Town Hall Meeting

East Helena Groundwater Update

August 28, 2014

Hosted By: The METG Team, EPA and Lewis & Clark County

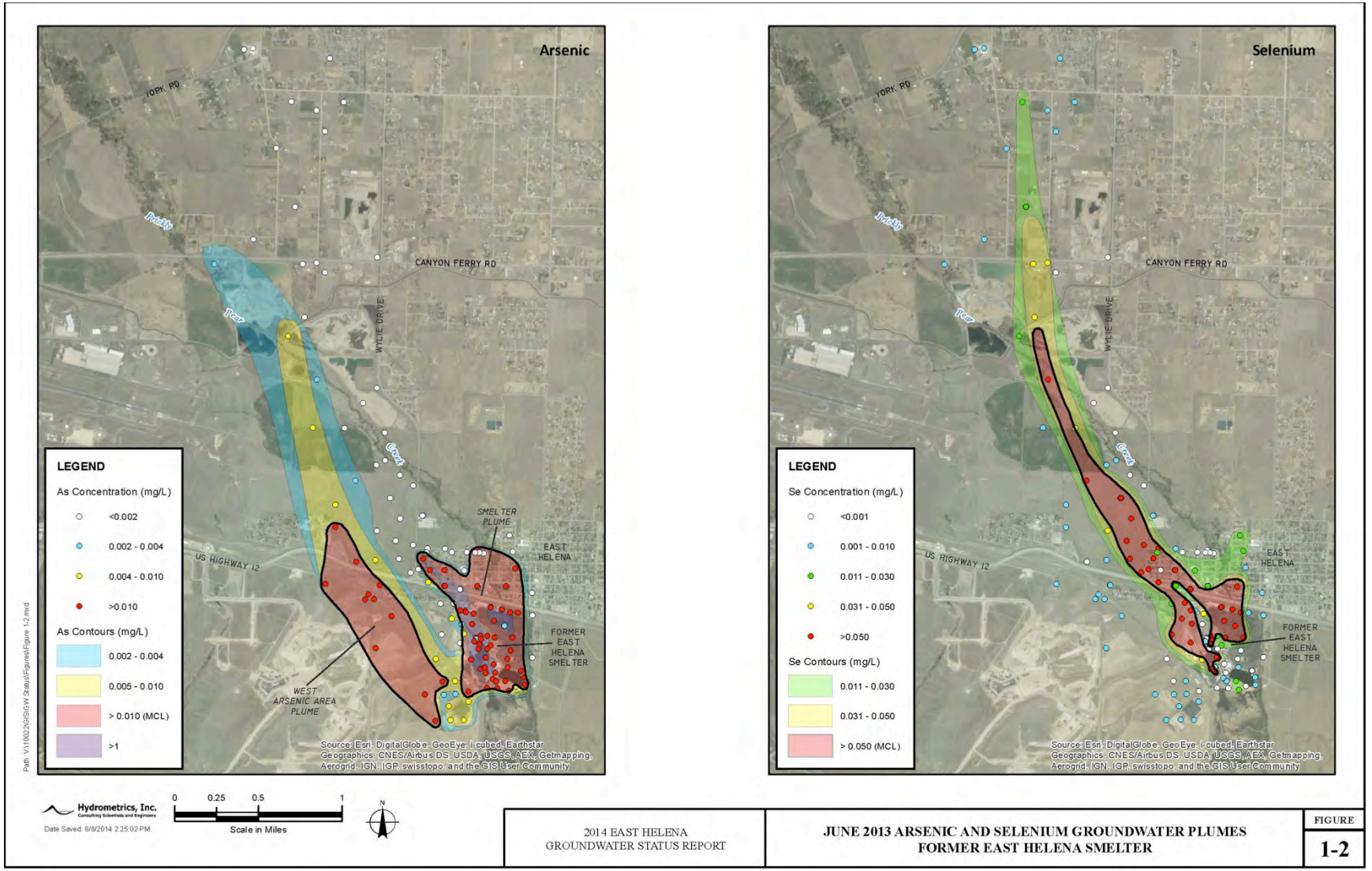
Today's Goals and Program

- Goals
  - Provide information and answer your questions
  - Listen and understand community perspective
- Program
  - Groundwater Technical Updates
    - Current Understanding of Conditions
    - Cleanup Actions Underway
      - Interim Measures
      - Corrective Measures Studies
      - Groundwater Modeling
    - Controlled Ground Water Area
  - Additional Questions and Open Discussion

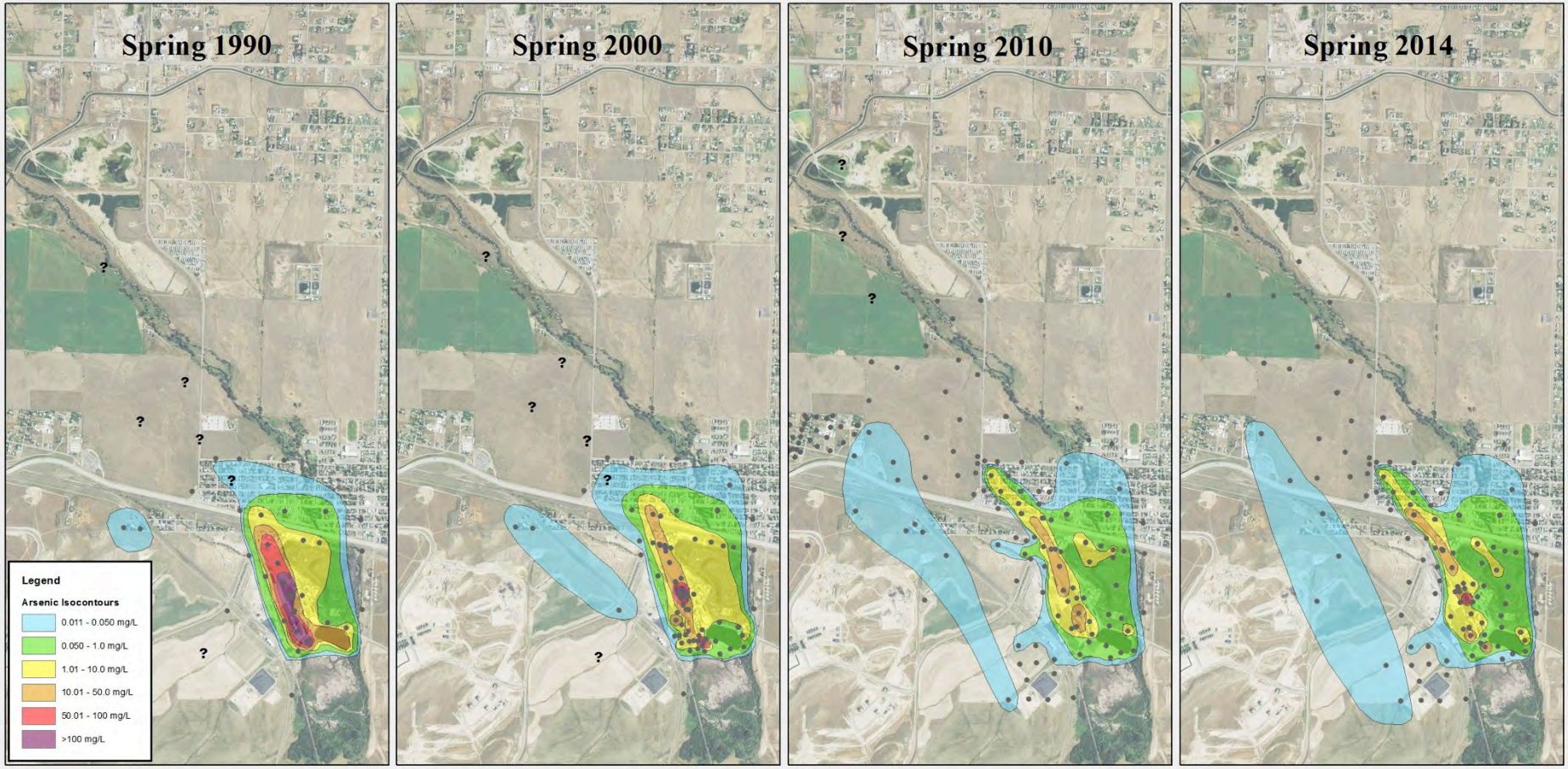
Current Understanding of Groundwater Contamination and Sources

Bob Anderson/Hydrometrics

CURRENT ARSENIC AND SELENIUM PLUMES



LONG-TERM WATER QUALITY TRENDS



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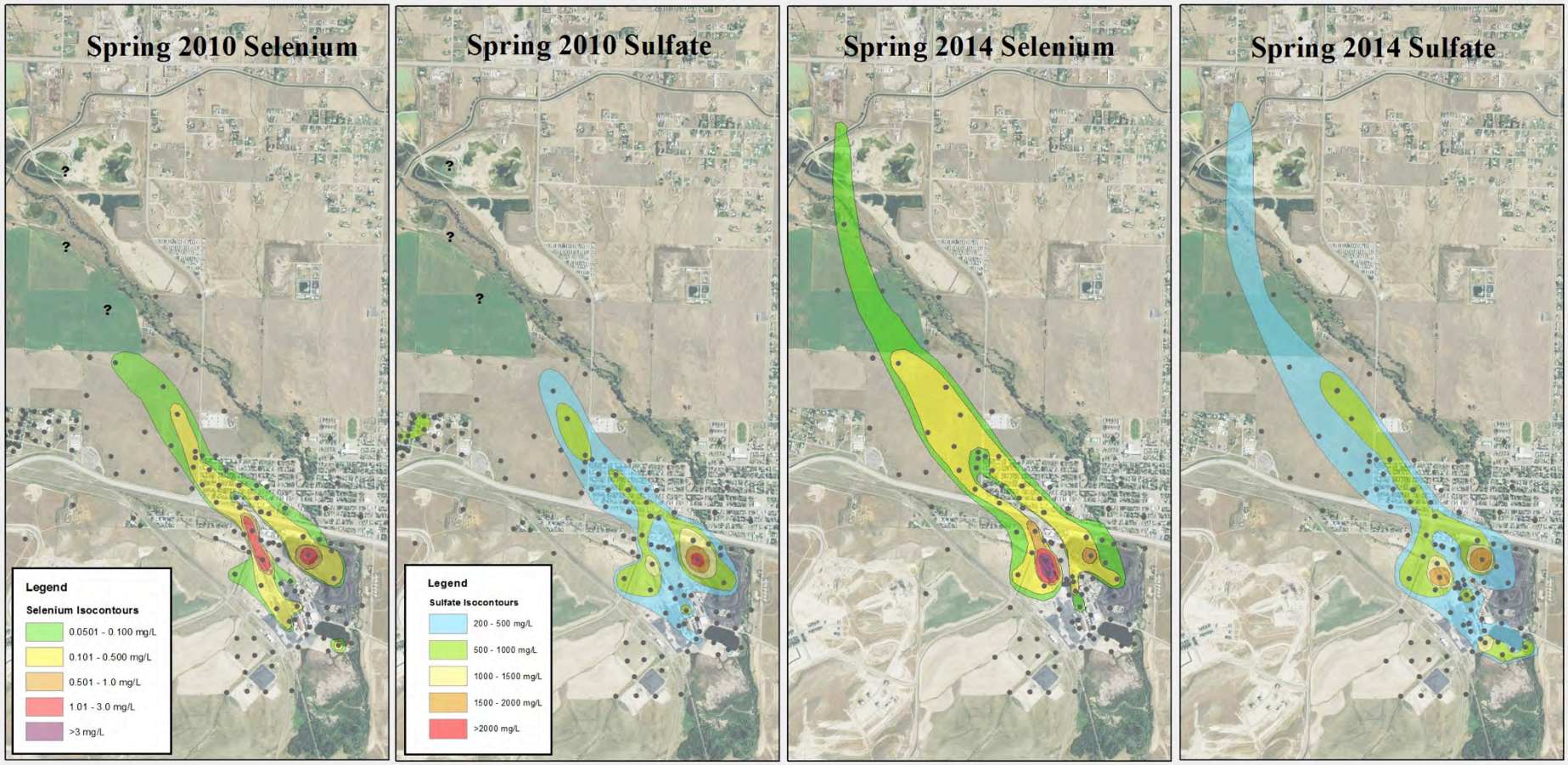
Arsenic Plumes

SPRING 1990/2000/2010/2014
GROUNDWATER ARSENIC PLUMES
EAST HELENA FACILITY

FIGURE



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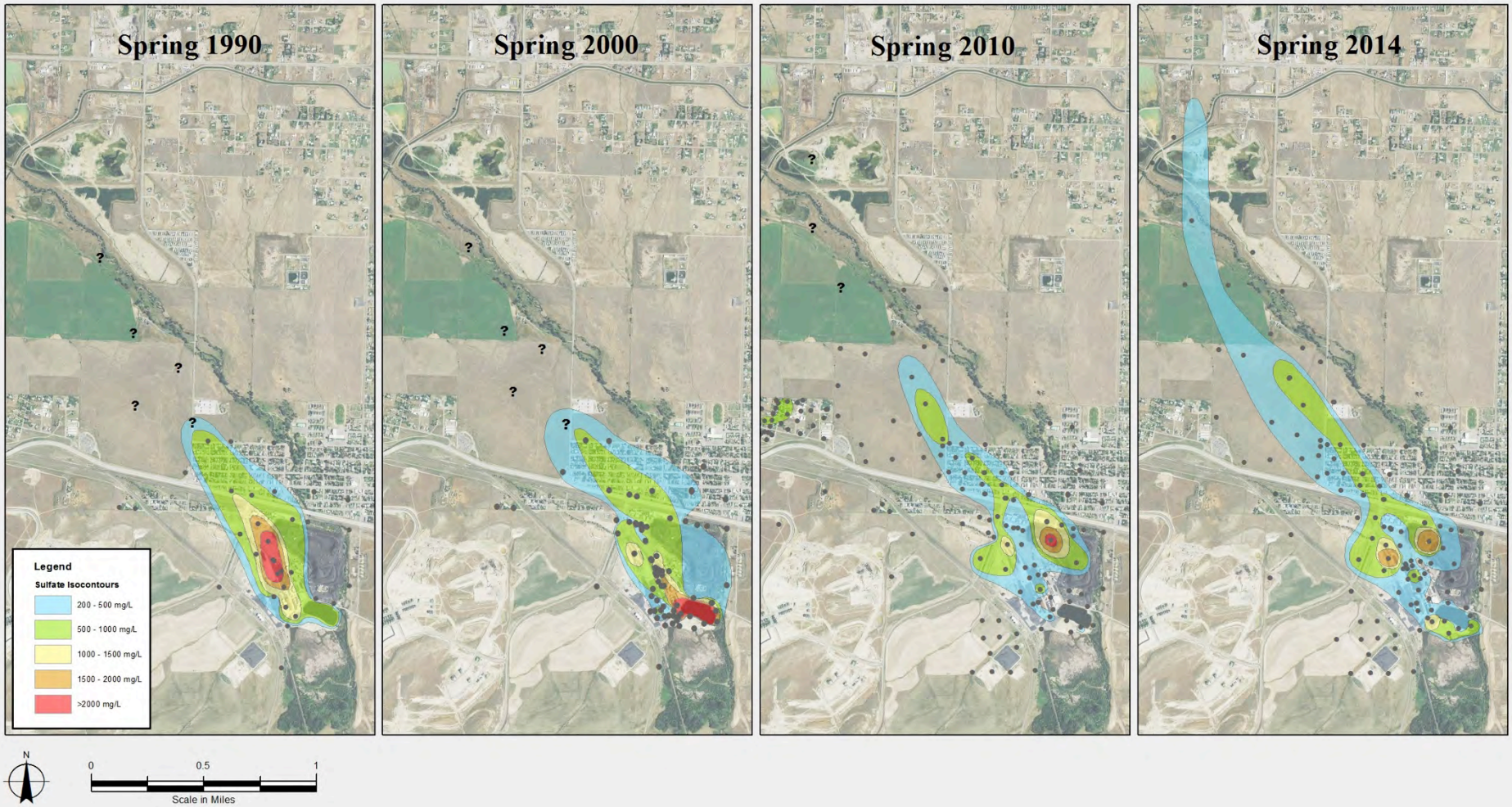
Selenium Plumes

SPRING 2010/2014
GROUNDWATER SELENIUM AND SULFATE PLUMES
EAST HELENA FACILITY

FIGURE



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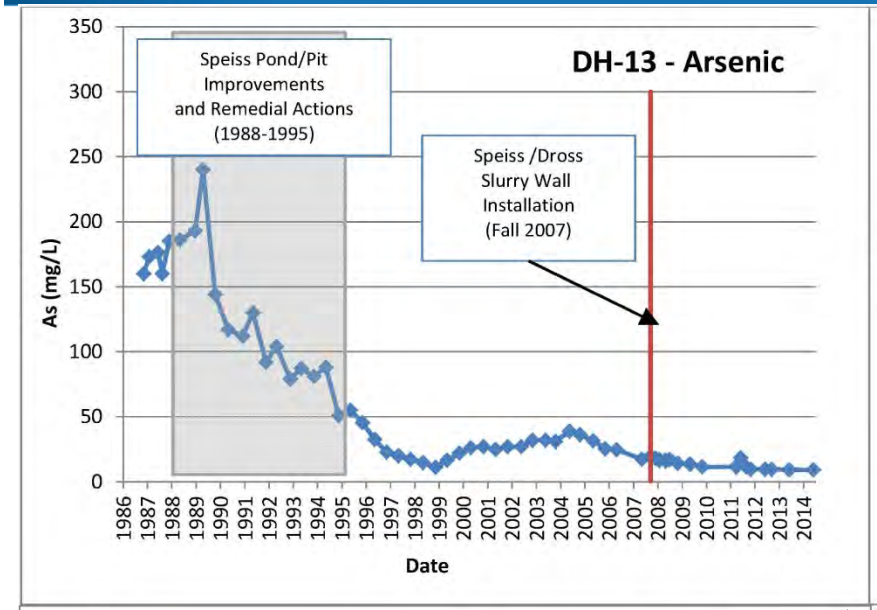
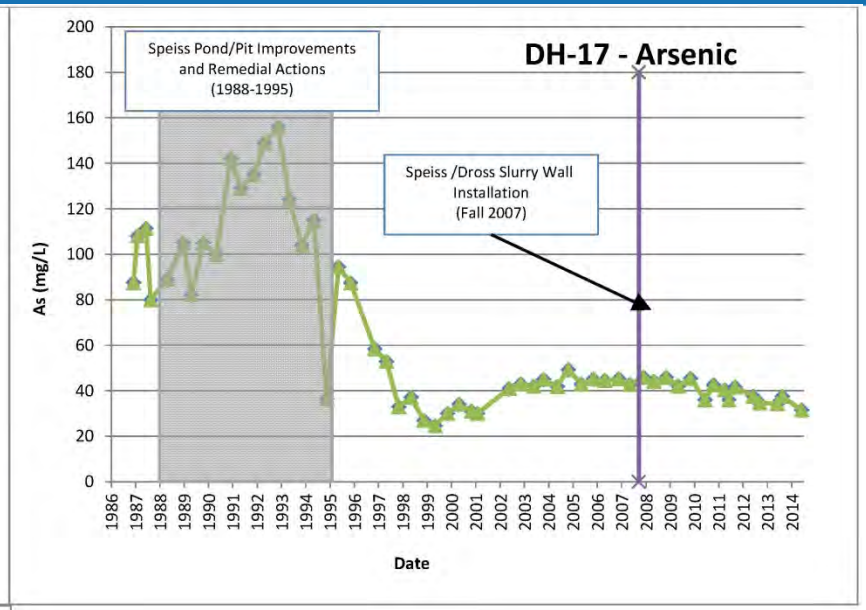
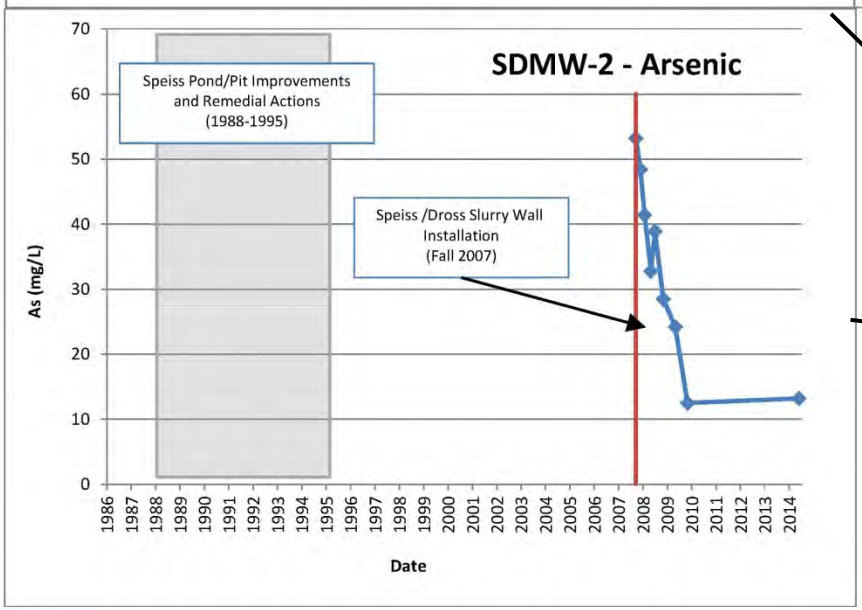
Sulfate plumes (surrogate for selenium)

SPRING 1990/2000/2010/2014
GROUNDWATER SULFATE PLUMES
EAST HELENA FACILITY

FIGURE

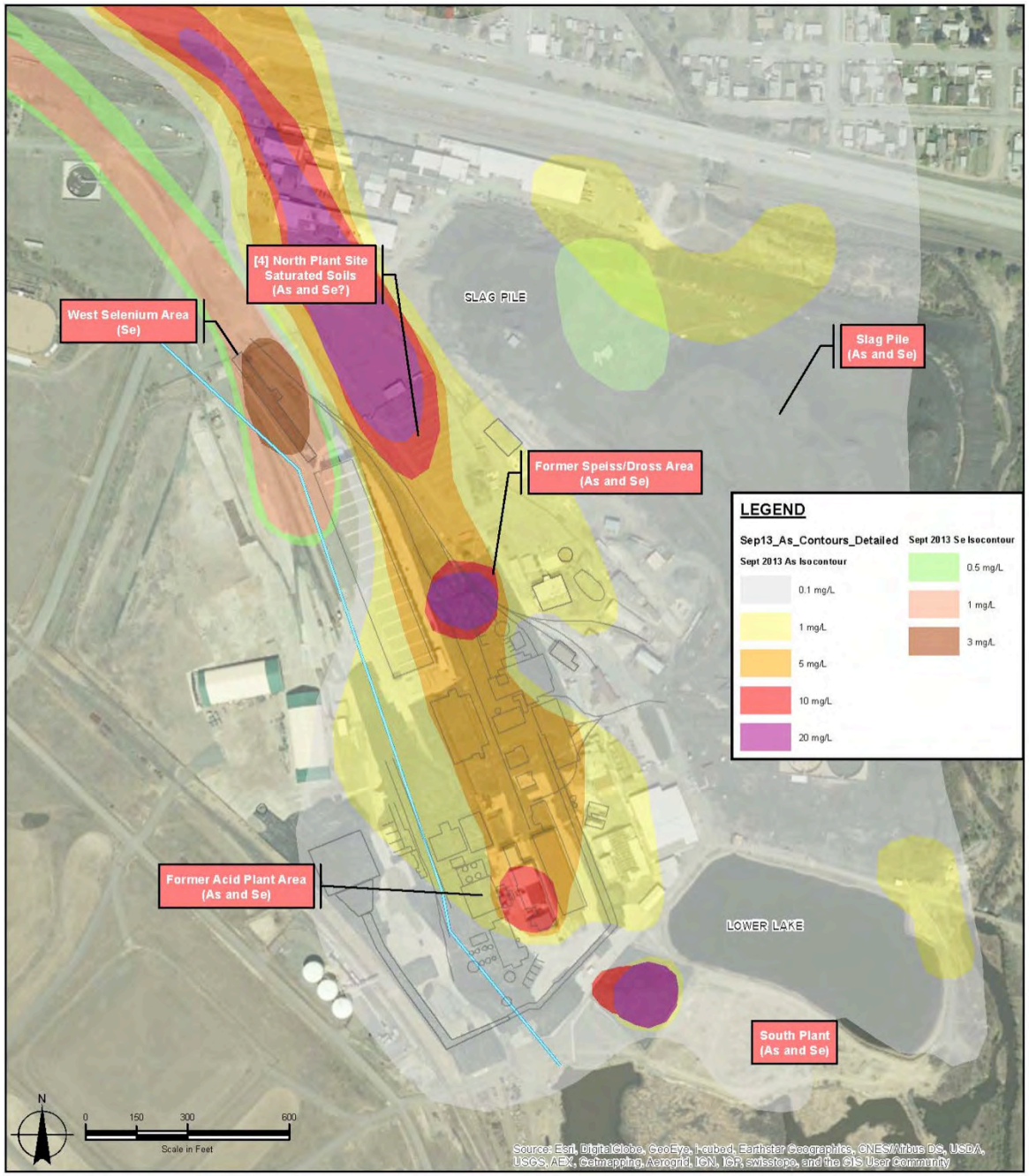




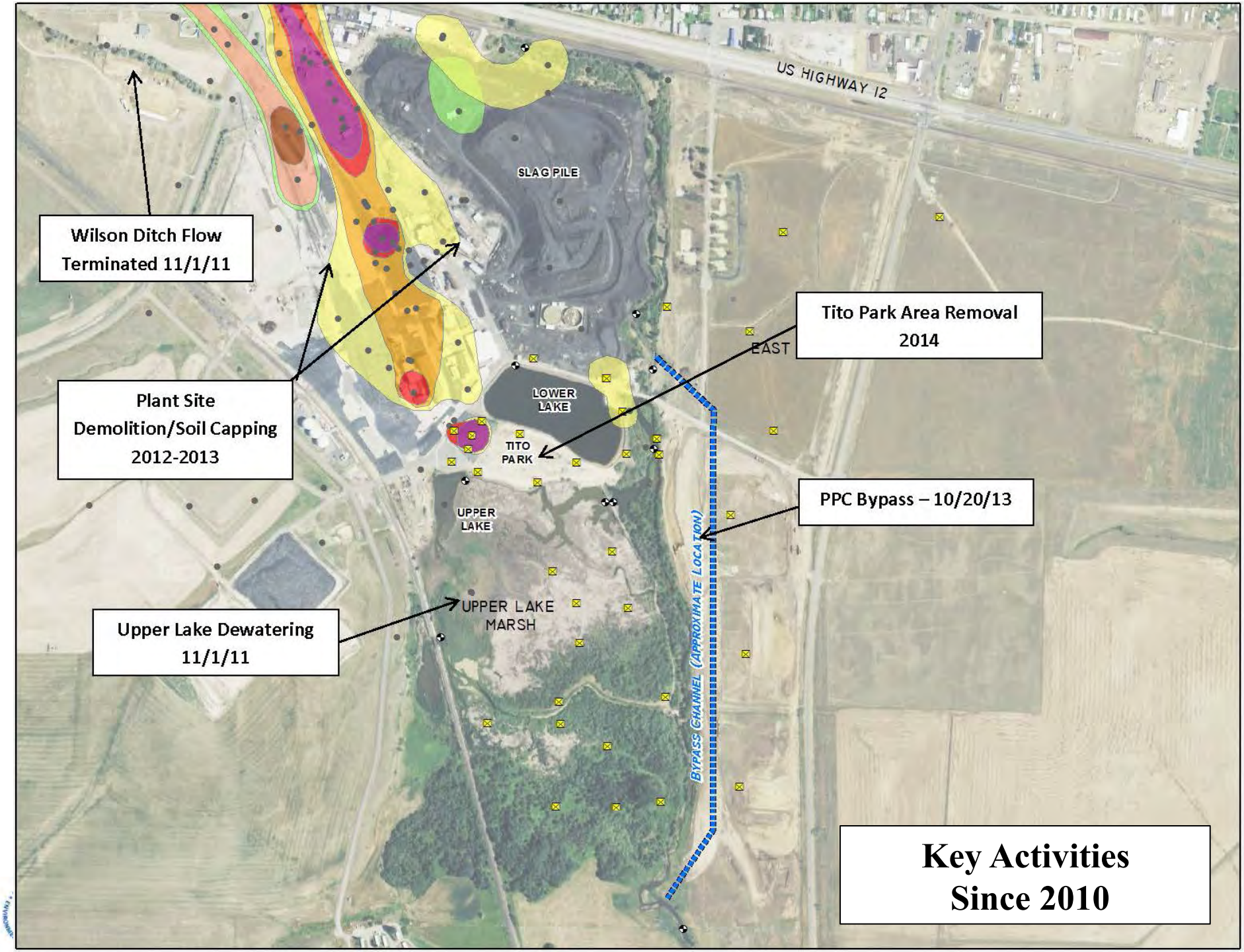


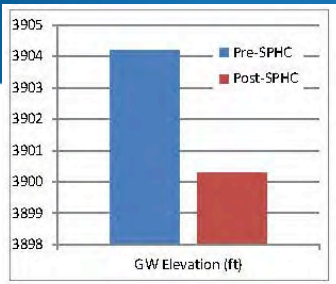
ARSENIC CONCENTRATION TRENDS IN SPEISS/DROSS AREA

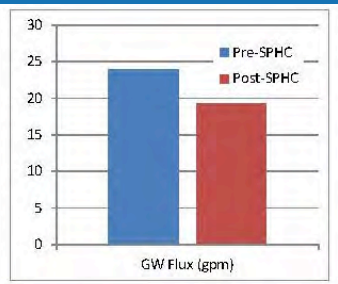
RECENT WATER QUALITY TRENDS

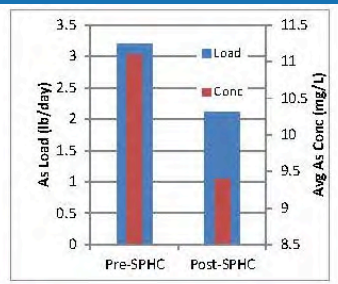


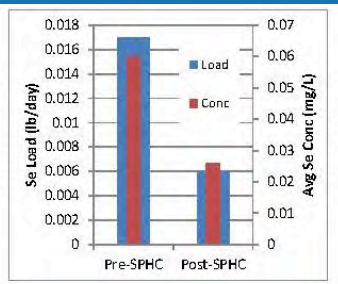
CURRENT PLANT SITE CONDITIONS AND SOURCE AREAS

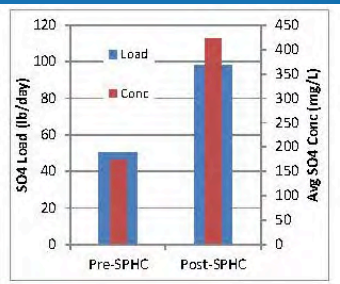

US HIGHWAY 12
SLAG PILE
Wilson Ditch Flow Terminated 11/1/11
Plant Site Demolition/Soil Capping 2012-2013
Tito Park Area Removal 2014
EAST
LOWER LAKE
TITO PARK
PPC Bypass – 10/20/13
UPPER LAKE
UPPER LAKE MARSH
Upper Lake Dewatering 11/1/11
BYPASS CHANNEL (APPROXIMATE LOCATION)
Key Activities Since 2010

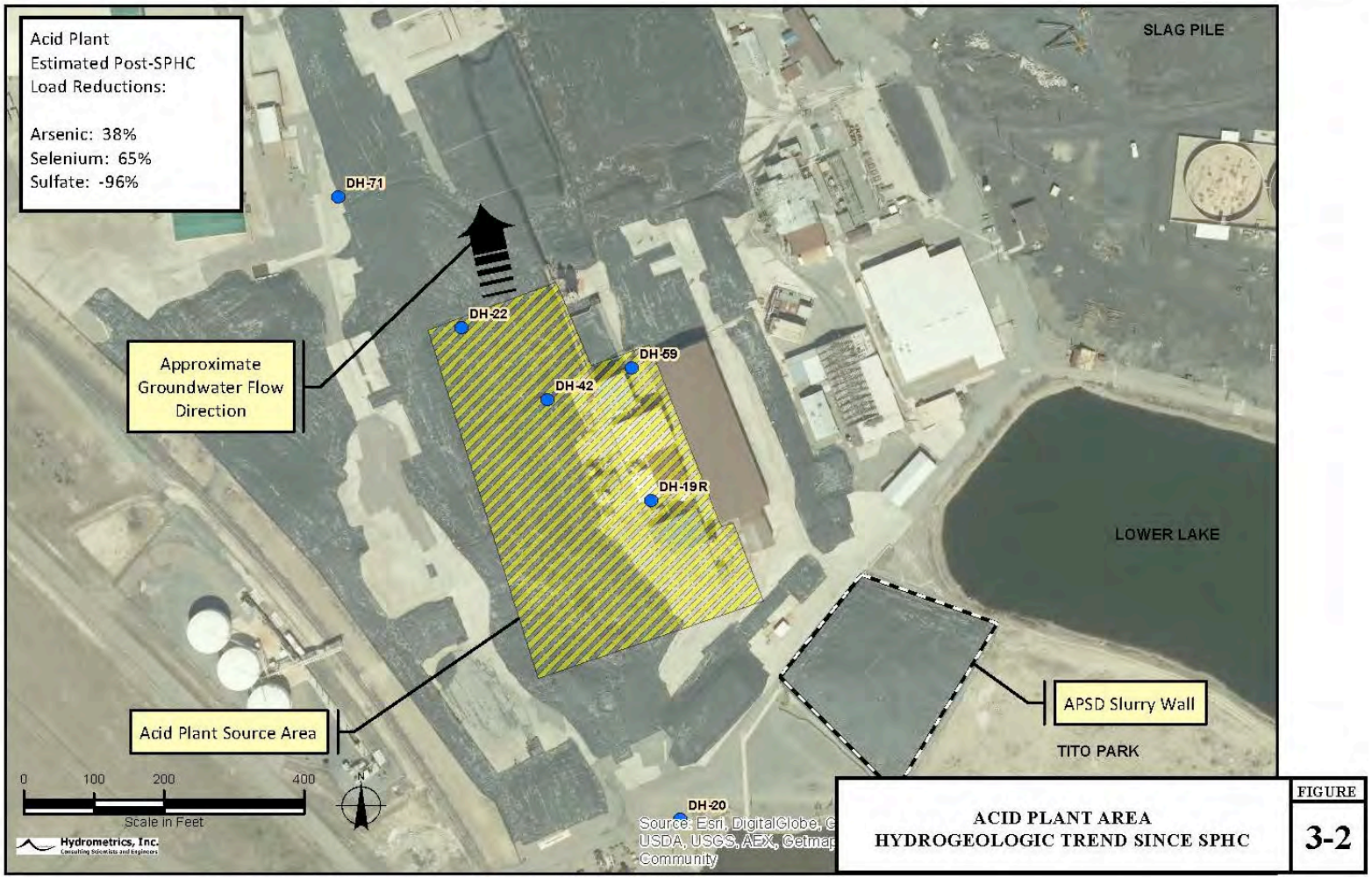












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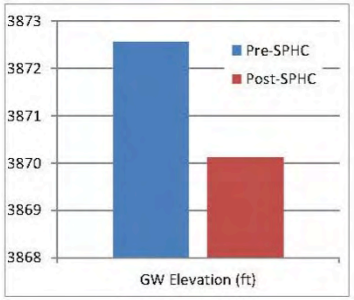
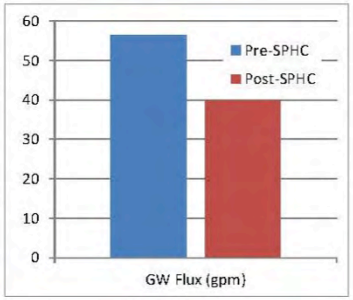
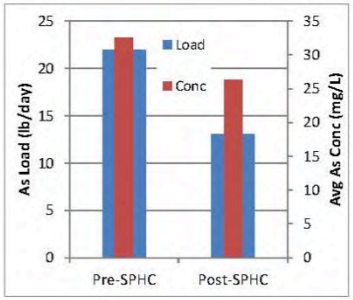
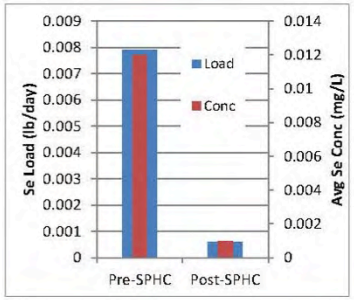
ACID PLANT AREA
HYDROGEOLOGIC TREND SINCE SPHC

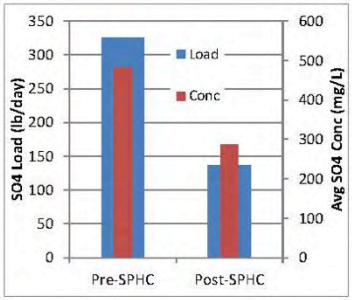
FIGURE
3-2

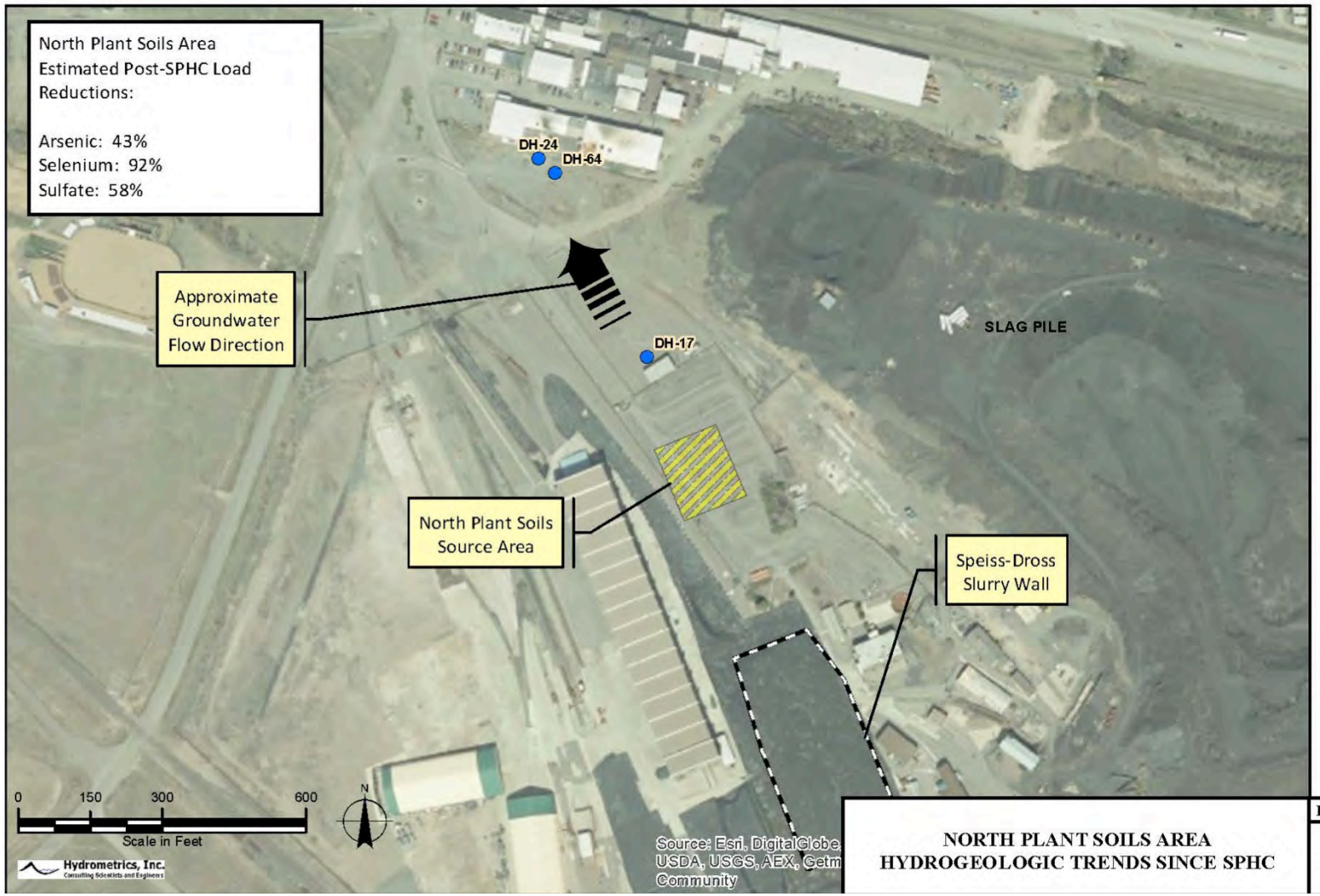












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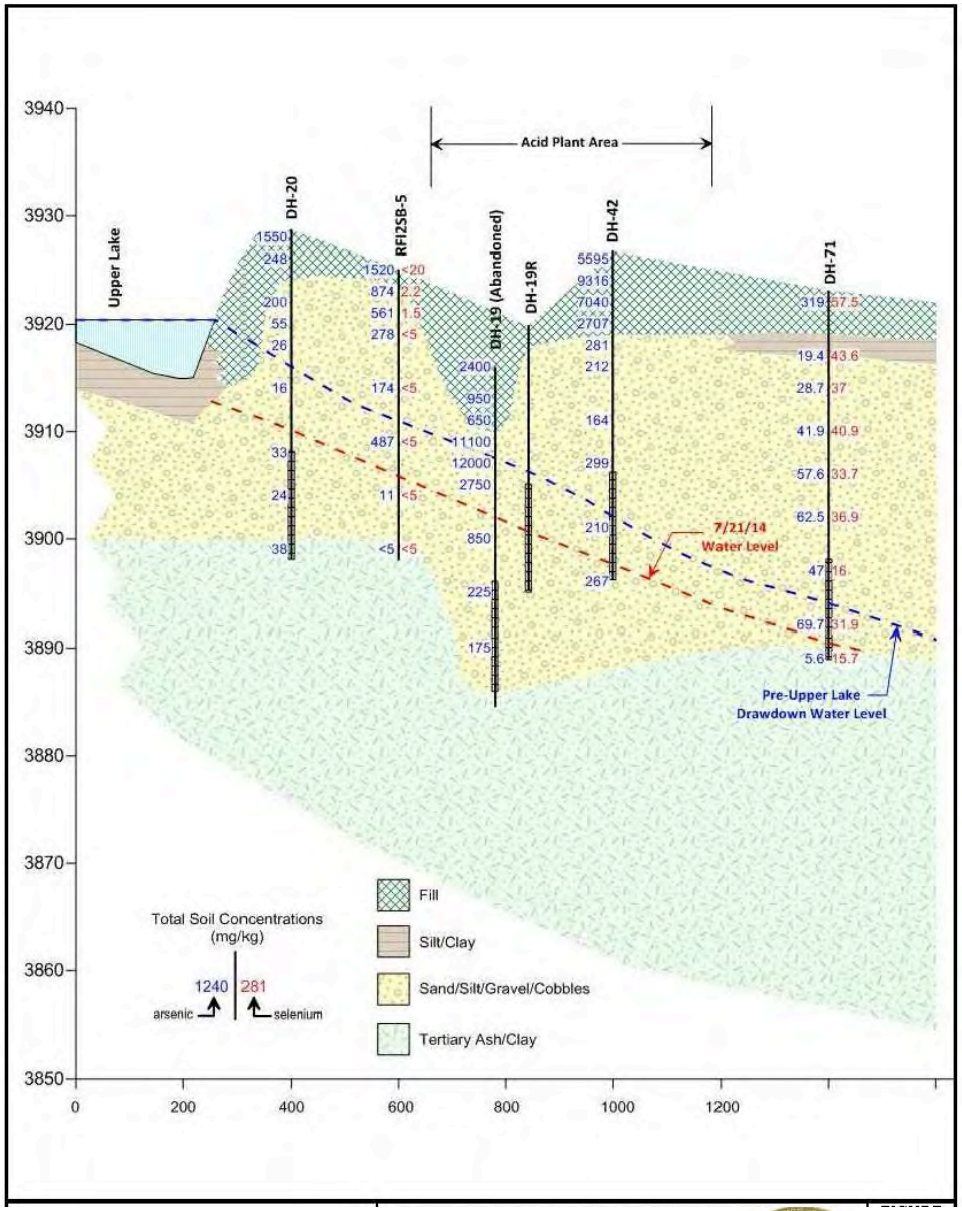
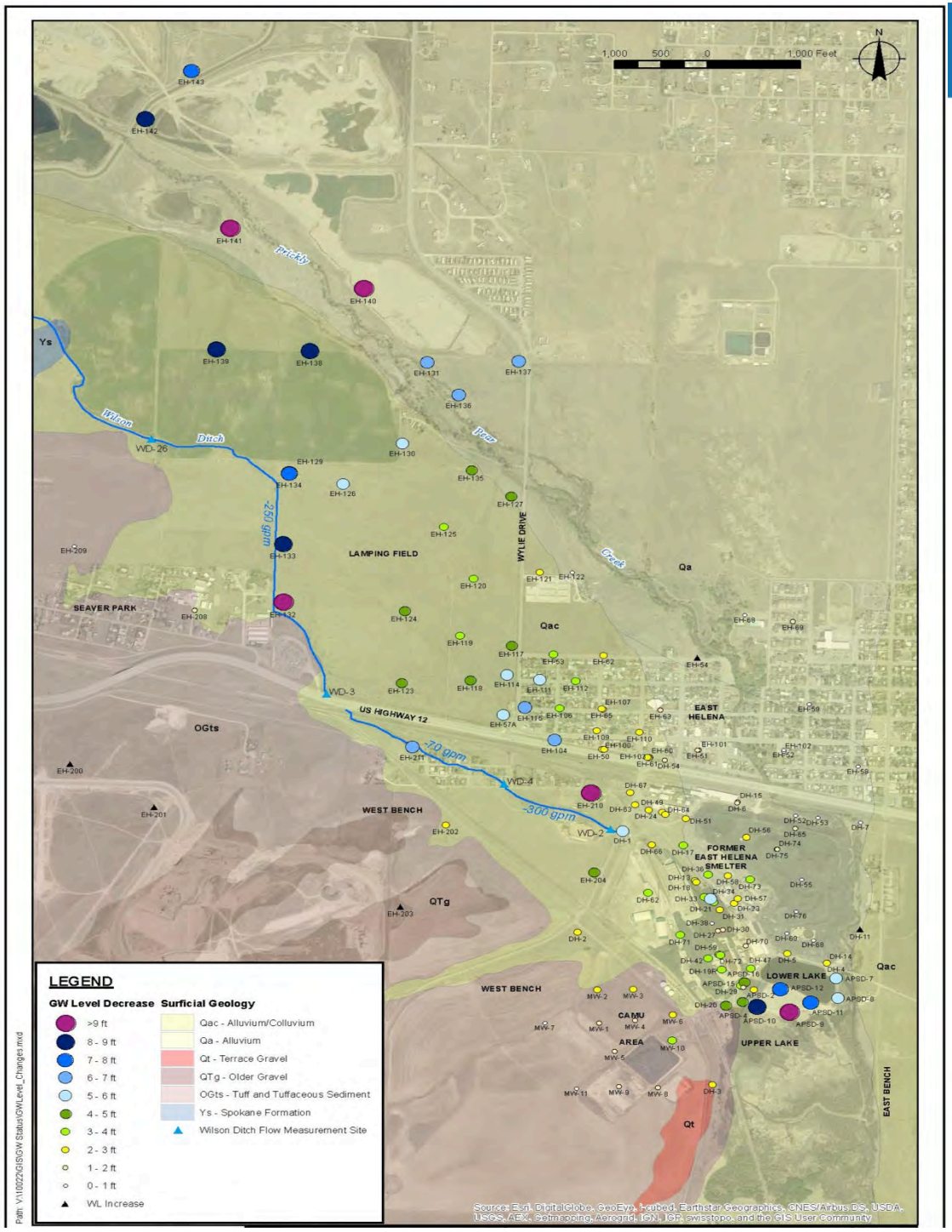
NORTH PLANT SOILS AREA
HYDROGEOLOGIC TRENDS SINCE SPHC

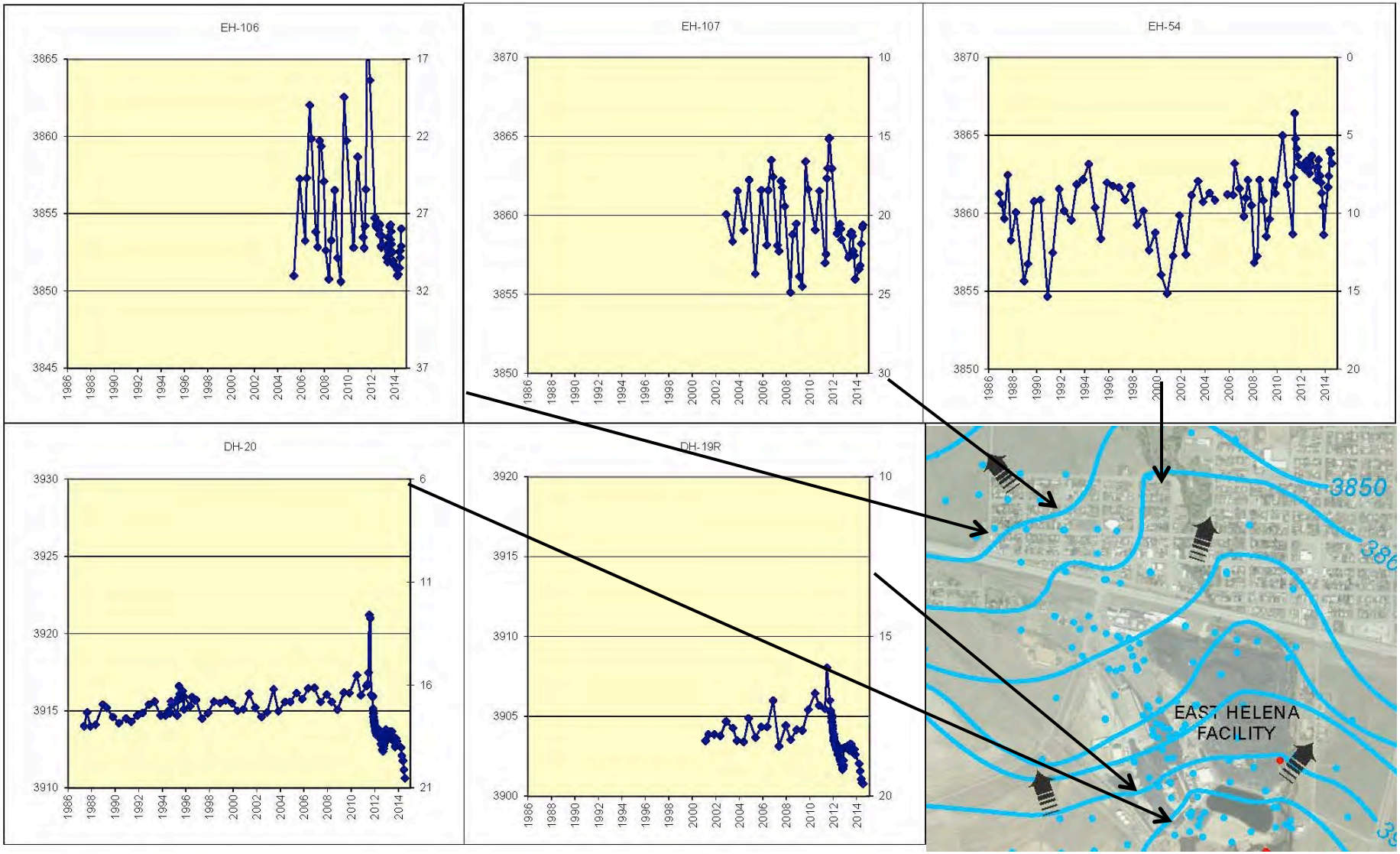
FIGURE
3-7



Acid Plant Area Groundwater Levels Are Dropping Below Areas of Highest Contaminant Concentrations

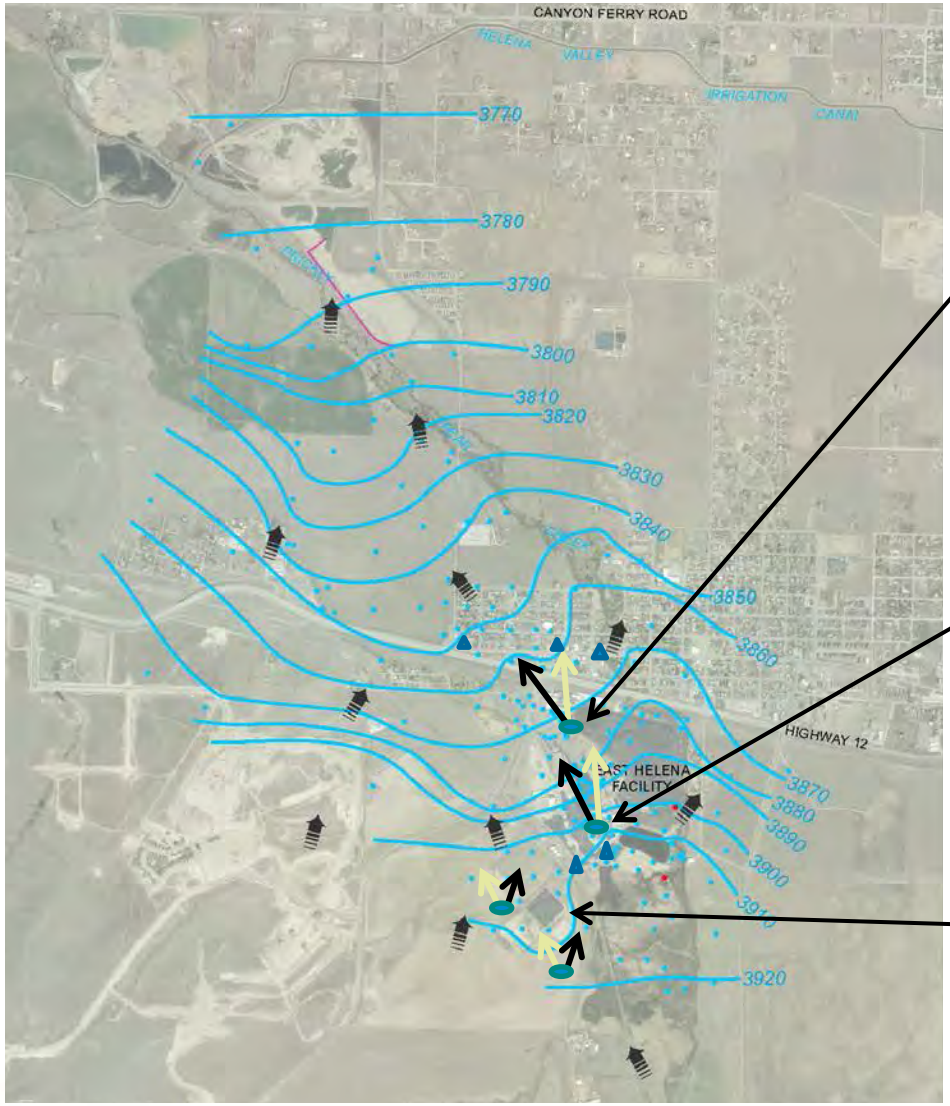


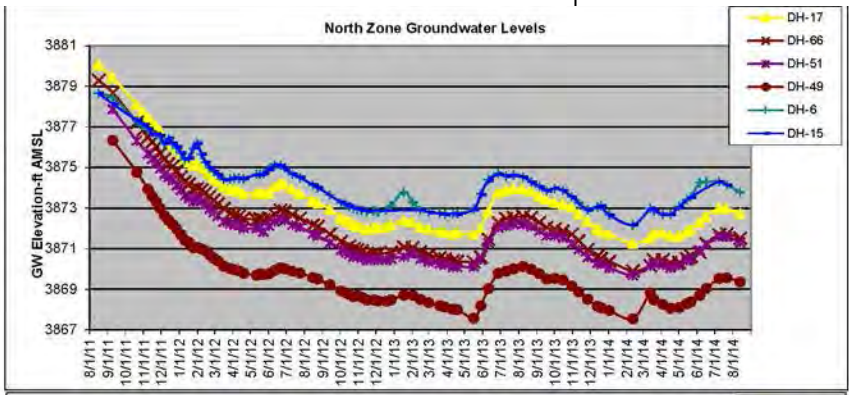
Several Factors Contribute to Observed Changes in Groundwater Levels

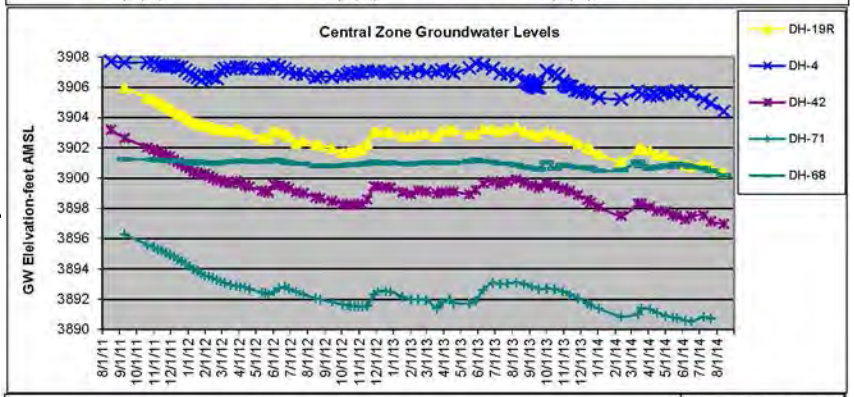


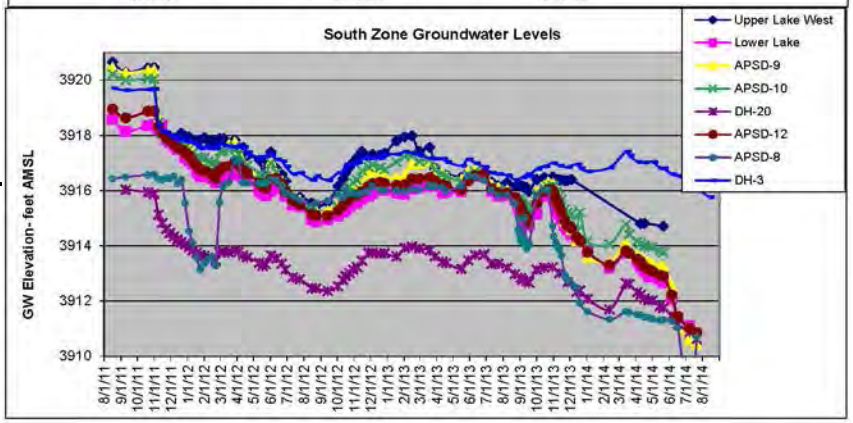
WATER LEVEL CHANGES IN EAST HELENA AND SOUTH PLANT SITE

LOCALIZED GROUNDWATER FLOW CHANGES

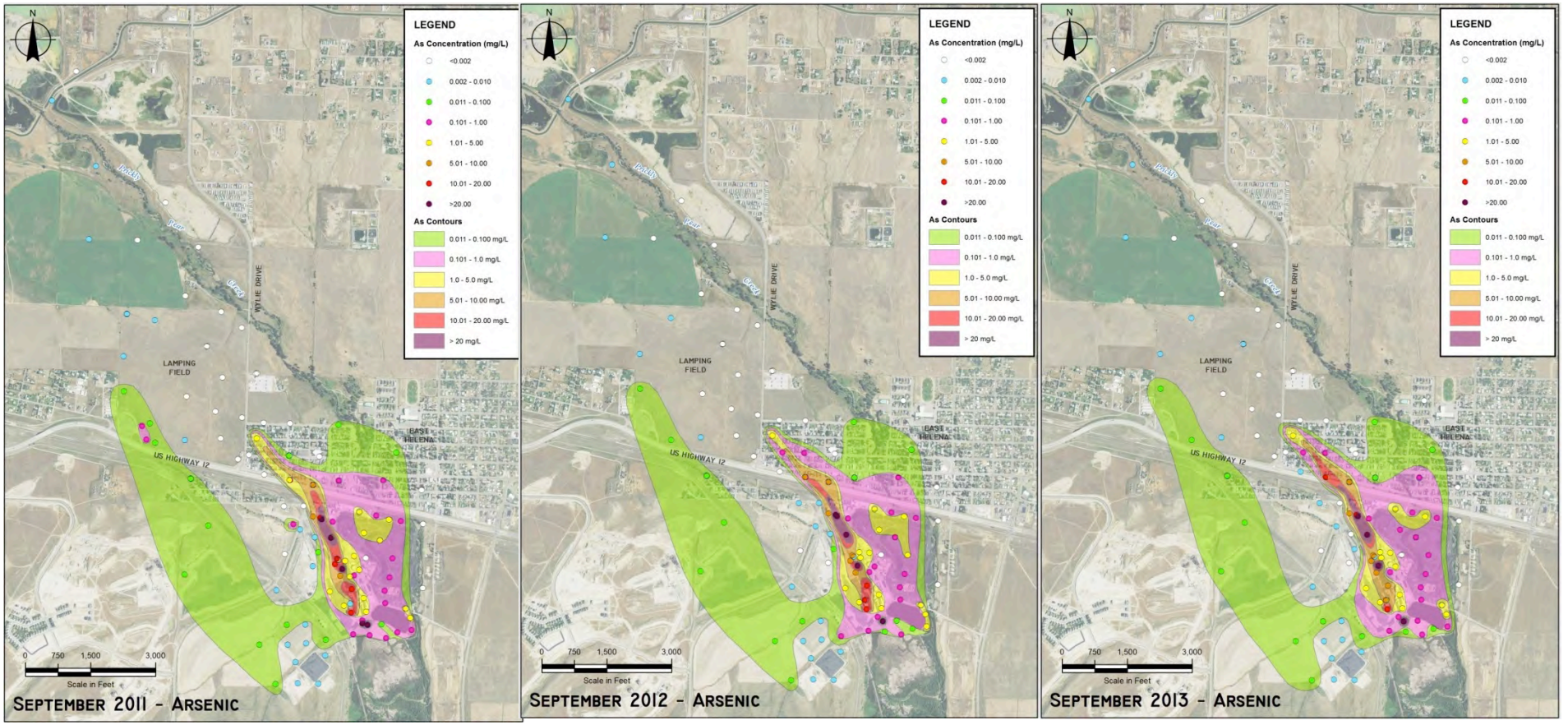








ARSENIC PLUME TRENDS



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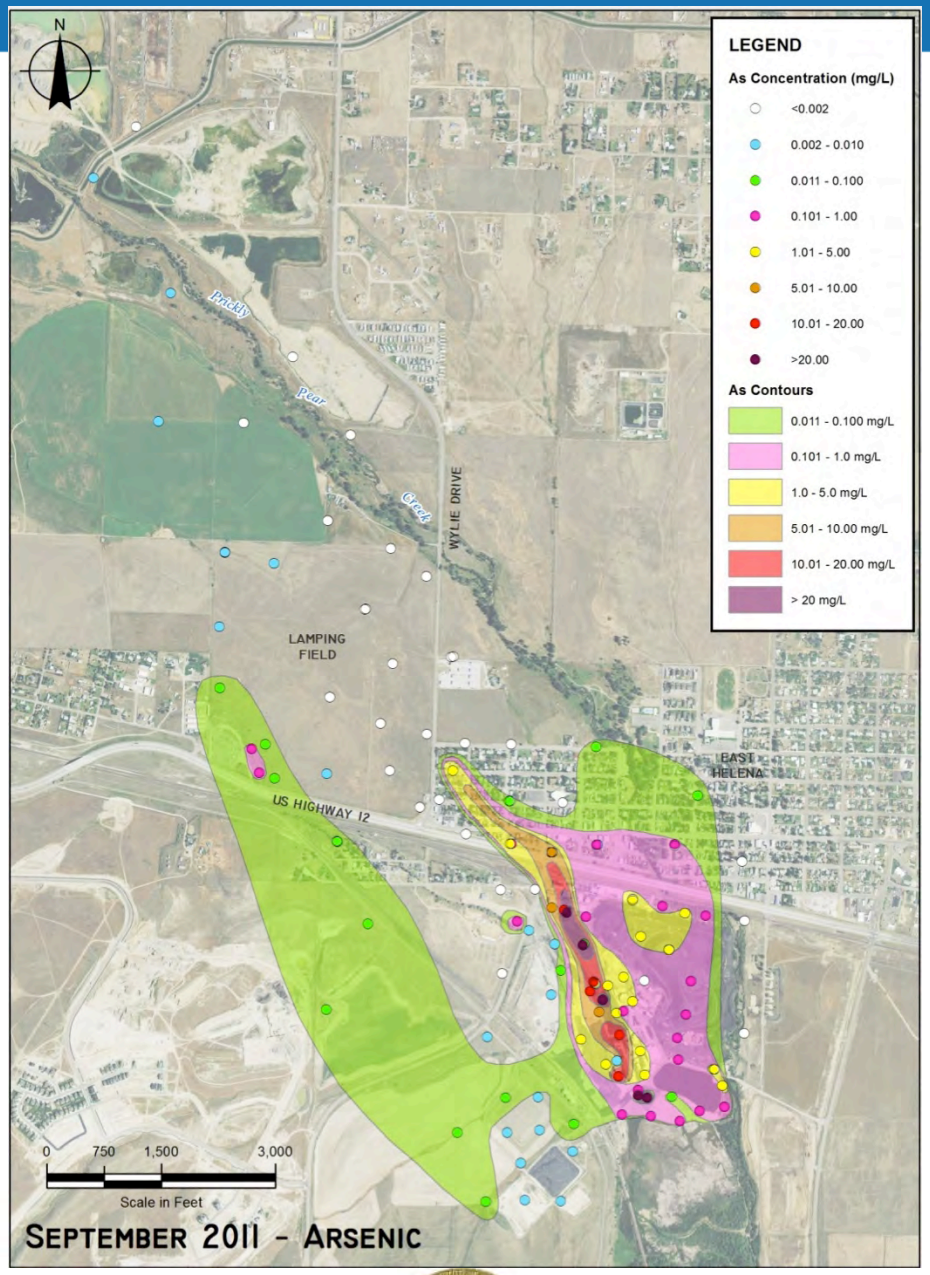

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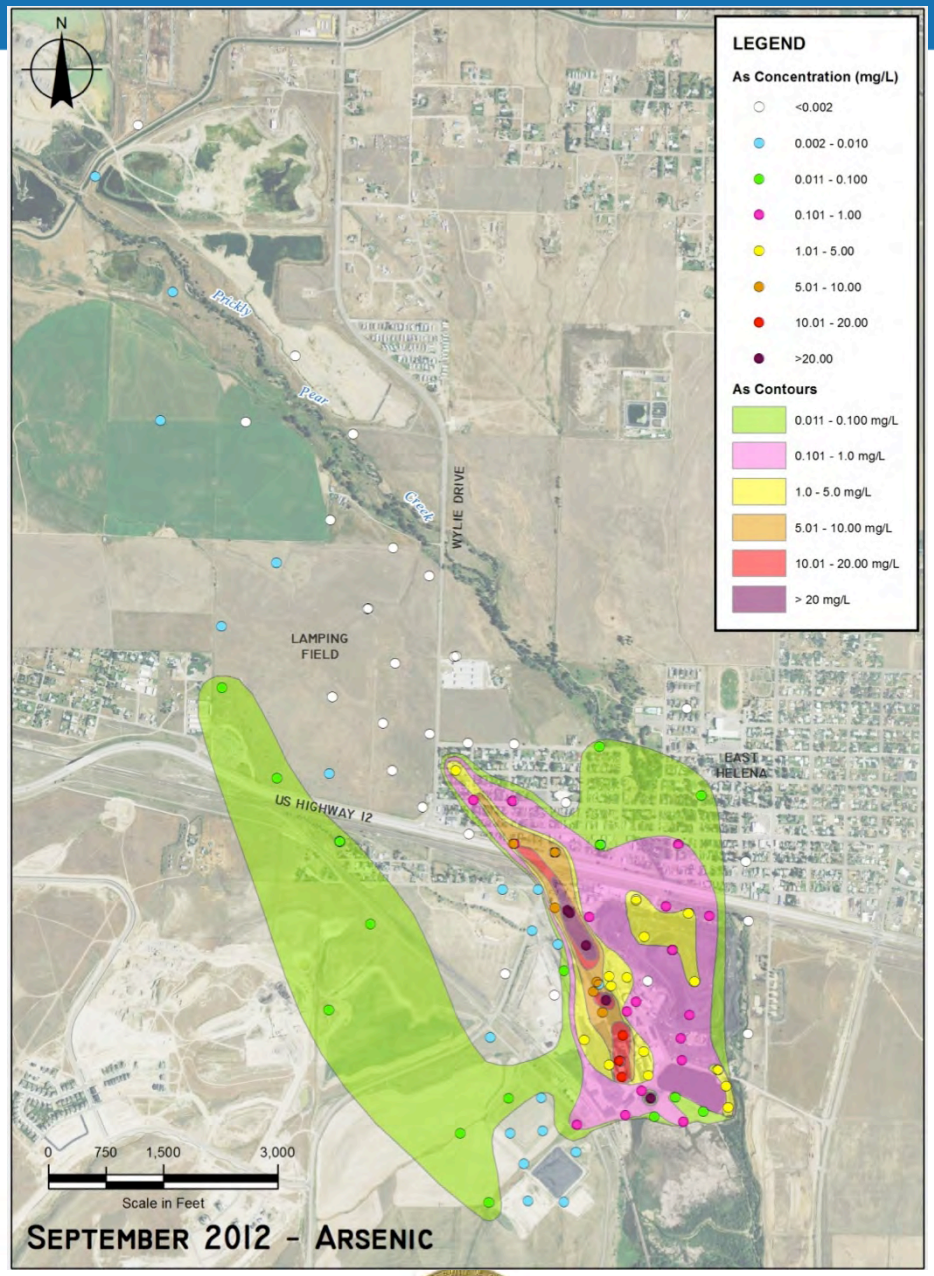

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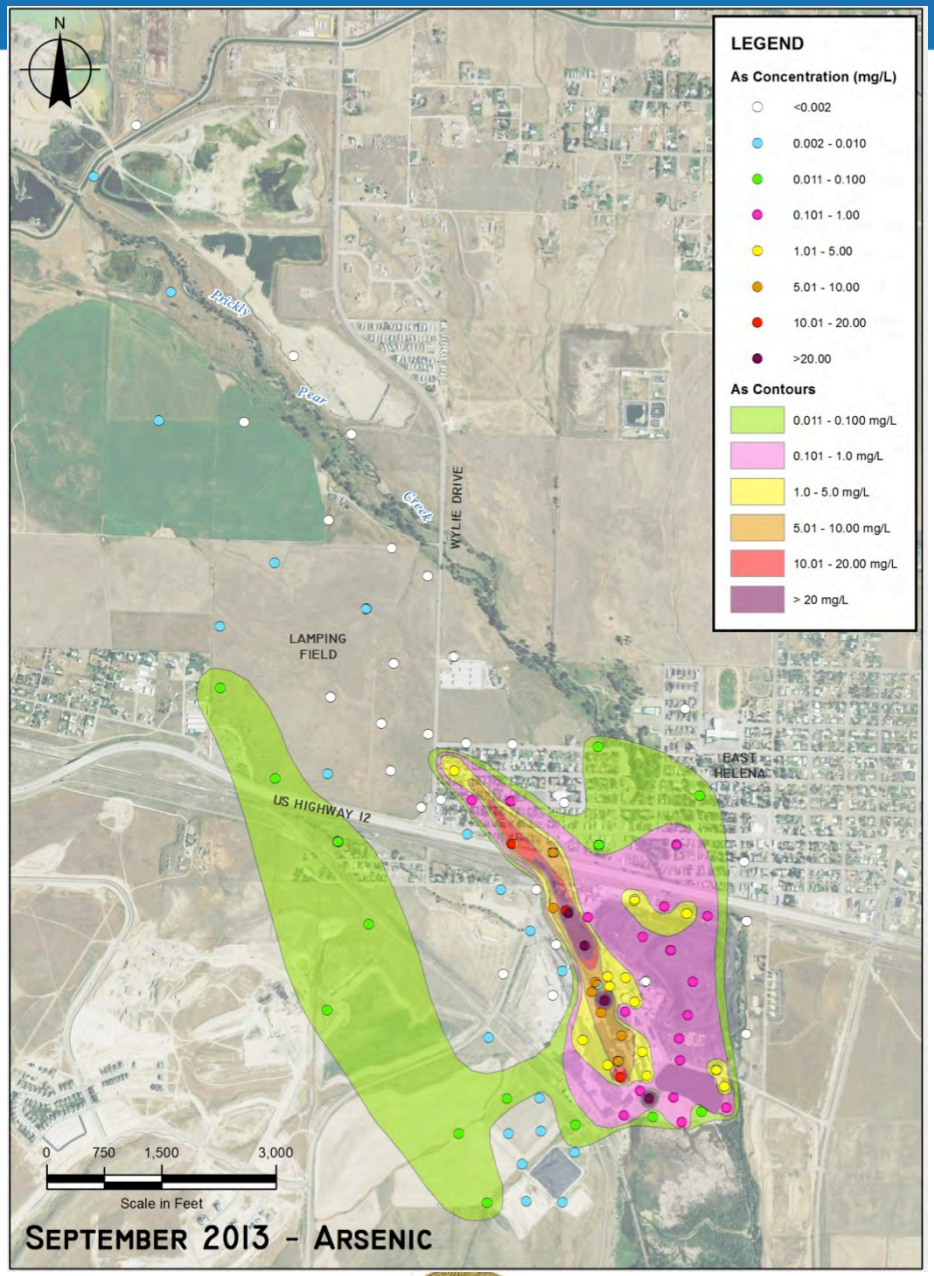
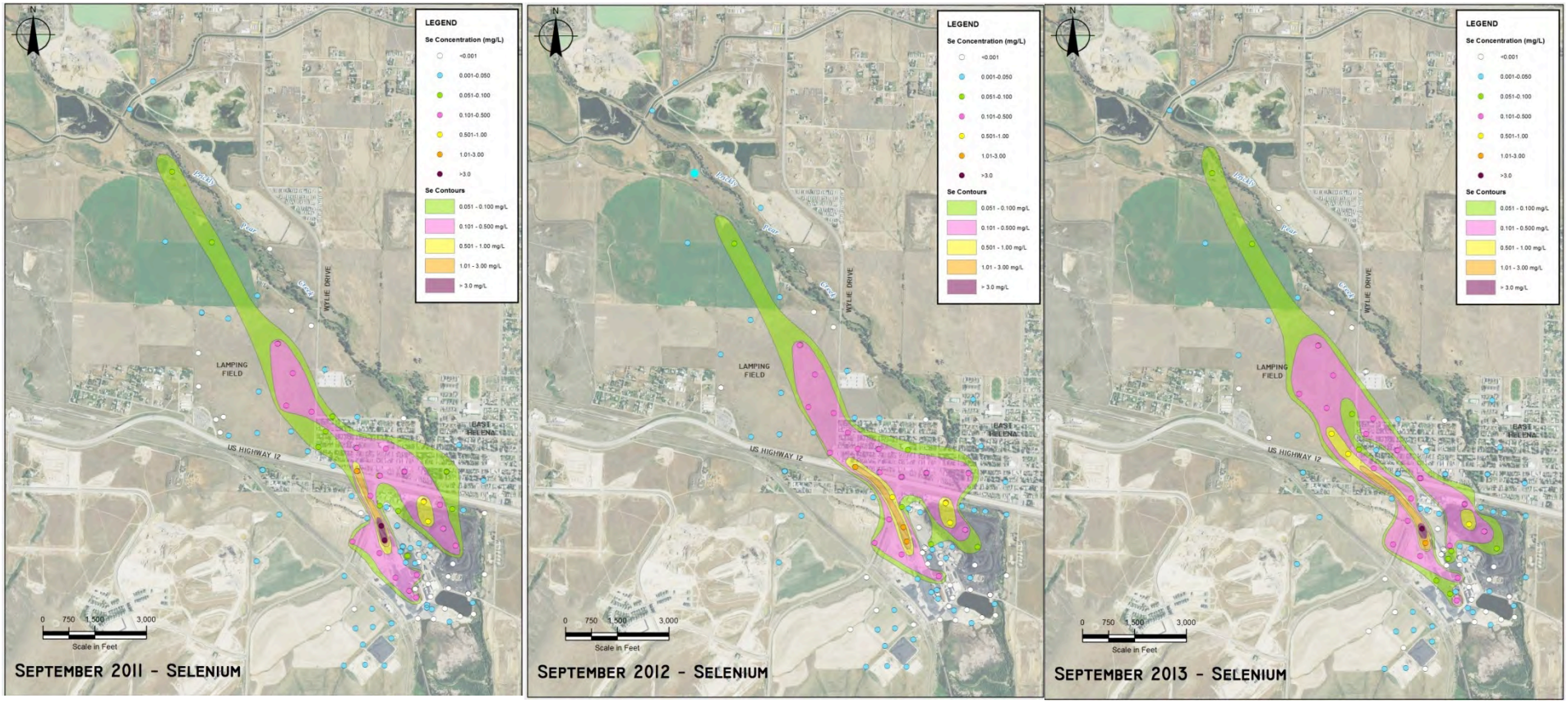


SELENIUM PLUME TRENDS



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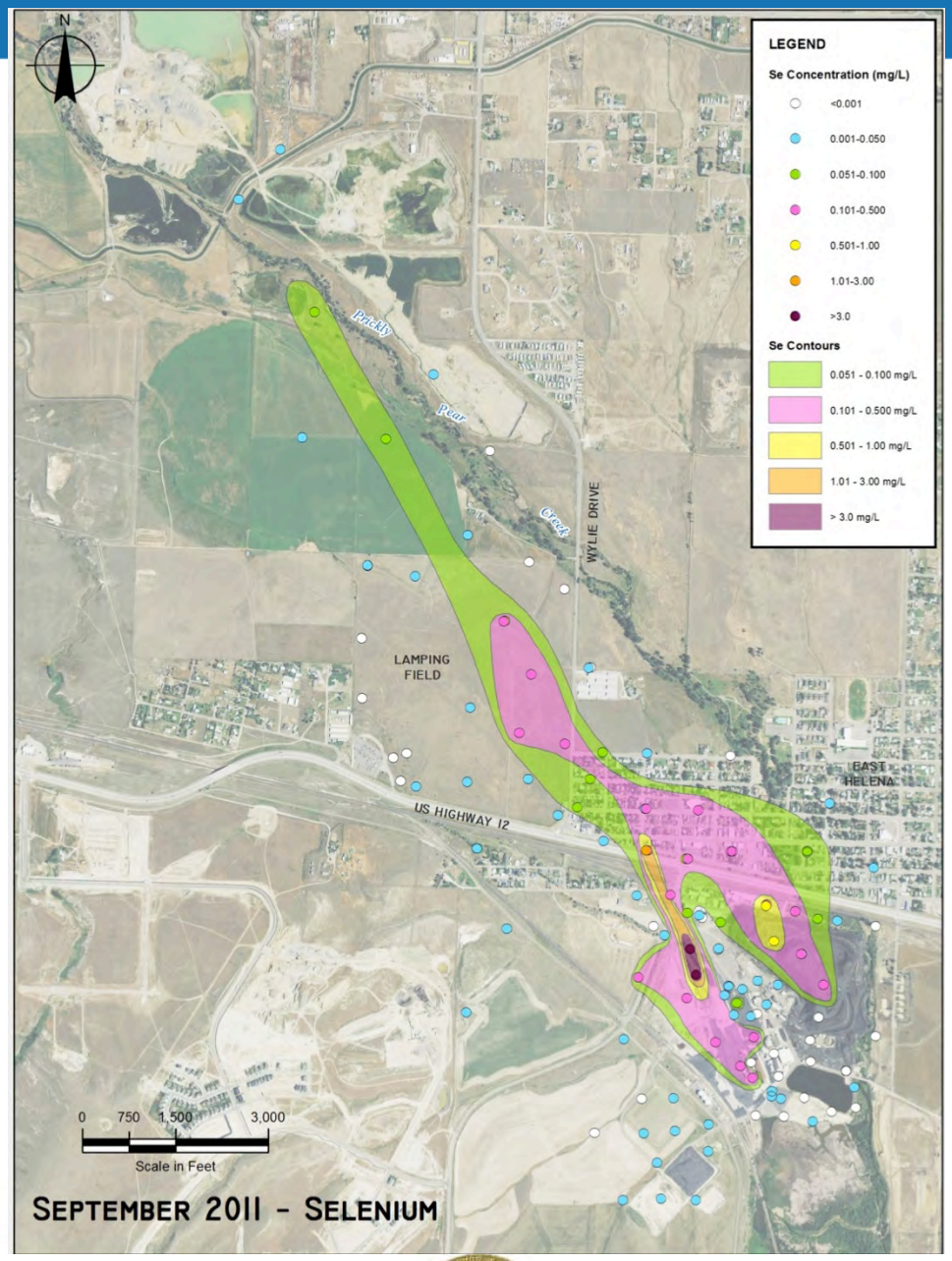

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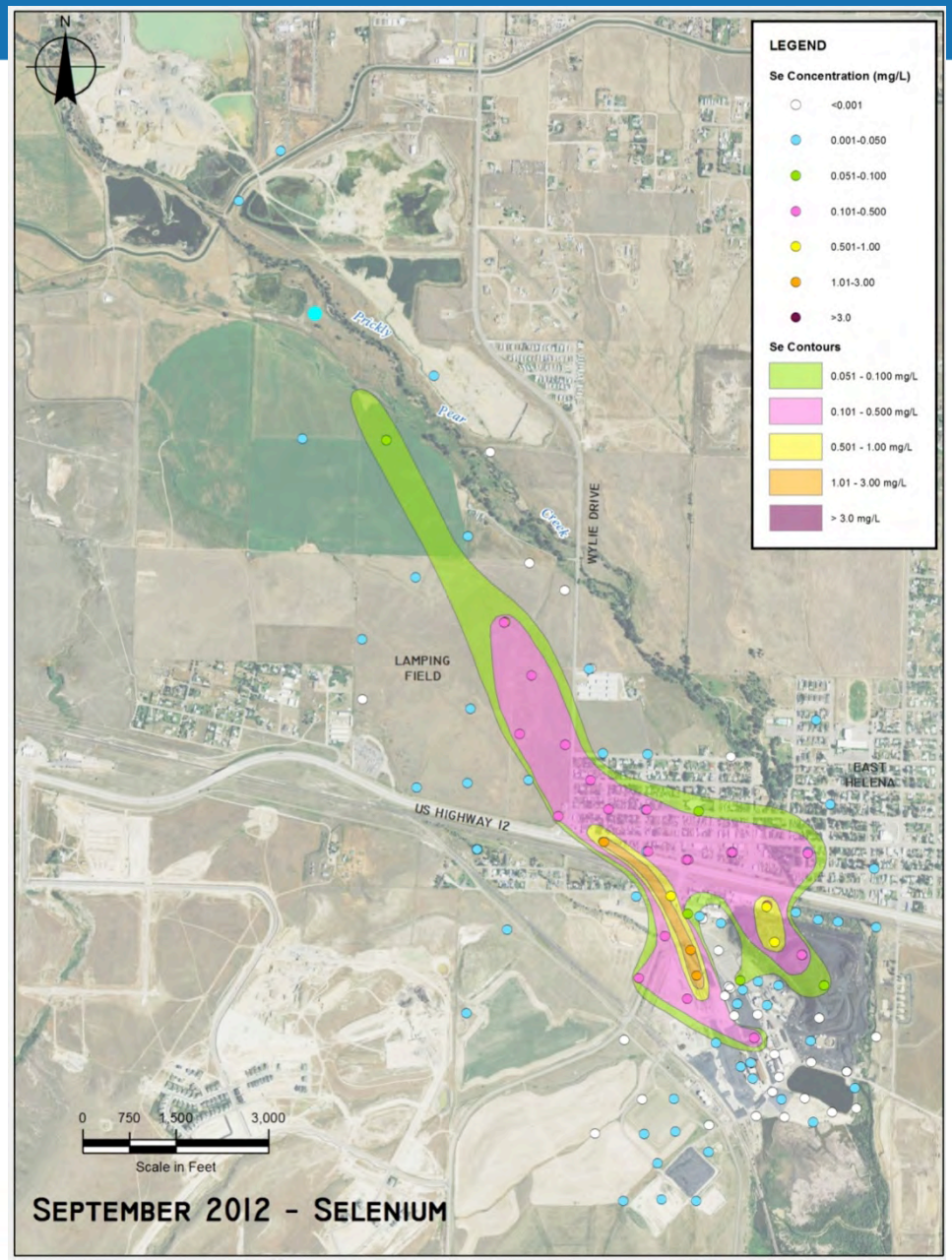

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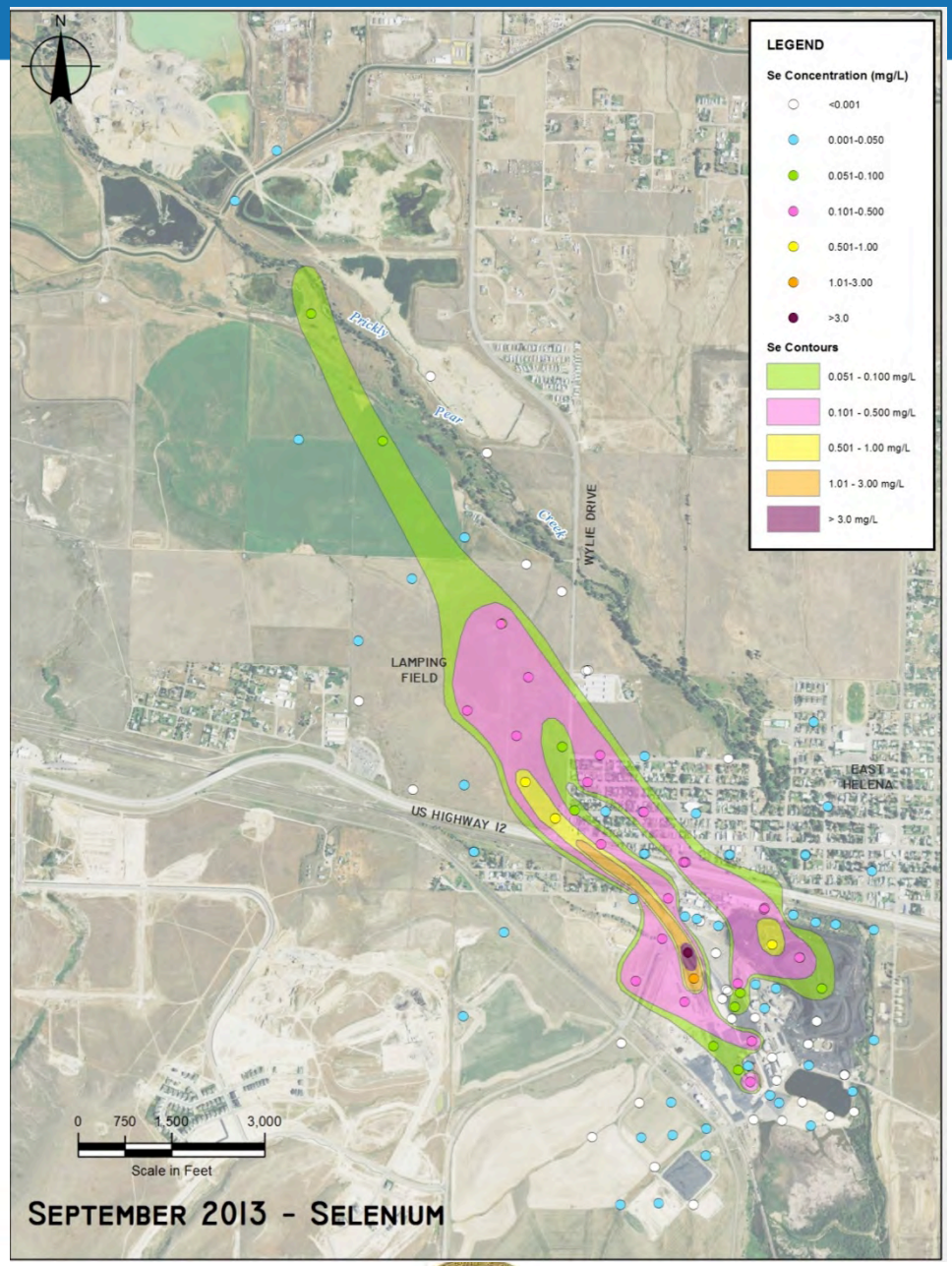
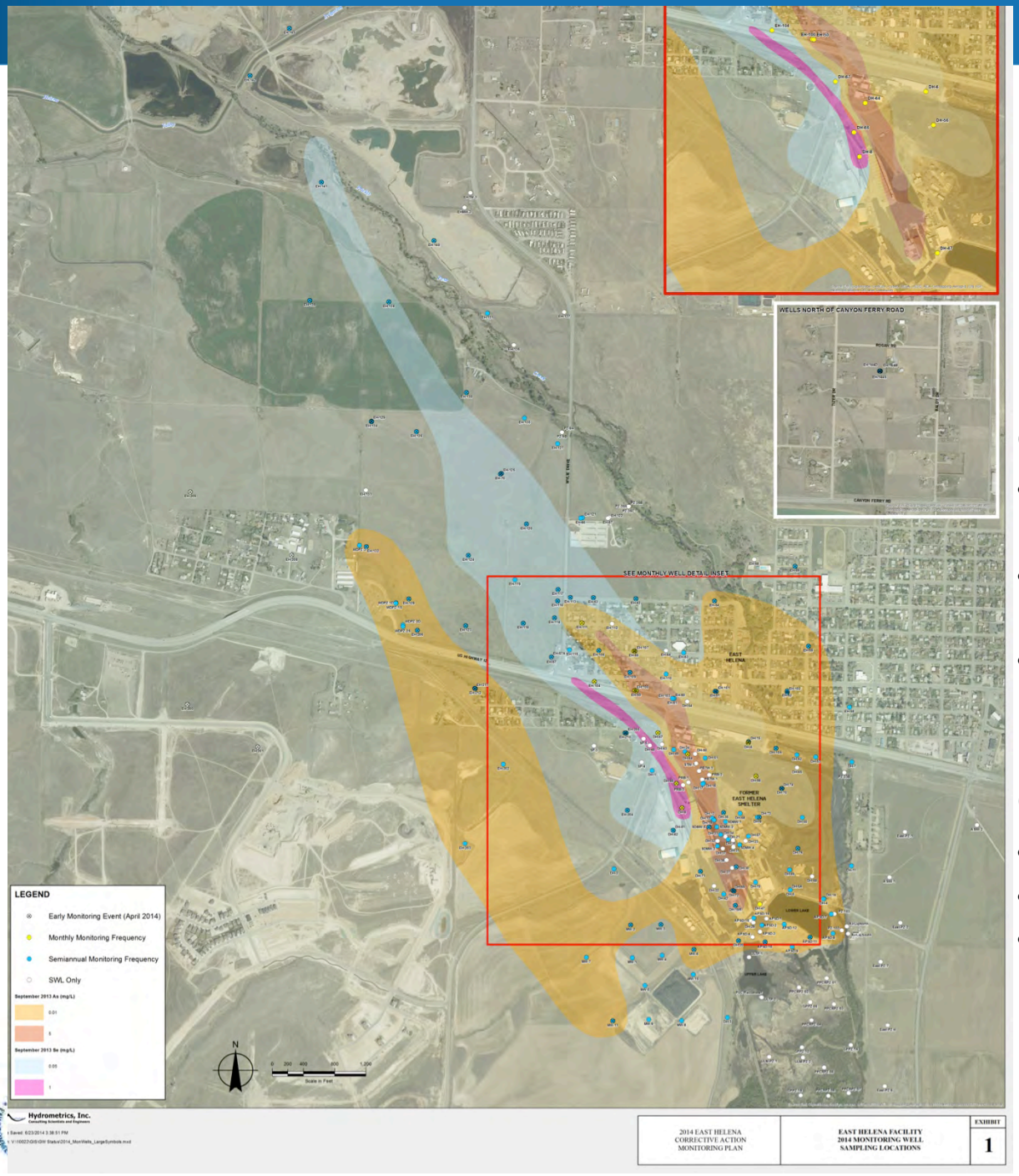




2014 GROUNDWATER MONITORING PROGRAM

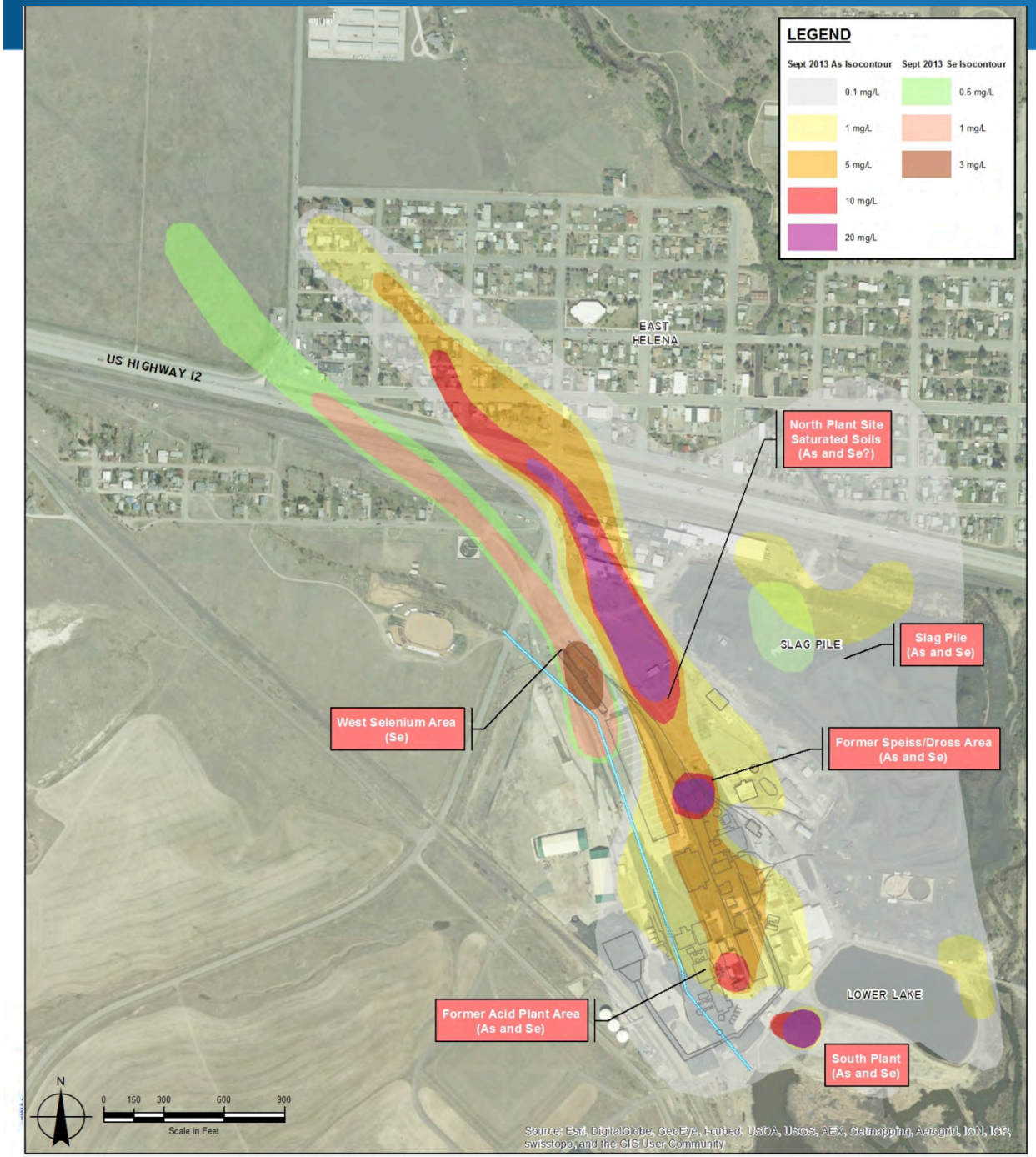
Objectives:

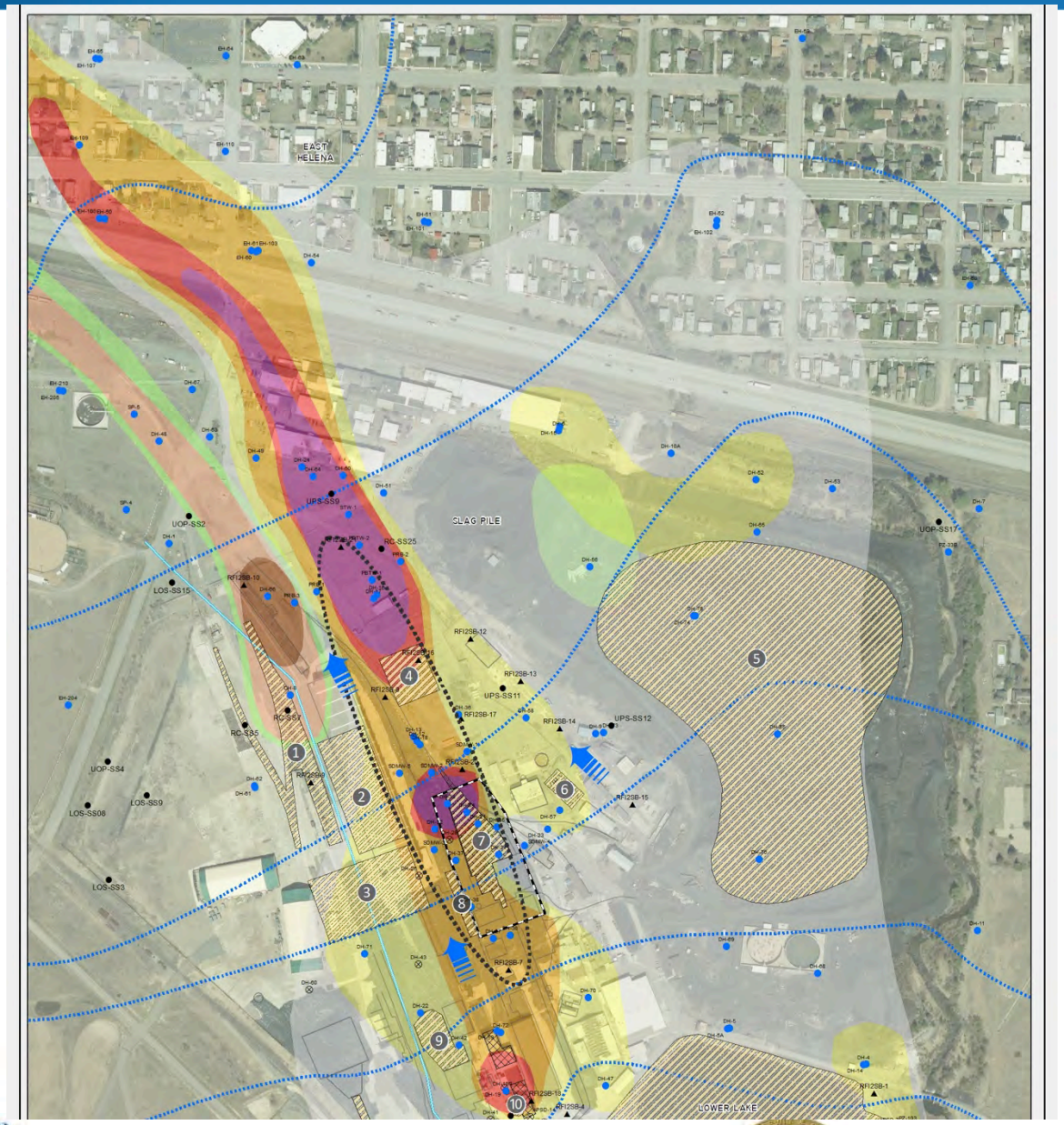
- Delineate contaminant migration patterns and sources
- Evaluate effectiveness of corrective measures
- Monitor potential risks to human health

Components:

- Monitoring Well Sampling
- Surface Water Sampling
- Residential Well Sampling

GROUNDWATER CONTAMINANT SOURCE AREAS





2014 SOURCE AREA INVESTIGATIONS

Objectives :

- Additional information on contaminant sources.
- Provide information for Groundwater Model.
- Provide information for Tier II Groundwater Remedy Evaluations.

Questions?

Overview of Groundwater Cleanup Activities

Lauri Gorton/METG and **Jay Dehner**/CH2M HILL

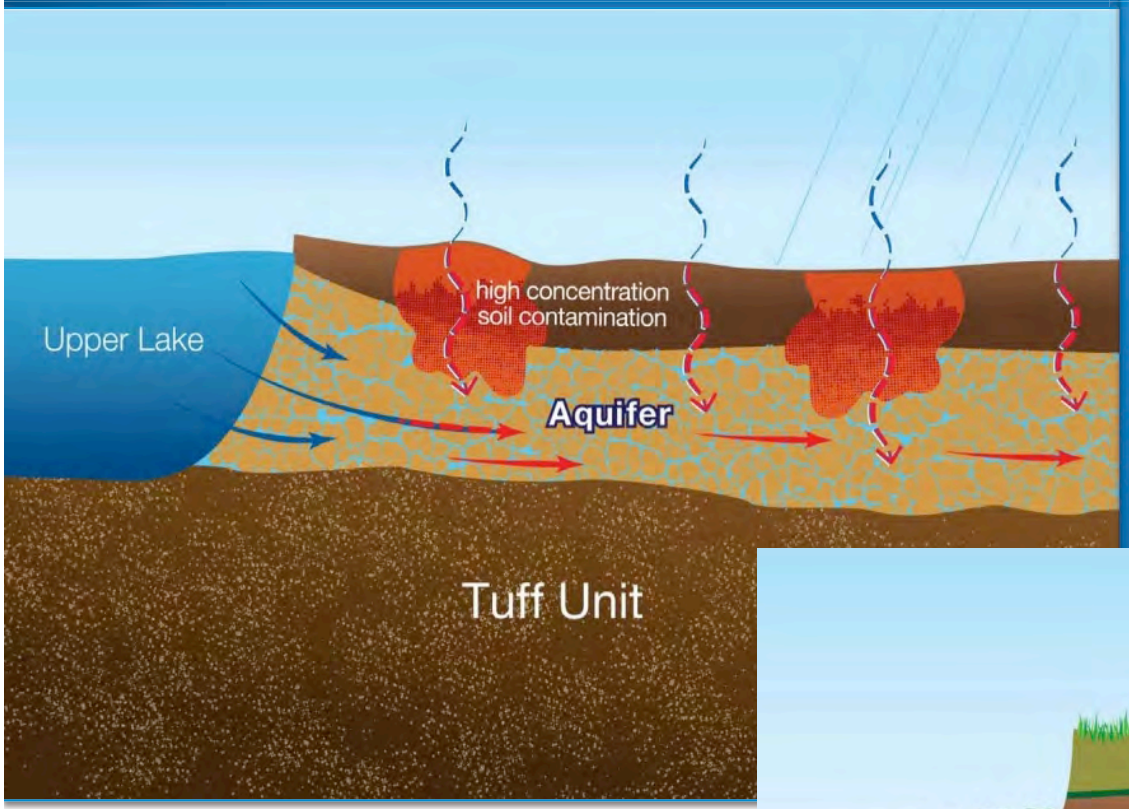
Cleanup Goals

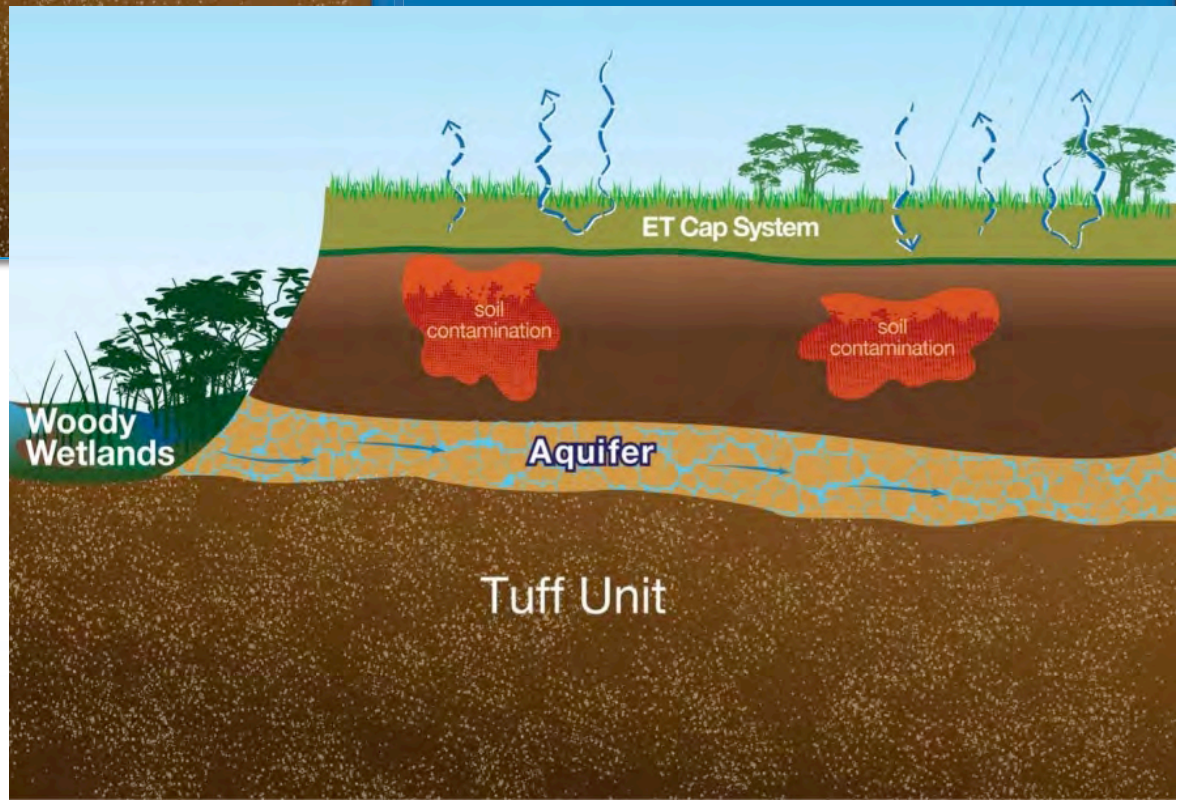
- Overall Cleanup Goals
  - Protect human health and the environment
  - Achieve cleanup standards
  - Control sources
  - Maximize environmental benefit of limited Trust funds
- Groundwater Cleanup Goals
  - Meet Montana concentration standards
    - Safe drinking water
    - Surface water quality
  - Return useable groundwater to maximum beneficial use, where practicable
  - Reduce contaminant loading to groundwater
  - Stabilize and reduce plumes
  - Prevent exposure to contaminated groundwater

Cleanup Approach

- Perform Corrective Measures Study to identify and evaluate cleanup alternatives
- Implement Interim Measures to start reducing contaminant loading to, and transport in groundwater
- Monitor conditions and incorporate new information into studies

Interim Measures Will Reduce Contaminant Loading to Groundwater





South Plant Hydraulic Control is Reducing Groundwater Contact with Contaminated Soils

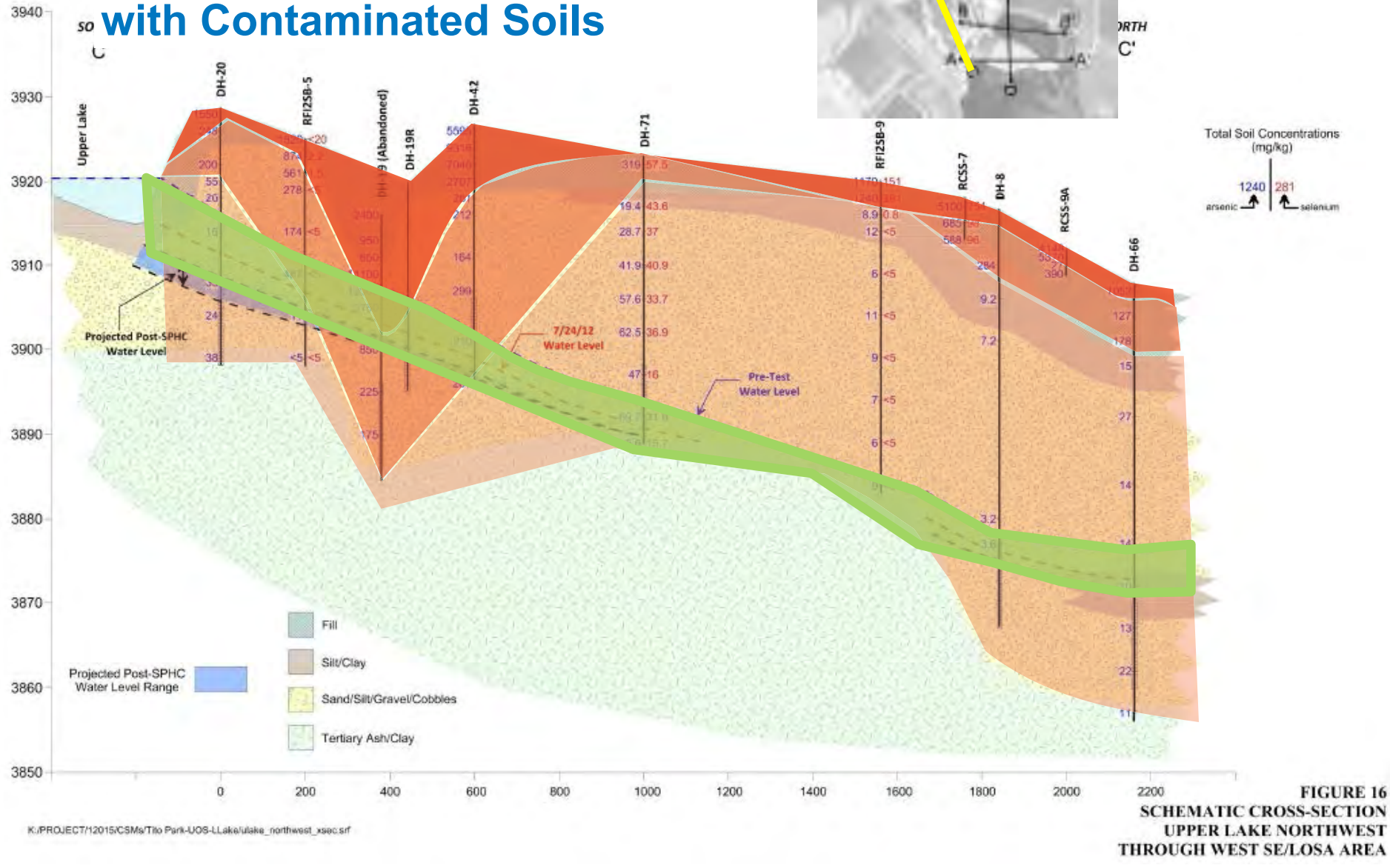


FIGURE 16
SCHEMATIC CROSS-SECTION
UPPER LAKE NORTHWEST
THROUGH WEST SE/LOSA AREA

The ET Cover System Will Isolate the Majority of Contaminants in Soil

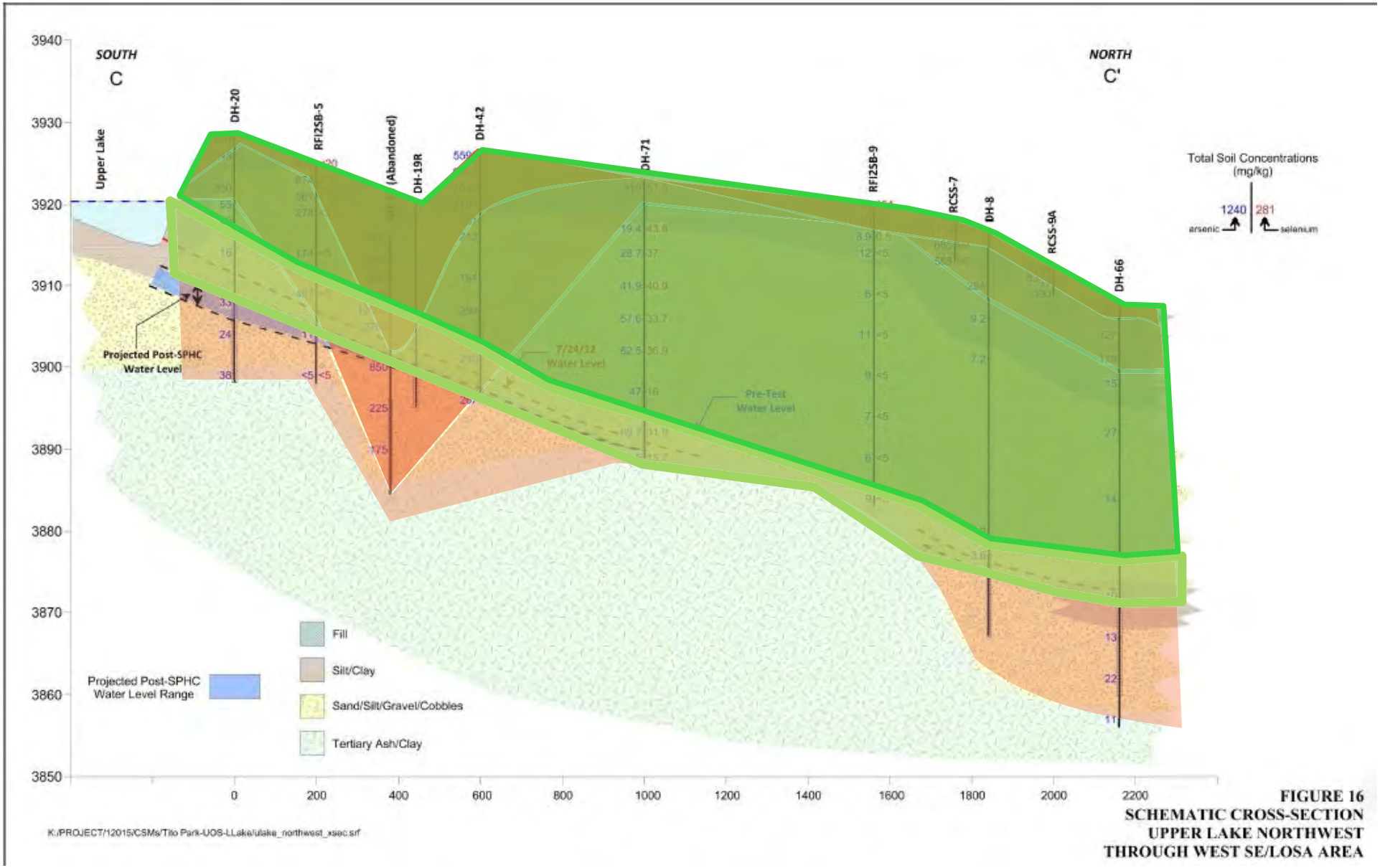


FIGURE 16
SCHEMATIC CROSS-SECTION
UPPER LAKE NORTHWEST
THROUGH WEST SE/LOSA AREA

Source Removal and Tier II Evaluations are Estimating the Environmental Benefit and Cost Cleaning Up Soils Not Addressed by Interim Measures

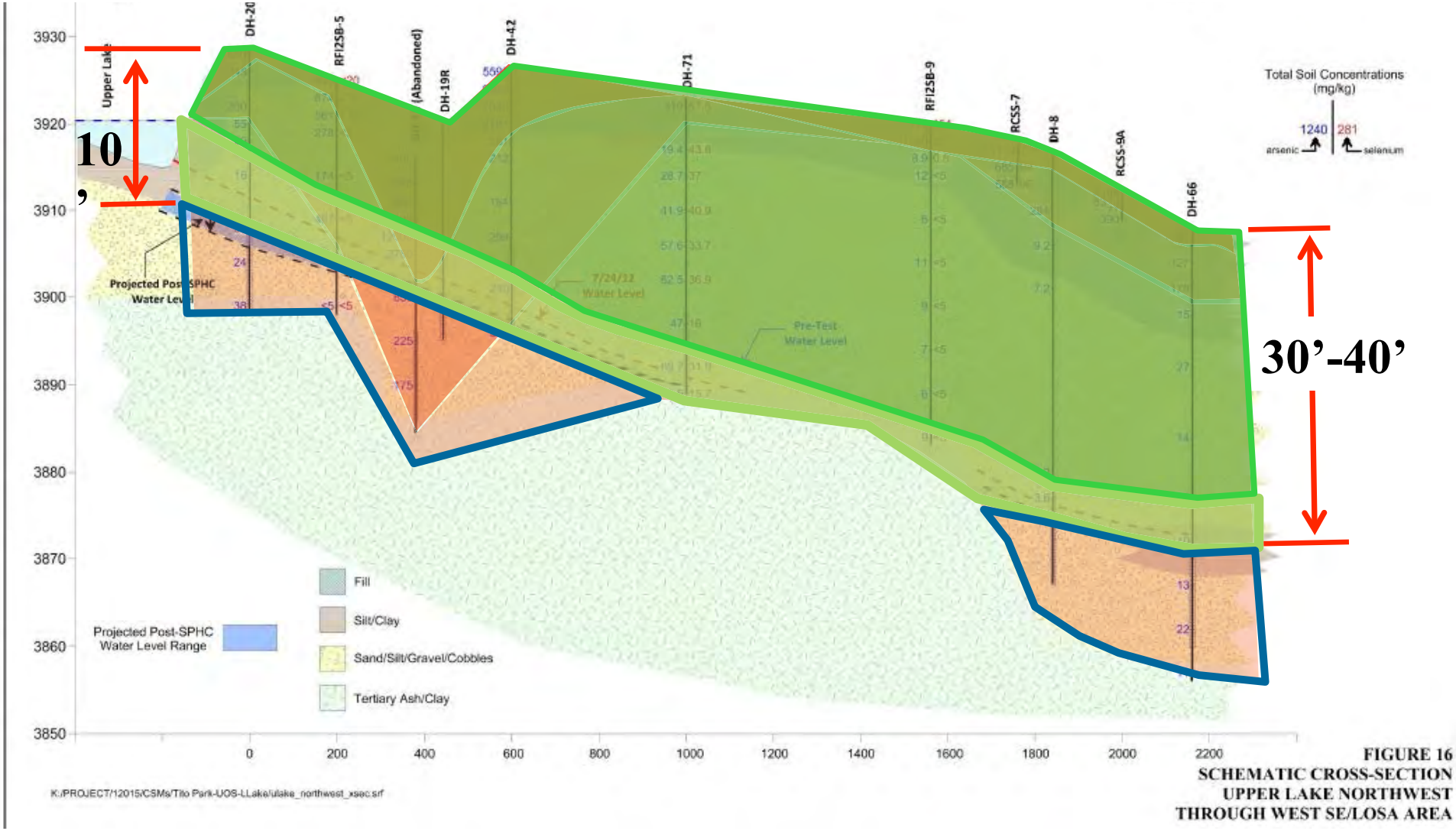


FIGURE 16
SCHEMATIC CROSS-SECTION
UPPER LAKE NORTHWEST
THROUGH WEST SE/LOSA AREA

Corrective Measures Studies Underway

- Source Area Evaluations
  - Improve understanding of key source areas
  - Assess potential effects on groundwater
- Tier II Remedy Evaluations
  - Identify additional cleanup actions
  - Evaluate feasibility and cost
  - Estimate incremental benefits to groundwater

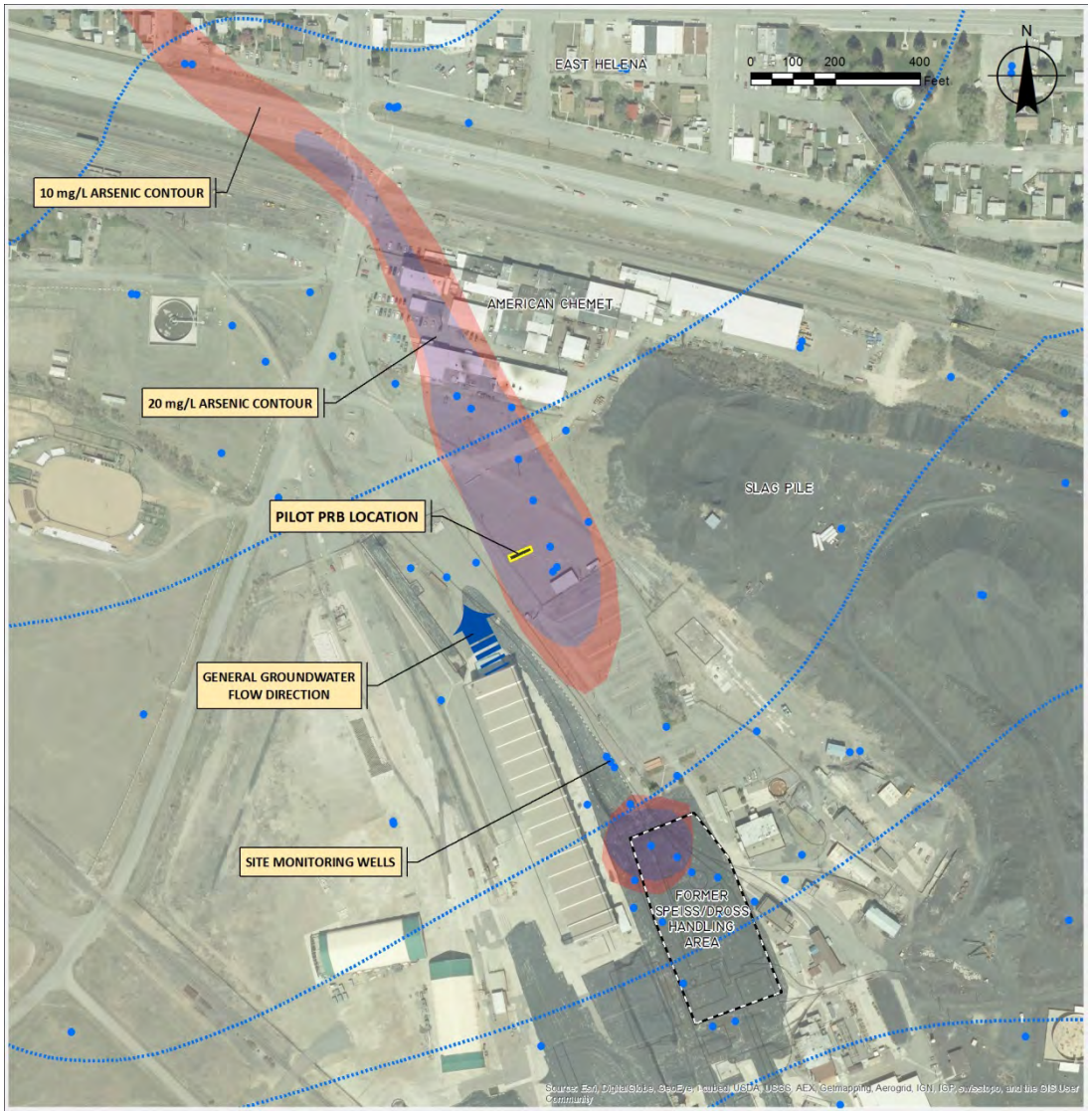
Potential Source Areas

General Area	Individual Area	Contaminant
West Selenium Area	Rail Corridor Soils	Se
	Se-Loaded Soils from Speiss Dross	Se
	Se-Loaded Soils from Acid Plant	Se
North Plant Site Soils	--	As, Se
Former Speiss/Dross Area	Speiss Granulation Area	As, Se
	Speiss Storage and Handling Area	As, Se
Former Acid Plant Area	Cottrell/Scrubber Blowdown Area	As, Se
	Acid Plant Settling Pond	As, Se
	Acid Plant Sediment Drying Area	As, Se
	Monier Flue	Se
Slag Pile	Younger (Unfumed) Slag	As, Se
Thornock Lake	--	As

Note: As = Arsenic; Se = Selenium

Tier II Source Control Measures/Groundwater Remedies Being Evaluated

- Permeable Reactive Barriers (PRBs)
  - Zero-valent Iron to Treat Arsenic
  - Organic Materials (e.g., mulch, molasses) to Treat Selenium
- Containment/Slurry Wall
  - Bentonite/Soil-Bentonite Mix
  - Possibly Combine with In-Situ Treatment within Walls
- Targeted Soil Removal through Deep Excavation
- Focused Groundwater Removal and Treatment



A Small-Scale Test of a Permeable Reactive Barrier to Treat Arsenic Has Been Underway by EPA Since 2005

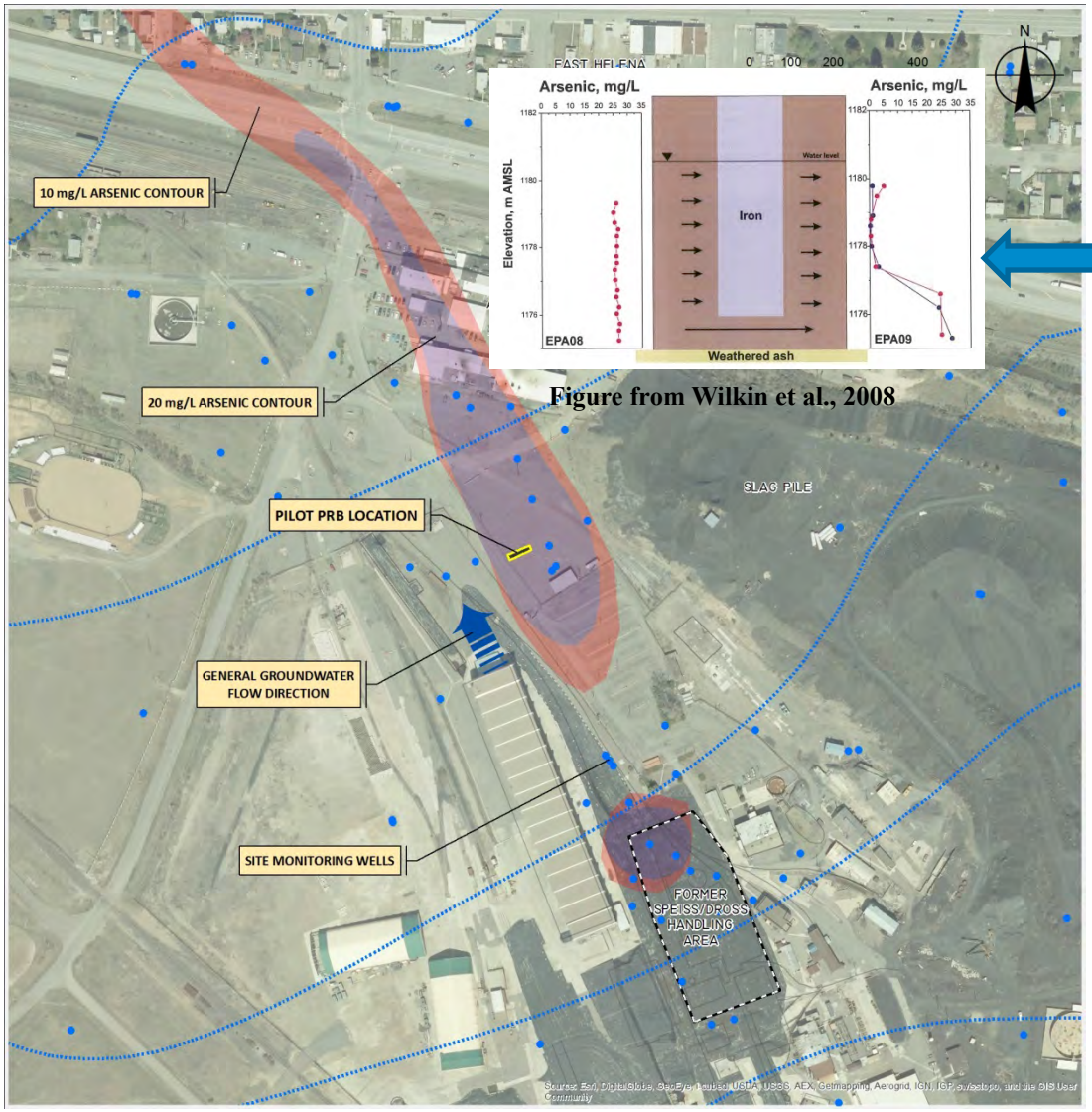


Figure from Wilkin et al., 2008

Preliminary Results:

- Groundwater flows through the PRB.
- Arsenic concentrations are significantly lowered within the PRB.
- Not seeing an effect on groundwater concentrations down-gradient of the PRB (likely due to small size of test PRB).

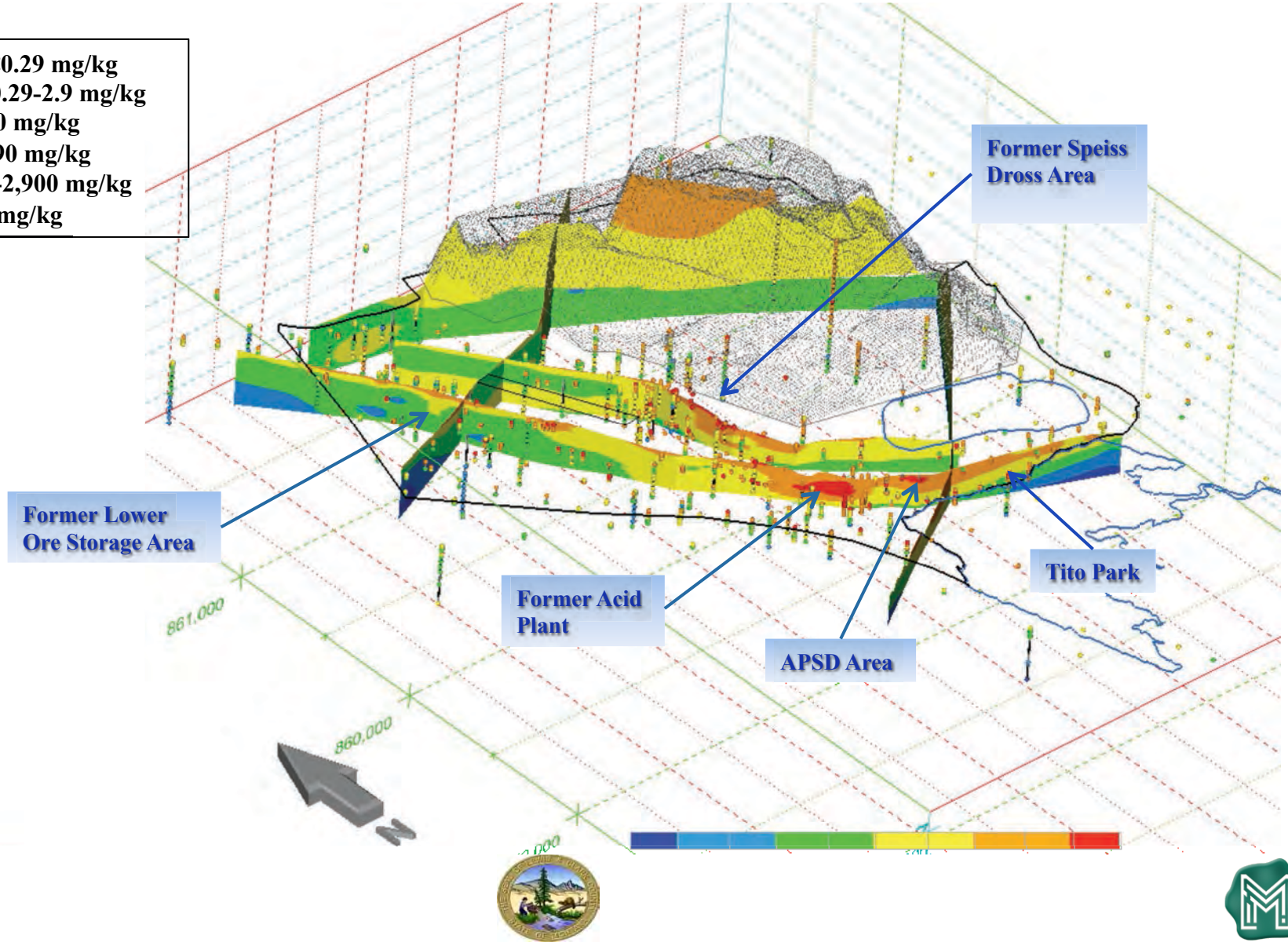
EPA PILOT-SCALE PRB

Groundwater Model
Key Tool for Predicting Conditions

- Model elements
  - Flow – where and how groundwater moves
  - Fate & Transport – what happens to contaminants in groundwater
- 2014 Work
  - Updating model with latest groundwater information
  - Will use model to estimate benefits to groundwater (changes in concentration and plume boundaries):
    - Interim Measures
    - Potential Tier II remedial options

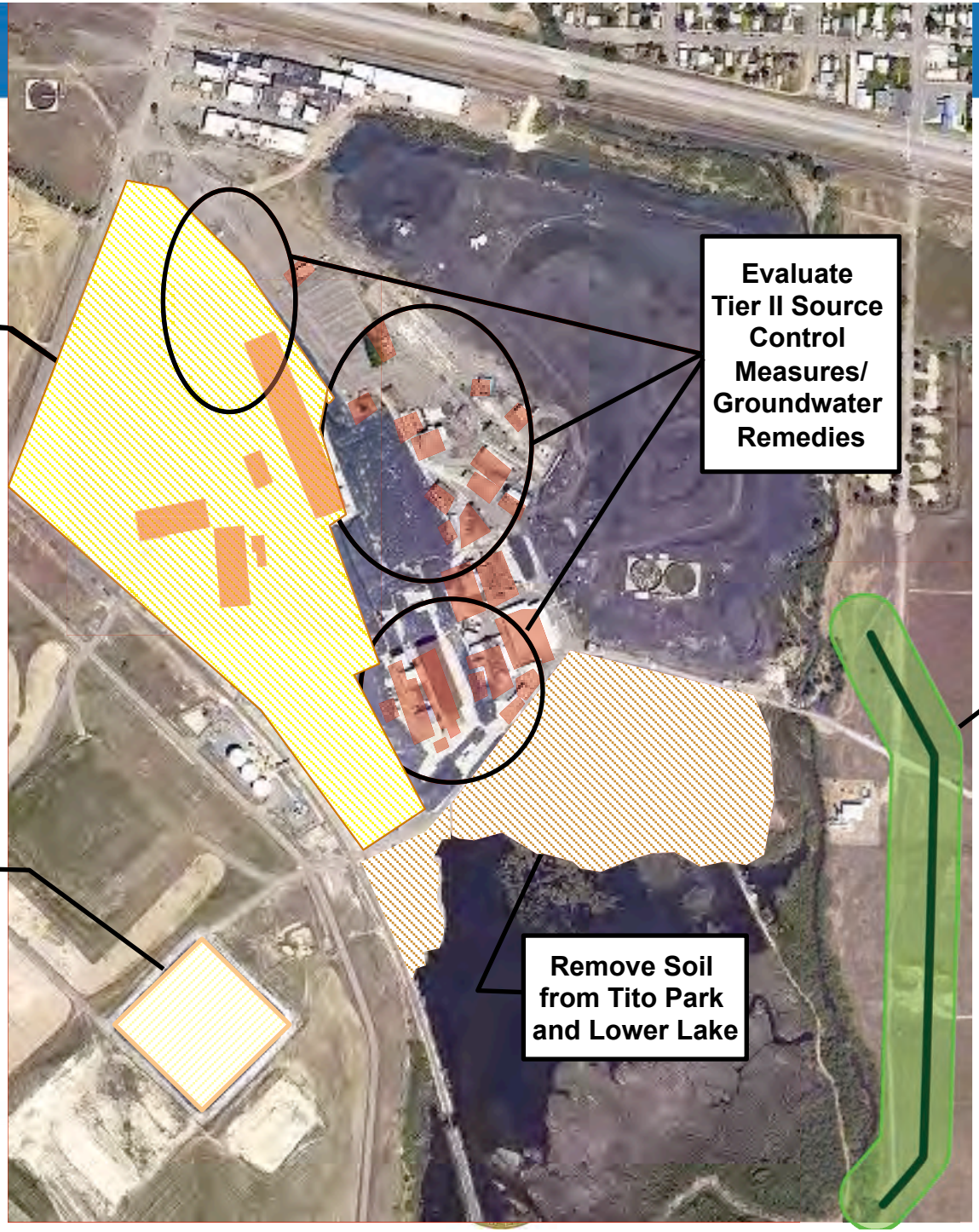
Arsenic in the Subsurface

Dark Blue: <0.29 mg/kg
Light Blue: 0.29-2.9 mg/kg
Green: 2.9-40 mg/kg
Yellow: 40-290 mg/kg
Orange: 290-2,900 mg/kg
Red: >2,900 mg/kg



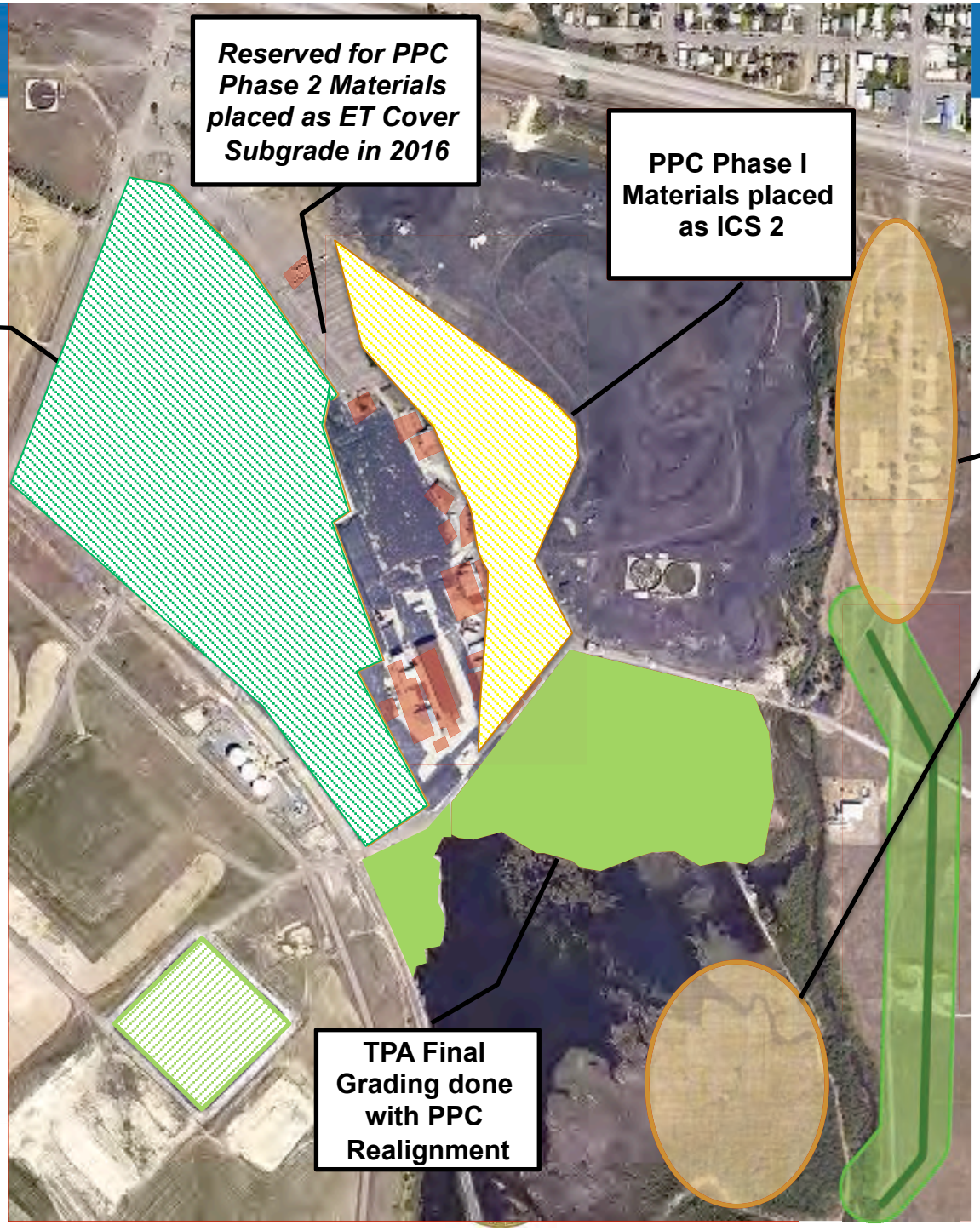
Interim Measures Progress to Date

- South Plant Hydraulic Control
  - Eliminated standing water in Upper and Lower Lakes
  - Constructed Temporary Bypass
- Source Control
  - Removing contaminated soils and waste materials from the Tito Park Area
  - Removing contaminated sediments from Lower Lake
- ET Cover System
  - Demolition of most site structures
  - Constructing first phase of Interim Cover System (ICS)



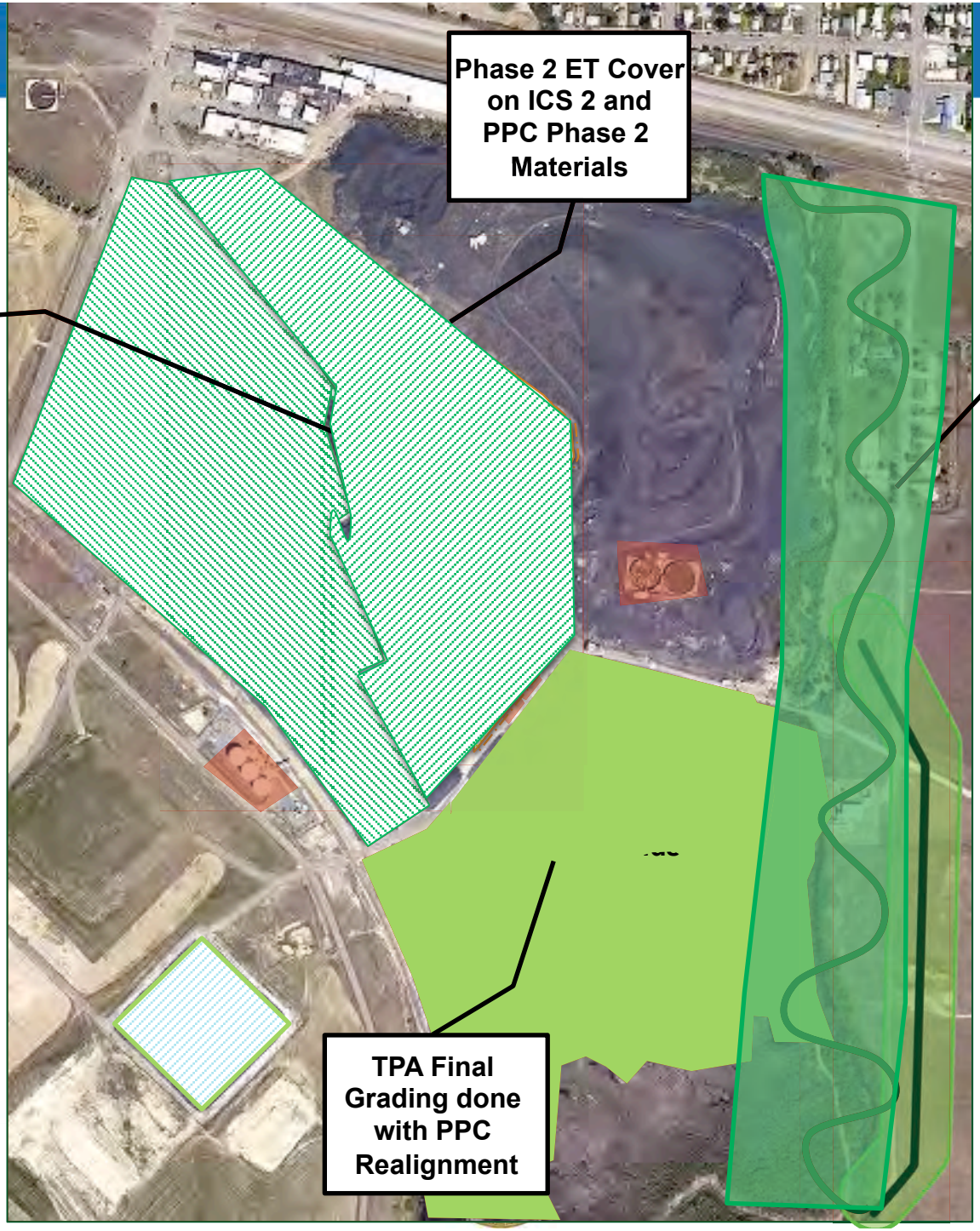
2014

East Helena
Montana



2015

East Helena Montana



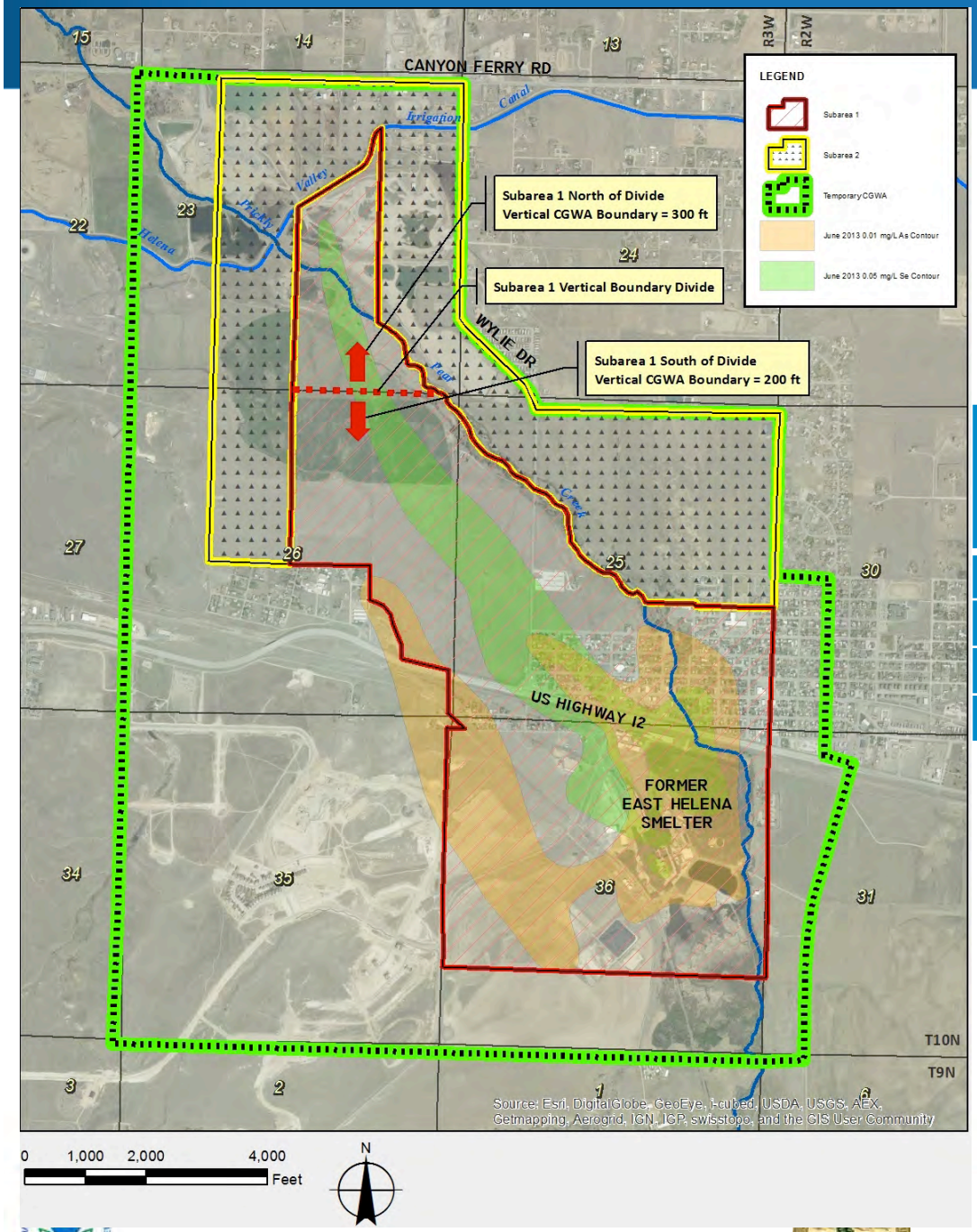
2016

East Helena Montana

Questions?

Overview of Controlled Groundwater Area

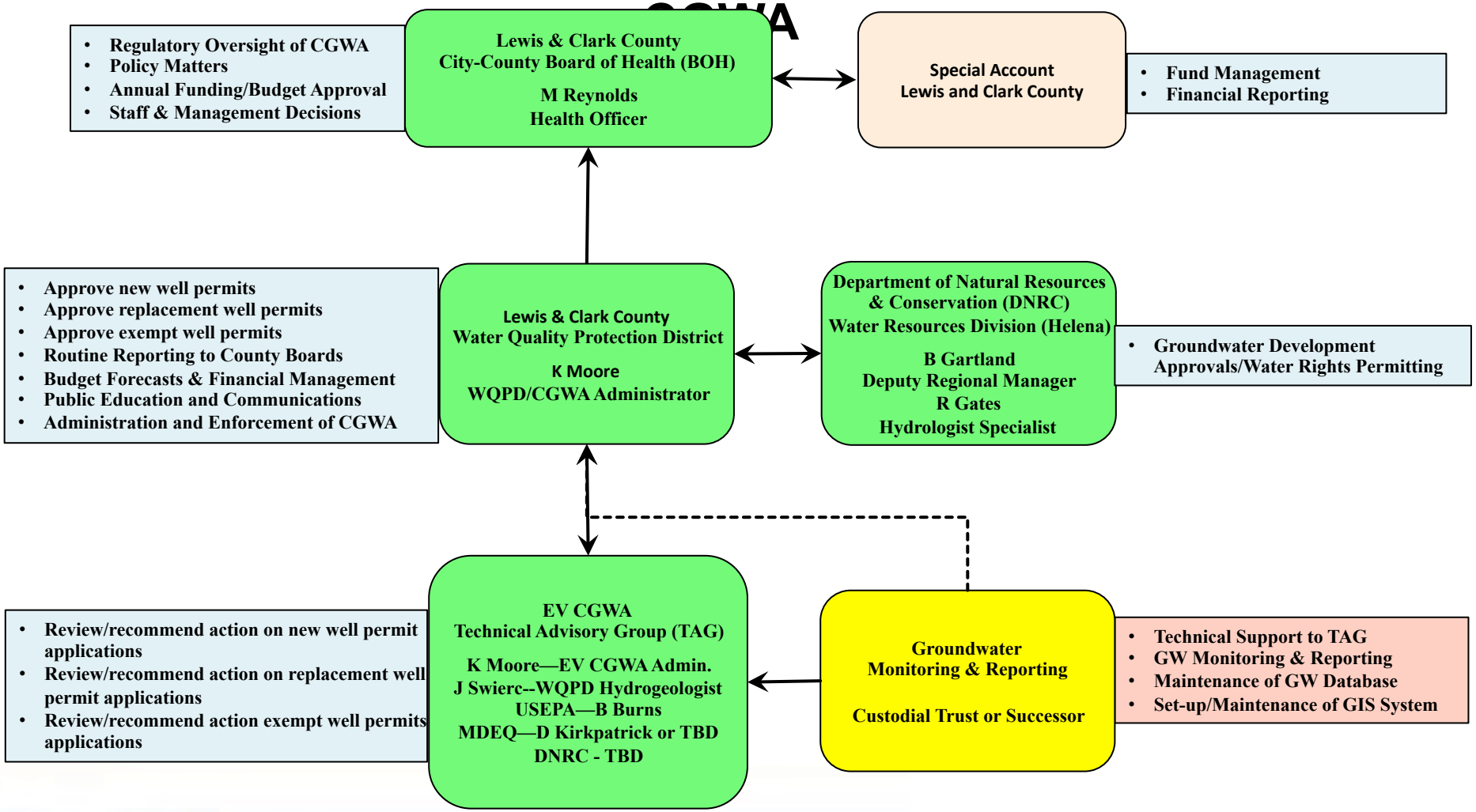
Kathy Moore/Lewis & Clark County



CONTROLLED GROUNDWATER AREA PETITION

	Area (Acres/ Sq. Miles)	Trust Owned Property	Area within East Helena
Subarea 1	1,190/1.9	693 acres	910 acres
Subarea 2	734/1.2	257 acres	280 acres
Temporary CGWA	1,366/2.0	170 acres	170 acres
Total	3,290/5.1	1,120 acres	1,360 acres

East Valley Controlled Groundwater Area (CGWA) Long-Term Operations & Enforcement of Permanent CGWA

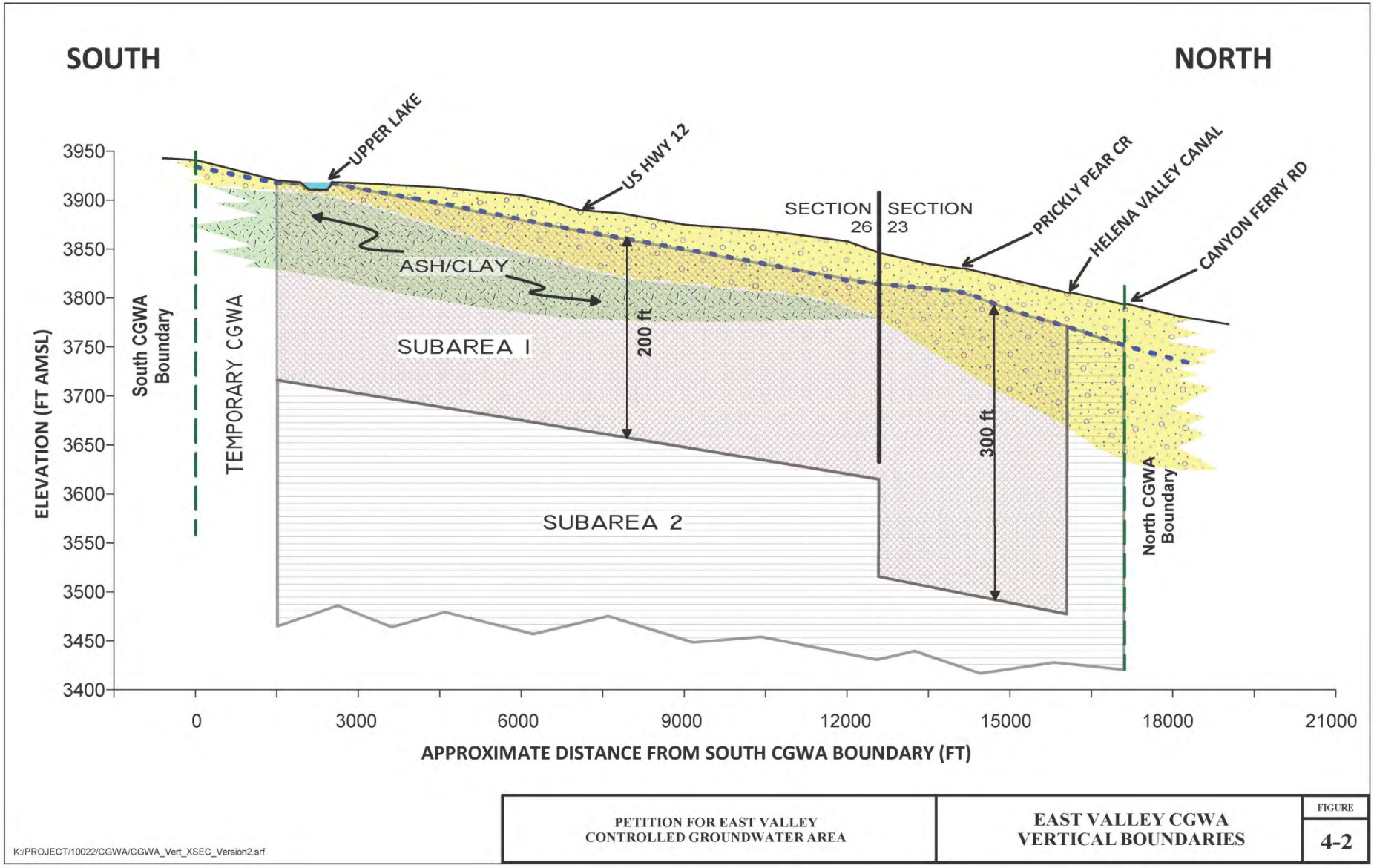


PROPOSED GROUNDWATER USAGE RESTRICTIONS FOR EAST VALLEY CONTROLLED GROUNDWATER AREA

CGWA Component	Proposed Restrictions[1]	Notes
Permanent CGWA Subarea 1	No new wells allowed. Existing wells not affected. Replacement wells (exempt and non-exempt) allowed if general location, depth, pumping rate and use same as original well.	All replacement wells require approval of TAG and DNRC[1]. Non-exempt wells also subject to DNRC water rights permitting requirements[2].
Permanent CGWA Subarea 2	New wells (exempt[2] and non-exempt) allowed if approved by TAG. Existing wells not affected. Replacement wells (exempt[2] and non-exempt) allowed if approved by TAG.	Non-exempt new or replacement wells approved by TAG also subject to DNRC water rights permitting requirements.
Temporary CGWA	No restrictions on new wells or groundwater usage.	No restrictions allowed per CGWA regulations.

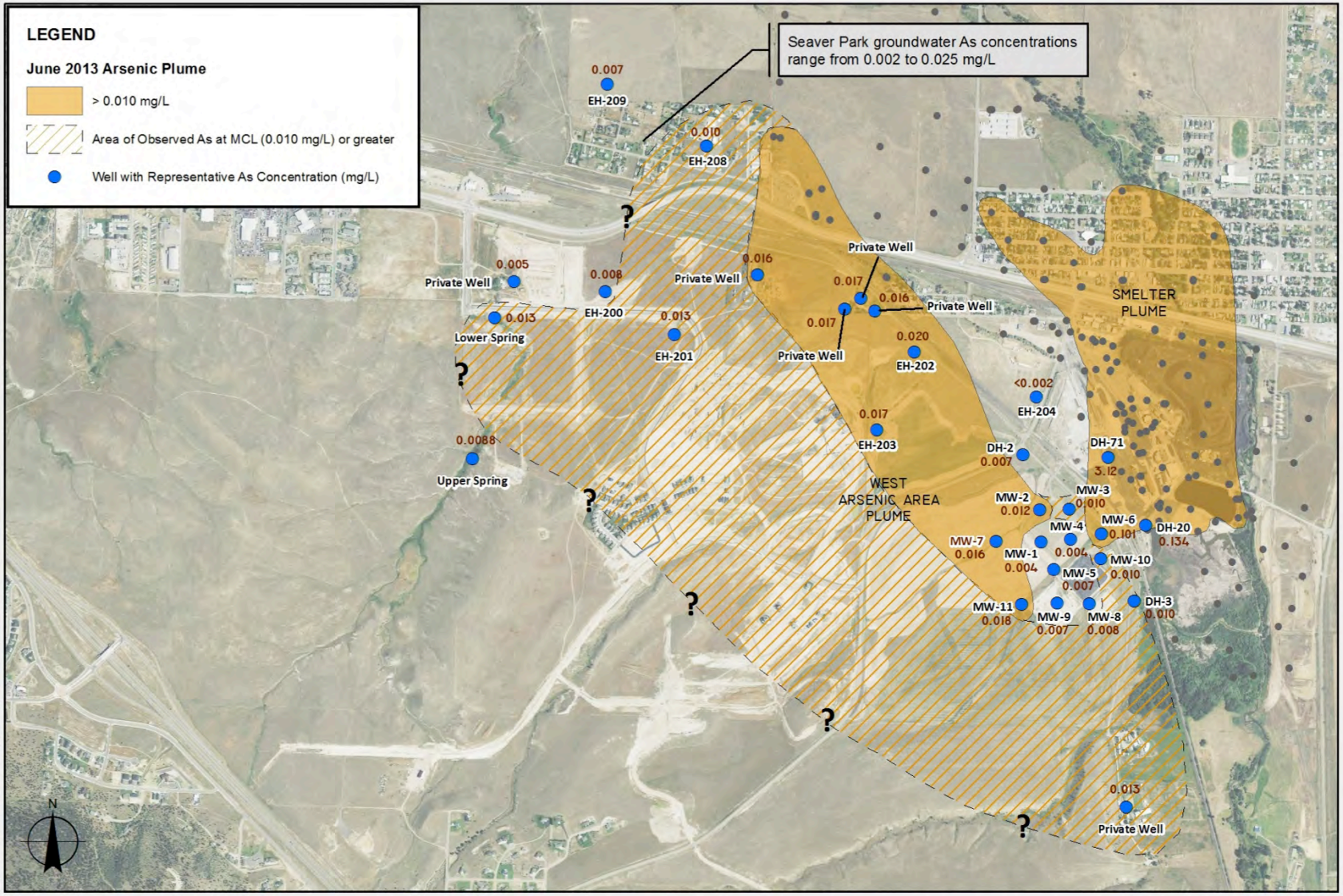
1. All new wells or replacement wells approved by the TAG are subject to all local state or federal regulations, laws and ordinances.
2. Exempt wells must meet requirements of MT Water Use Act; MCA 85-2-306 and 85-2-500.

TAG - Technical Advisory Group.



PETITION FOR EAST VALLEY CONTROLLED GROUNDWATER AREA	EAST VALLEY CGWA VERTICAL BOUNDARIES	FIGURE 4-2

K:/PROJECT/10022/CGWA/CGWA_Vert_XSEC_Version2.srf



Hydrometrics, Inc.
Consulting Scientists and Engineers

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PETITION FOR EAST HELENA CONTROLLED GROUNDWATER AREA	WEST ARSENIC PLUME AREA CONCENTRATIONS	FIGURE 2-7

Preliminary CGWA Petition Schedule

Present Draft Petition to L&CC/C Board of Health – April 24, 2014

Present Draft Petition to Water Quality Protection District Board – May 27, 2014

L&C City/County Board of Health Working Session – June 2014

Resolution by BOH/WQPD to Carry Petition Forward - July 2014

Public Meeting for Area Residents – June or July 2014

Submittal of Petition to DNRC - August 25, 2014

DNRC Review/Approval of Petition:

- **Initial Review - up to 180 days***
- **Second Review - up to 150 days***

Initiate Rulemaking by DNRC – TBD

DNRC Public Notice Period – Minimum 30 days

Approval of East Helena CGWA – TBD

**** Rulemaking process will be expedited through coordination with DNRC and public throughout process.***

Questions?

Thanks for coming tonight!