

ZOAR LEVEE & DIVERSION DAM

Muskingum River Basin, Tuscarawas River, OH

BASELINE CONDITION IN-PROGRESS STAKEHOLDER MEETING

**Huntington District
&**

**Great Lakes & Rivers Division
Dam Safety Production Center**

06 MARCH 2013



®

US Army Corps of Engineers
BUILDING STRONG®



MEETING PURPOSE

► Presentations

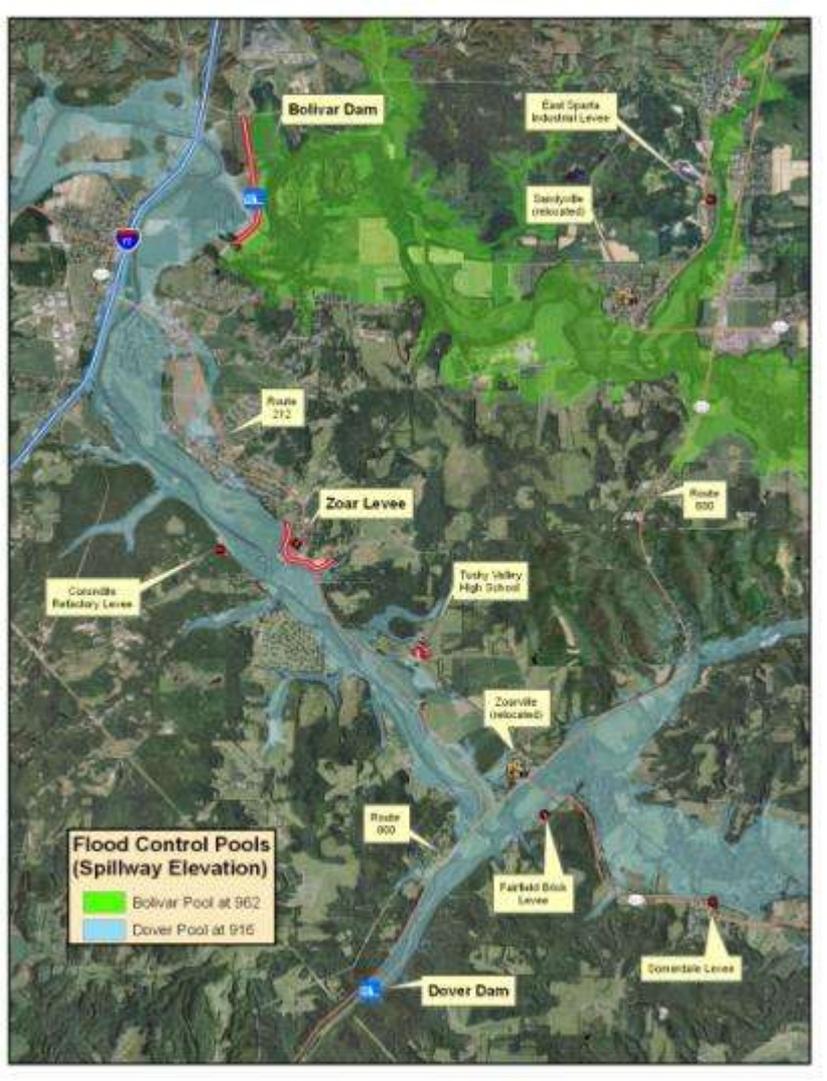
- Project Overview
- Overview of Study Process
- Summary of Status of Study

► Presentation & Discussion:

- Baseline Risk Assessment / Estimate
- Economic Baseline Data
- Habitat Baseline Data
- HTRW Baseline Data
- Historic Property Baseline Data
- Community Impacts Baseline Data



APPURTENANT TO DOVER DAM



Dover Dam's Spillway Crest and Flowage Easement is EL 916'



PROJECT COMPONENTS

BKGRD



PROJECT PURPOSE



- ~169 People (2010 Census)
- ~98 Structures below EL. 916'
- Founded in 1817 by German Separatists
- Listed on National Register of Historic Places
 - Ohio State Memorial & Site Museum
 - Regional Heritage Asset
 - Nationally Significant Historical Site
- ~57 of the 98 buildings date from 1817-1899



DIVERSION DAM PERFORMANCE ISSUES

1947



1978



1993



JANUARY 2005 STORM EVENT



Dover Pool of
Record, El 907.4

4 Week Duration



MARCH 2008 STORM EVENT



Dover Pool EI 904.6
4 Week Duration



DAM SAFETY ACTION CLASSIFICATION

AS A RESULT OF 2008 STORM EVENT ZOAR LEVEE & DIVERSION DAM: DSAC I

ER 1110-2-1156
DRAFT

Table 31 USACE Dam Safety Action Classification Table* 3 February 2009 version

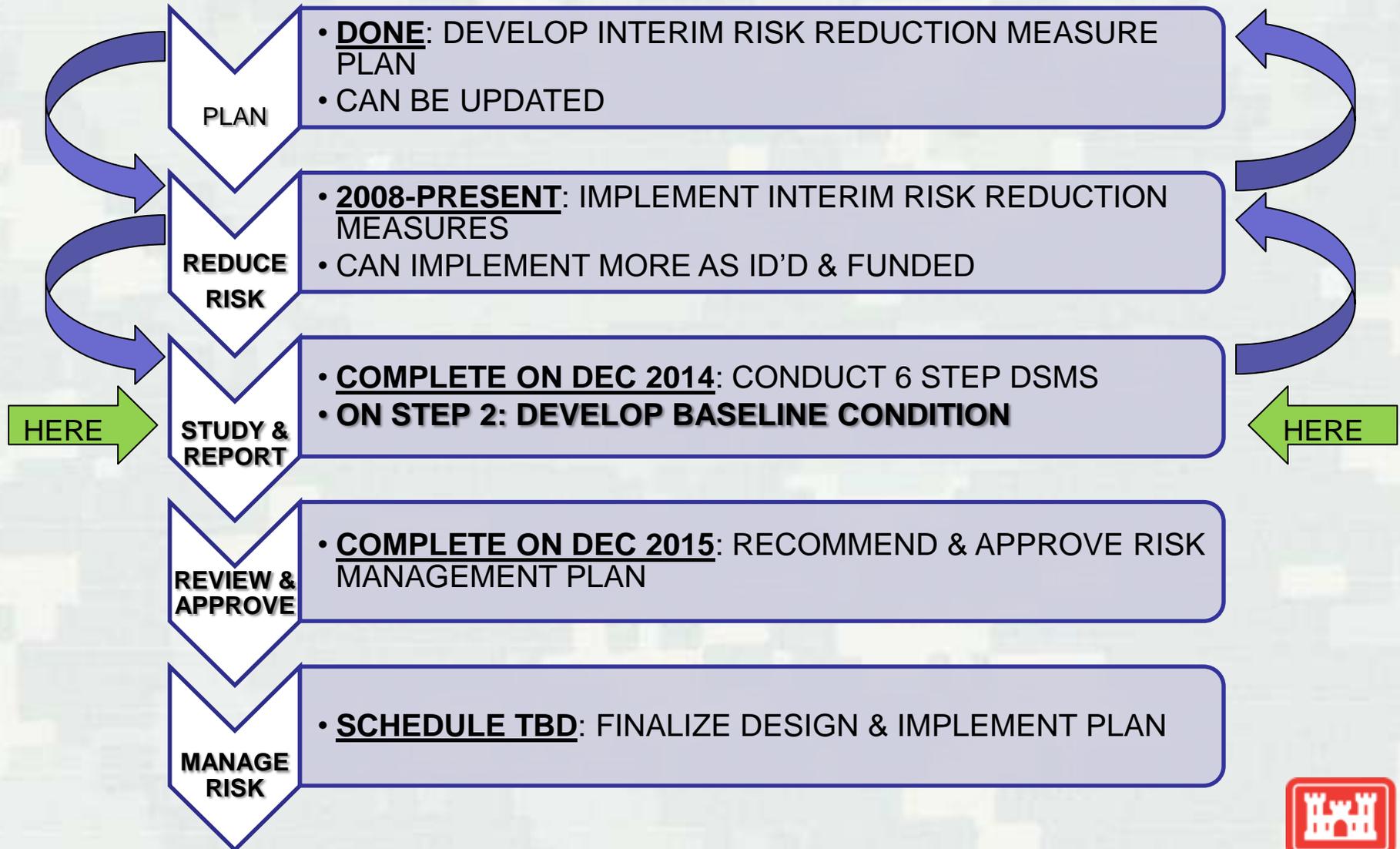
Dam Safety Action Class	Characteristics of this class:	Actions for dams in this class:
I URGENT AND COMPELLING (Unsafe)	<p>CRITICALLY NEAR FAILURE Progression toward failure is confirmed to be taking place under normal operations. Almost certain to fail under normal operations from immediately to within a few years without intervention.</p> <p>OR EXTREMELY HIGH RISK Combination of life or economic consequences with probability of failure is extremely high</p>	<p>Take immediate action to avoid failure.</p> <p>Validate classification through an external peer review for dams with life loss concerns.</p> <p>Implement interim risk reduction measures, including operational restrictions, ensure that emergency action plan is current, and functionally tested for initiating event.</p> <p>Conduct heightened monitoring and evaluation.</p> <p>Expedite investigations to support justification for remediation using all resources and funding necessary.</p> <p>Initiate intensive management and situation reports.</p>
II URGENT (Unsafe or Potentially Unsafe)	<p>FAILURE INITIATION FORESEEN For confirmed (unsafe) and unconfirmed (potentially unsafe) dam safety issues, failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety.</p> <p>OR VERY HIGH RISK The combination of life or economic consequences with probability of failure is very high.</p>	<p>Implement interim risk reduction measures, including operational restrictions as justified, and ensure that emergency action plan is current and functionally tested for initiating event.</p> <p>Conduct heightened monitoring and evaluation.</p> <p>Expedite confirmation of classification.</p> <p>Give very high priority for investigations to support justification for remediation.</p>
III HIGH PRIORITY (Conditionally Unsafe)	<p>SIGNIFICANTLY INADEQUATE OR MODERATE TO HIGH RISK For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with probability of failure is moderate to high.</p>	<p>Implement interim risk reduction measures, including operational restrictions as justified, ensure that emergency action plan is current and functionally tested for initiating event.</p> <p>Conduct heightened monitoring and evaluation.</p> <p>Prioritize for investigations to support justification for remediation considering consequences and other factors.</p>
IV PRIORITY (Marginally Safe)	<p>INADEQUATE WITH LOW RISK For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with probability of failure is low and may not meet all essential USACE guidelines.</p>	<p>Conduct elevated monitoring and evaluation.</p> <p>Give normal priority to investigations to validate classification, but no plan for risk reduction measures at this time.</p>
V NORMAL (Adequately Safe)	<p>ADEQUATELY SAFE Dam is considered adequately safe, meeting all essential USACE guidelines with no unconfirmed dam safety issues, AND RESIDUAL RISK IS CONSIDERED TOLERABLE.</p>	<p>Continue routine dam safety activities, normal operation, and maintenance.</p>

* At any time for specific events a dam, from any action class, can become an emergency requiring activation of the emergency plan



DSAC 1 PROCESS

DSMS



HOW WE HAVE REDUCED RISK

IMPLEMENTED IRRMS

- ▶ Installed additional piezometers
- ▶ Rehab existing relief wells & added relief wells
- ▶ Properly abandoned old relief wells
- ▶ Constructed toe drain and interior collection system
- ▶ Stockpile of materials for future events
- ▶ Interim Surveillance Plan
- ▶ Adding the 3rd pump and new emergency generator for pump station, which it was originally designed to have
- ▶ Added Alert System At Diversion Dam



STUDY & REPORT SCHEDULE



REVIEW & APPROVAL SCHEDULE

JANUARY 2015: Agency Technical Review (ATR)

FEB-APRIL 2015: Public & Agency Review

APRIL-JULY 2015: Major Subordinate Command (MSC) and Headquarters (HQ) Policy and Legal Review

JULY-AUG 2015: Dam Safety Senior Oversight Group (DSOG) Review

AUG 2015: District & MSC Dam Safety Officers (DSO) & DSOG Chairman Recommend Approval

AUG-OCT 2015: Independent External Peer Review (IEPR) Finalized

OCT-DEC 2015: USACE DSO Approves DSMR & ROD Signed

DEC 2015: Notify USACE & MSC CDR and ASA-CW



QUESTIONS / DISCUSSION



STEP 2: ESTIMATE EXISTING & FUTURE W/O ACTION RISK CONDITION

- TOTAL BASELINE CONDITION

- PREPARED FOR RISK MANAGEMENT MEASURES IDENTIFICATION MEETING (RMMIM)

- **13 SEPT 2013**

- ENGINEERING BASELINE STUDIES

- RISK ASSESSMENT
- RISK ESTIMATE
- **DRAFT PRESENTED TO DSOG 26 JULY 2013**
- **FINALIZED TO ADDRESS DSOG COMMENTS BY 09 AUG 2013**

- PLANNING BASELINE STUDIES

- ECONOMIC ANALYSIS
- HABITAT BASELINE STUDY
- HTRW BASELINE STUDY
- HISTORIC PROPERTY BASELINE STUDY
- COMMUNITY IMPACTS BASELINE STUDY
- **FINAL DRAFTS COMPLETED 19 JUNE 2013**
- **FINALIZED AFTER 13 SEPT 2013 AT RMMIM**



QUESTIONS / DISCUSSION



- **PURPOSE**

- TO DEFINE RISK TO PUBLIC AND WHAT RISK IS IN A W/O PROJECT CONDITION OR IF NO ACTION WAS TAKEN
- IDENTIFY SIGNIFICANT FAILURE MODES THAT MUST BE ADDRESSED

- **PROCESS**

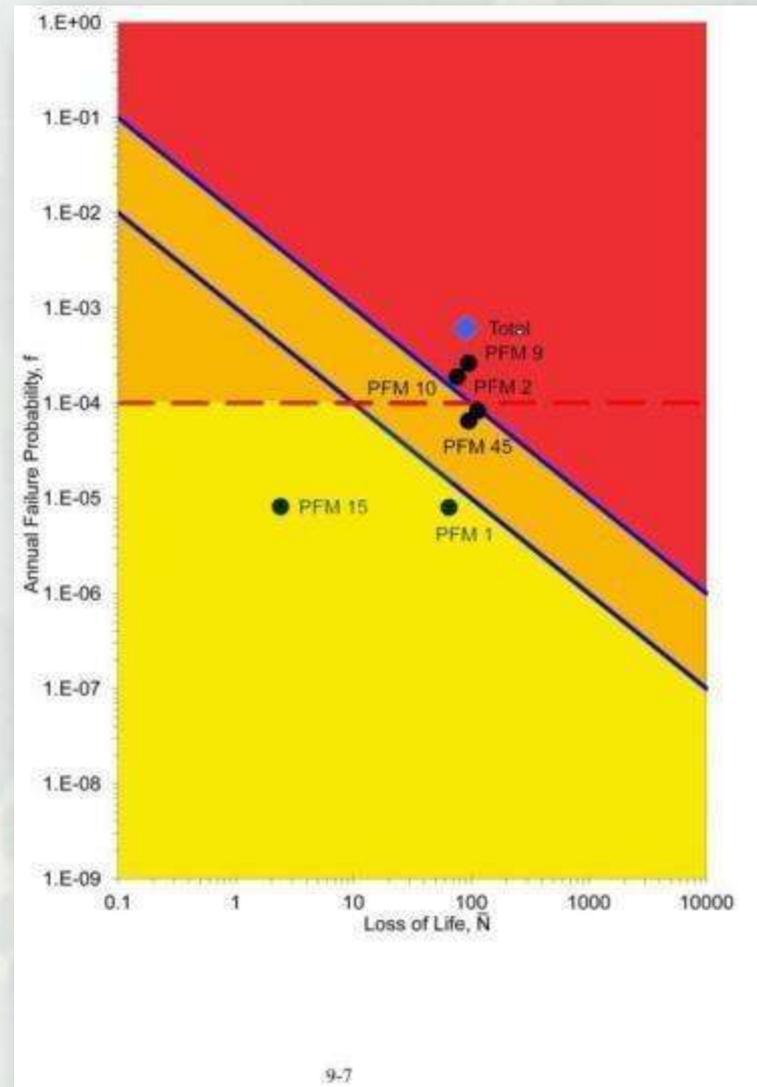
- RISK MANAGEMENT CENTER MANAGES
 - ASSIGNS SENIOR/TECHNICAL ADVISORS
 - ASSIGNS A RISK CADRE
- DISTRICT / DAM SAFETY PRODUCTION CENTER (DSPC) CHARACTERIZE SITE AND PROVIDE ALL BACKGROUND DATA
- RISK CADRE: POTENTIAL FAILURE MODES
 - NARROWS DOWN TO CREDIBLE MODES
- RISK CADRE: EXPERT OPINION ELICITATION
 - ASSIGNS PROBABILITIES TO NODES
 - FLAW; INITIATION; CONTINUATION; PROGRESSION; INTERVENTION; BREACH



ENG: BASELINE RISK ESTIMATE

GOALS

- HAVE BASELINE DATA TO MEASURE EFFECTIVENESS & COMPLETENESS OF ALTERNATIVES AGAINST
- ALSO QUALITATIVELY CONSIDER
 - ECONOMIC
 - SOCIETAL
 - HISTORICAL
 - COMMUNITY
 - ENVIRONMENTAL



← THIS IS AN EXAMPLE ONLY



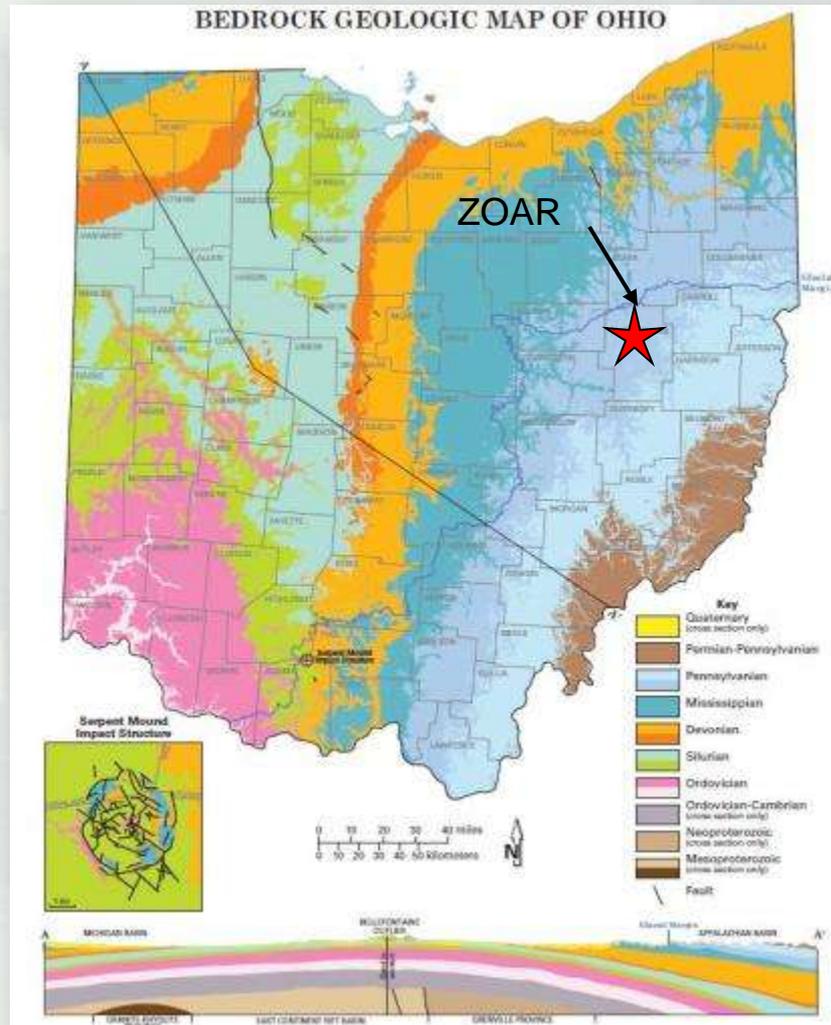
9-7

QUESTIONS / DISCUSSION

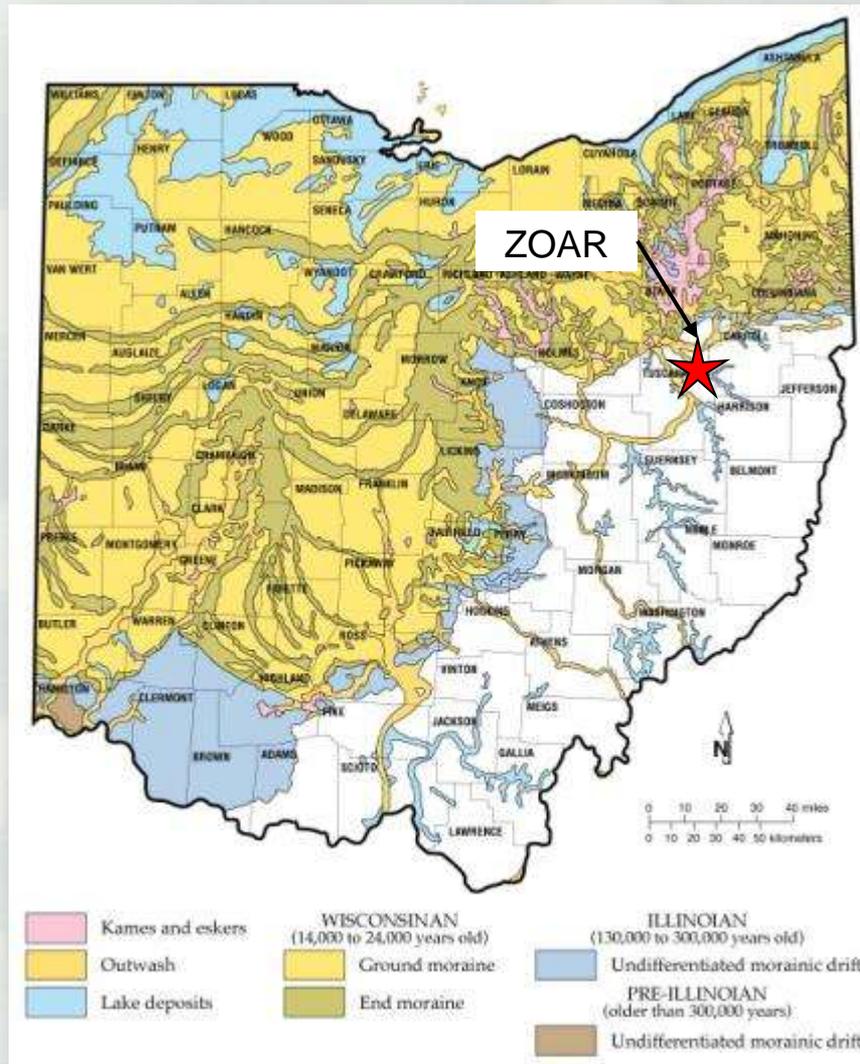


BASELINE GEOLOGY UNDERSTANDING

- Near-horizontal sedimentary rock
- Pennsylvanian aged Pottsville Group
- Sandstone, shale, siltstone, claystone with thin seams of coal and limestone
- Typically fractures are high angled with smooth and planar surfaces.
- Solutioned discontinuities are common in limestone seams.



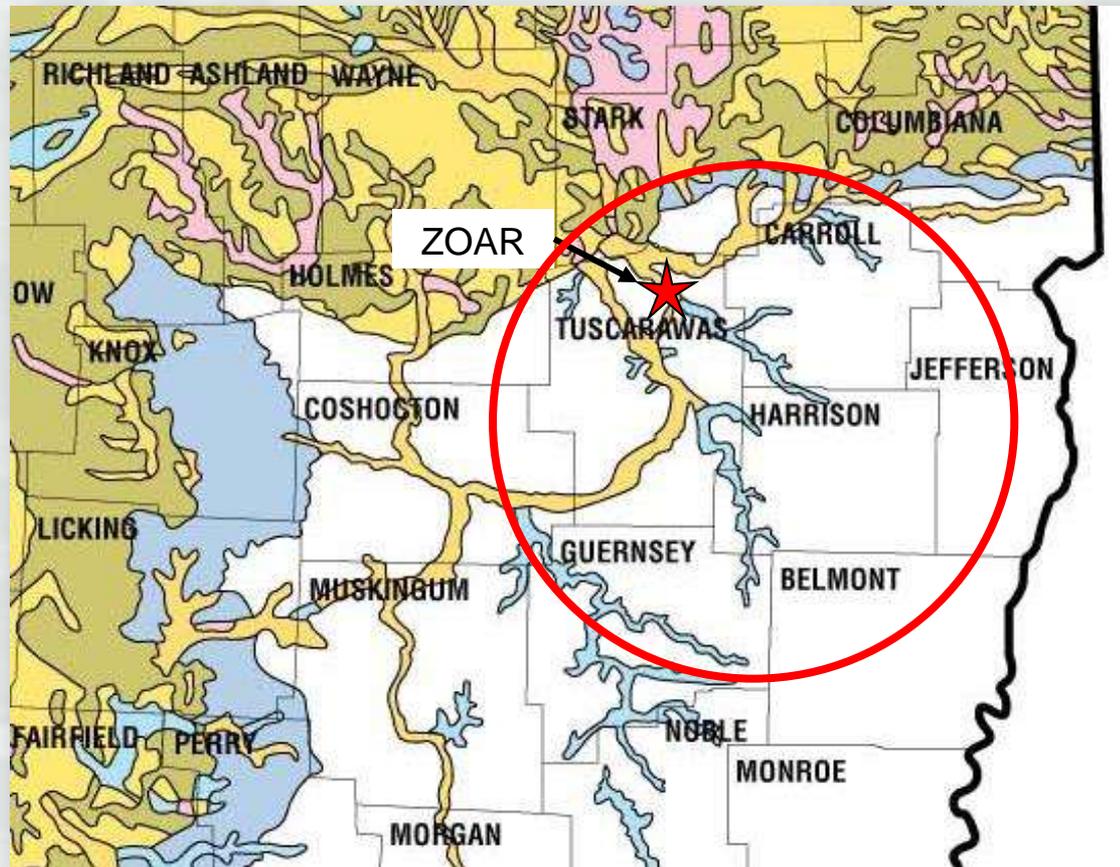
SITE CHARACTERIZATION - GEOLOGY

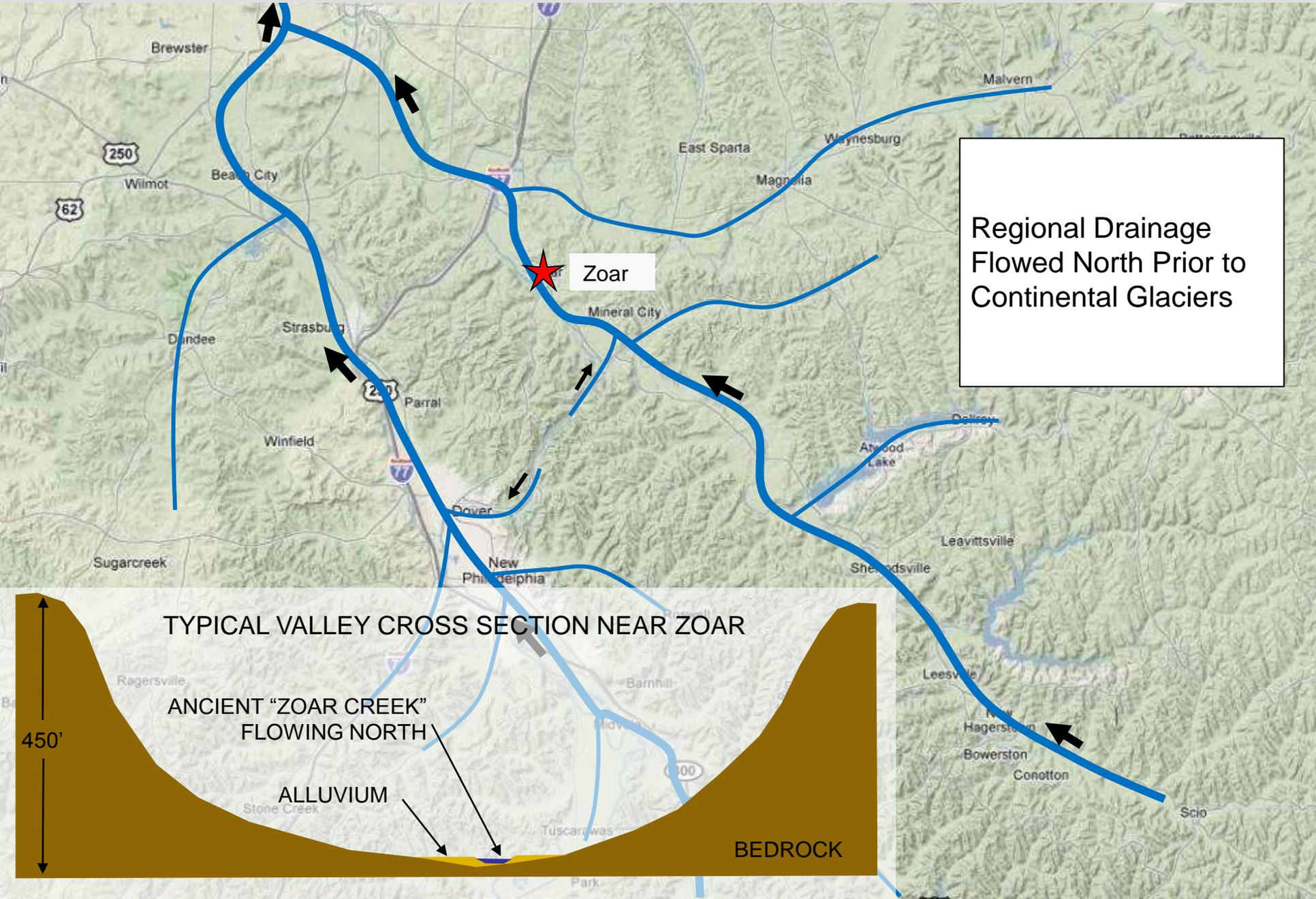


- Unglaciated
- Located near the margin of the Wisconsin-age glacier (within 5 miles)
- Thick overburden (+100'), variable top of rock surface.
- Thick (30') glacial outwash near top of ground surface



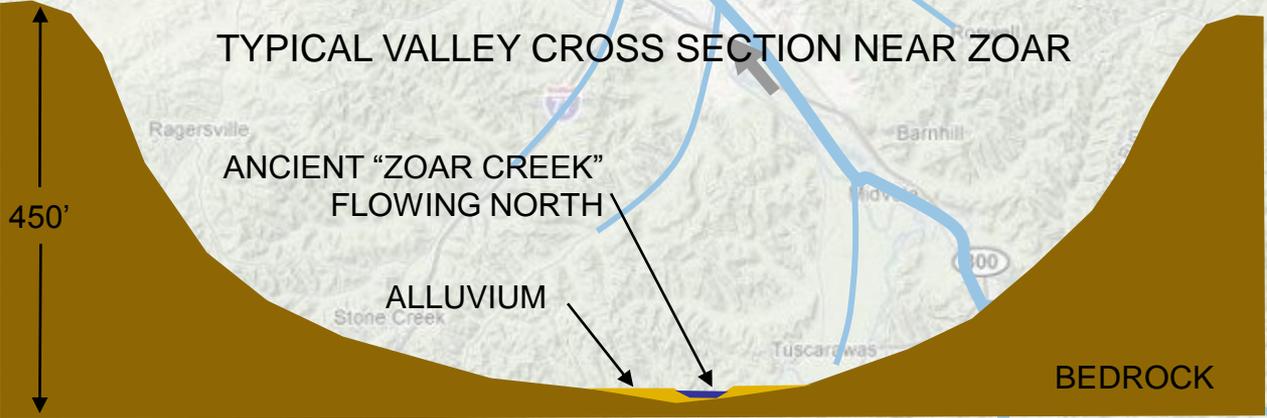
SITE CHARACTERIZATION - GEOLOGY





Regional Drainage
Flowed North Prior to
Continental Glaciers

TYPICAL VALLEY CROSS SECTION NEAR ZOAR

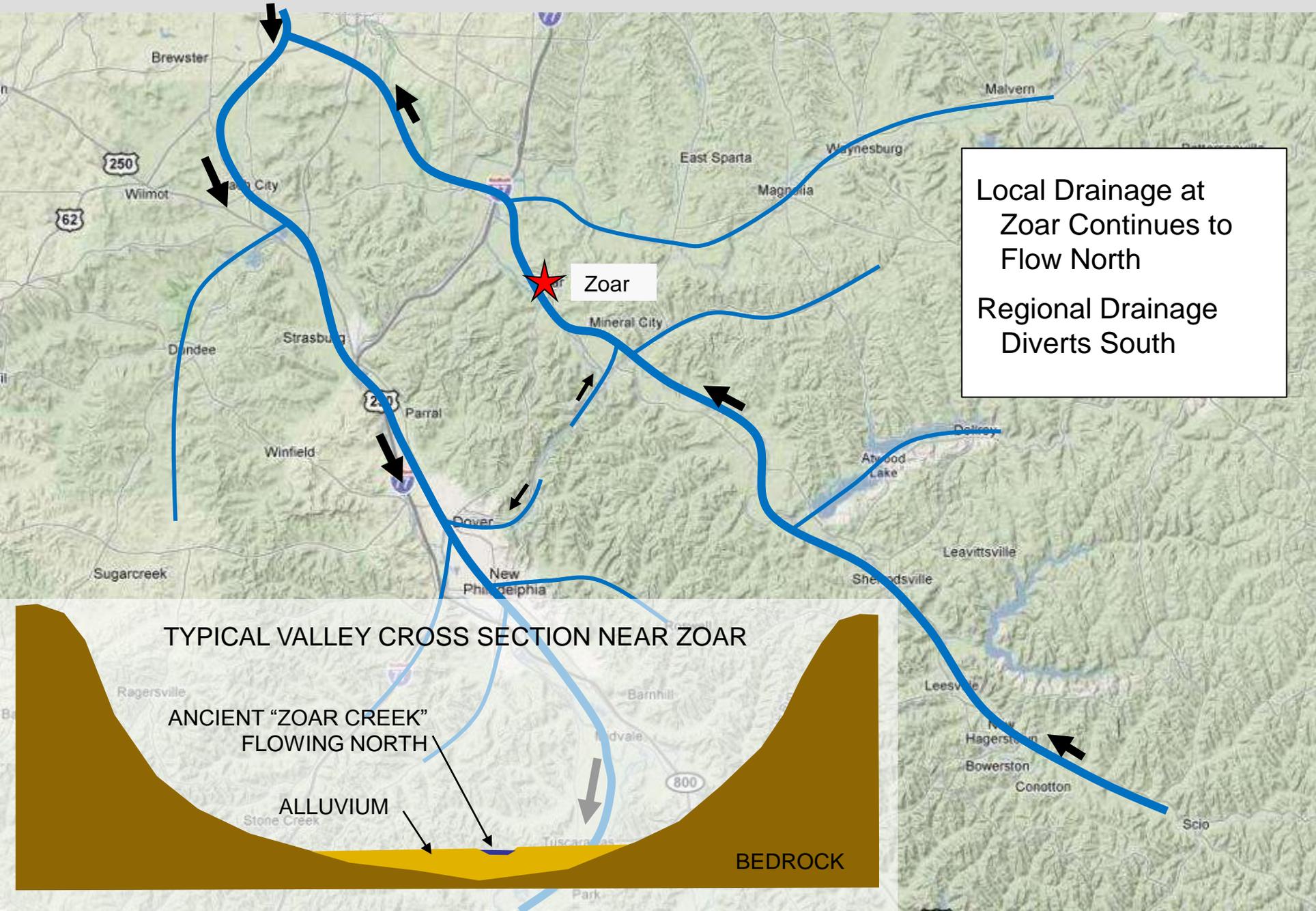


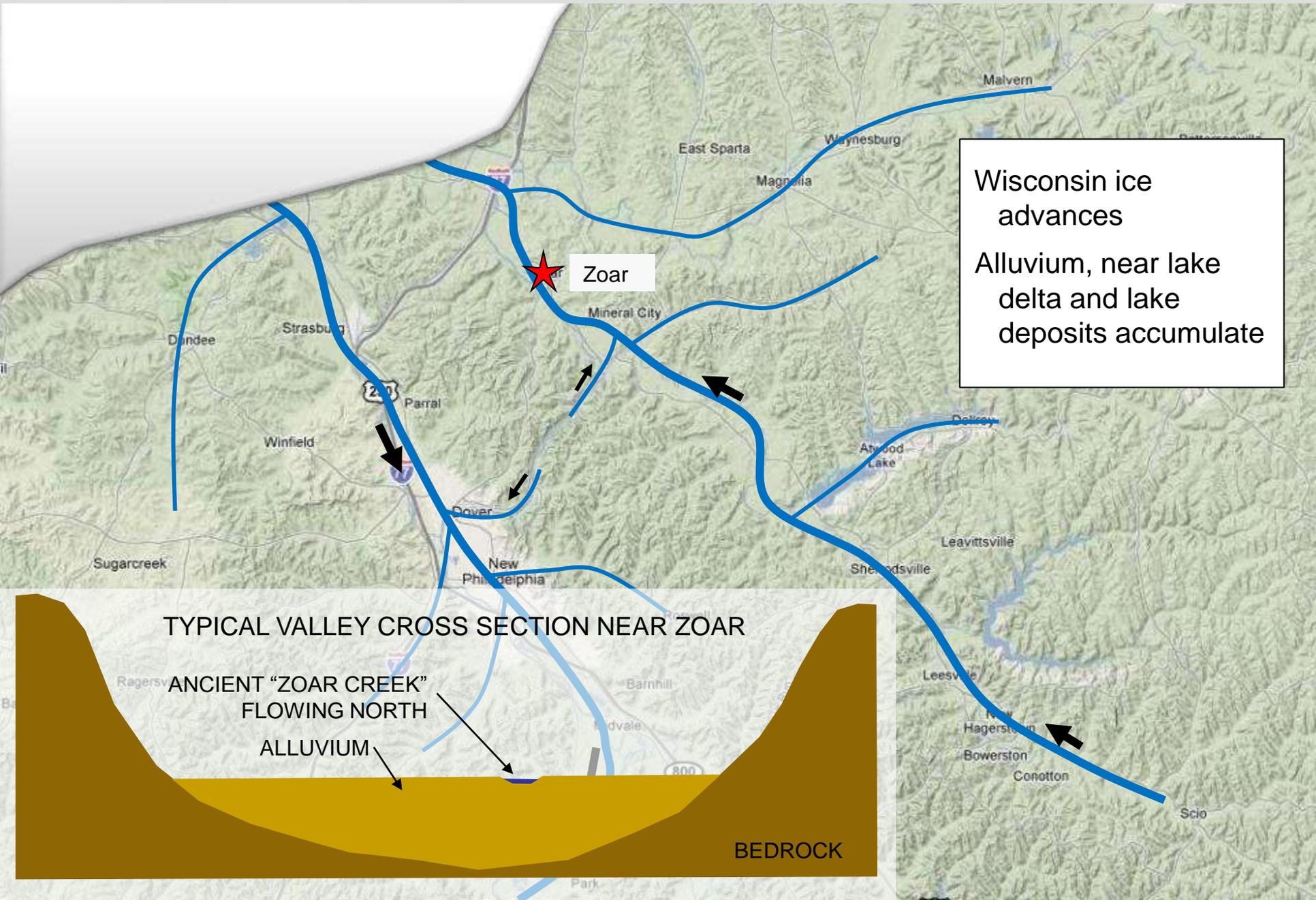
ANCIENT "ZOAR CREEK"
FLOWING NORTH

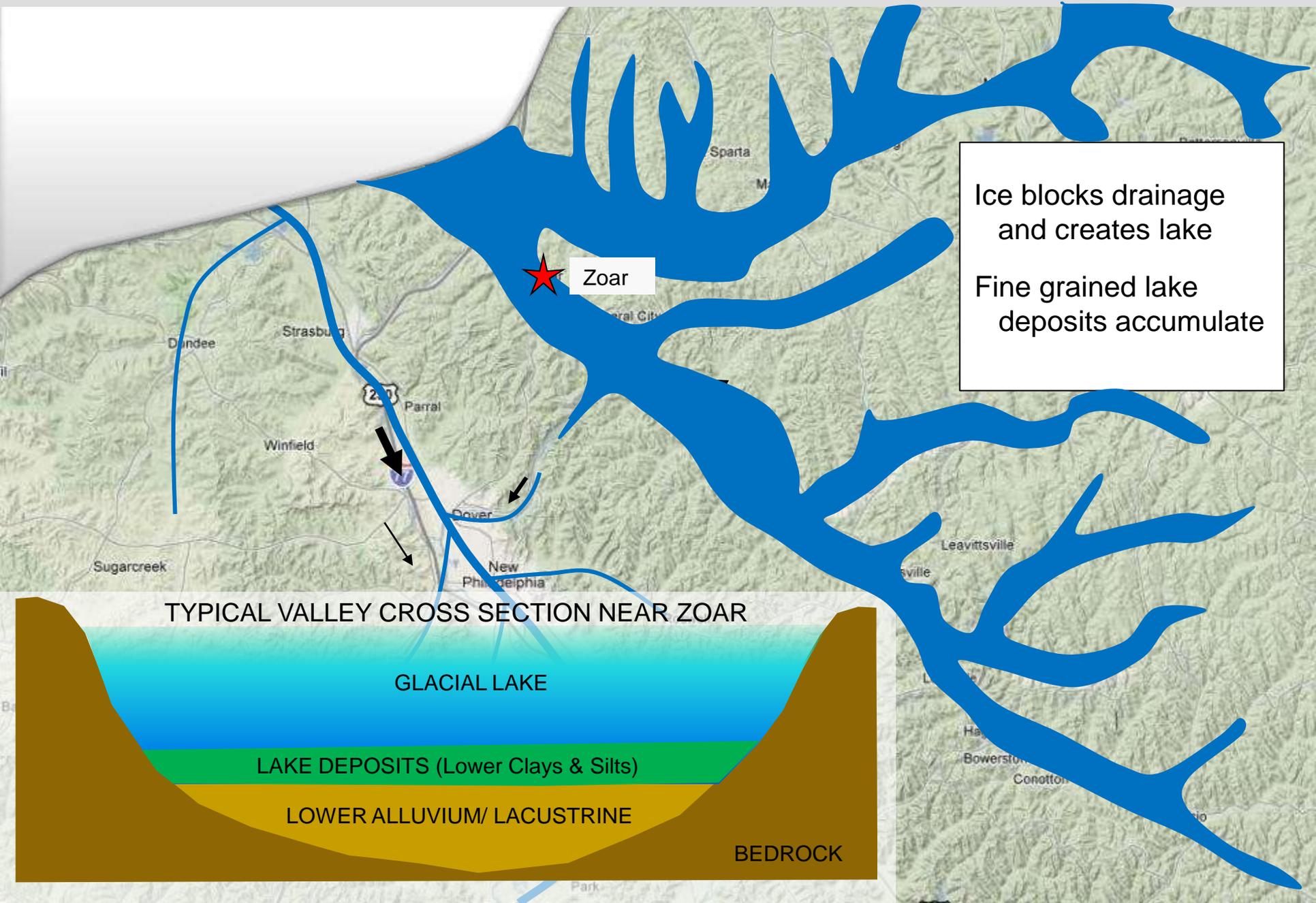
ALLUVIUM

BEDROCK

450'







Ice blocks drainage and creates lake

Fine grained lake deposits accumulate

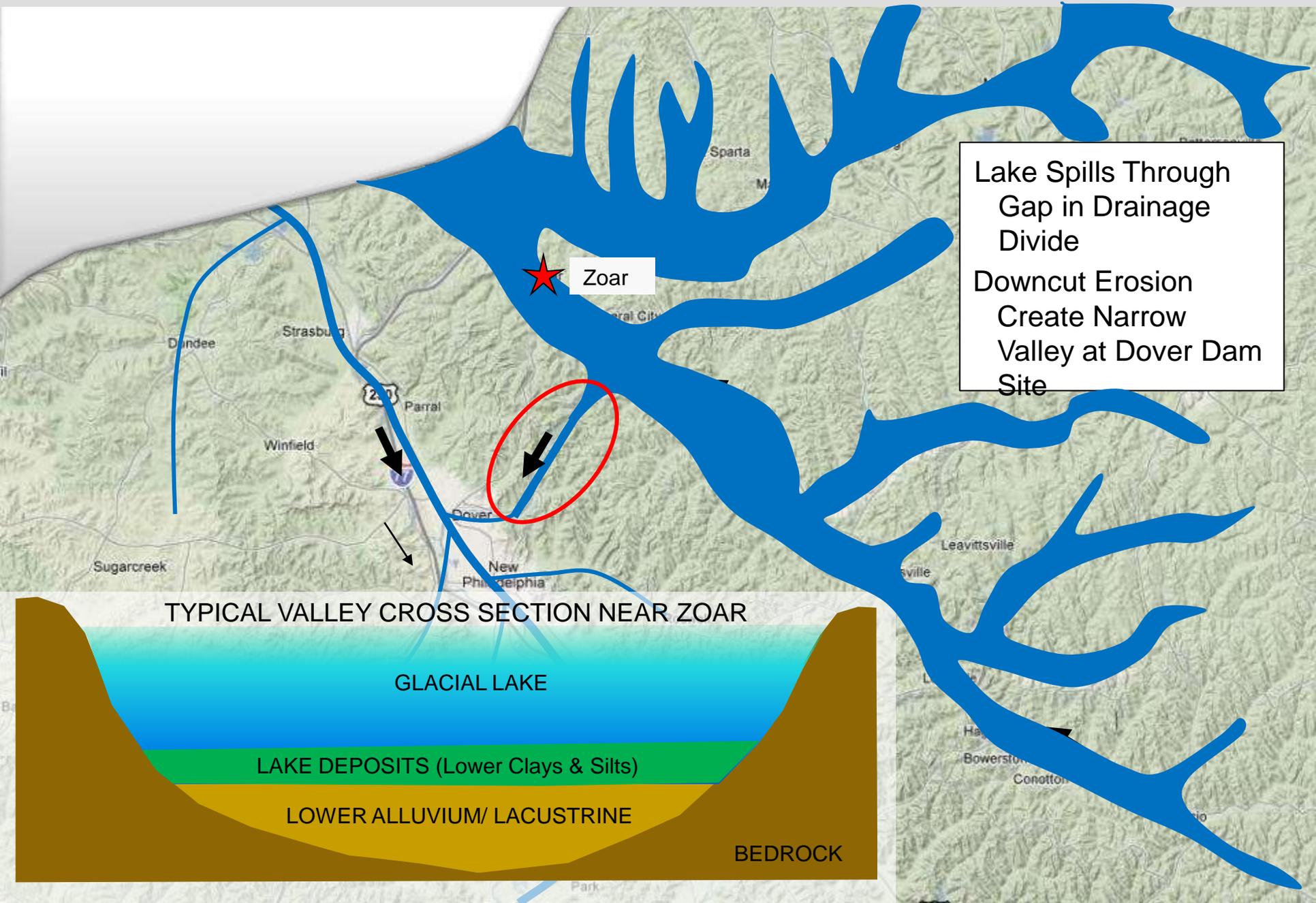
TYPICAL VALLEY CROSS SECTION NEAR ZOAR

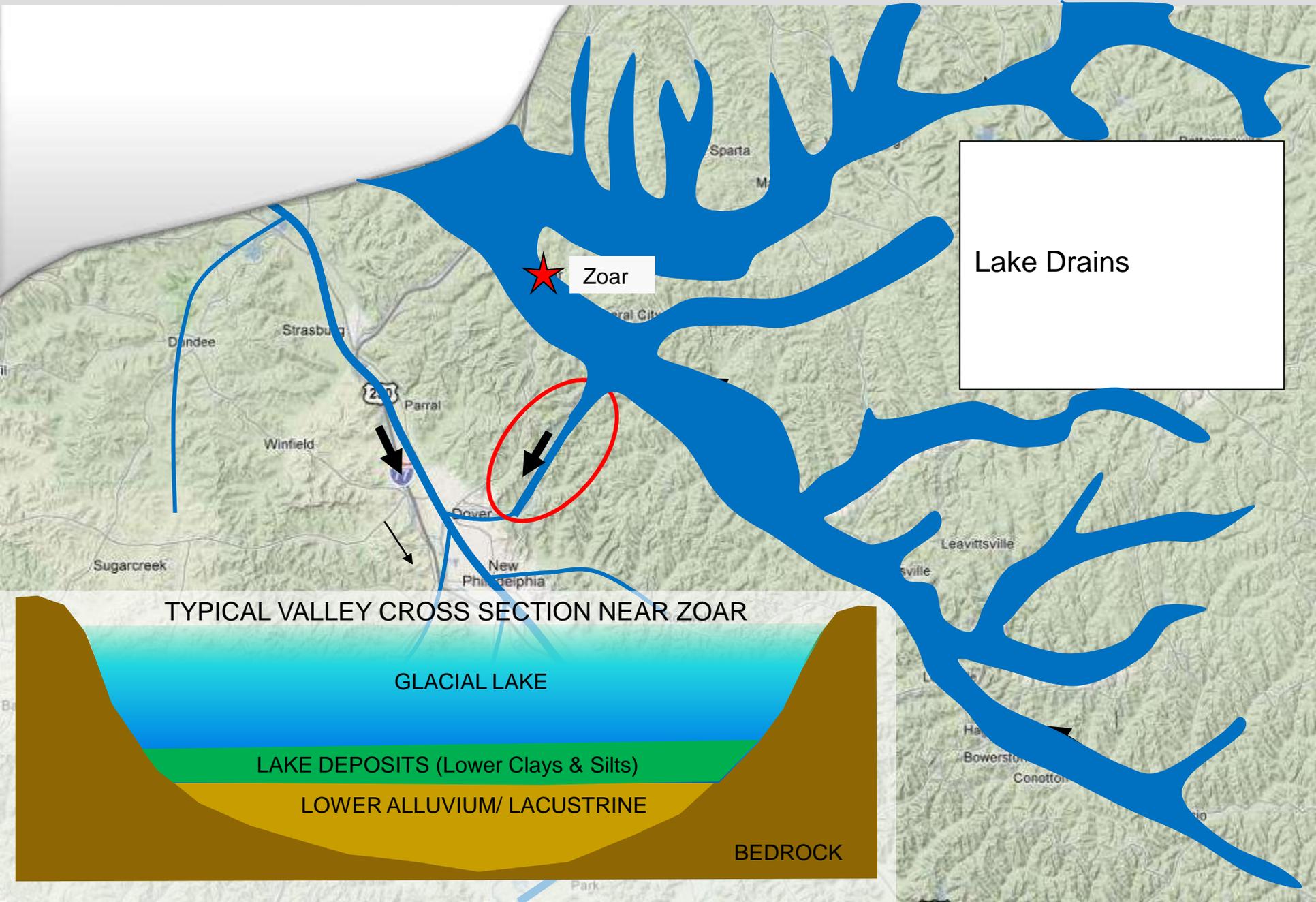
GLACIAL LAKE

LAKE DEPOSITS (Lower Clays & Silts)

LOWER ALLUVIUM/ LACUSTRINE

BEDROCK





Lake Drains

Zoar

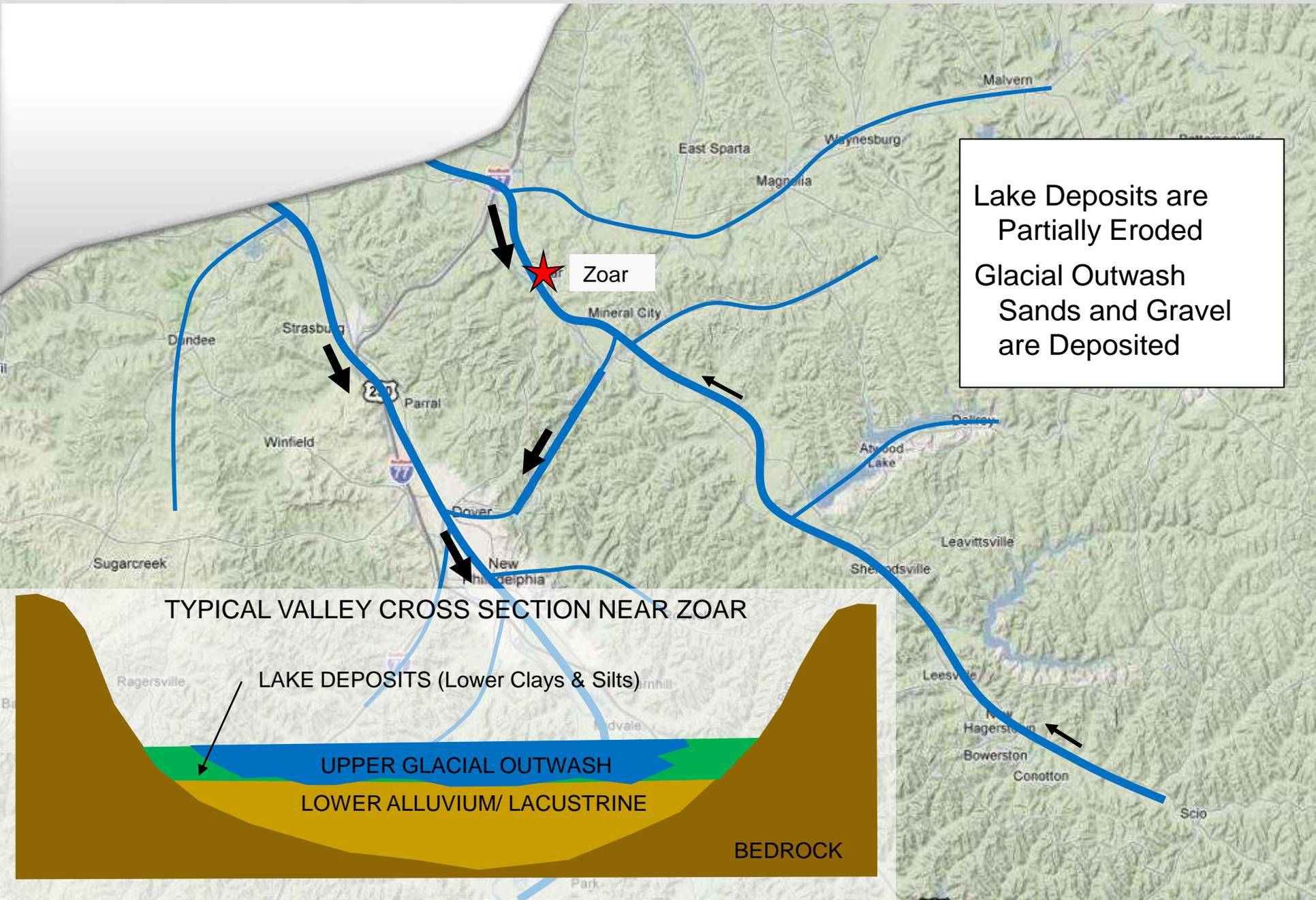
TYPICAL VALLEY CROSS SECTION NEAR ZOAR

GLACIAL LAKE

LAKE DEPOSITS (Lower Clays & Silts)

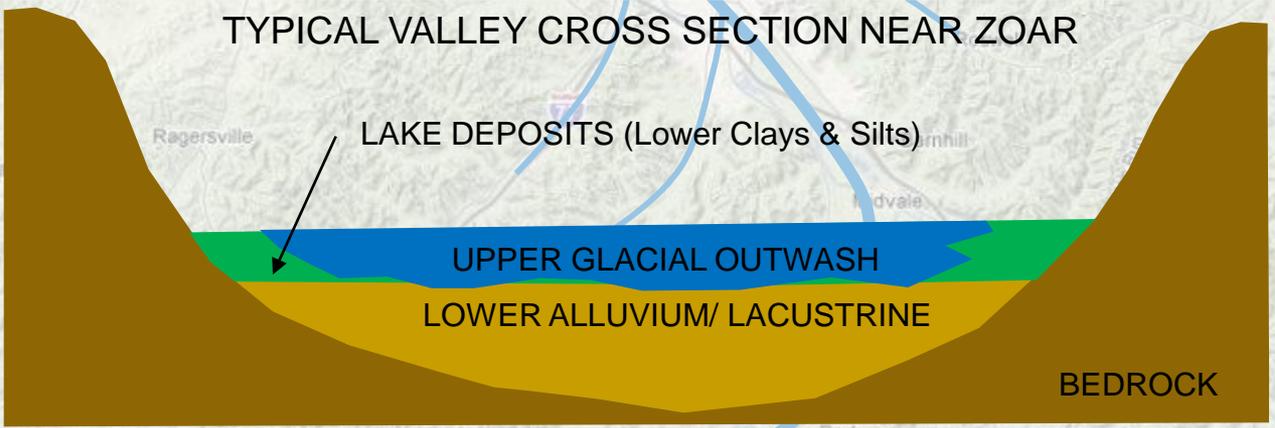
LOWER ALLUVIUM/ LACUSTRINE

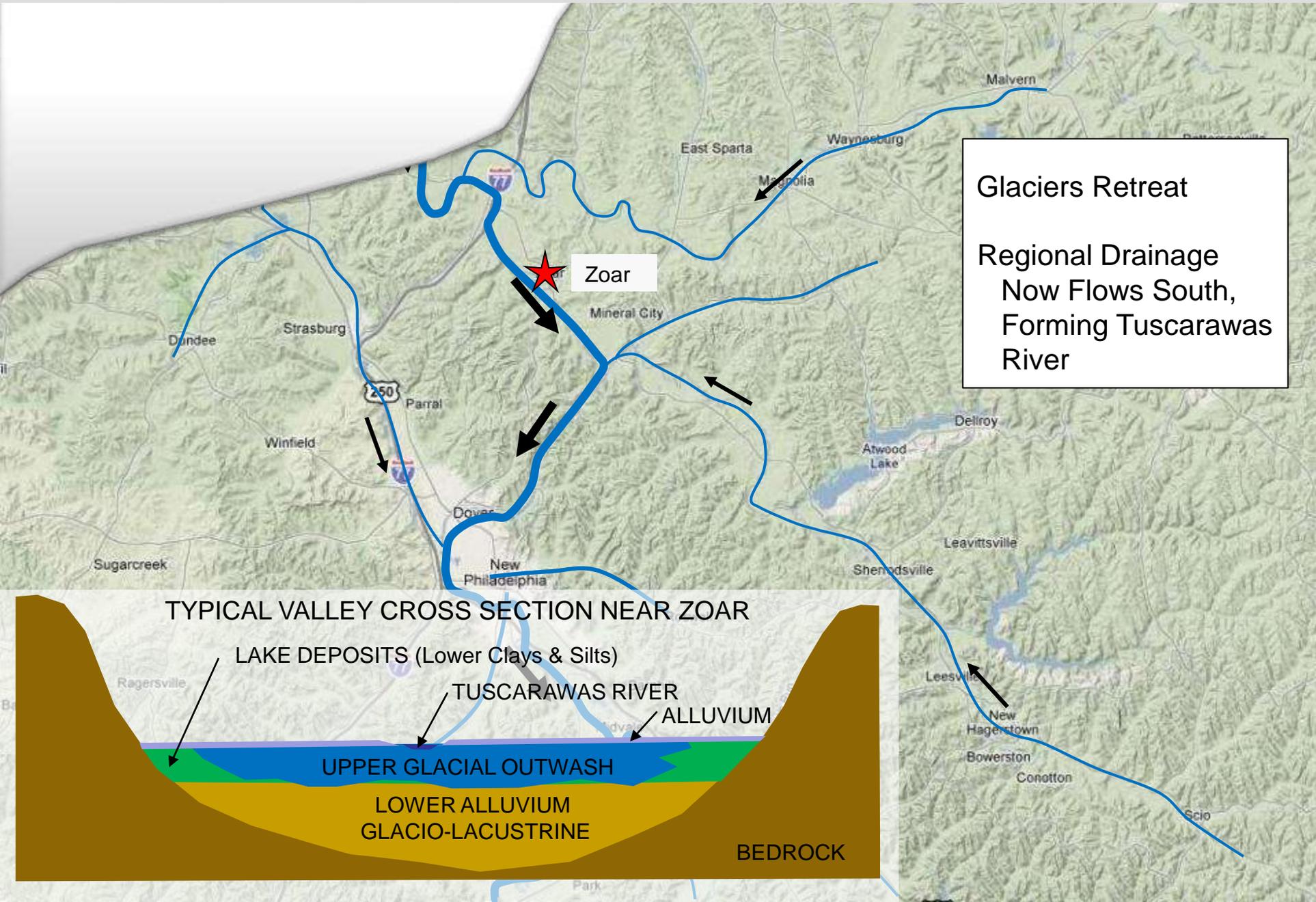
BEDROCK



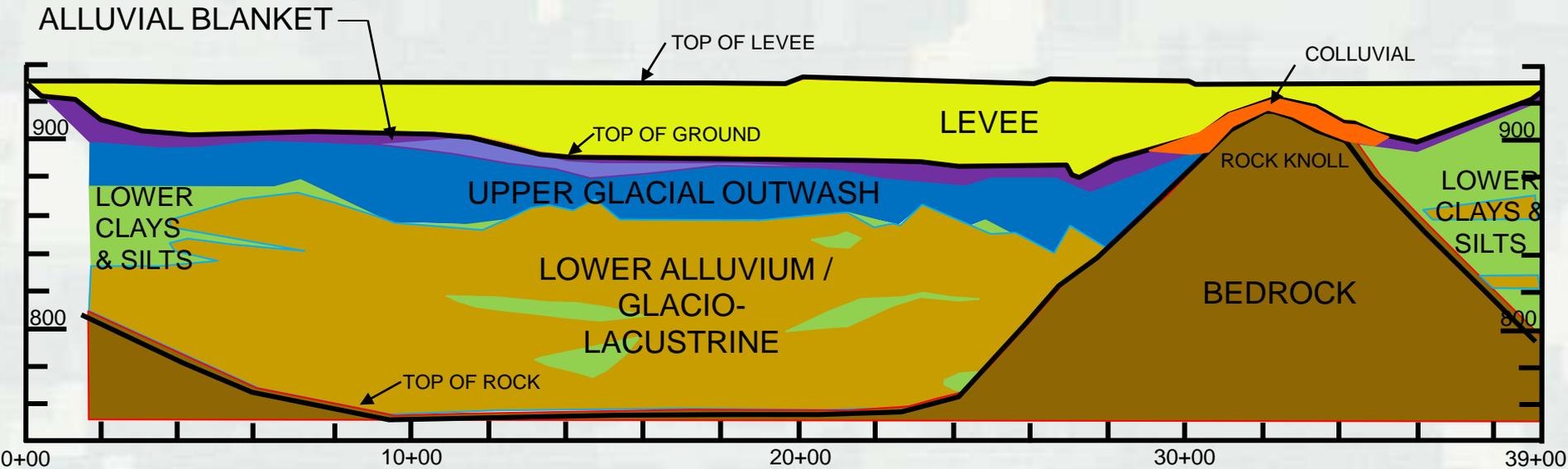
Lake Deposits are Partially Eroded
Glacial Outwash Sands and Gravel are Deposited

TYPICAL VALLEY CROSS SECTION NEAR ZOAR





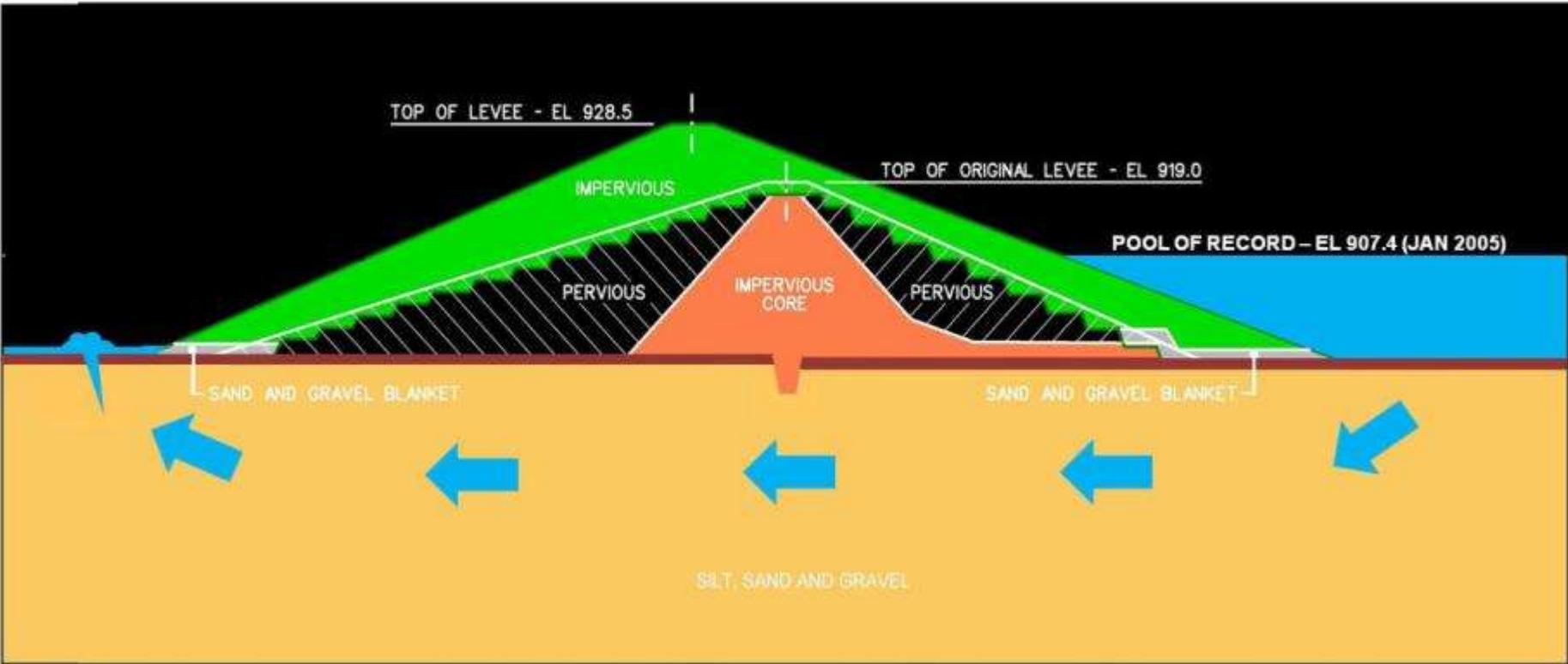
GEOLOGIC PROFILE-LEVEE



- LEVEE: Original levee constructed in 1937 with crest raised in 1951 to elevation 928.5.
- ALLUVIAL BLANKET: Fine grained clays and silt, recent
- UPPER GLACIAL OUTWASH: Sands and gravels, glacial outwash, Wisconsin ice advance
- LOWER CLAYS AND SILTS: Clays and silts, lake deposits, partially eroded and replaced by overlying Upper Glacial Outwash, Wisconsin ice advance
- LOWER ALLUVIUM/LACUSTRINE: Sand and silty sand with lenses of clays and silts, alluvial and lake deposits, Wisconsin and possibly Illinoian ice advances
- BEDROCK: Relatively flat lying sedimentary rock of the Pennsylvanian-aged Pottsville Group

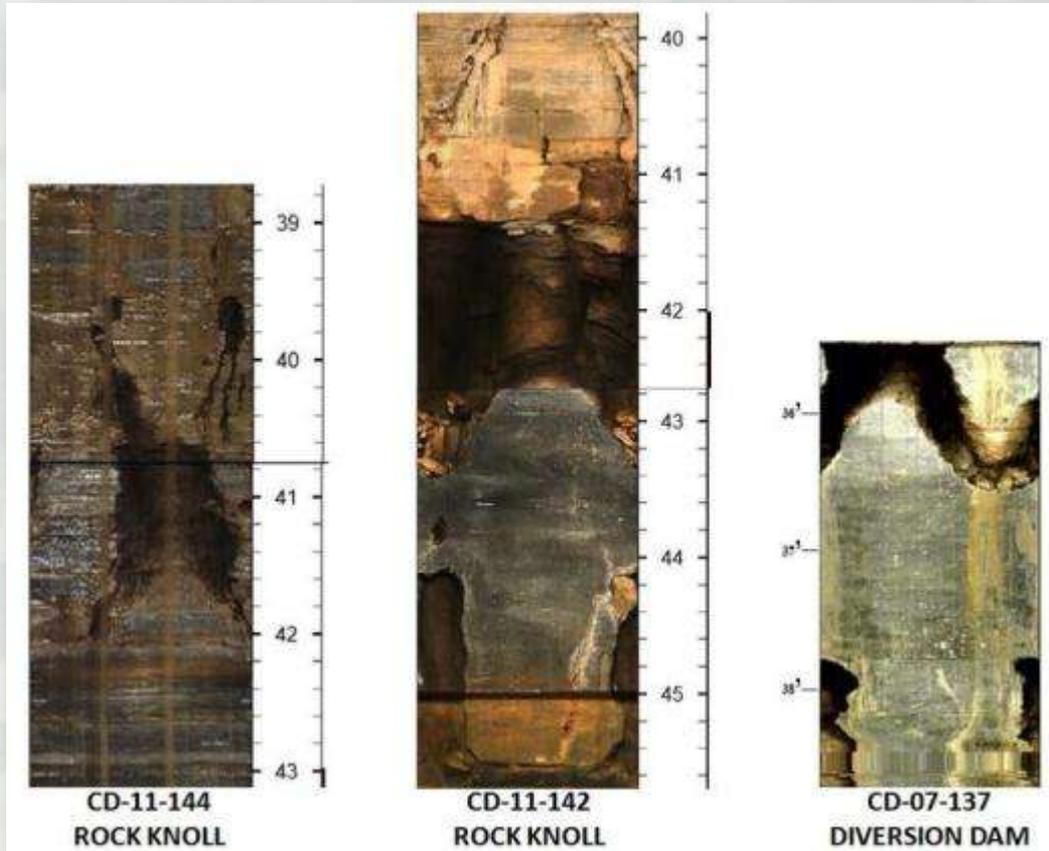


LEVEE PROFILE



LOWER MERCER LIMESTONE

- Thin, typically 3 to 4 foot thick
- Grey to dark gray, fine textured, very hard, occasionally fossiliferous.
- High unconfined compressive strength (+20,000 psi)
- Discontinuities can be solutioned, including near-horizontal bedding planes and high angled joints.
- Suspected of providing avenues for seepage at several projects in region



Down-hole Camera Images of Solutioned Discontinuities within Lower Mercer Limestone

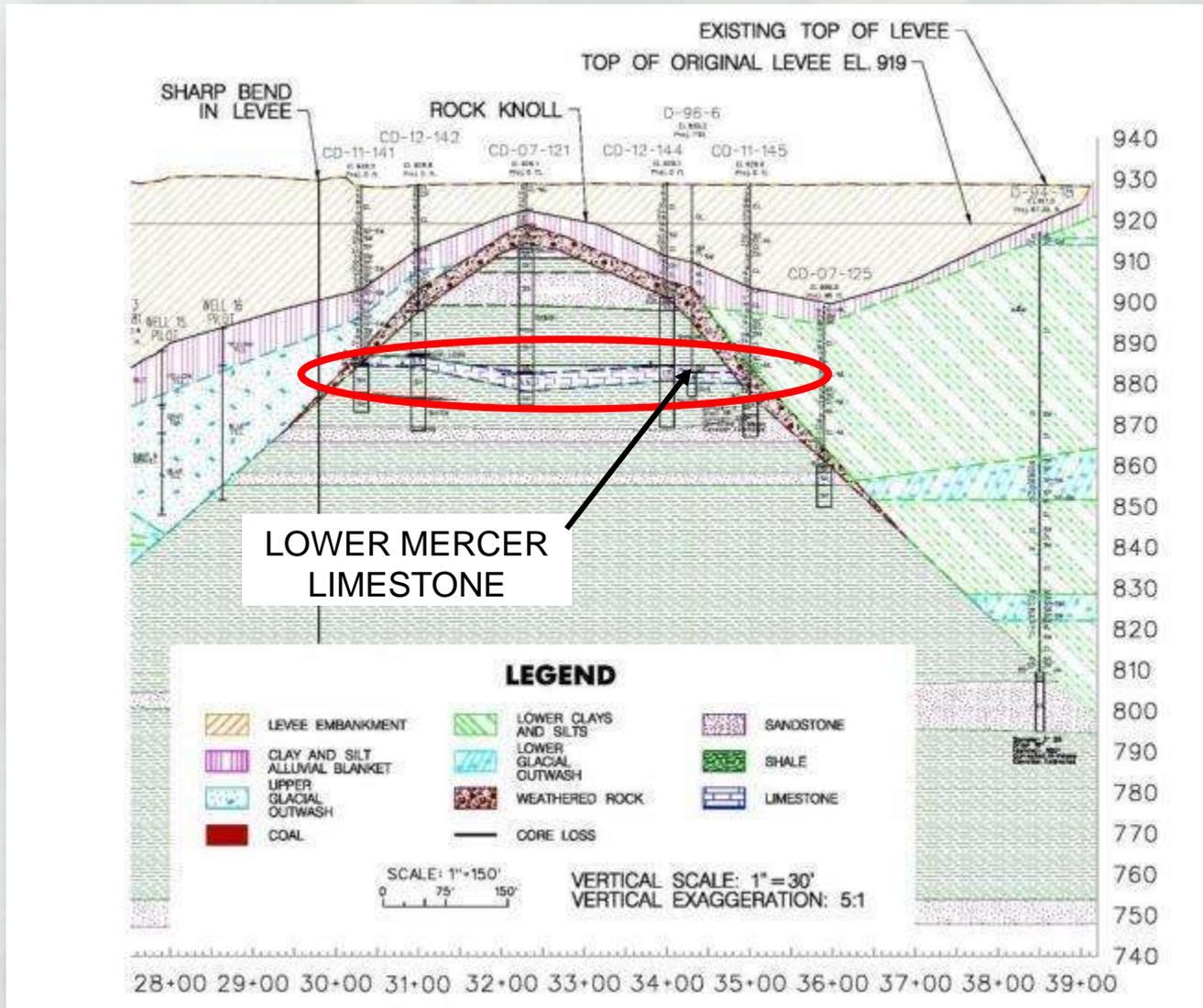


SITE PLAN – ROCK KNOLL

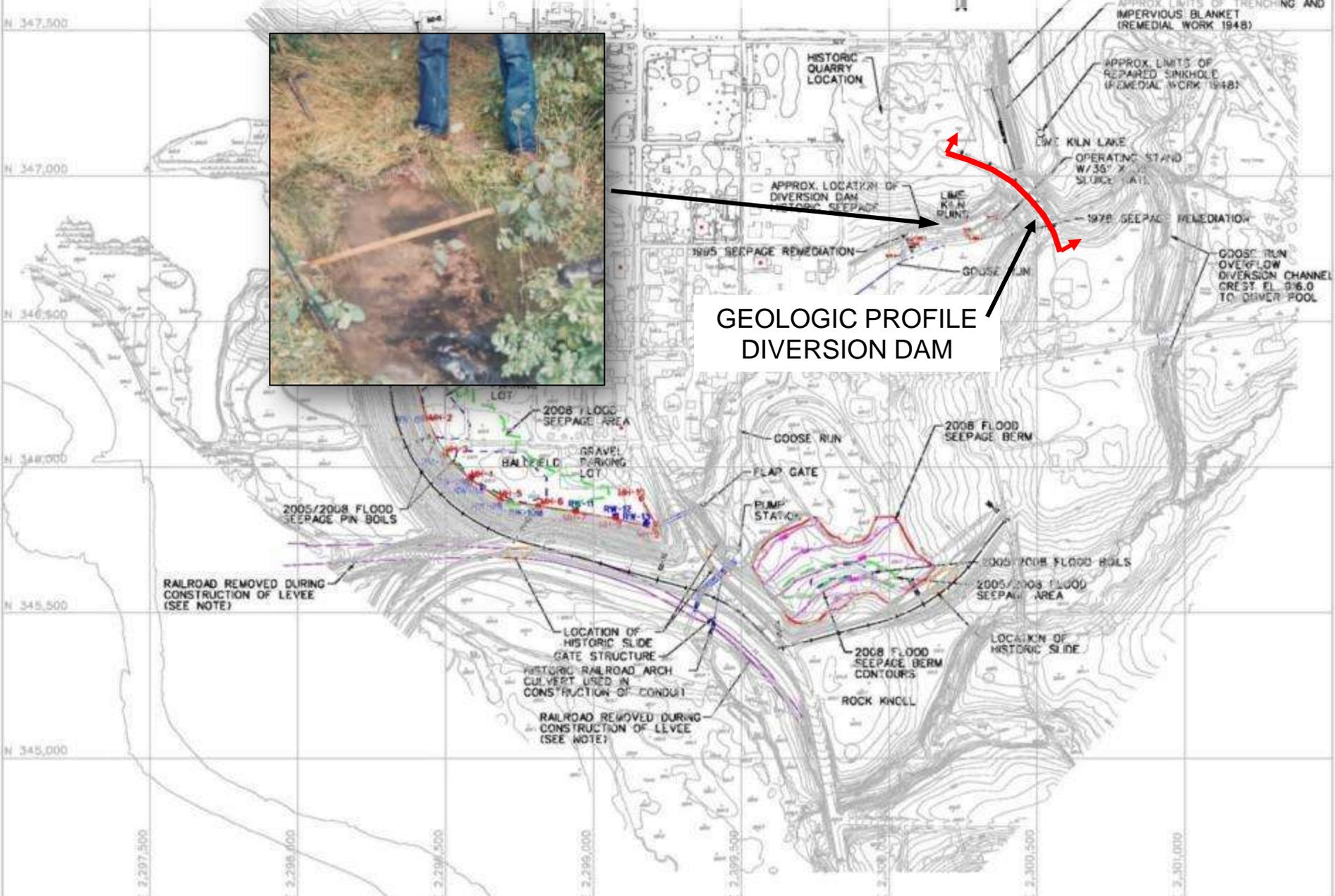


GEOLOGIC PROFILE
ROCK KNOLL

GEOLOGIC PROFILE – ROCK KNOLL



SITE PLAN – DIVERSION DAM

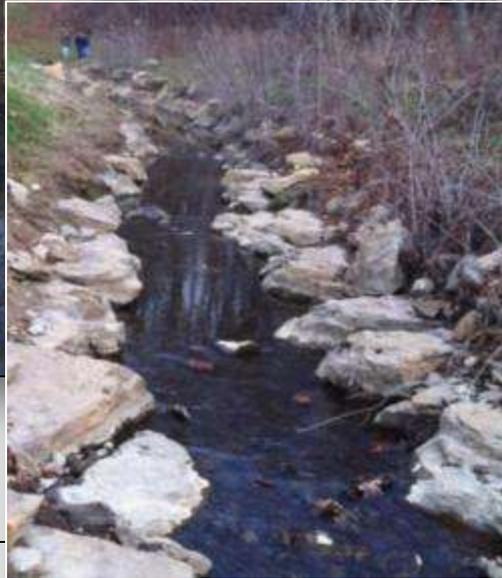
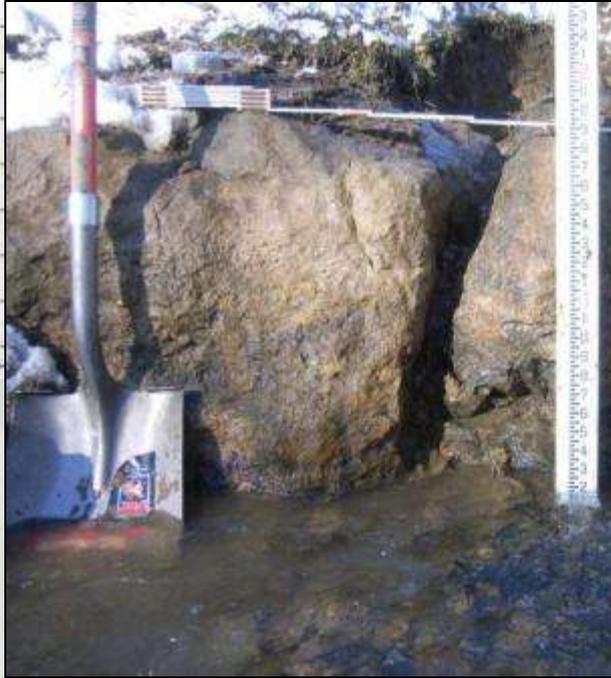
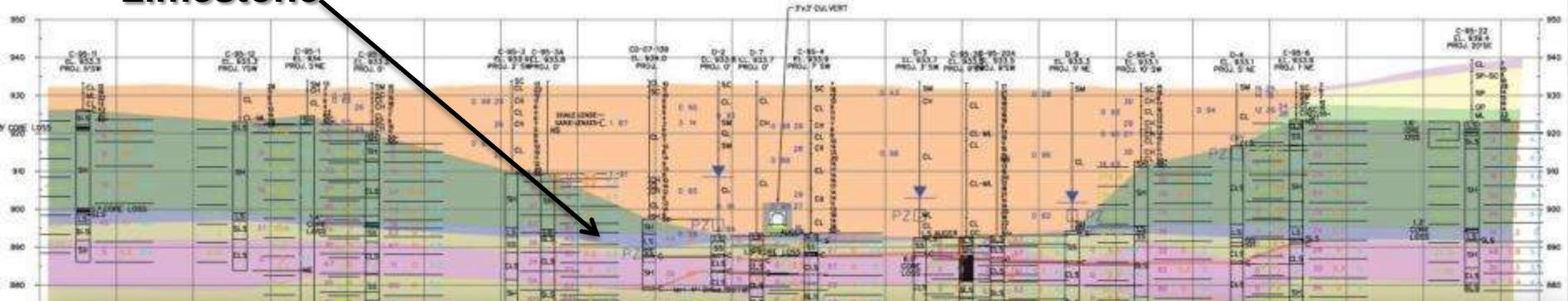


GEOLOGIC PROFILE
DIVERSION DAM

Lower Mercer Limestone

GEOLOGIC PROFILE - DIVERSION DAM

GEO



BUILDING STRONG®

QUESTIONS / DISCUSSION



- **PURPOSE**

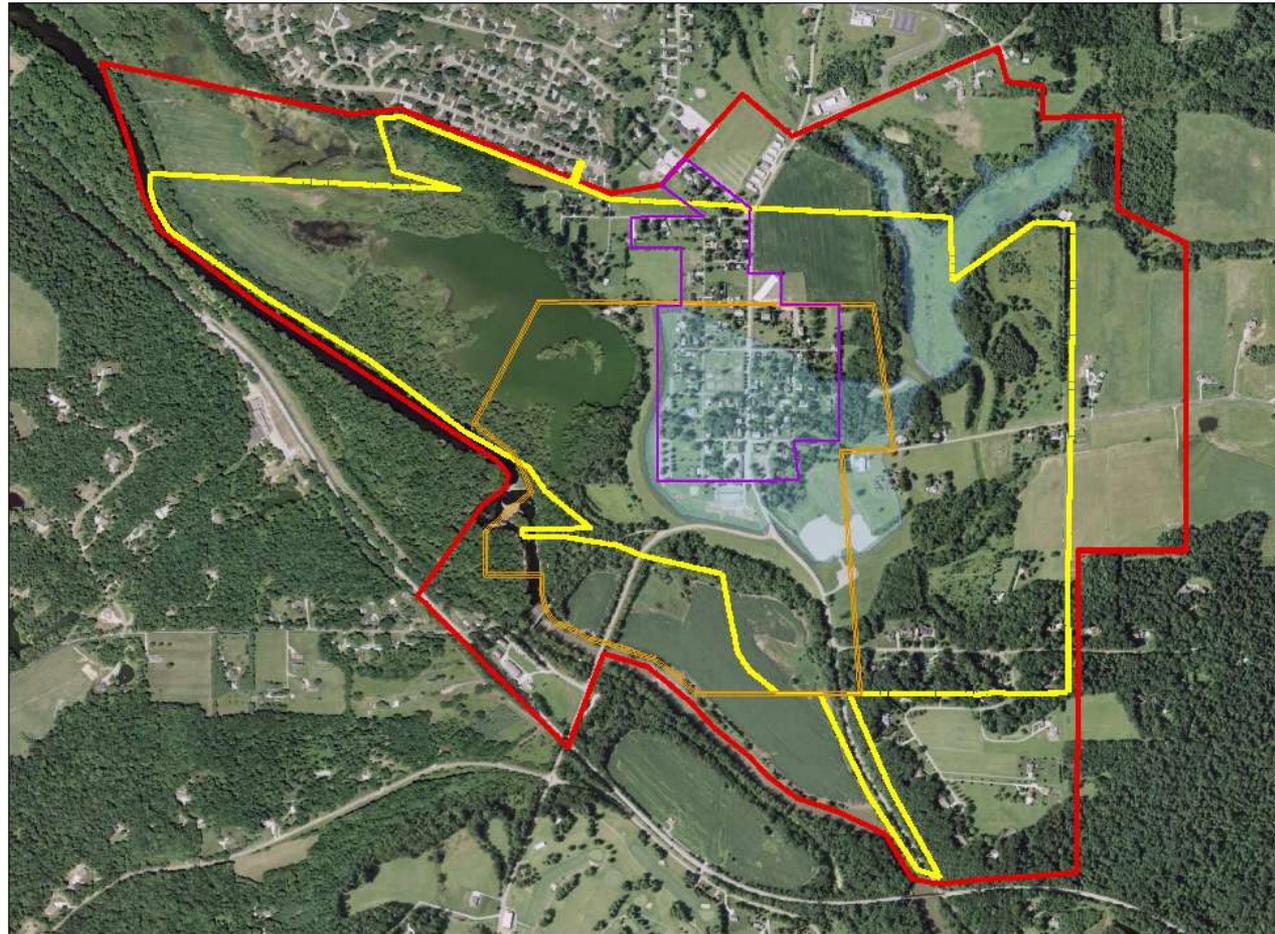
- TO HELP DEFINE W/O PROJECT CONDITION OR WHAT WOULD HAPPEN IF NO ACTION WAS TAKEN
- IDENTIFY SIGNIFICANT RESOURCE CONSTRAINTS TO CONSIDER DURING FORMULATION, EVALUATION, COMPARISON OF ALTERNATIVES
- 4 ACCOUNTS WE USE
 - NED – Contributes to National Economic Development
 - EQ – Environmental Statutes
 - OSE & RED: Community, Social and Local Economic Development

- **PROCESS**

- DEFINE A STUDY AREA
- GATHER & ANALYZE DATA
 - ECONOMIC – NED
 - HABITAT – EQ
 - HTRW - EQ
 - HISTORIC PROPERTIES - EQ
 - COMMUNITY IMPACTS – OSE & RED



PLANNING BASELINE STUDY AREA



Zoar Levee and Diversion Dam

Legend

-  Real Estate Exclusion Area
-  National Register Boundary
-  Incorporated Village Boundary
-  916 Elevation Boundary
-  Corps Study Area

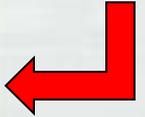


PLANNING BASELINE STUDIES

- GOALS**

- TO HAVE BASELINE DATA TO MEASURE THE EFFICENCY & ACCEPTABILITY OF ALTERNATIVES AGAINST

THIS IS AN EXAMPLE ONLY



EFFECTS	W/O PROJECT OR BASELINE	ALT A	ALT B	ALT C	ALT D
NET ECONOMIC BENEFITS	LOW	0	-	+	++
COMMUNITY	HIGH	--	0	0	-
REGIONAL ECONOMY	MODERATE	--	+	0	+
HISTORIC PROPERTIES	HIGH	--	++	-	0
SIGNIFICANT HABITAT	MODERATE	+	0	0	-
HTRW	MODERATE	++	0	0	-

0 = no change / + beneficial / ++ = very beneficial / - adverse / -- very adverse



QUESTIONS / DISCUSSION



BASELINE ECONOMIC ANALYSIS

NED (NATIONAL ECONOMIC DEVELOPMENT) ANALYSIS

GOALS:

- To assess economic benefits and costs
- To find the alternative with the highest net benefits not the least costly

PROCESS:

- NED analysis
 - Net benefits (reduction in damages)
 - Net costs (associated with construction, operations and maintenance)
 - Benefit to cost ratio (considered for funding prioritization)
- Strict rules for what can and can't be considered damages

THIS IS AN EXAMPLE ONLY



NED PLAN



ALT	Cost	Benefits	Net Difference
A	\$100	\$110	\$10
B	\$5,000	\$25,000	\$20,000
C	\$30,000	\$32,000	\$2,000
D	\$80,000	\$70,000	\$10,000

Cost to build project

Flood Damages Prevented



FLOOD DAMAGES

EMERGENCY COSTS

- Expenses resulting from a flood that would not otherwise be incurred
 - Evacuation
 - Flood fighting
 - Cleanup and disaster relief
 - Increased costs of operations during the flood (fire protection and police)

PHYSICAL

- Damages to or Total Loss of a Building, or Part of a Building and its Contents.
- Loss of Roads, Sewers, Bridges, Power Lines and Public Utilities



QUANTIFYING EMERGENCY COSTS

•EMERGENCY COSTS

- Accounting for all emergency costs per flood event
- Occurs on an agency by agency basis



QUANTIFYING PHYSICAL DAMAGES

•PHYSICAL DAMAGES

- Compilation of a Structure Inventory of all buildings that might be impacted during the maximum flood event
 - First floor elevation
 - Square footage
 - Number of floors
 - Type of structure (residential or commercial)
 - Occupancy type (store, post office, restaurant)
 - Age of structure



SAMPLE STRUCTURE INVENTORY

HELP US IMPROVE OUR DATA

	A	B	C	D	E	F	G
1	Structure						Number of
2	Identification	Street		Square	Type of	Age of	Floors
3	Number	Address	Street	Footage	Structure	Structure	(excluding
4							
5	5837		1st	800	Residential		3
6	5838		1st	1,004	Public		1
7	5839	151	1st	2,690	Residential		3
8	5841		1st	12,918	Commercial		3
9	5842b	23	Main	13,666	Commercial		2
10	5843		1st	11,126	Commercial		3
11	5845		1st	1,348	Public		1
12	5847		Park	2,306	Commercial		1
13	5848		Park	6,223	Residential		2
14	5922	338	7th	1,100	Residential		1
15	5923	388	7th	3,200	Residential		2



THEN WHAT?

- These damages are collected or estimated for each of our risk management alternatives.
- All of these damages are “annualized” over a fifty year time frame.
- This tells us what the expected average annual damages are.
- We can use that number to assess the success of our various risk management alternatives by comparing them against each other.



QUESTIONS / DISCUSSION



BASELINE HABITAT STUDY

GOAL: To identify significant habitat

PROCESS: Using existing resource laws to measure significance

- National Environmental Policy Act

- ▶ USACE
- ▶ EPA



- Clean Water Act

- ▶ USACE
- ▶ Ohio Environmental Protection Agency



OhioEPA

- Endangered Species Act

- ▶ US Fish and Wildlife Service



AQUATIC HABITAT EVALUATION

- Stream and Wetland Delineations
 - ▶ 6 streams
 - ▶ 12+ wetlands
- No presence of threatened or endangered aquatic species within the study boundary



EQ Habitat



Zoar Habitat Study

Zoar Habitat Study

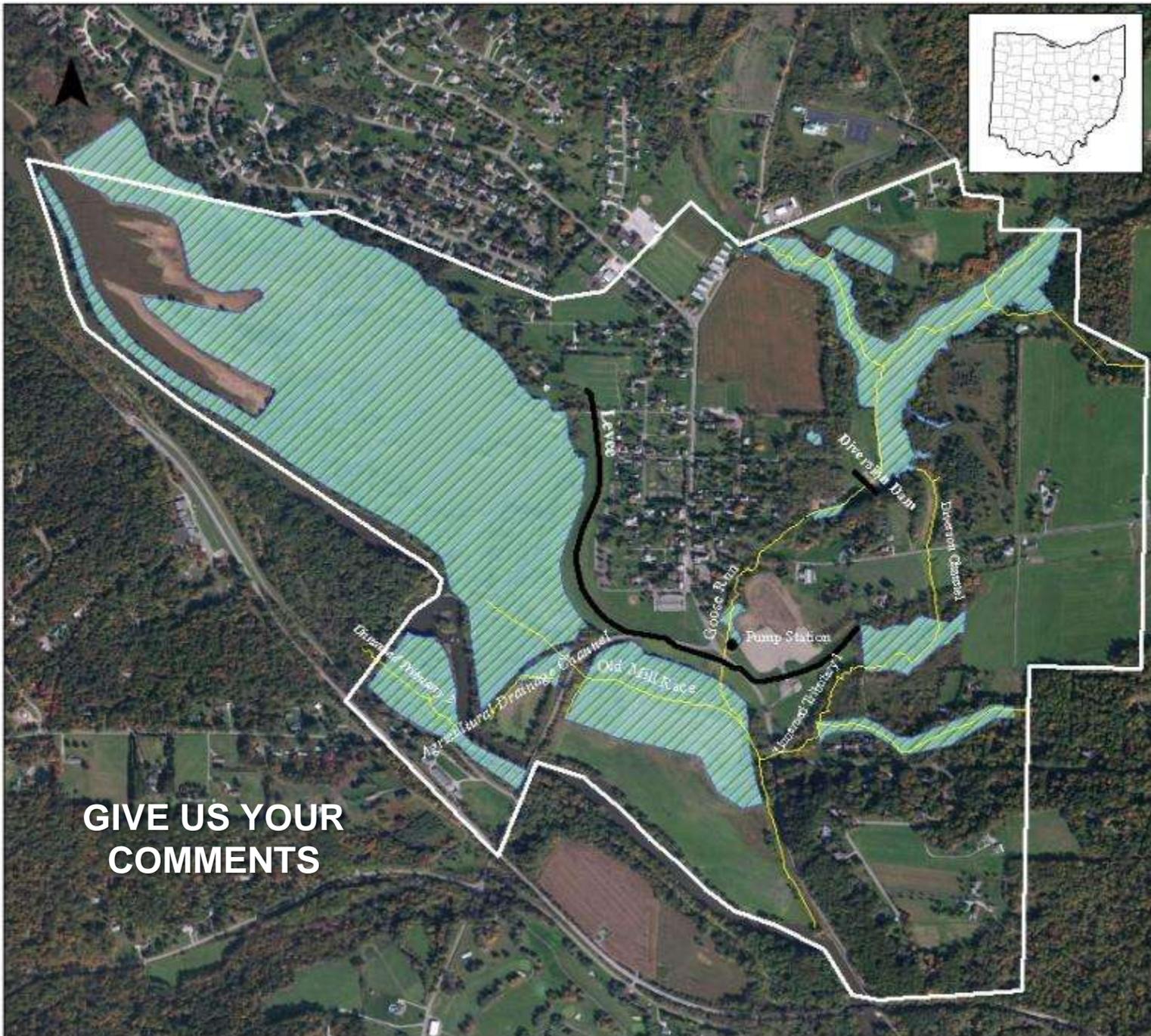
- Pump Station
- Drainage Features
- Levee & Diversion Dam
- Wetland
- Corps Study Boundary

0 0.1 0.2 Miles



US Army Corps of Engineers

GIVE US YOUR COMMENTS



TERRESTRIAL HABITAT EVALUATION

- No ecologically significant terrestrial habitats were found
- Indiana bat (*Myotis sodalis*) and the Bald eagle (*Haliaeetus leucocephalus*) may use the area



Adam Mann



QUESTIONS / DISCUSSION



BASELINE HTRW ANALYSIS

DEFINITIONS

Hazardous Toxic & Radioactive Waste

Describe a material that is detrimental to the environment and human health.

Environmental Site Assessment (ESA)

An ESA is a report that summarizes a site visit and records review of a property and its surrounding area to determine if any additional environmental investigation is warranted to understand the liability risks associated with the identified property .



ESA PURPOSE & TYPES

THE PURPOSE OF AN ESA

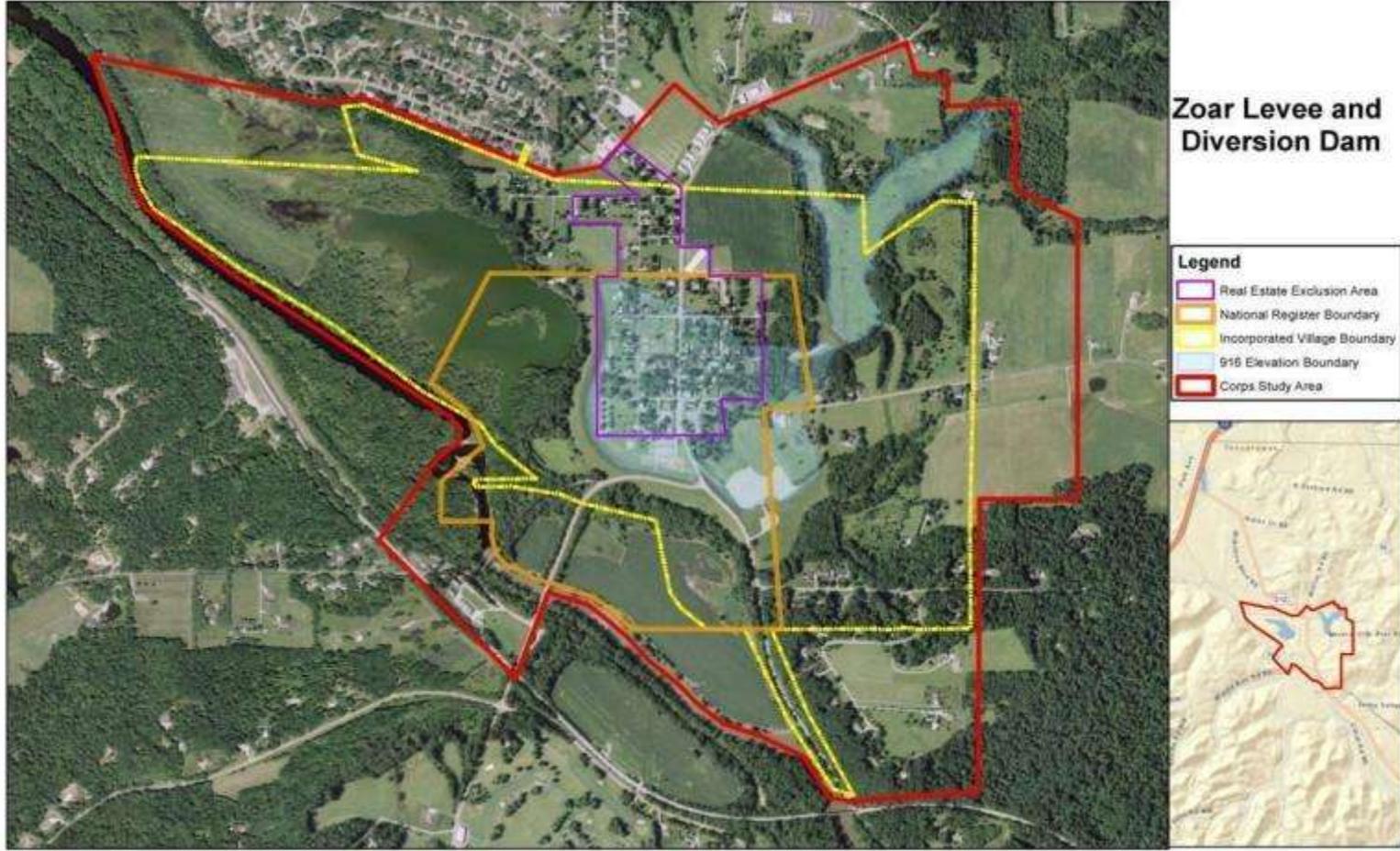
- To use a consistent systematic approach to identify any existing or potential environmental conditions that may be present or affect a real estate property.
- Early identification and appropriate consideration of HTRW problems during each phase of project development.

TWO TYPES OF ESAs

- Phase I - Unobtrusive: Observations and Research (Due Diligence).
- Phase II - Intrusive: Limited Samples taken for laboratory analysis



PLANNING BASELINE STUDY AREA



PHASE 1 ESA DRAFT RESULTS

METHODS:

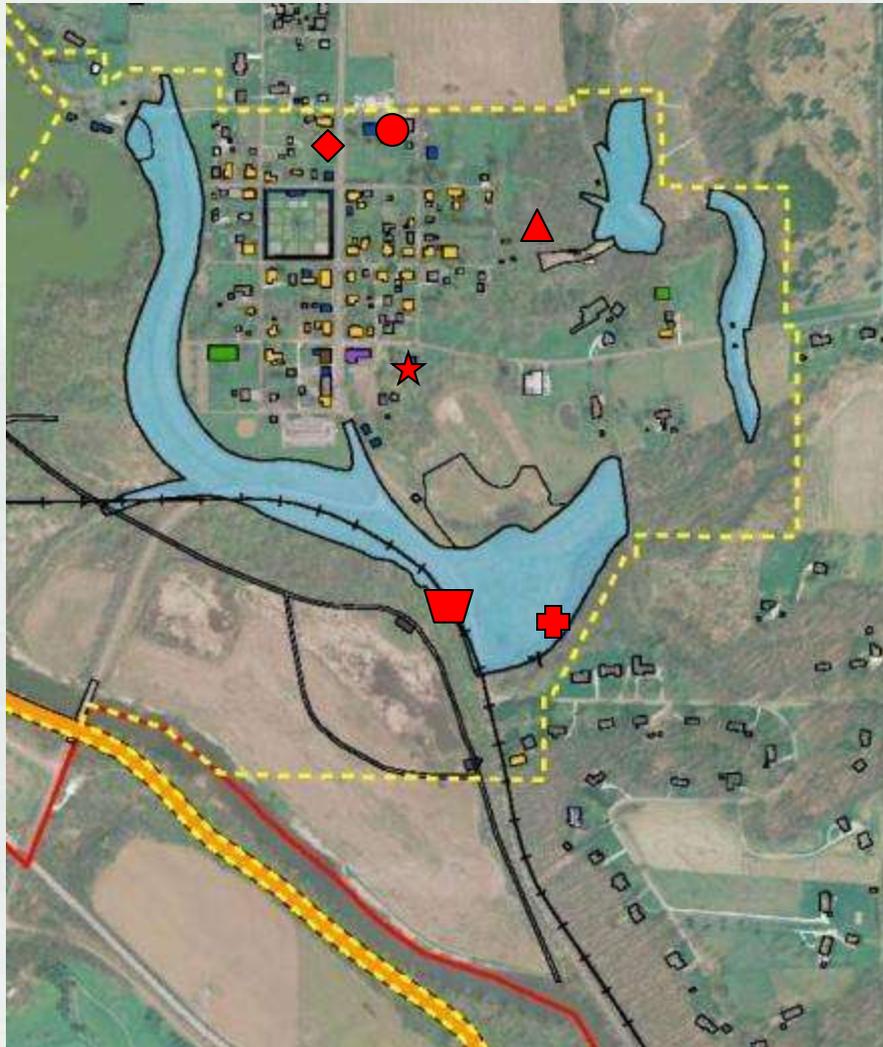
- Phase I ESA on Baseline Study area
- Records Review
- Site Reconnaissance
- Interviews
 - Seeking more input today.

RESULTS:

- There are several potential HTRW concerns within the Study Area:
 - It is possible that many structures in the study area contain material such as, asbestos, heating oil tanks, transformers.
 - There may also be potential impact of past industries in the Village:
for example:
 - Blacksmithing (coal/metals);
 - Tinsmithing (metals);
 - Tannery (acids, metals);
 - Agriculture (pesticides, herbicides).



HTRW INDUSTRIAL CONCERNS



Asbestos may be in any structure built into the 1980's

- Insulation
- Shingles/roofing material
- Siding
- Linoleum/floor tile
- Window glazing

★ Blacksmith shop

● Tinsmith shop

▲ Tannery

◆ Agriculture/Garden

▼ Machine Shop

⊕ Foundry

**LET US KNOW
WHAT YOU KNOW
ABOUT**



QUESTIONS / DISCUSSION

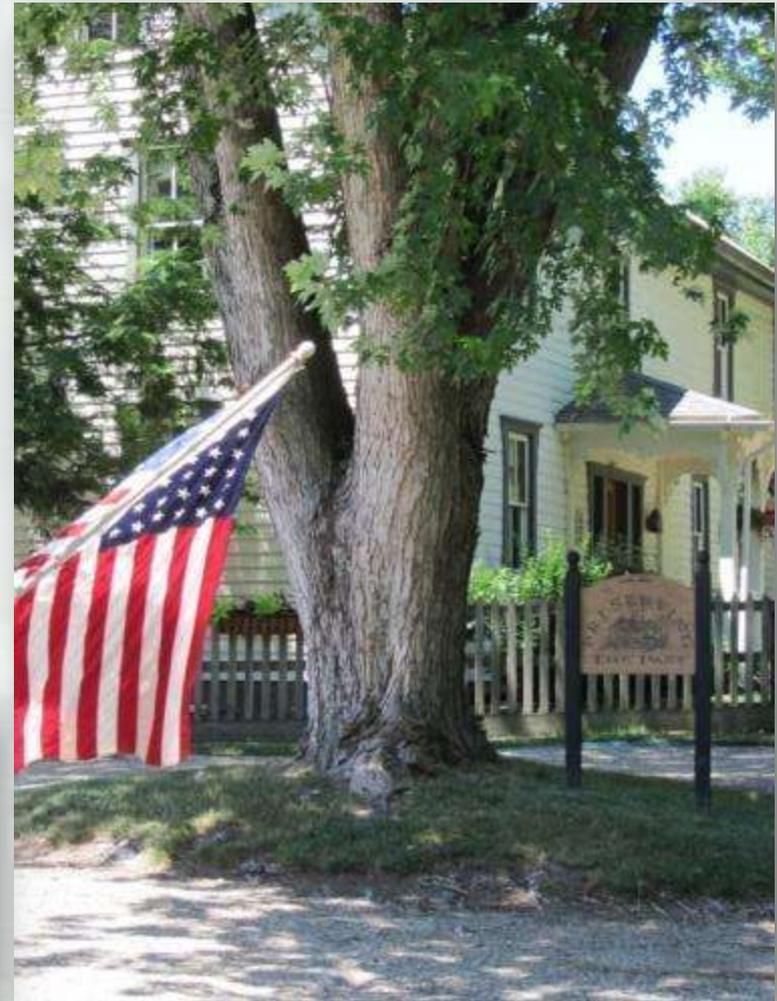


BASELINE HISTORIC PROPERTY STUDY

OBJECTIVES

HELP US IMPROVE OUR STUDY

- Record pertinent data about existing and potential historic properties in Study Area through background research, survey of above-ground resources, and development of archeological probability models
- Help identify potential impacts to historic properties during evaluation and comparison of risk management alternatives
- Assist in consultation with consulting parties under Section 106 of the National Historic Preservation Act of 1966 33 USC 470(f) and 36 CFR 800
 - a) Define Area of Potential Effects
 - b) Identify Historic Properties
 - c) Consider Effects to Historic Properties
 - d) Resolve Effects to Historic Properties



PLANNING BASELINE STUDY AREA



RESEARCH METHODS

- Repositories
- Interviews
- USACE Documents
- Online Resources
- Miscellaneous Resources



ABOVE GROUND SURVEY METHODS

- Baseline Study Area: Intensive Survey
- Zoar Land Holdings:
 - ▶ Documentary Review and
 - ▶ Visual Reconnaissance



- Separatist Resources
 - ▶ 82 resources within Study Area
 - ▶ 3 confirmed resources outside Study Area
 - Non-Separatist Resources
 - ▶ 263 resources within Study Area
- ▶ 86 resources pre-date 1962 (over 50 years of age)

1. Zoar Outliers Map; 2. All Separatist; 3. Numbered Structures



ABOVE GROUND SURVEY RESULTS

- Separatist Resources
 - ▶ Inside Baseline Study Area
 - ▶ Outside Baseline Study Area



- Non-Separatist Resources
 - ▶ 1898-1962
 - ▶ Post-1962

1. All Separatist; 2. Zoar Outliers Map; 3. Eligible Resources



SEPARATIST RESOURCE THEMES

- Residential: 42 resources
- Commercial: 1 resource
- Agricultural: 10 Resources
- Industry & Manufacturing: 7 Resources
- Transportation: 6 Resources
- Community, Education, and Religion: 20 Resources
- Tourism & Recreation: 2 Resources
- Flood Control Efforts: 1 Resource



SEPARATIST RESOURCES



NON-SEPARATIST RESOURCE THEMES UP TO 1962

- Residential & Community Development: 72 Resources
- Commerce & Industry: 4 Resources
- Tourism & Recreation: 4 Resources
- Transportation: 1 Resource
- Zoar & International Arts Movement: 0 Resources
- Flood Control Efforts: 5 Resources
- Preservation Efforts: 5 Resources



NON-SEPARATIST RESOURCE THEMES UP TO 1962



NON-SEPARATIST RESOURCE THEMES POST-1962

- Residential & Community: 155 Resources
- Commerce & Industry: 15 Resources
- Tourism & Recreation: 2 Resources
- Transportation: 1 Resource
- Zoar & International Arts Movement: 0 Resources
- Flood Control Efforts: 3 Resources
- Preservation Efforts: 6 Resources

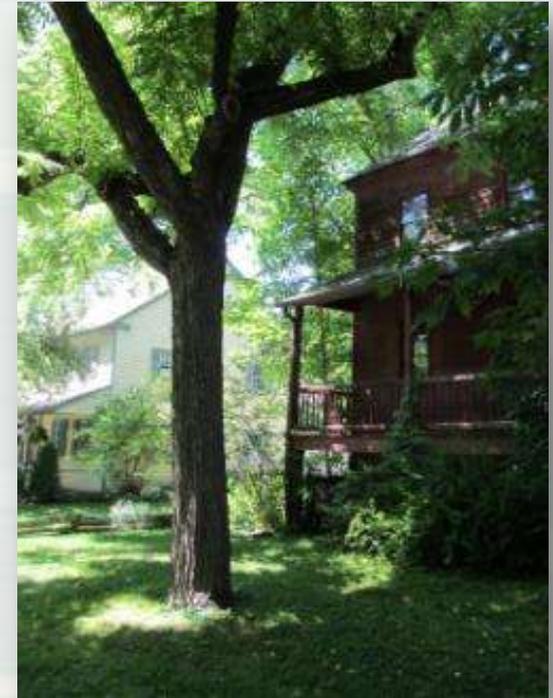


NON-SEPARATIST RESOURCE THEMES POST-1962



SUMMARY OF ABOVE-GROUND SURVEY RESULTS

- 348 total resources surveyed within Study Area
- 3 Separatist-era resources identified outside Study Area
- Seven new post-Separatist themes of significance
- Expand Zoar Historic District boundary to include newly-identified significant resources and themes
- Expand period of significance to 1962 to include significant developments in Study Area after dissolution of Society of Separatists of Zoar



Eligible
Resources
by
Theme



BOUNDARY ASSESSMENT

- Current Zoar Historic District
 - ▶ 14 Resources listed as contributing
 - ▶ Last updated in 1975
 - ▶ Did not consider post-1898 developments for period of significance
- Proposed Expansion to Zoar Historic District
 - ▶ Include a total of 83 Separatist resources and 9 non-Separatist resources
 - ▶ Reclassify Lime Kiln as non-Separatist and remove Zoar Foundry from list (not confirmed to exist)
 - ▶ Expand boundaries to include canal; add a discontinuous boundary to include outlying barn

1. Eligible Resources by Theme; 2. Zoar Outliers



ARCHAEOLOGICAL PROBABILITY ASSESSMENT

- Goals:
 - ▶ Conduct a disturbance assessment of Study Area to identify locations with no or low probability of surviving archeological resources
 - ▶ Identify areas within Study Area likely to hold significant Pre-Contact archeology resources
 - ▶ Identify areas within Study Area likely to hold significant Historic-period archeology resources



DISTURBANCE ASSESSMENT

- Goal: Identify areas of major and minor landform disturbance within the Study Area that would impact the probability of survival for significant archeological resources
- Areas identified include Zoar Levee & Diversion Dam construction footprints and borrow areas, areas of modern development, and subsurface utility locations
- Construction events may impact pre-contact and historical resources, including building construction and demolition, and construction of modern transportation assets.

Disturbance Map



ARCHAEOLOGICAL PROBABILITY ASSESSMENT: PRE-CONTACT

- Pre-Contact Archeological Resources
 - ▶ Predict locations of Pre-Contact resources by cultural affiliation and site type
 - ▶ Assess probability that site types within individual cultural periods will have information qualifying for inclusion in NRHP
 - ▶ Determine categories of data required to survive at each individual site type to make the site significant



PRE-CONTACT SITE TYPES

- Paleoindian: 3 site types
- Early Archaic: 1 site type
- Middle Archaic: 1 site type
- Late Archaic: 2 site types
- Early Woodland: 2 site types
- Middle Woodland: 1 site type
- Late Woodland: 3 site types
- Late Prehistoric: 2 site types



PRE-CONTACT PROBABILITY BY LANDFORM

- Floodplains, well-drained
 - ▶ Paleoindian workshops and chert-processing sites
 - ▶ Late Archaic and Early Woodland large summer base camps
 - ▶ Middle and Late Woodland year-round hamlets
 - ▶ Late Woodland small resource-extraction camps
 - ▶ Late Prehistoric villages
- Floodplains, poorly drained
 - ▶ Low probability for any pre-contact sites

1. 03 PaleoWorkshop Map 2. 08 E. Woodland Large Camp



PRE-CONTACT PROBABILITY BY LANDFORM

- Terraces
 - ▶ Paleoindian large workshops
 - ▶ Late Archaic and Early Woodland large summer base camps
 - ▶ Middle and Late Woodland year-round hamlets
 - ▶ Late Prehistoric villages
- Uplands
 - ▶ Small seasonally occupied resource-extraction camps, all cultural periods

1. 09 E. Woodland Small Camp



ARCHAEOLOGICAL PROBABILITY ASSESSMENT: HISTORIC-PERIOD RESOURCES

- Separatist Resources
 - ▶ Residential
 - ▶ Commercial
 - ▶ Agriculture
 - ▶ Industry & Manufacturing
 - ▶ Transportation
 - ▶ Community
 - ▶ Tourism & Recreation
 - ▶ Flood Control

Historic Probability Assessment Map



ARCHAEOLOGICAL PROBABILITY ASSESSMENT: HISTORIC-PERIOD RESOURCES

- Non-Separatist Resources
 - ▶ Residential
 - ▶ Commercial
 - ▶ Agricultural
 - ▶ Transportation
 - ▶ Industry & Manufacturing
 - ▶ Community, Education, & Religion
 - ▶ Tourism & Recreation
 - ▶ Flood Control

Historic Probability Assessment Map



QUESTIONS / DISCUSSION



COMMUNITY IMPACTS BASELINE STUDY

REVIEW THIS DATA FOR ACCURACY

DATA NEEDS & USES:

- As part of the OSE accounting process, USACE needs to collect data that:
 - ▶ Describes the complete social profile of Zoar Village
 - ▶ Identifies other social effects and regional economic development information
 - ▶ Documents the existing condition also known as the “without project” condition
 - ▶ Will also use to capture regional economic development



This data will be used to avoid, minimize and design mitigation for impacts to social or community life, and regional economic development.



PLANNING BASELINE STUDY AREA



Zoar Levee and Diversion Dam

Legend	
	Real Estate Exclusion Area
	National Register Boundary
	Incorporated Village Boundary
	916 Elevation Boundary
	Corps Study Area



ORGANIZATION

- The study covers three major topics:
 - Current demographic and socioeconomic characteristics;
 - Current community social interactions and activities; and
 - Potential significant community characteristics.

OSE DEFINITION POSTER



STUDY APPROACH & METHODOLOGY

- Implemented guidelines from the USACE Handbook for Applying “Other Social Effects” Factors in Water Resources Planning
- Collected most recent publicly available demographic data for Zoar Village
- Collected similar data for Tuscarawas County and three comparison communities: Parral, Roswell and Stone Creek
- Conducted comparative analysis to put Zoar’s characteristics in a regional context and highlight unique features

COMPARISON COMMUNITIES
POSTER



DEMOGRAPHIC SUMMARY

POPULATION:

- 169 individuals spread across 77 households
- Over half the population is between 45 and 69 years of age
- Over a quarter of the population is 65 or over
- Highest median age (53) when compared to Tuscarawas County (41); Parral (49), Roswell (34); and Stone Creek (47)

POPULATION CHARACTERISTIC POSTER



DEMOGRAPHIC SUMMARY

EDUCATION:

- 34% of Zoar resident's that are 25 or older have a Bachelor's degree or higher
- Zoar Village has a higher percentage of Bachelor degrees than Tuscarawas County (18%), Parral (7%), Roswell (2%) and Stone Creek (7%)

INCOME:

- Median household income (\$80,625) is higher than comparison communities and almost twice the County (\$42,081)



DEMOGRAPHIC SUMMARY

EMPLOYMENT:

- 81 percent of residents work for a private company
- 10 percent of residents are self employed

MAJOR INDUSTRY SECTORS:

- 44 percent work in the education and health services sector
- 22 percent work in professional, scientific and management sector
- 11 percent in retail trade



DEMOGRAPHIC SUMMARY

COMMUTE MODE:

Mode	Zoar	Parral	Roswell	Stone Creek	Tuscarawas
Worked at home	11.0%	0.0%	0.0%	0.0%	2.4%
Car, truck, or van	89.0%	95.5%	96.4%	84.8%	94.2%
Drove alone	89.0%	91.0%	92.7%	83.9%	87.8%
Carpooled	0.0%	4.5%	3.6%	0.9%	6.5%
Public transportation (excluding taxi)	0.0%	0.0%	0.0%	0.0%	0.1%
Walked	0.0%	2.7%	0.0%	2.7%	1.9%
Bicycle	0.0%	1.8%	0.0%	0.0%	0.6%
Taxi, motorcycle, or other means	0.0%	0.0%	3.6%	12.5%	0.8%



DEMOGRAPHIC SUMMARY:

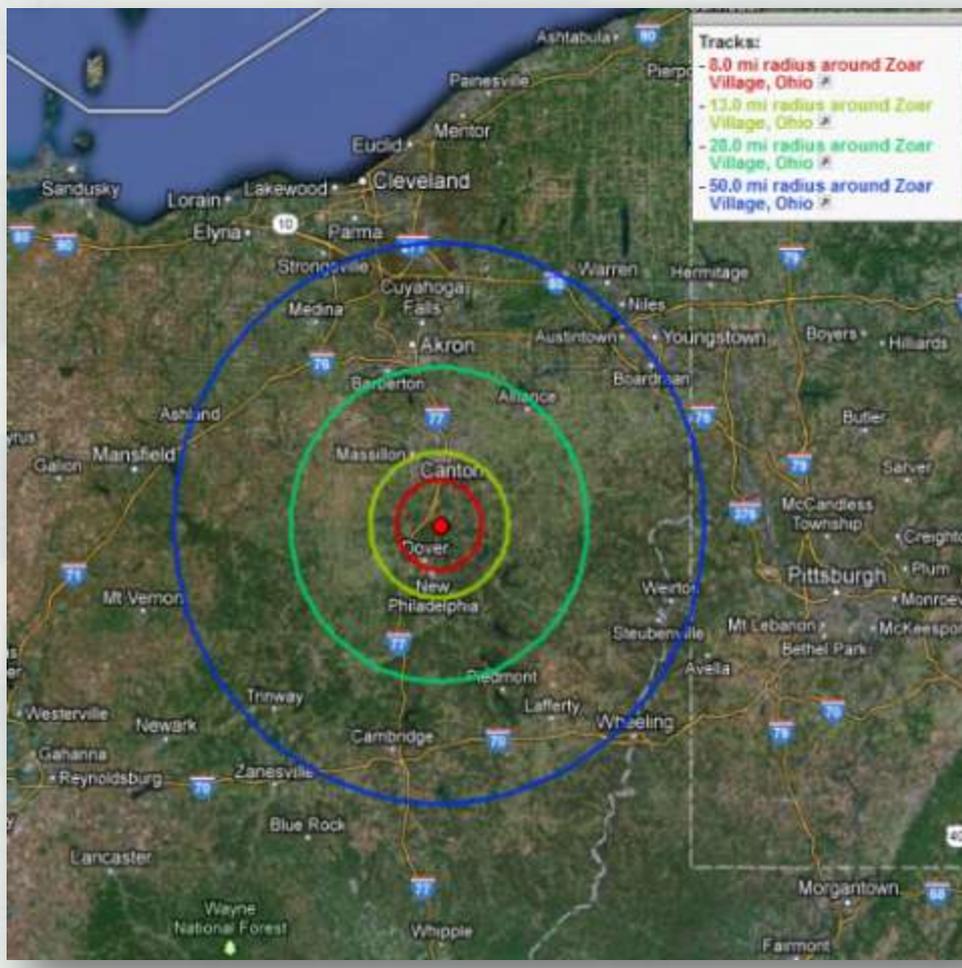
COMMUTE TIMES:

- The mean commute time for all workers in Zoar Village is 25.3 minutes.
- Over 80 percent of Zoar workers drive between 15 to 34 minutes to their place of employment.
- Nearly 8 percent drive for one hour or longer to where they work.



DEMOGRAPHIC SUMMARY:

COMMUTE DISTANCE:



4.6% commute within 8-mile radius, where Dover is located

81.5% commute within the 13- and 28-mile radii, where Massillon, Canton, Green, Louisville, East Rochester, Carrollton, and Uhrichsville are located

3.1% commute within the 28-mile & 50-mile radii, which includes Akron, Steubenville, Piedmont, Lafferty, and Cambridge



WHAT ARE ZOAR'S CHARACTERISTICS

- ▶ **Incorporated Community**
 - Municipal Services and Fire Department
- ▶ **A Socially Active Community**
 - ZCA , Earth Action Partnership, Religious and Private Partners
- ▶ **Ohio State Memorial Site**
 - Ohio Historical Society and Ohio State Investment
- ▶ **Regional Heritage & Tourist Asset**
 - Part of a National Heritage Area
 - Ohio & Erie Canalway Coalition
- ▶ **Nationally Significant Historic Site**
 - National Trust Involvement

INTERACTION
SPHERES
AND
MEMBERSHIP
POSTERS



ZOAR'S CHARACTERISTICS GENERATE

- ▶ An identity with Society of Separatists heritage
- ▶ Organizations that promote social interaction and sense of group identity
- ▶ Means for social welfare, safety, and security
- ▶ Opportunities for economic development through heritage tourism
- ▶ Potential to meet recreational needs of residents and the State of Ohio
- ▶ Continued investment in maintaining vitality of historically significant resources in present
- ▶ Development of environmental assets



ZOAR'S CHARACTERISTICS GENERATE

SIGNIFICANT EVENTS:

- Harvest Festival
- Christmas in Zoar
- Civil War Reenactment
- Oktoberfest Festival
- Zoar Village Cultural Classes, Speaker Series
- Adult and School Guided Tours & Educational Programs



VISITOR STATISTICS SLIDE



FUTURE EXPECTATIONS

GOVERNMENT AGENCIES, LOCAL GROUPS & PUBLIC INTEREST ORGANIZATIONS ARE COLLABORATING AND INVESTING IN ZOAR'S FUTURE

- ▶ Improve streetscapes and accessibility and preserve and maintain historic buildings
- ▶ Joint marketing of Zoar Village as a historic destination
- ▶ Collaborative effort led by the Ohio Historical Society to apply for National Historic Landmark designation



CONCLUSIONS

FINDINGS:

- USACE needs additional data to complete the Community Impacts Baseline Study

RECOMMENDATIONS:

- Collect primary data from Zoar residents, businesses and other stakeholders to better understand:
 - ▶ Community connectivity:
 - ▶ Dependence on tourism
 - ▶ Resident socioeconomic patterns
 - ▶ Existing or perceived threats to Zoar Village



NEXT STEP: SMALL GROUP WORKSHOPS

- Primary data acquisition requires Office Of Management and Budget (OMB) approval
- USACE is developing a Small Group Workshop Delivery Plan that identifies stakeholders, groupings, potential questions and workshop logistics
- USACE will seek OMB approval of questions and implement plan
- Workshops planned for June/July 2013



QUESTIONS / DISCUSSION



THANK YOU

