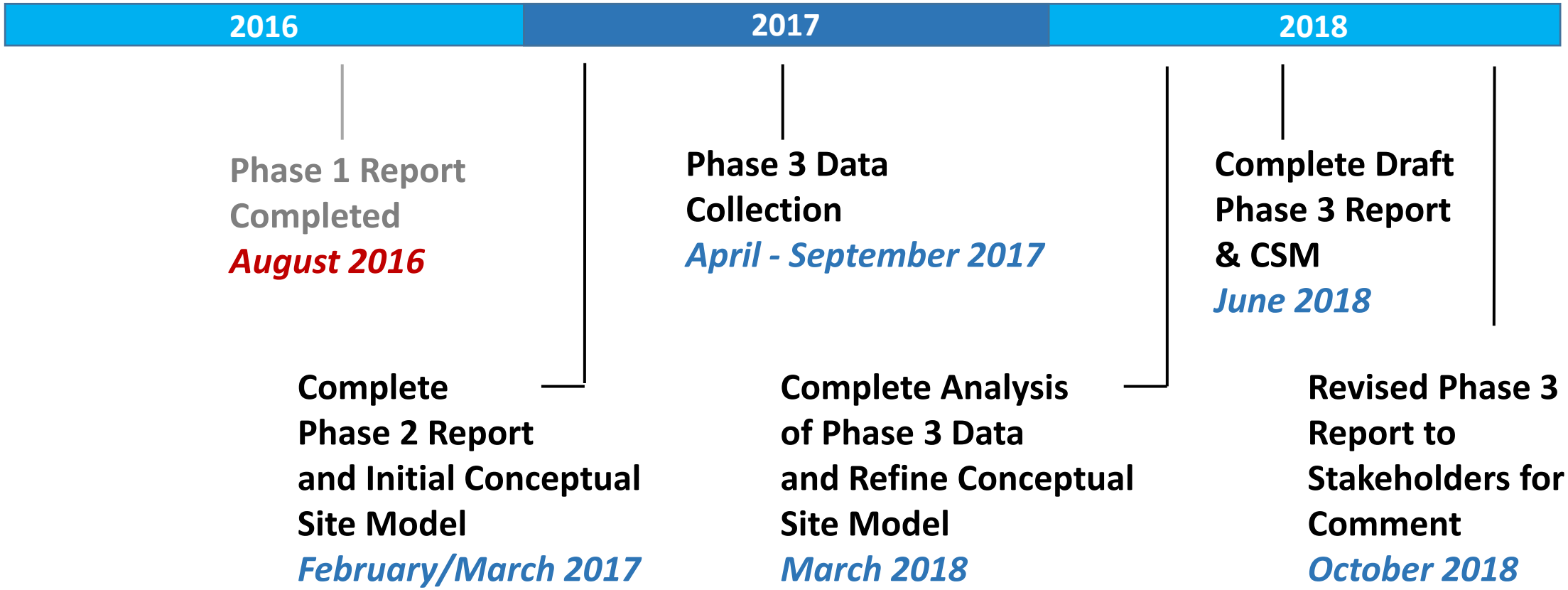
DOE Anaconda Bluewater Mill Site
Lobo Creek
Homestake Mill NPL Site
40
Milan
MT. TAYLOR
Alluvial Ground Water
Poor Alluvial Water Quality (Exceeds Standards)
Poor Alluvial Water Quality Contaminated by Homestake NPL site (Exceeds Standards)
Draft – For Discussion Purposes Only

RESULTS OF PRIVATE WELL SAMPLING

- All 10 private wells exceeded standards
- Only 3 of 10 wells used for drinking water supply
- Only 1 of the 3 exceeded drinking water standards
- Point-of-Use Treatment Systems installed by EPA at home exceeding standards

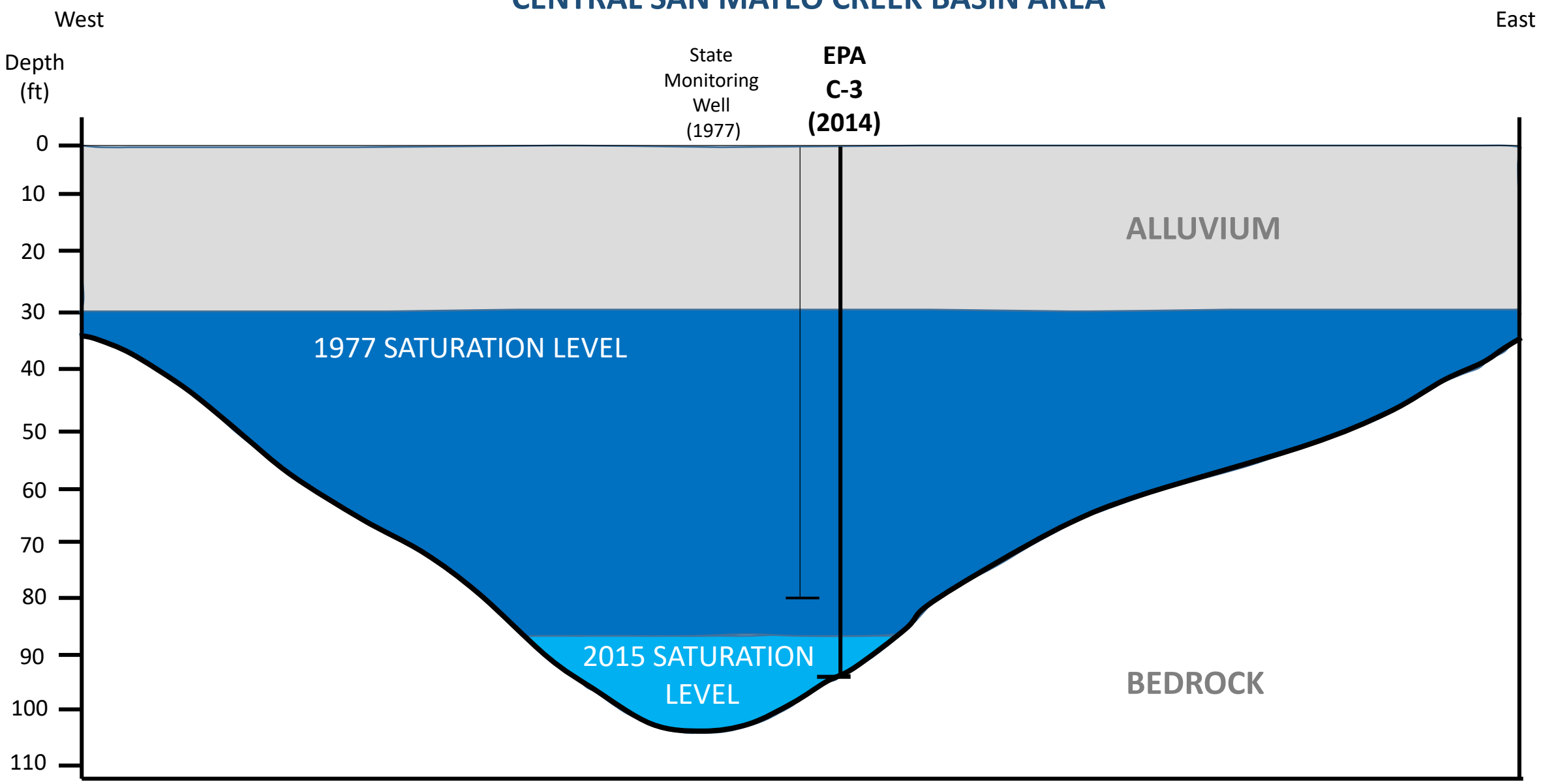
PLANNED ACTIVITIES FOR GROUND WATER INVESTIGATION



Other Slides

CROSS SECTION A-A'

CENTRAL SAN MATEO CREEK BASIN AREA



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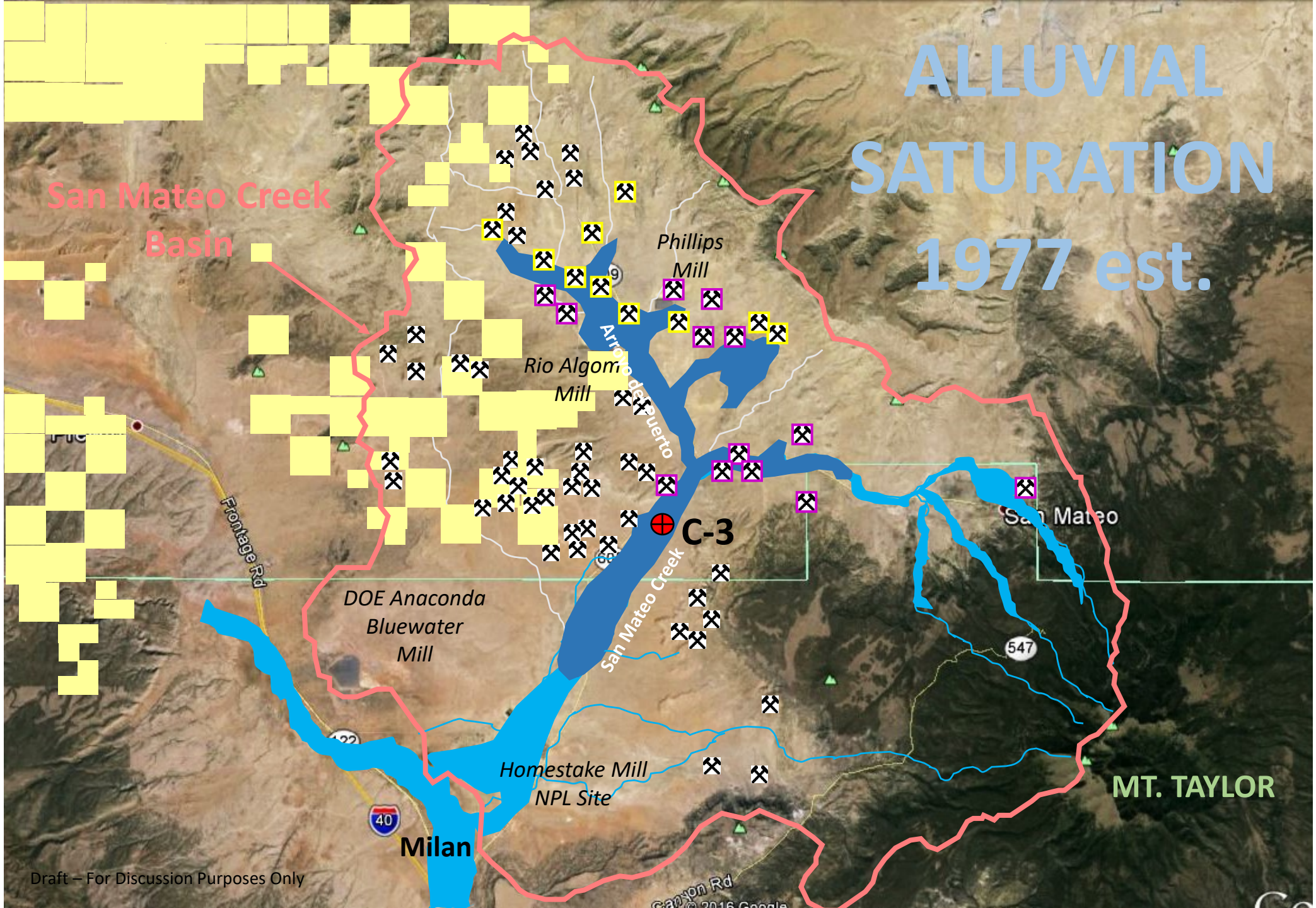

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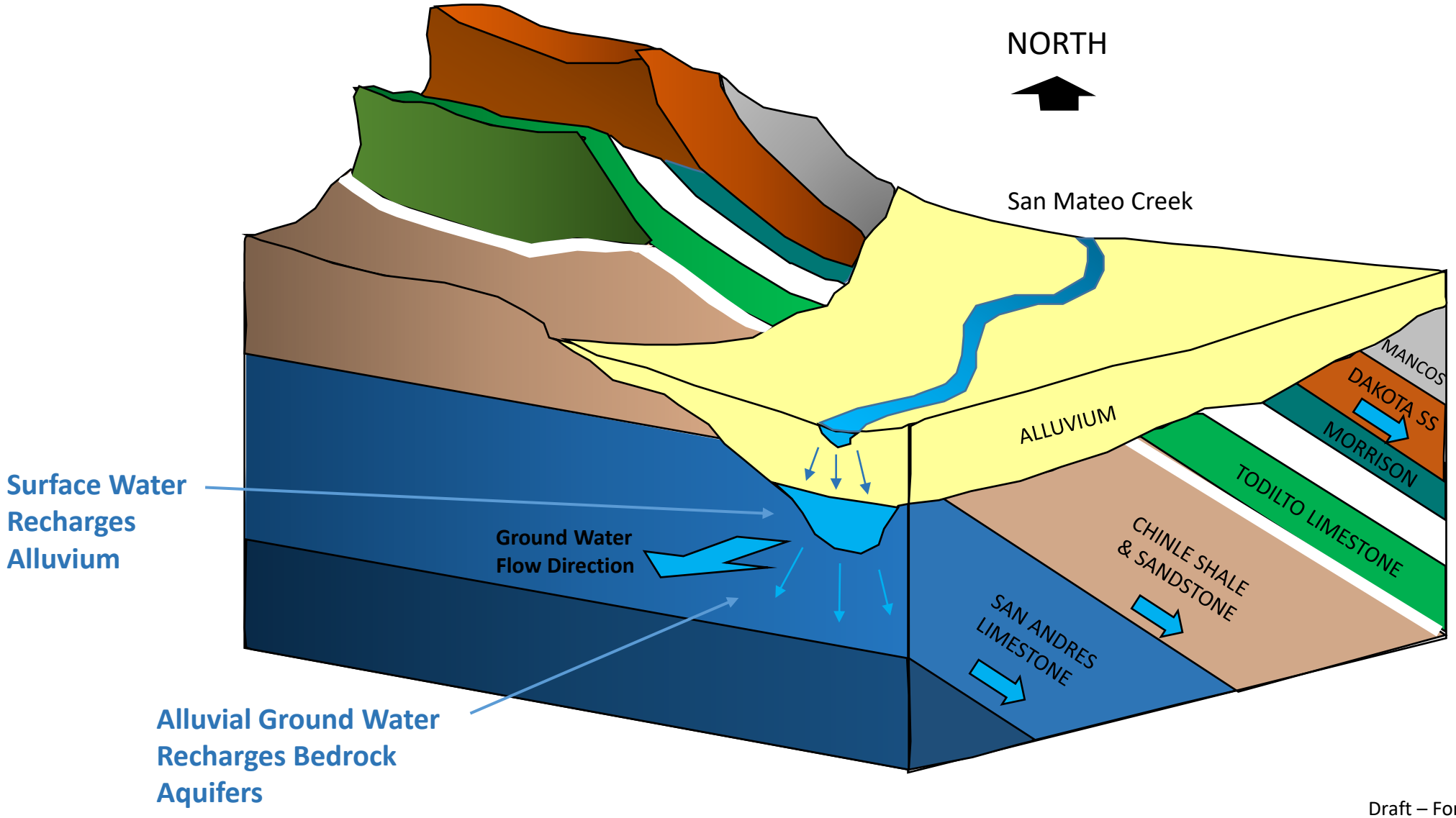
CONCEPTUAL SITE GROUND WATER MODEL



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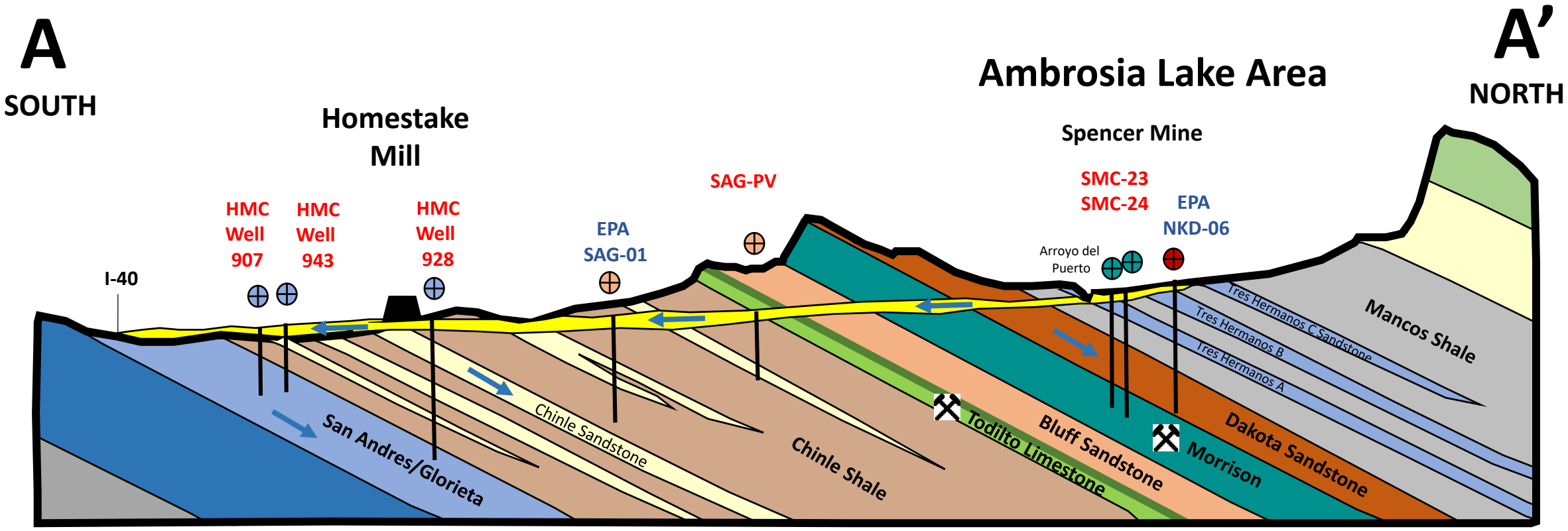
CONCEPTUAL SITE GROUND WATER MODEL

Generalized Cross Section Through San Mateo Creek Basin



5 Miles

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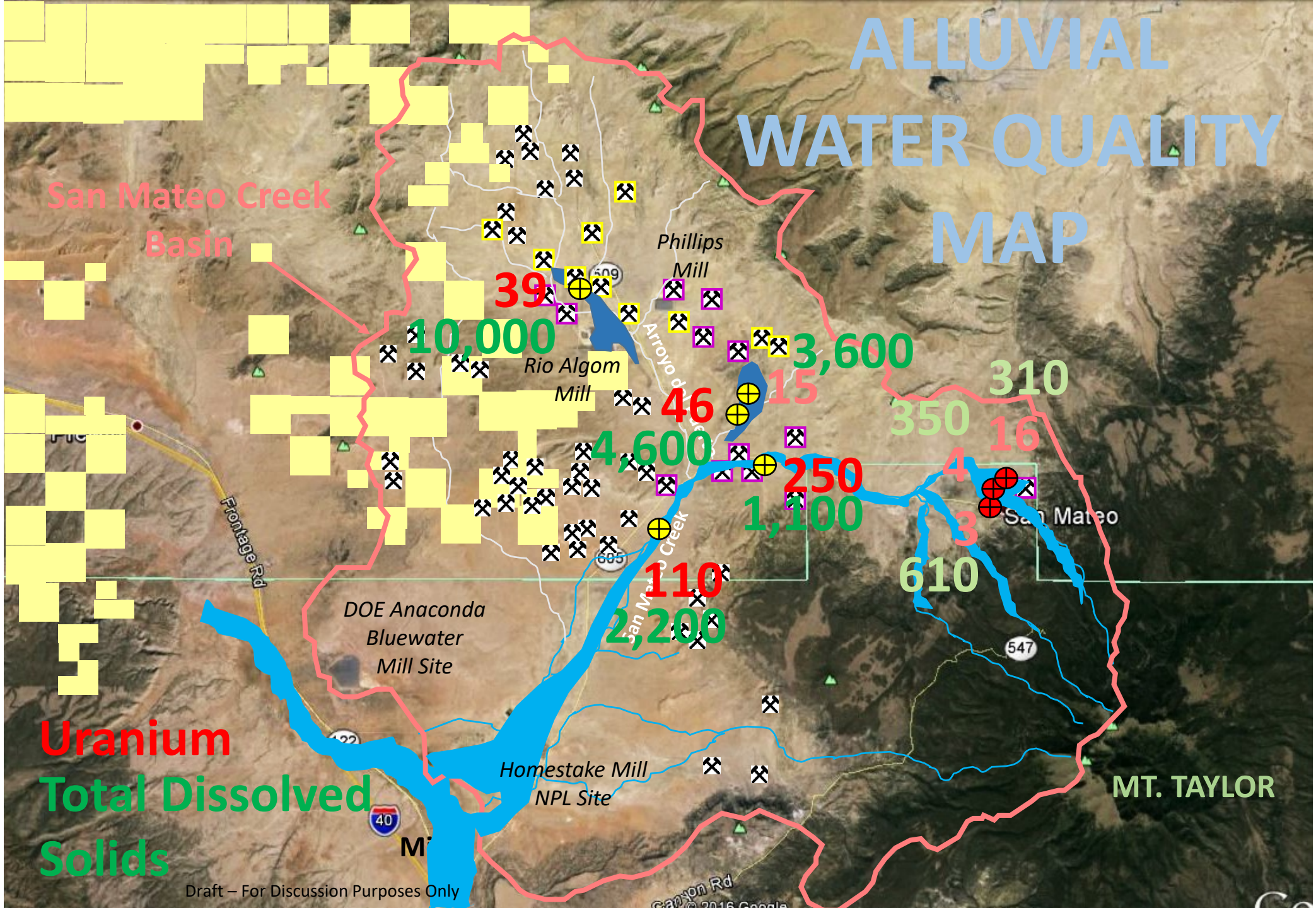

EPA Background Well

Well Downgradient to Legacy Mines

16 Uranium (ppb)

16 Total Dissolved Solids (ppm)

Alluvial Water

Mine Water Discharge