PHASE 1 STUDIES UPDATE
EROSION WORKING GROUP

Presented By
MICHAEL WOLFF, PG

Erosion Study Area Manager

West Valley Demonstration Project
Quarterly Public Meeting
August 24, 2016

OUTLINE

- ***Study 1 – Terrain Analysis, Age Dating, and Paleoclimate***
- ***Study 2 – Recent Erosion and Deposition Processes***
- ***Study 3 – Preliminary Erosion Modeling***
- ***Next Steps***
- ***Questions***

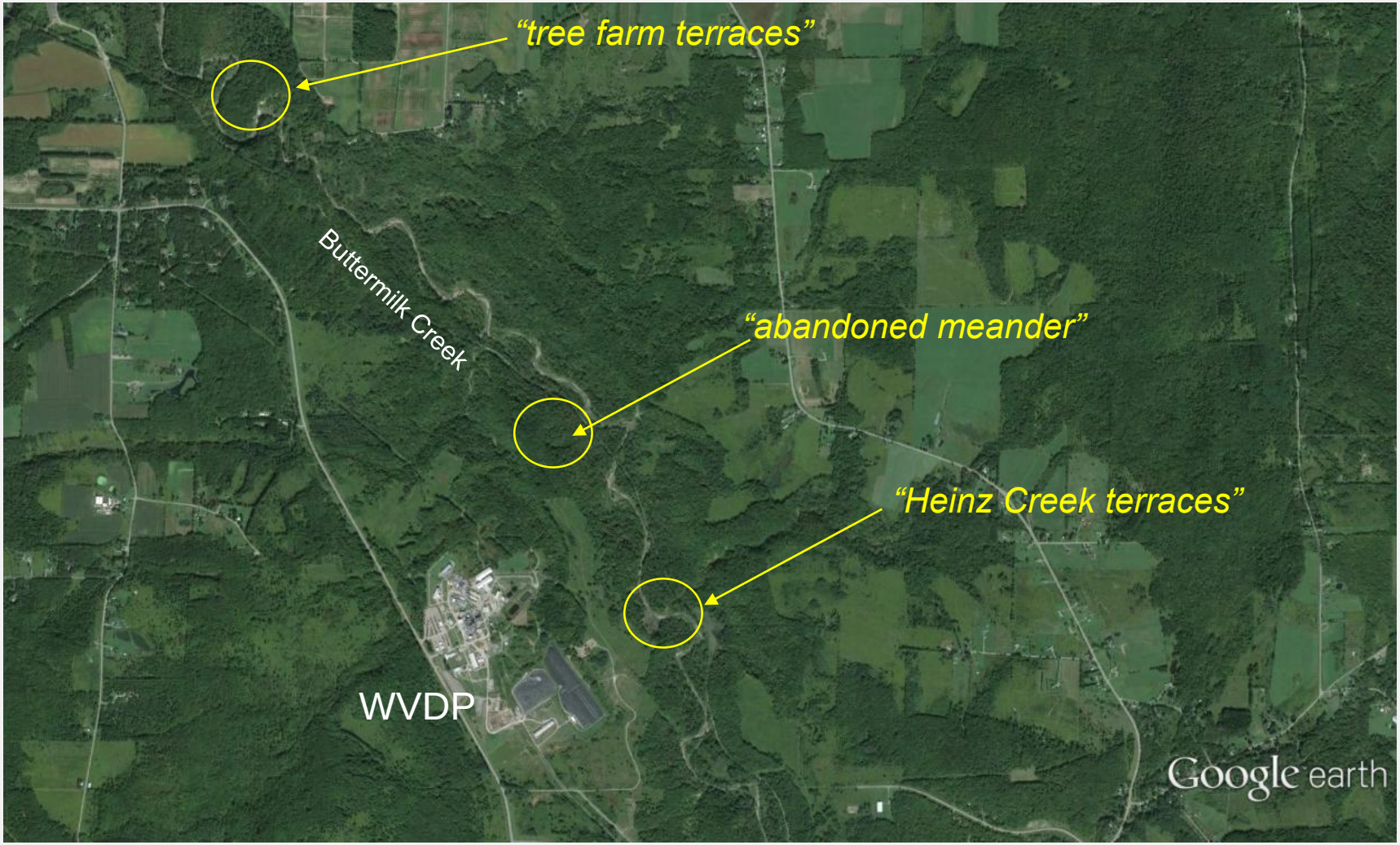
Study 1 – Terrain Analysis, Age Dating, and Paleoclimate

TASK STATUS:

- **Task 1.1:** Mapping - **completed**
- **Task 1.2:** Field Reconnaissance - **in progress**
- **Task 1.3:** Site Prioritization - **completed**
- **Task 1.4:** Site Walkover - **completed**
- **Task 1.5:** Site Sampling - **nearly completed**
- **Task 1.6:** Sample Preparation and Selection for Dating - **in progress**
- **Task 1.7:** Sample Age Analysis, Geologic Interpretation - **in progress**
- **Task 1.8:** Report - **start August 2016**

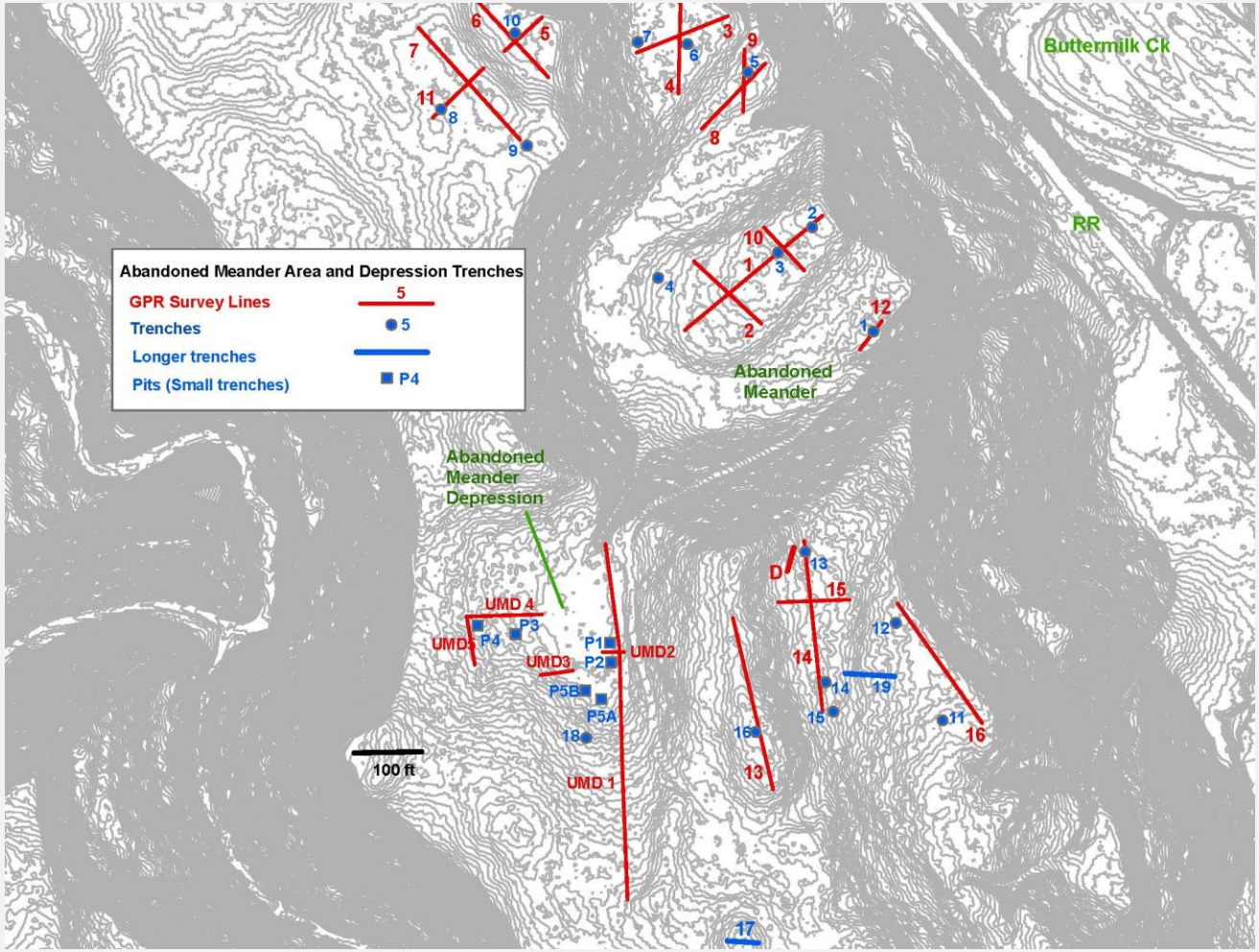
STUDY 1 - *Terrain Analysis, Age Dating, and Paleoclimate*

Task 1.5: Key Sampling Locations



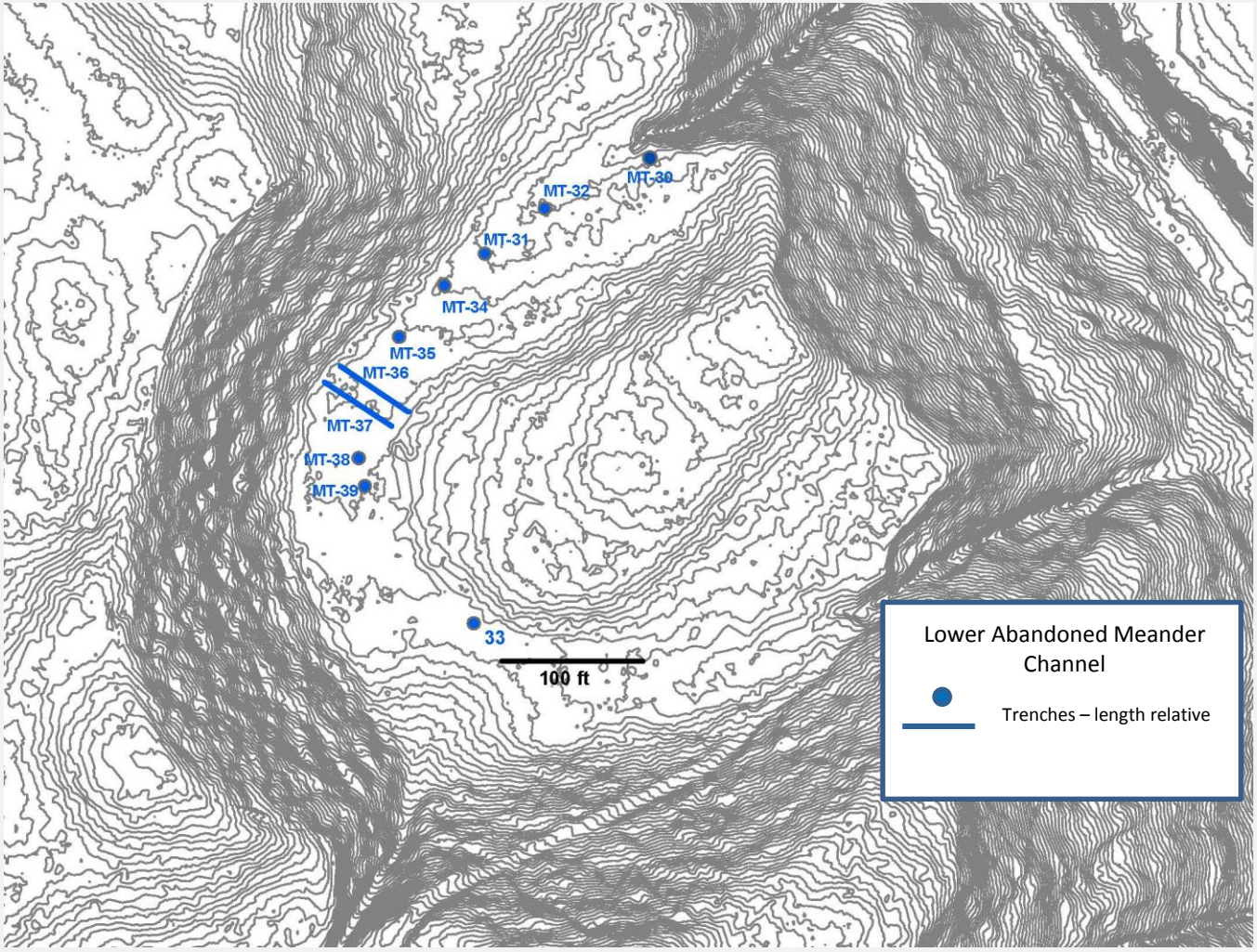
STUDY 1 - *Terrain Analysis, Age Dating, and Paleoclimate*

Task 1.5: Example – Abandoned Meander Area



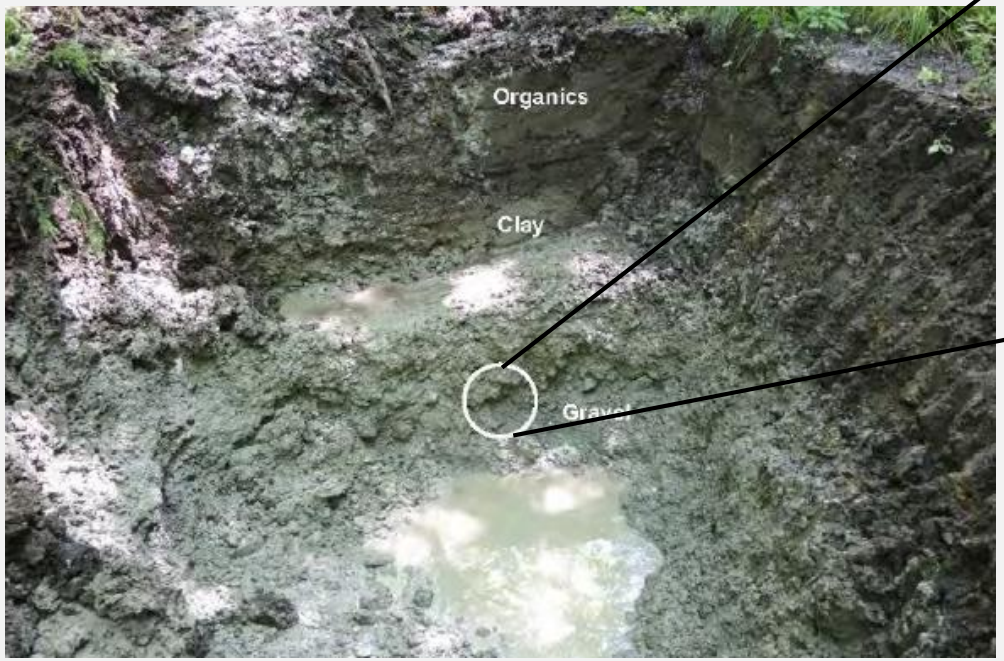
STUDY 1 - *Terrain Analysis, Age Dating, and Paleoclimate*

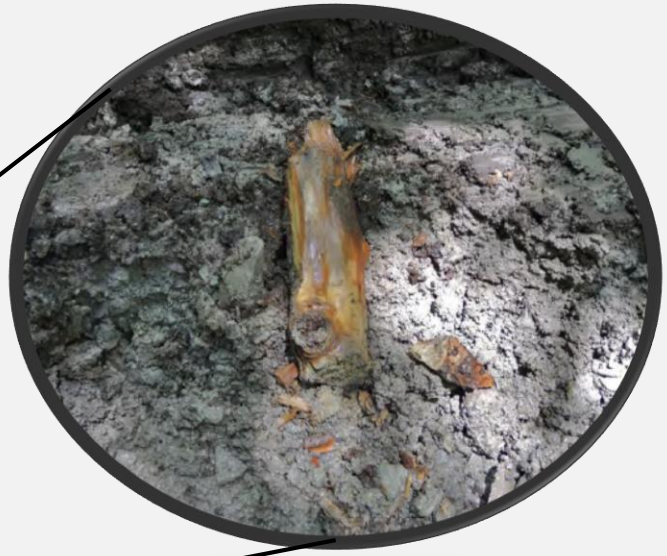
Task 1.5: Example – Abandoned Meander - Channel



Task 1.5: Example – Sampling at Abandoned Meander

Trench MT-38 (location shown on Slide 6)





Wood sample collected for C14 dating

STUDY 2 - *Recent Erosion and Deposition Processes*

TASKS:

- ***Task 2.1**: Quantify Rainfall Rates and Snow Depth – may use existing data from SDA*
- ***Task 2.2**: Quantify Infiltration Capacity - in progress*
- ***Task 2.3**: Quantify Flow Rates and Total Suspended Solids in Select Gullies – see added task*
- ***Task 2.4**: Quantify Flow Rates and Total Suspended Solids at Select Stream Locations – see added task*
- ***Task 2.5**: Quantify Erodibility of Cohesive Sediment - in progress*
- ***Task 2.6**: Quantify Erodibility of Clastic Sediment – in progress*
- ***Task 2.7**: Quantify Topographic Characteristics of Select Gullies - completed*
- ***Task 2.8**: Reports – in progress*

***Added task:** Dr. Bennett recommended digital comparison of 2010 and 2015 LiDAR using change detection modeling owing to difficulty of installing instrumentation in steep and active gullies; this also provides a 5-year timeframe instead of one season.*

STUDY 2 - *Recent Erosion and Deposition Processes*

TASKS:

Examples of Infiltration and Jet Testing (erodibility) Tasks 2.2, 2.5, and 2.6:

Jet testing in shallow pit

Infiltration testing

STUDY 3 –*Preliminary Erosion Modeling*

TASKS:

- ***Task 3.1:*** *New Data-Collection Support and Evaluation – in progress*
- ***Task 3.2:*** *Preparatory Work for Model Selection and Component Testing – in progress*
- ***Task 3.3:*** *Design Model Calibration and Testing Strategy - in progress*
- ***Task 3.4:*** *Select, Extract, and Analyze Topographic Metrics – in progress*
- ***Task 3.5:*** *Generate Model Grids – in progress*
- ***Task 3.6:*** *Design Strategy and Select Site for Model Validation – in progress*
- ***Task 3.7:*** *Report Progress to Agencies and Stakeholders – in progress*
- ***Task 3.8:*** *Identify, Obtain, and Become Familiar with Computing Resources – in progress*
- ***Task 3.9:*** *Create Preliminary Design for Future-Erosion Projection*
- ***Task 3.10:*** *Compile and Analyze New Available Climate/Hydrology Data and Define Parameter Ranges*

STUDY 3 – *Preliminary Erosion Modeling*

Modeling Activities Completed Include:

- *Assessed modeling improvements published since FEIS modeling (8-10 years ago)*
- *Completed preliminary review and evaluation of*
  - *Geomorphic processes*
  - *Mathematical methods for simulating the processes*
  - *Methods for evaluating uncertainty*
- *Developed a code structure that can readily incorporate external data such as digital topography data, etc.*
- *Developed code to extract and statistically analyze data used in FEIS modeling to assist in benchmarking uncertainty*
- *Completed quality assurance assessment of the methodology*
- *Created model grids from LiDAR for two areas: (1) Buttermilk Creek watershed, and (2) Franks Creek watershed, at five resolutions: 3, 6, 12, 24, and 48 feet*
- *Completed quality control evaluation for input of grids into erosion-modeling software*

STUDY 3 –*Preliminary Erosion Modeling*

Modeling Activities Underway Include:

- *Started developing code using most useful and computationally- efficient models currently available*
- *Testing a simple model for computational efficiency using various input parameters, algorithms, and grid spacings to determine where computational "logjams" occur*
- *Preparing model development documentation to provide a paper trail of the development process*
- *Evaluating state-of-practice means of incorporating probabilistic methods for representing parameter ranges*
- *Evaluating state-of-practice means of evaluating uncertainty, including uncertainty growth with time*

NEXT STEPS

- ✓ ***Study 1 – Additional data collection will be dependent on data gaps identified by modeling***

- ✓ ***Study 2 – Continue collection of field data as needed for modeling; use change detection models to extract key information from comparison of the 2015 with earlier LiDAR data***

- ✓ ***Study 3***
  - ***Continue building and testing model(s),***
  - ***Calibrate to past history***
  - ***Test on analogue watershed***
  - ***Run forward projections***
  - ***Evaluate uncertainty***

QUESTIONS?