Quarterly Public Meeting[1, 2]

Ashford Office Complex
9030 Route 219
West Valley, New York
Wednesday, August 22, 2012

6:30 pm Welcome and Introductions..... Bill Logue

6:35 pm Project Update ..... Bryan Bower, DOE

6:50 pm Update on Phase 1 Studies Timeline of Activities and Studies.....Dhananjay Rawal, ECS

7:05 pm Erosion Working Group (EWG) Recommendations for Phase 1 Studies.....Erosion Study Area Subject Matter Experts (SMEs) and Michael Wolff, ECS

7:55 pm Public Discussion, Questions, and Answers with Erosion SMEs

8:30 pm Topics for Next Meeting.....Bill Logue

8:35 pm Wrap up

8:40 pm Adjourn

Next Meeting Tentatively Scheduled
Wednesday, November 14, 2012
6:30 p.m.
Ashford Office Complex

[1]If you want to participate the QPM via WebEx then please e-mail Dhananjay at drawal@ecs-i.com with your name, affiliation, and e-mail address by August 19, 2012.

[2] Call-in number: 1-866-203-7023; Participant code: 3471502563

To mute your phone press *6. To un-mute press #6. Please mute when listening to presentations.

Meeting discussion material will be posted to: www.westvalleyphaseonestudies.org

GROUND RULES

For Moderated Public Meetings

Phase 1 Studies

West Valley Demonstration Project (WVDP) and
Western New York Nuclear Service Center (WNYNSC)

- *Please turn cell phones off, or to vibrate.*
- *Please respect the time limitations of the meeting.*
- *One person will speak at a time.*
- *Please do not interrupt anyone who is speaking.*
- *Please avoid side conversations in the room.*
- *Please hold all questions and comments until the presentation is completed and the moderator begins the question/comment period.*
- *Please clearly state your name before asking a question or making a comment.*
- *It is the moderator's job to manage the order of stakeholder participation (questions/comments) during the meeting.*
- *Stakeholders at the meeting will be recognized first.*
- *Stakeholders at the meeting should raise hands to be recognized before speaking.*
- *Stakeholders on the telephone or participating in a web-based meeting will be recognized after all questions/comments from stakeholders at the meeting are processed.*
- *Stakeholders on the phone please place your telephones on mute unless you are recognized by the moderator to speak.*
- *Meeting notes will be taken; meeting summaries will be prepared and posted on the website following review and approval by DOE/NYSERDA. The meeting summaries will include a general summary of questions and responses, but will not include individual comments and responses.*

West Valley Phase 1 Studies Update

Presented By

Quarterly Public Meeting
August 22, 2012

Agenda

- Status of Erosion PAS – You will hear from SMEs directly in next presentation.
- Status of Engineered Barriers PAS
- Status of Exhumation PAS
- Climate Change Workshop – Feedback
- Phase 1 Study Website - Update
- Looking Ahead
- Near – Term Timeline

Status of Engineered Barriers PAS

- ECS invited and completed contracting agreements with the SMEs to participate in the Engineered Barriers PAS. A brief bio of each SME is presented on the (westvalleyphaseonestudies.org) website.
- David Kosson, PhD, Professor and Chair of Civil and Environmental Engineering, Vanderbilt University, was added as fifth SME per agency approval. Currently Dr. Kosson is conducting research in collaboration with the Energy Research Centre of The Netherlands on leaching of contaminants from wastes.
- Other four are:
  - **Craig Benson, PhD, PE, DGE, NAE**
  - **Jay Beech, PhD, PE**
  - **Charles Shackelford, PhD, PE**
  - **Ted Johnson**
- A Kick Off meeting was held on July 12, 2012 with SMEs, DOE, NYSERDA, and ECS to discuss the mission, roles, and scope.
- Weekly Engineered Barriers Working Group (EBWG) conference calls and discussions are ongoing.

Update on Exhumation
PAS & SMEs

Area of Specialization	Subject Matter Expert(s)
West Valley Waste Inventory	Dr. Ralph Wild Stephen Marschke
Waste Removal and Handling	Dr. Frank Parker Jay Pride Michael Travaglini
Radiological Protection	William (Billy) Thomas
Waste Classification and Disposal	W. T. (Sonny) Goldston

Exhumation SMEs

Dr. Ralph Wild

- More than 33 years of experience in various corporate and consulting roles related to radiological waste disposal and integrated safety analysis
- Since 2004, Radiological Consultant to private companies and government agencies in the areas of integrated safety assessments, licensing, and radiological waste management
- Extensive Experience at West Valley Dating Back to Late 1990's
  - Project/Technical Manager/Principal Investigator for development of radionuclide inventories for the NRC- and State-Licensed Disposal Areas
  - Technical support to evaluation of waste management alternatives
  - Technical support to evaluation of remedial actions

Exhumation SMEs (cont.)

Stephen Marschke

- Senior nuclear engineering and radiological assessment analyst
- Areas of expertise include technology assessment, radiological risk assessment, nuclear licensing, and regulation development
- Managed effort for West Valley Nuclear Services Company (WVNSCO) in the assessment of alternative technologies for completion and closure and/or long-term management of the WNYNSC
- Authored the residual inventory supplemental report for the four high level waste tanks at WNYNSC

Exhumation SMEs (cont.)

Dr. Frank Parker

- PhD in Civil Engineering from Harvard University
- Distinguished Professor (Emeritus) of Environmental and Water Resources Engineering, Vanderbilt University
- Formerly Head of Radioactive Waste Disposal Research at Oak Ridge National Laboratory and first person to hold that position at IAEA in Vienna
- Internationally recognized expert in nuclear remediation, and one of the leading experts in helping the United States and Russia clean up after accidents and inadequate handling of nuclear wastes
- Named a National Associate by the National Academies, which includes the National Academy of Sciences, the National Academy of Engineering, and the National Research Council
- Primary areas of current research are radiological and hazardous waste management and water infrastructure and terrorism
- Previous involvement as member of DOE review team at West Valley

Exhumation SMEs (cont.)

Jay Pride

- Currently serves as Manager for DOE and nuclear business areas for ITSI, designated subcontractor to ECS for Phase I Studies
- 36 years of experience and national recognition as a leader in developing and implementing innovative solutions in the areas of decontamination and decommissioning (D&D) and waste management for both DOE and the commercial industry
- Licensed, designed, and managed total operations for three companies executing nuclear D&D and nuclear and mixed waste management projects
- Extensive experience with complex nuclear safety related facilities, including criticality control and high activity levels requiring remote sectioning and handling

Exhumation SMEs (cont.)

Michael Travaglini

- 30+ years' experience in site remediation activities for the Department of Energy, Oak Ridge Operations
- Senior Project Manager for several waste removal projects at Oak Ridge:
  - Remediation of ~65,000 deteriorating drums of low level radioactive sludge, with repackaging of the material into new containers for off-site disposal
  - Remediation of the K-770 Scrap Yard; segregating, shipping and disposing of 48,000 tons of uranium contaminated metal waste
  - Remediation of the K-1070-A burial ground; exhumation, segregation, and disposal of 22,000 cubic yards of uranium contaminated debris and soil
  - Remediation of the K-1070-B Burial Ground; exhumation, segregation, and disposal of 100,000 cubic yards of uranium contaminated debris and soils
  - Demolition of several uranium/technetium contaminated facilities

Exhumation SMEs (cont.)

William (Billy) Thomas, CHP, CIH

- BS in Health Physics and MS in Environmental Health
- Over 31 years of practice as both a Certified Health Physicist and a Certified Industrial Hygienist with an emphasis on systems to minimize personnel exposure to radiological and hazardous materials during remedial activities
- Developed and/or audited site-specific Health and Safety Plans and Radiation Protection Plans for remediation work, including radioactive waste excavation, at DOE's Fernald, Oak Ridge, Los Alamos, Nevada, and Rocky Flats Plants and Other DOE National Laboratories
- Recently served as Radiation Safety Officer at a decommissioning project for the excavation and packing of 2-5% uranium and thorium source material

Exhumation SMEs (cont.)

W.T. (Sonny) Goldston

- Currently serves as Manager of Integrated Waste Strategy for Energy Solutions, Inc.
- Primary area of expertise is the determination of waste classification and the most cost-effective disposal options as waste is exhumed from the ground
  - Appropriately integrates the requirements of DOE, the NRC, and EPA as they apply to high level, low level, and transuranic wastes
- Serves as Chair of the Energy Facility Contractors Group (EFCOG) Waste Management Working Group, which provides leadership and direct regulatory and technical assistance to the DOE and their contractors on current waste management issues
  - Led the EFCOG team for development of Waste Incidental to Reprocessing Citation procedures at West Valley and at DOE's Savannah River Site

Climate Change Workshop -Update

Climate Change Workshop was held on August 2, 2012 at West Valley.

Path Forward:

With contributions from the Climate Scientists, ECS will prepare *a Climate Guidance for Phase 1 Studies* document to address the following Foundation Questions:

- What are the potential impacts of climate change on the Phase 1 Studies Potential Areas of Study (PAS)?
- How may these impacts be evaluated in order to help the agencies reach consensus on Phase 2 decisions?

The guidance estimated to publish in November 2012 will include:

- ✓ A summary of issues addressed during the workshop.
- ✓ The Climate Scientists' thoughts, observations, and recommendations for a path forward to help DOE, NYSERDA and Subject Matter Experts (SMEs) address the topic of climate within the scope of Phase 1 Studies

Status of Phase 1 Study Website

Website Address: http://westvalleyphaseonestudies.org

- ✓ Phase 1 Study Website is the primary tool where public is now very familiar in obtaining up-to-date information on Phase 1 Studies including latest announcements and updates
- ✓ Auto Update E-Mail notification will be restored soon after more security measures and testing
- ✓ Climate Change Workshop Handbook and EWG Recommendations for Phase 1 Studies documents were posted
- ✓ Website Contents: The phase 1 studies website has six main pages: ***Home***, ***Phase 1 Studies Process***, ***Phase 1 Studies Update***, ***Documents, Public Meeting***, and ***Contact us***

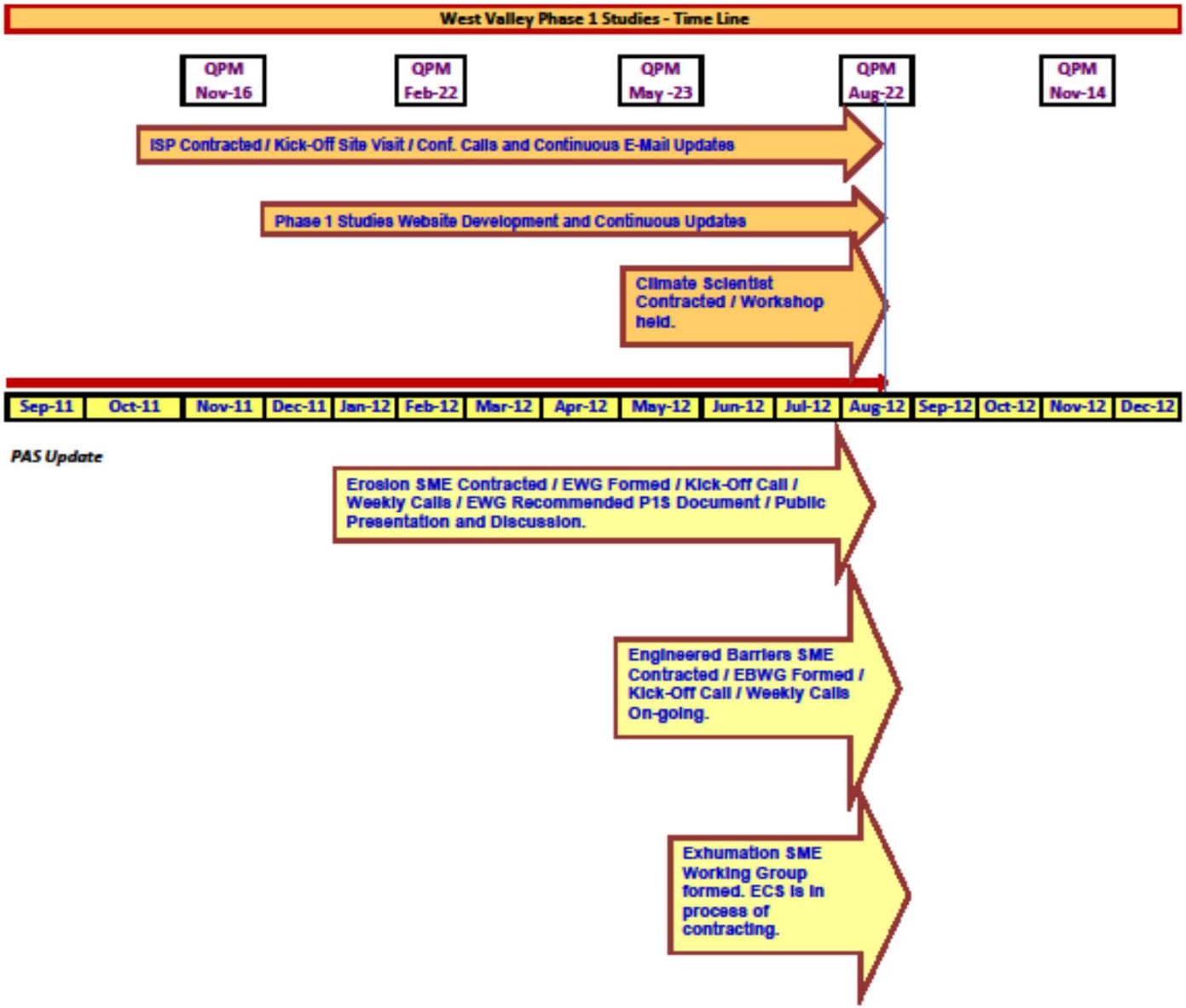
Next Steps for EWG Recommendations

- DOE/NYSERDA currently gathering stakeholder input on EWG recommendations.
- On 9/7/2012, DOE/NYSERDA will provide all input received to Independent Scientific Panel (ISP).
- ISP will begin their review of the recommendations and consideration of stakeholder input.
- ISP will provide their review of the EWG recommendations to DOE/NYSERDA. Target: 10/1/2012.
- DOE/NYSERDA to identify path forward on Phase 1 Studies for Erosion. Target: 11/1/2012

Looking Ahead

Upcoming ECS Work Activities:

- Continue to update Phase 1 Study Website with DOE/NYSERDA
- Continue to work on *Climate Guidance for Phase 1 Studies*
- Complete a recommended program of work for the Engineered Barriers PAS and progress with implementation upon DOE/NYSERDA approval
- Complete SME contracts for Exhumation PAS and develop recommended program of work for the Exhumation PAS


West Valley Phase 1 Studies - Time Line
QPM Nov-16
QPM Feb-22
QPM May -23
QPM Aug-22
QPM Nov-14
ISP Contracted / Kick-Off Site Visit / Conf. Calls and Continuous E-Mail Updates
Phase 1 Studies Website Development and Continuous Updates
Climate Scientist Contracted / Workshop held.
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
Dec-12
PAS Update
Erosion SME Contracted / EWG Formed / Kick-Off Call / Weekly Calls / EWG Recommended P1S Document / Public Presentation and Discussion.
Engineered Barriers SME Contracted / EBWG Formed / Kick-Off Call / Weekly Calls On-going.
Exhumation SME Working Group formed. ECS is in process of contracting.

Acronyms

CIH	Certified Industrial Hygienist
CHP	Certified Health Physicist
DOE	Department of Energy
ECS	Enviro Compliance Solutions, Inc.
EBWG	Engineered Barriers Working Group
EFCOG	Energy Facility Contractors Group
EWG	Erosion Working Group
ISP	Independent Scientific Panel
NYSERDA	New York State Energy Research and Development Authority
PAS	Potential Areas of Study
SME	Subject Matter Expert
WVNSCO	West Valley Nuclear Services Company
WNYNSC	Western New York Nuclear Service Center

We Welcome Your Questions . . .

Erosion Working Group Recommendations for Phase 1 Studies

Presented By

West Valley Erosion Working Group (EWG)

Quarterly Public Meeting
August 22, 2012

- Introduction & Overview
- Study 1 – Terrain Analysis
- Study 2 – Age Dating and Paleoclimate
- Study 3 – Recent Erosion and Deposition Processes
- Study 4 – Model Refinement, Validation, and Improved Erosion Projections
- Summary
- Questions & Answers

Introduction & Overview

Presented By Dr. Robert H. Fakundiny

PROBLEM:

- Lack of consensus between the two agencies over long-term erosion projections

QUESTIONS:

- Future landscapes
- Future exposure to radionuclides

RECOMMENDED STUDIES:

- Fill data gaps
- Improve scientific defensibility
- Strengthen confidence in projections
- Synergy

PREFERRED MODEL:

- CHILD landscape evolution model

DISCUSSION OF EACH STUDY:

- Objectives
- Components
- Rationale

Introduction & Overview

Study 1 – Terrain Analysis

Study 2 – Age Dating and Paleoclimate

Study 3 – Recent Erosion and Deposition Processes

Study 4 – Model Refinement, Validation, and Improved Erosion Projections

Summary

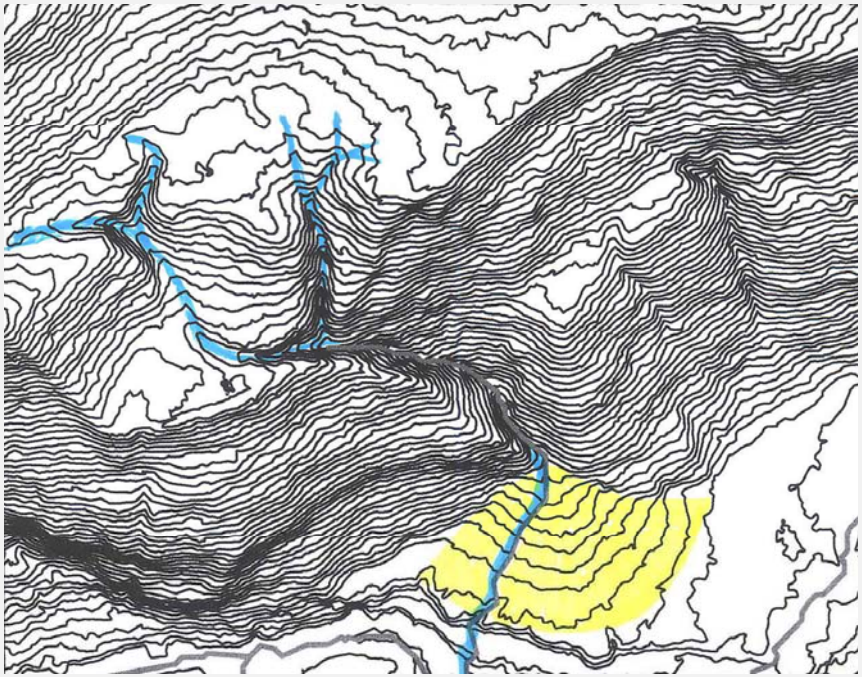
Questions & Answers

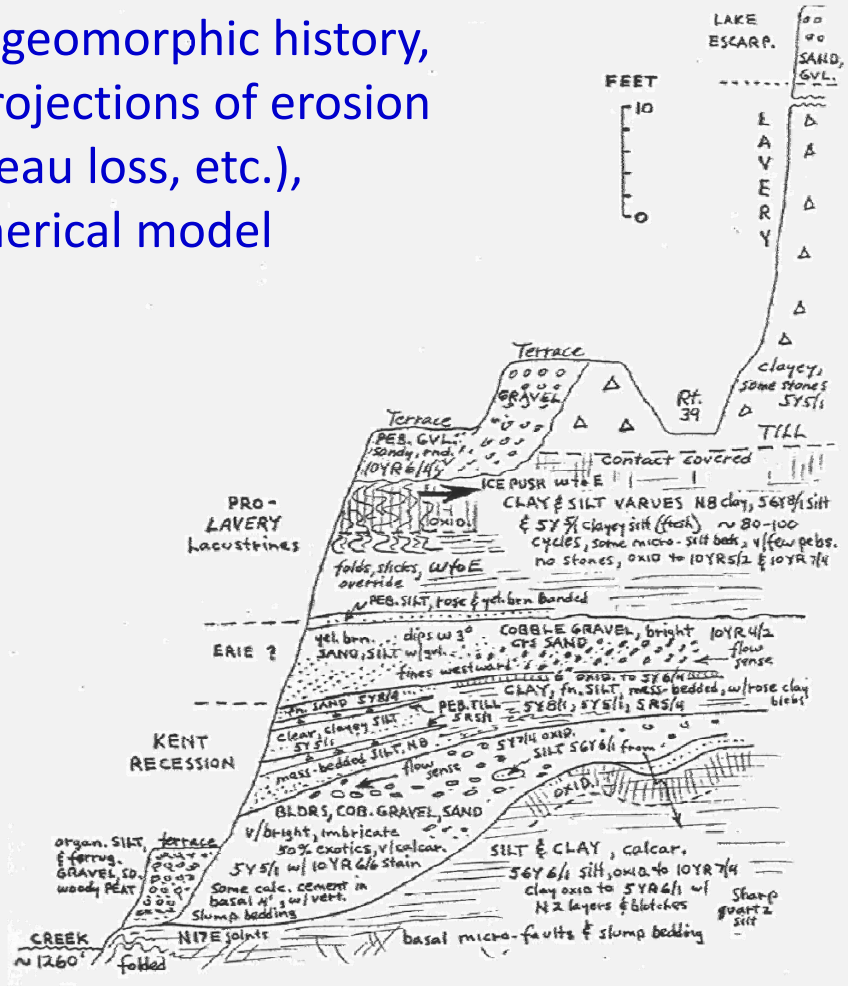
Study 1 – Terrain Analysis

Presented By Dr. Michael Wilson

Objectives: Build on previous work in order to:

1) enhance understanding of post-glacial geomorphic history,
2) enable more confident independent projections of erosion (fan development, gully initiation, plateau loss, etc.),
3) and provide enhanced context for numerical model calibration and sensitivity analyses.



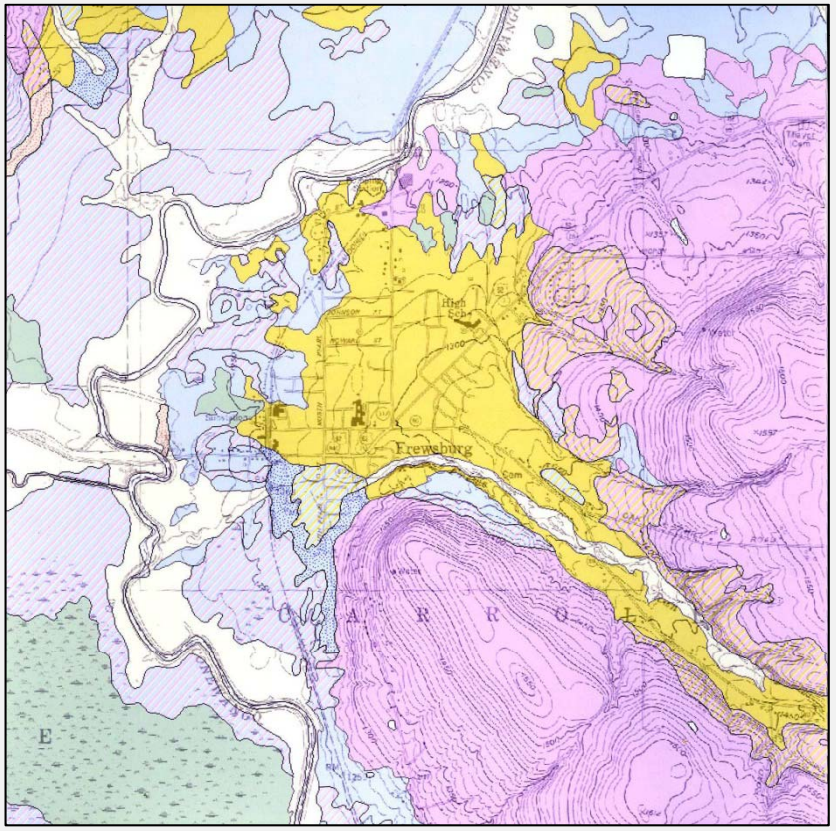


From LaFleur, 1980, figure 8.

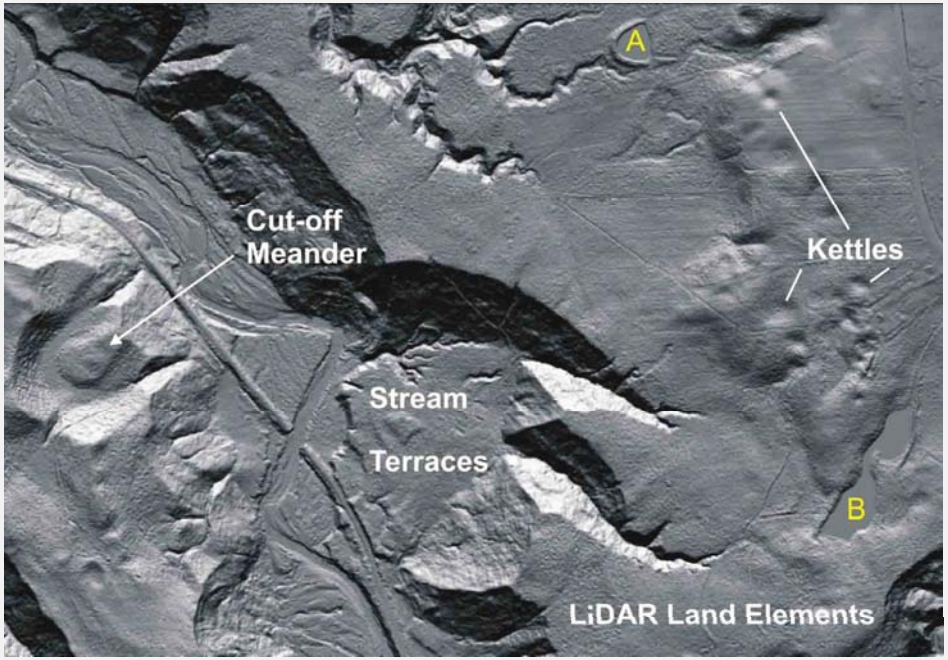
Study 1 – Terrain Analysis

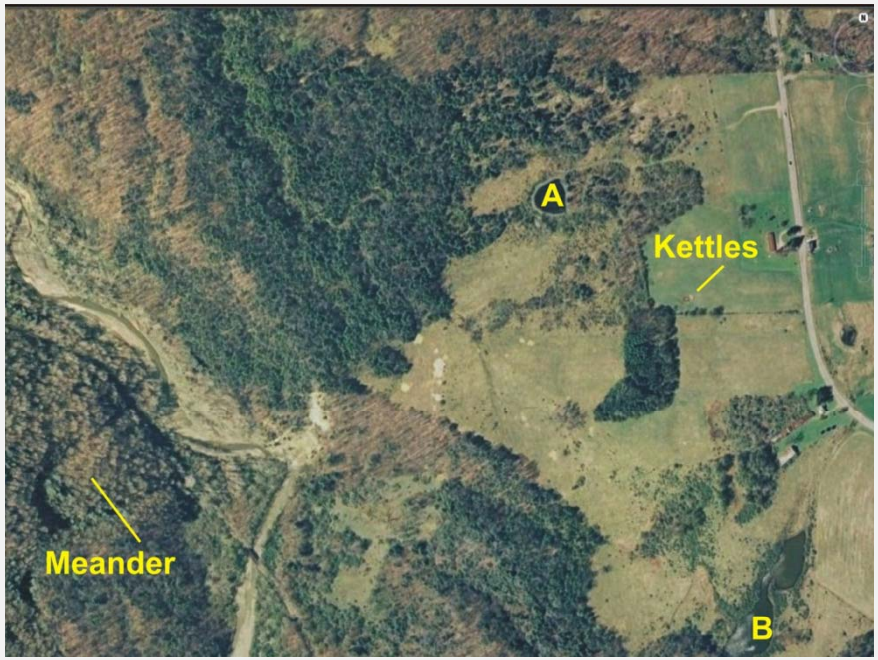
Components:

- Identify land elements of interest using Light Detection And Ranging (Lidar or LiDAR) hillshade or contour lines, and other mapping techniques such as USDA soil surveys.
- Compare local area with the wider region to identify useful similarities or differences, for example stream profiles.
- Perform field walk-overs, test drilling, and trenching as confirmation.
- Construct enhanced graphics of key areas, such as cross-sections, cut-away views, or animations.
- Identify targets for age dating.
- Use the data to refine the conceptual framework for geomorphic history of Buttermilk Creek and its base level.



Study 1 – Terrain Analysis





Buttermilk Creek abandoned meander scar (known as the “Race Track”) is shown on LiDAR and air photo images.

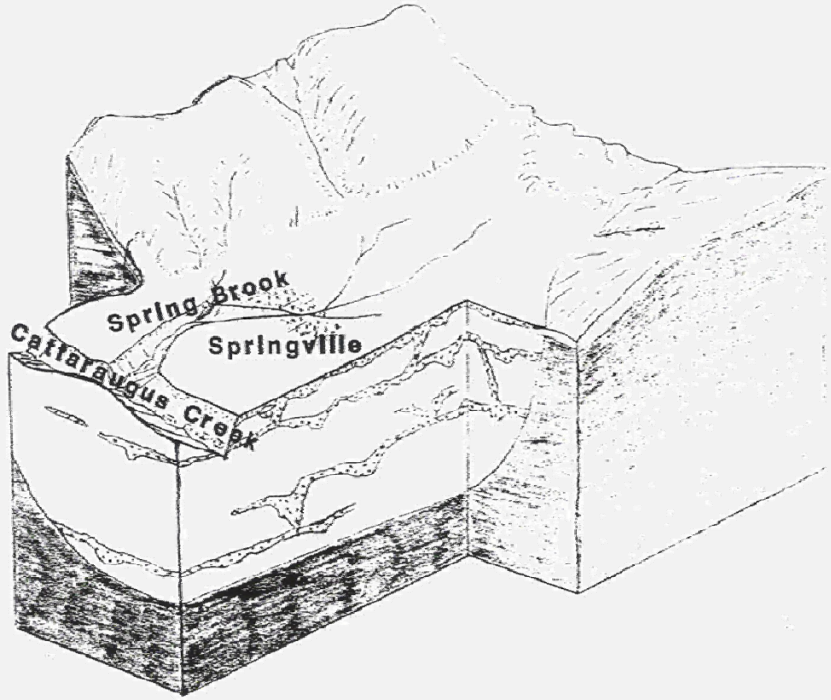
Study 1 – Terrain Analysis

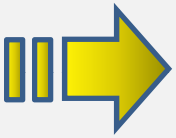
Recent trenching by Lee Gordon south of the "Race Track" abandoned meander.

Rationale:

Enhancing the understanding of the history and rates of landscape processes will provide the following benefits:

- Enable better definition of critical parameters for use in constructing independent projections of future erosional and depositional effects.
- Enable better definition of model parameters for numerical simulations of potential future erosion of the site, and sensitivity analyses.
- Strengthen confidence in erosion prediction due to converging lines of evidence and enhanced characterization of uncertainty.





- Introduction & Overview
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Study 2 – Age Dating and Paleoclimate

Presented By Dr. Richard Young

OBJECTIVES:

Provide additional age and paleoclimate data at key locations to:

- better define and constrain past rates of stream downcutting and valley rim widening for the site, the Buttermilk Creek watershed, and potential companion drainages;
- provide a better understanding of post-glacial climate cycles and their effects on erosion processes; and facilitate sensitivity analysis of climate inputs in the predictive model.

Study 2 – Age Dating and Paleoclimate

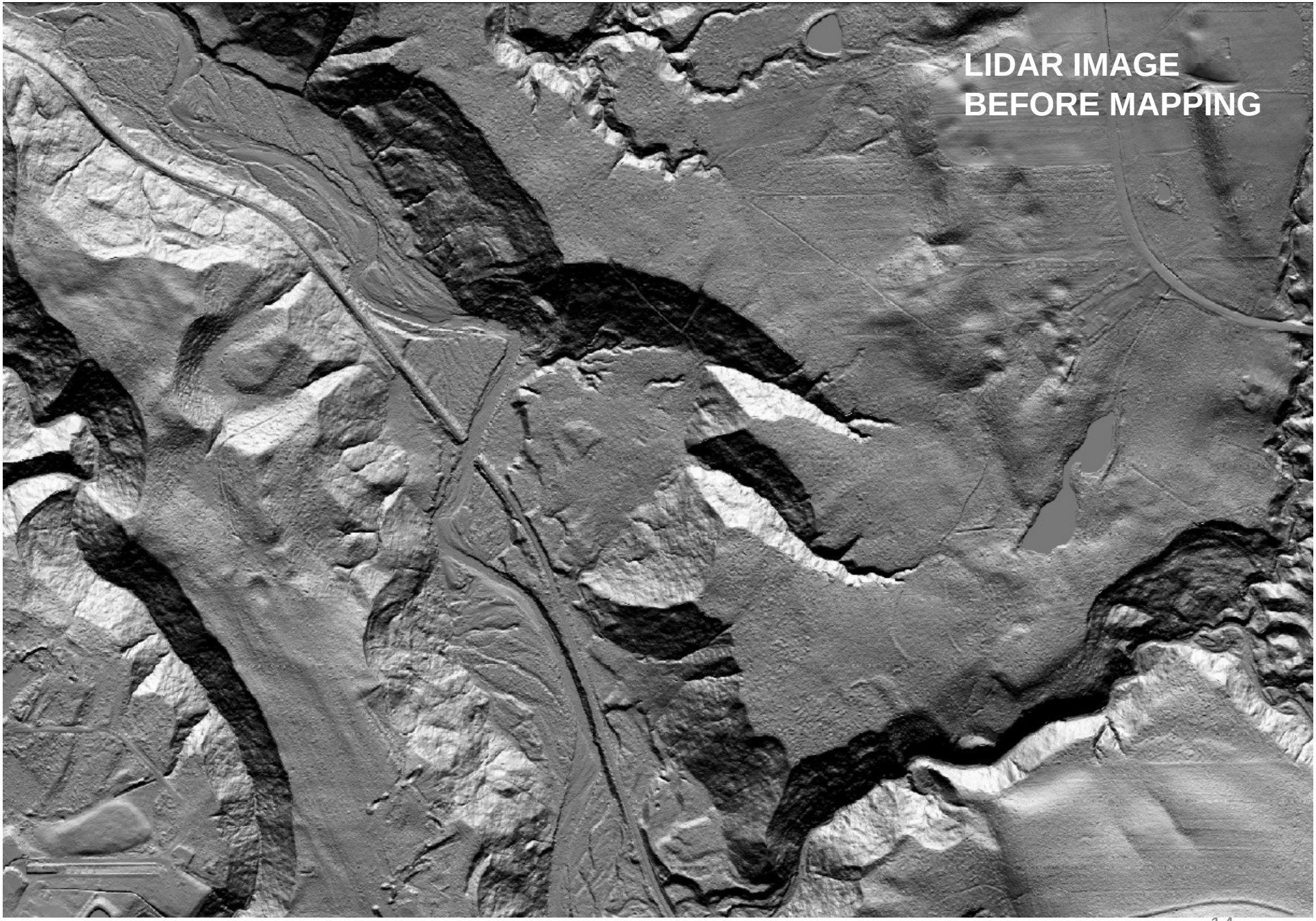
***COMPONENTS*:**

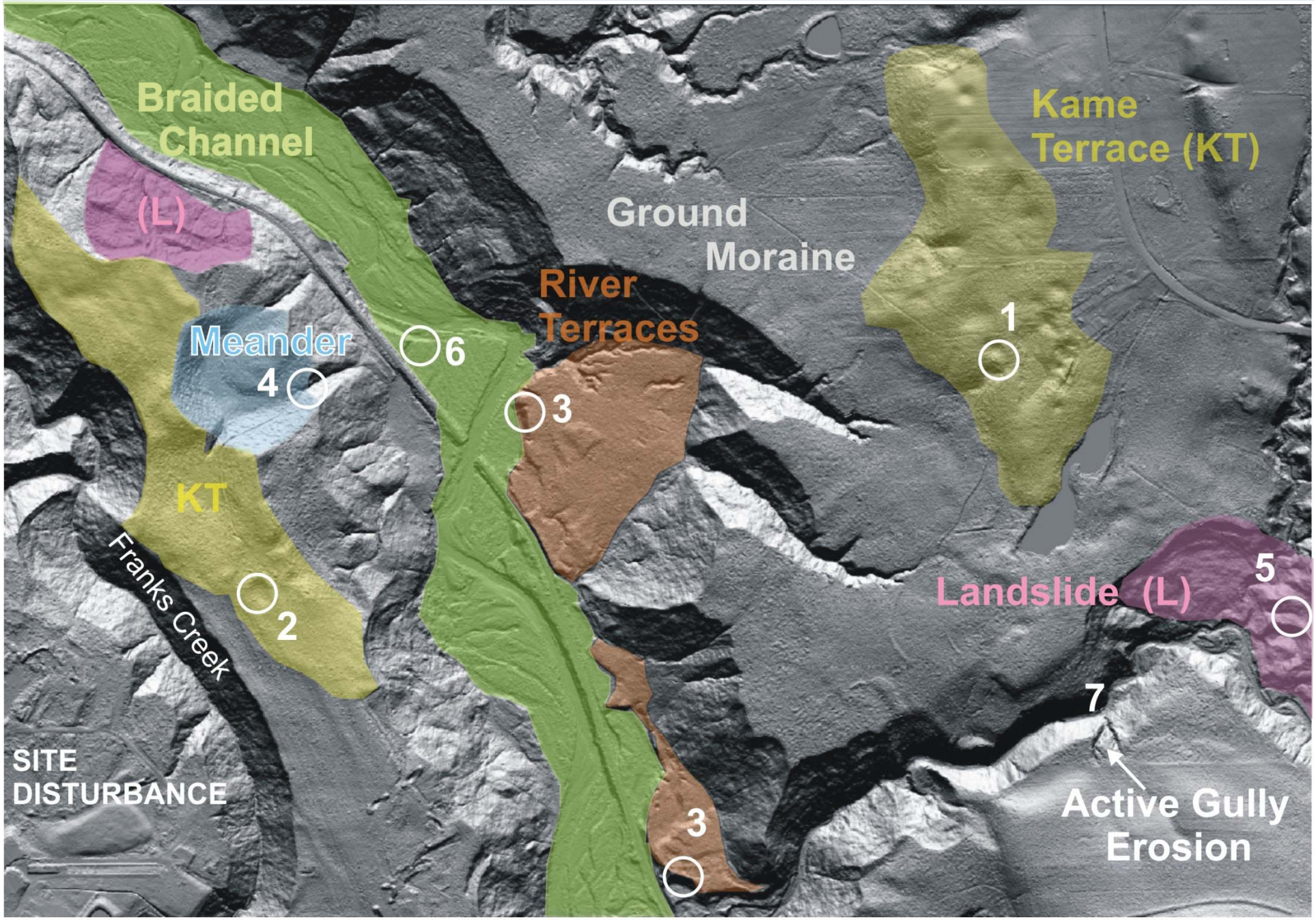
- Excavate and/or examine mapped key “land elements” such as terraces likely to contain reliable materials for dating methods.
- Excavate and/or core glacial kettles for “bog bottom” dating (end of glacial stadial).
- Examine relevant landslide toes exposed in channel walls or tributary gullies to search for buried debris (timing of slide activity).
- Core tree rings (determine times of tree deformation from landslide movements, and for local climate proxy [drought] linked to terracing).
- Collect samples for uranium-lead (U-Pb) dating of secondary carbonates.
- Date post-glacial erosional and depositional features.
- Analyze dating samples in laboratory.
- Evaluate age data for evidence of possible correlations with known Late Wisconsin glacial or postglacial climatic events.
- Optically Stimulated Luminescence date sampling (Some completed).

Examples:

Relate local ^{14}C data to broader global or regional climatic excursions

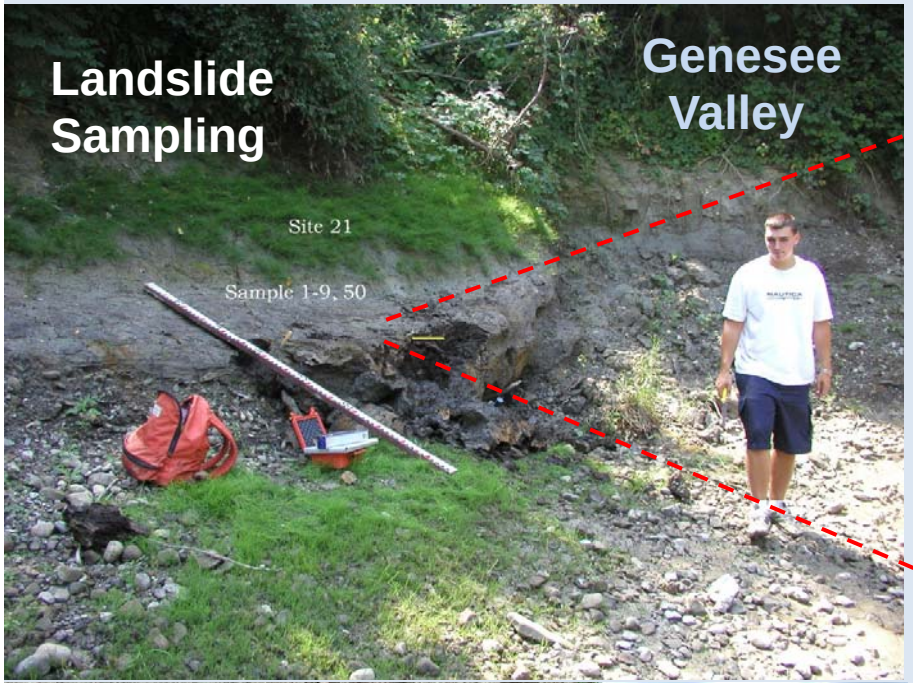
- Demonstrate that global climatic events may be recorded in local sediments
- Attempt to define sedimentary intervals and events that record variable erosion rates
- Demonstrate when West Valley region was first ice free (strengthen existing glacial chronology)

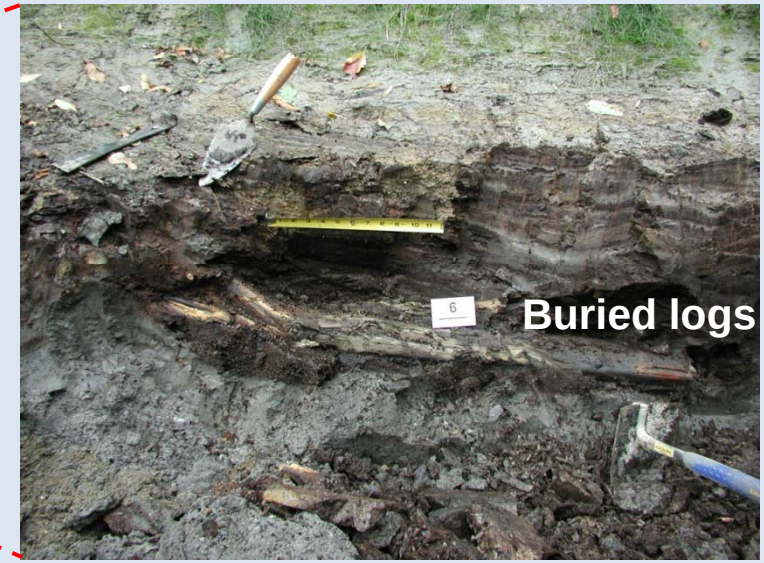

LIDAR IMAGE
BEFORE MAPPING

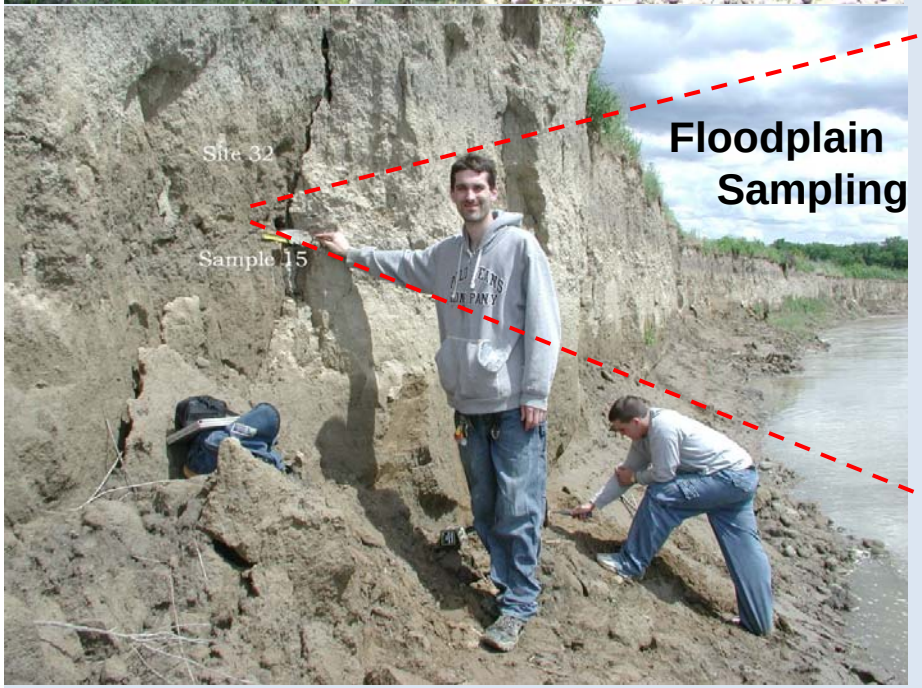


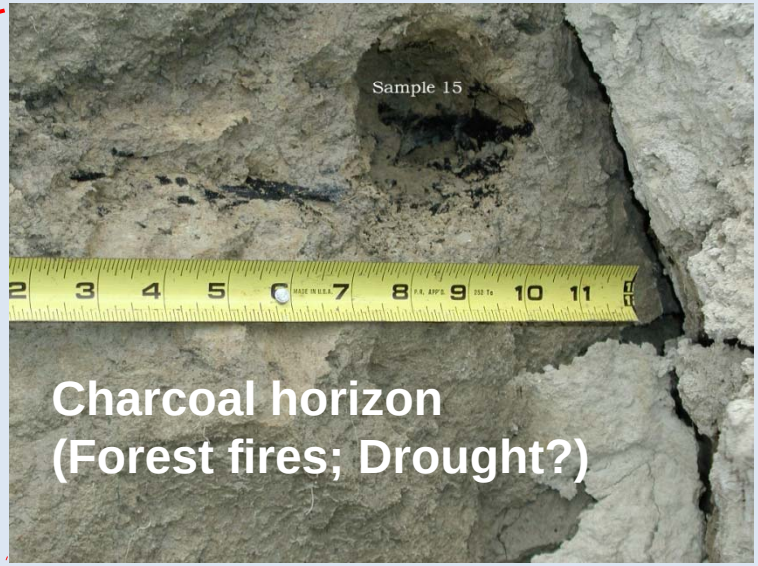
Example of Land Element Mapping (colors) with Dating Prioritization Numbers

LAND ELEMENT AGE SAMPLING







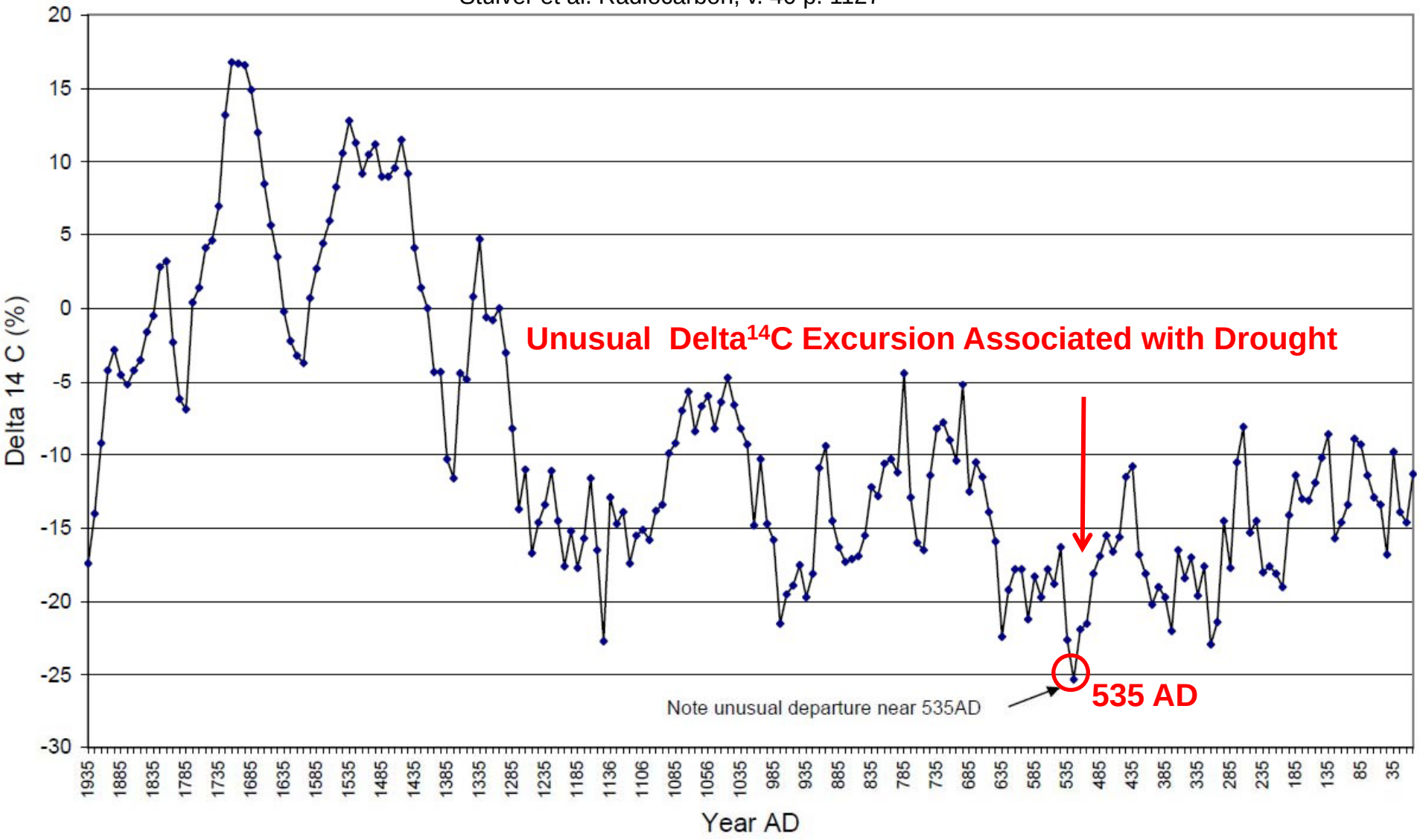


Global Climatic Event 535 AD (next slide)

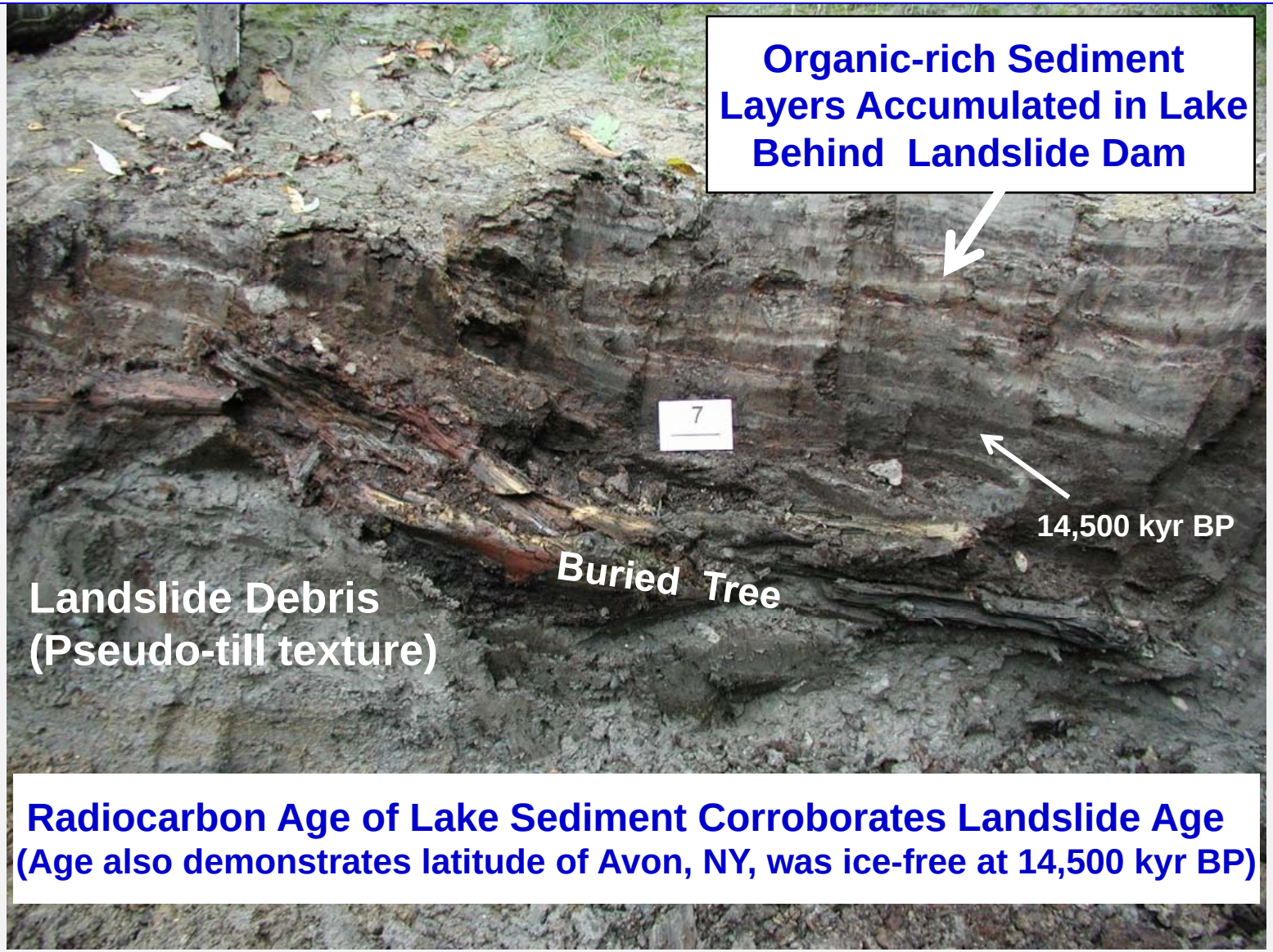
Example of Correlation of ^{14}C Data with Global Climatic Events

Delta ^{14}C Variation by Decade from 5 AD to 1935 AD

Stuiver et al. Radiocarbon, v. 40 p. 1127



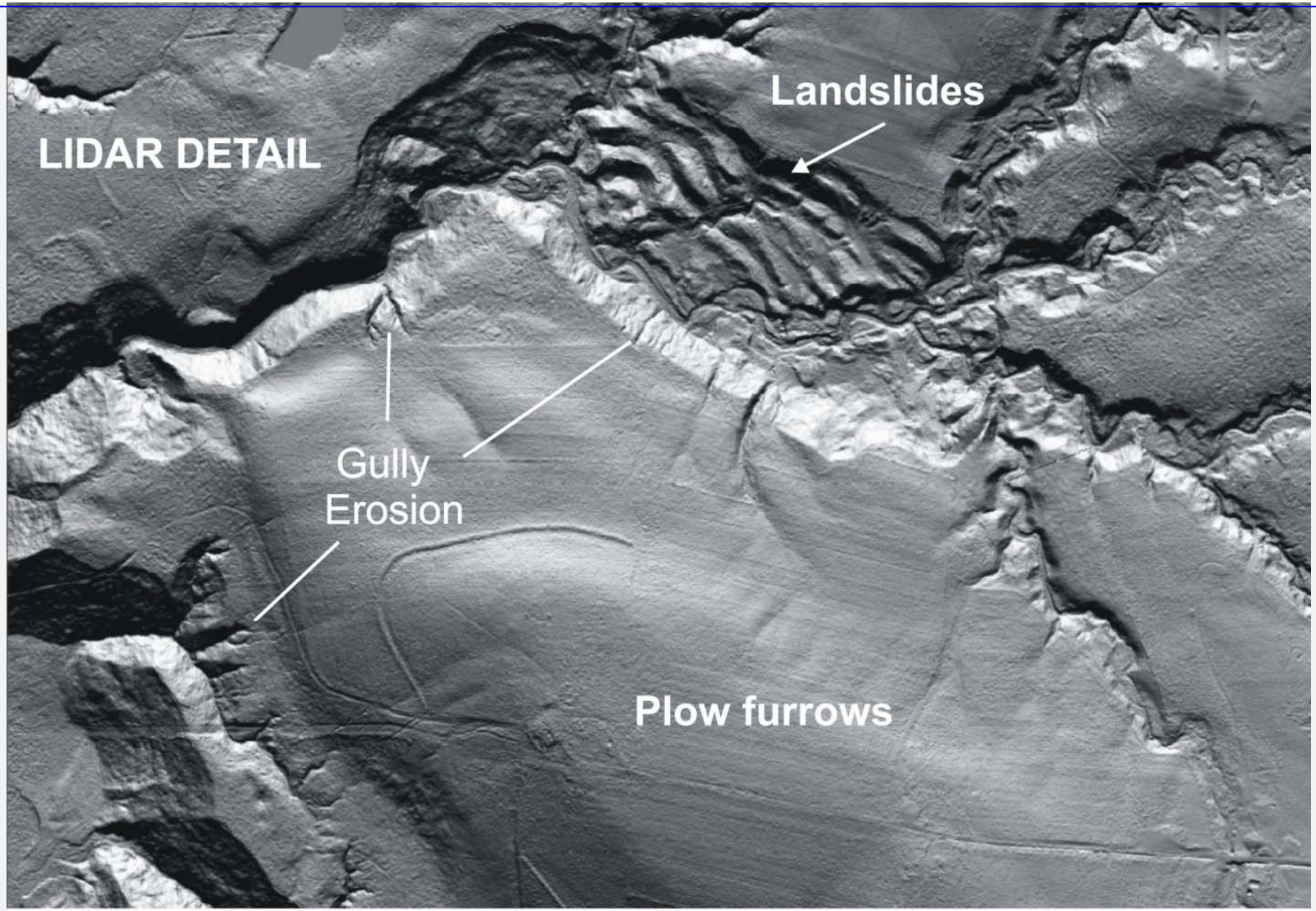
Example of Age-Dating Methods



Radiocarbon Age of Lake Sediment Corroborates Landslide Age
(Age also demonstrates latitude of Avon, NY, was ice-free at 14,500 kyr BP)

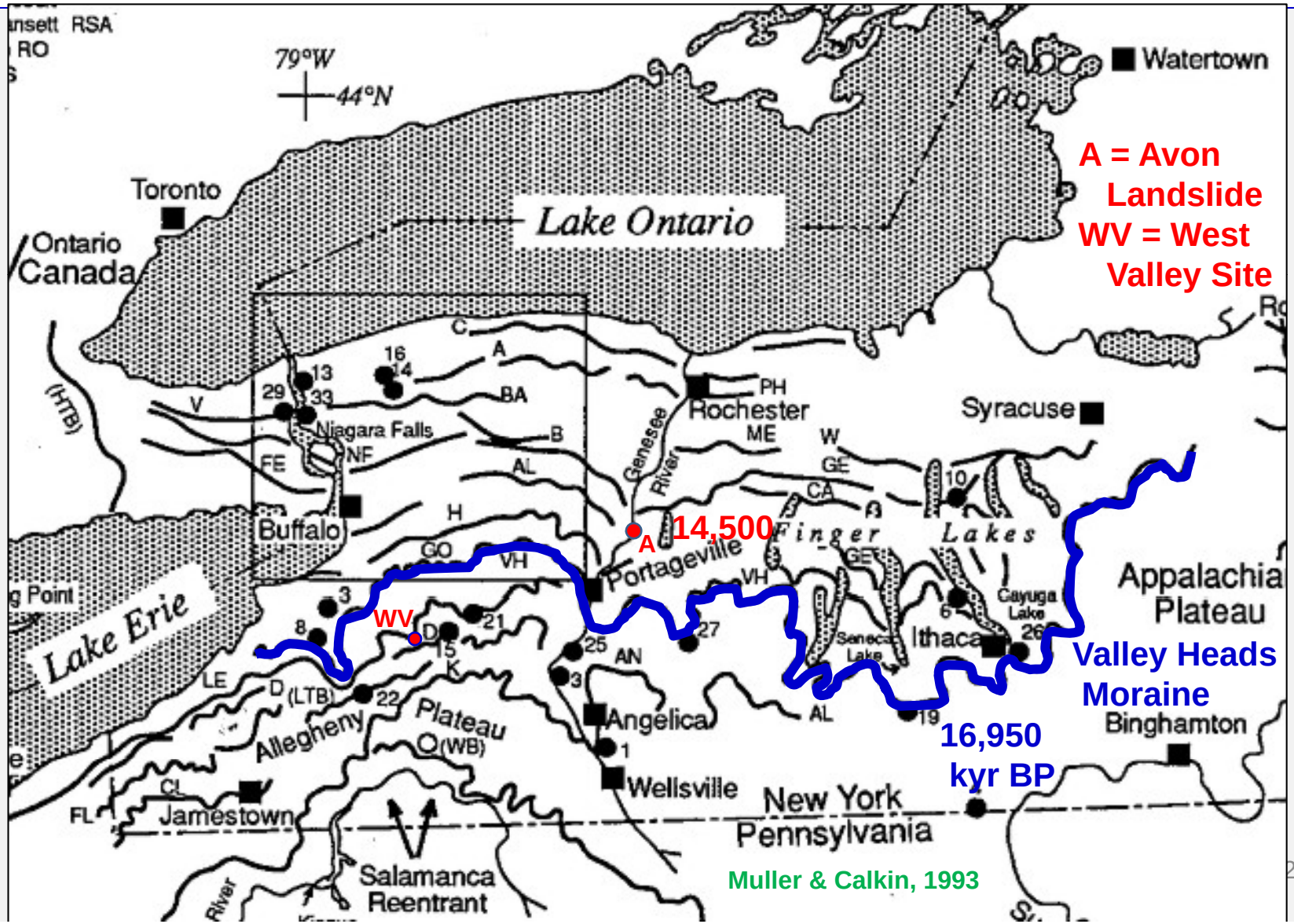
Landslide Activity – Genesee Valley

Landslide Activity Revealed by LIDAR

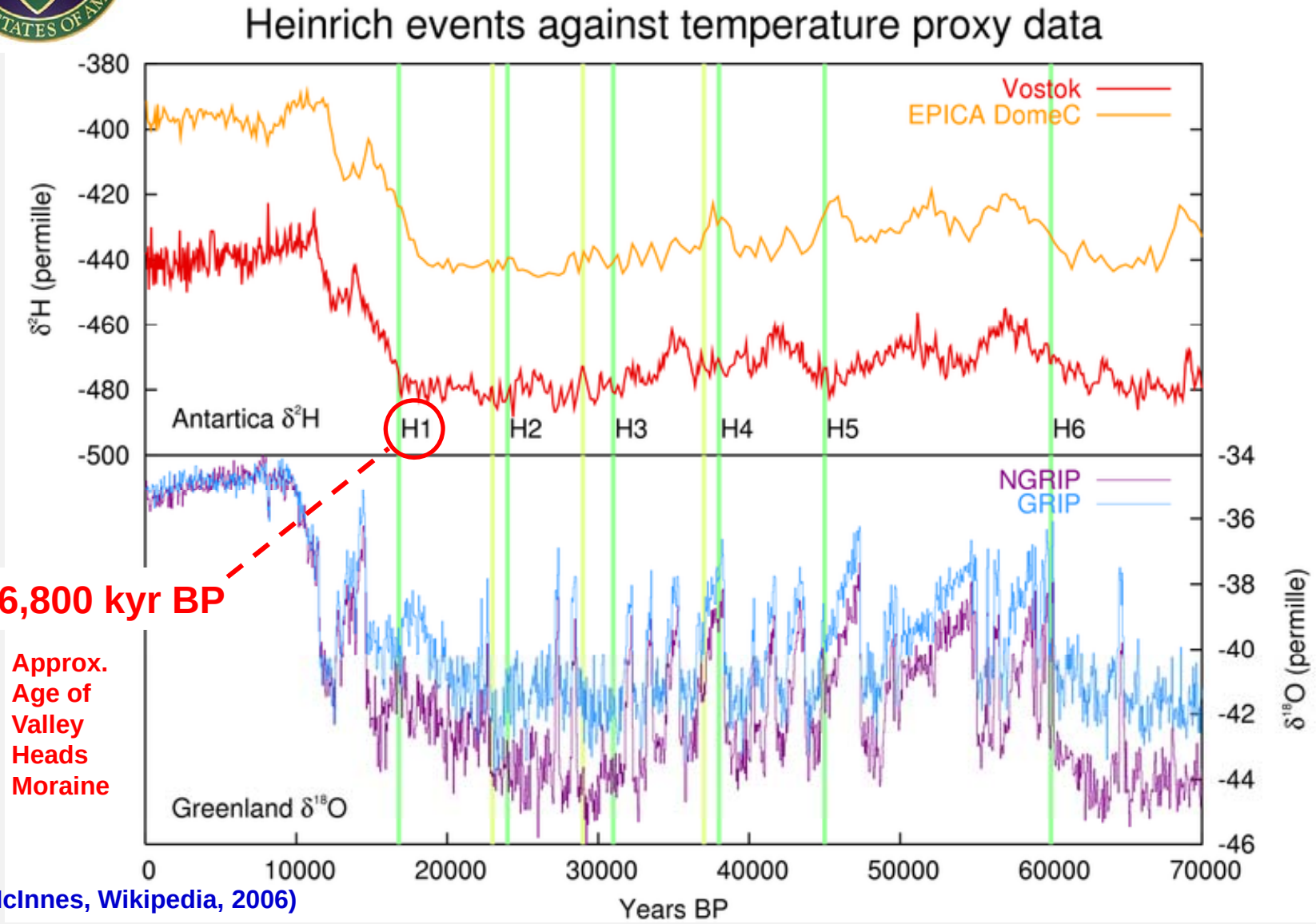


LIDAR Details Not Available Using Other Types of Imagery

Glacial Moraines and Ice Positions



Heinrich Ice Advances – Atlantic Ocean Cores



16,800 kyr BP

Approx. Age of Valley Heads Moraine

(McInnes, Wikipedia, 2006)

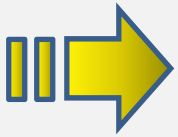
***RATIONALE*:**

- Age dating of geomorphic features provides the time lines of their formation, and together with spatial distribution of land elements, provides some of the required data for calibrating the landscape evolution model.
- By reducing uncertainty in key age dates, numerical model calibration could be improved thereby reducing uncertainty associated with erosion prediction.
- Paleoclimate data provide a meteorologic history that can be used for calibrating the landscape evolution model, and to bound ranges of climate inputs for sensitivity analyses. This in turn may help to quantify uncertainty and improve confidence in model predictions.

Introduction & Overview

Study 1 – Terrain Analysis

Study 2 – Age Dating and Paleoclimate



Study 3 – Recent Erosion and Deposition Processes

Study 4 – Model Refinement, Validation, and Improved Erosion Projections

Summary

Questions & Answers

Study 3 – Recent Erosion and Deposition Processes

Presented By Dr. Sean Bennett

Study Objectives:

- To quantify and characterize recent rates of erosion and deposition
- To understand more deeply how current processes compare to long-term evolution of the landscape
- To verify and validate erosion prediction technology

Erdman Brook

Study 3 – Recent Erosion and Deposition Processes

Erdman Brook
Knickpoints: 0.4 m deep, 0.5 m wide, 3 m/yr

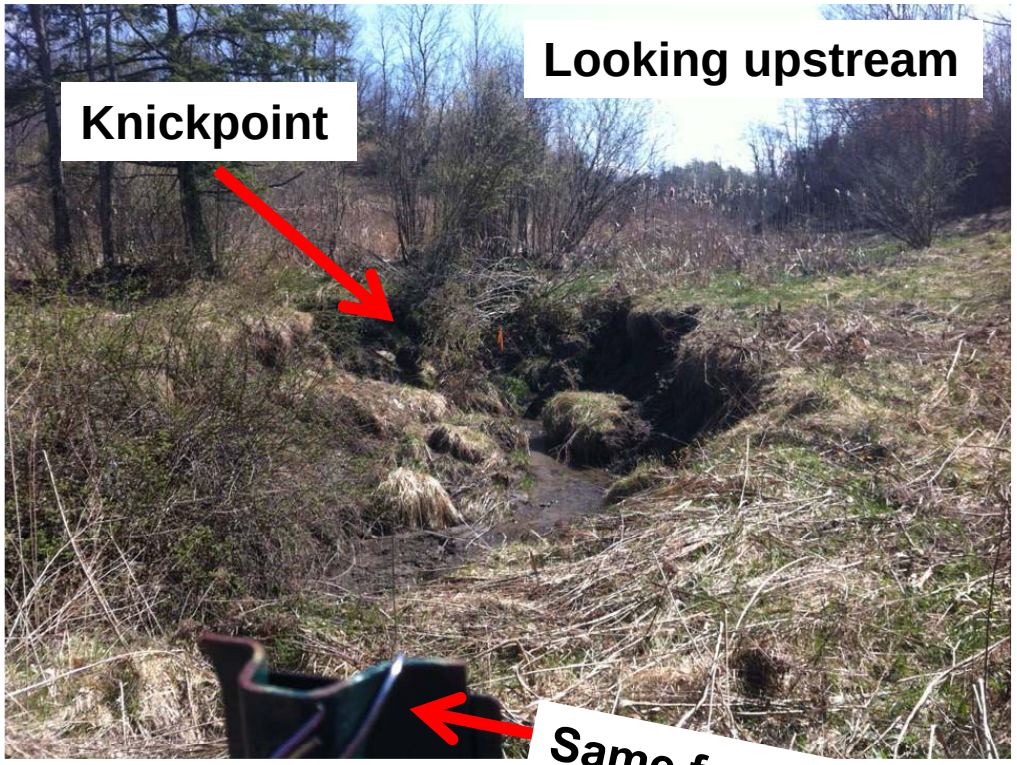
Franks Creek
Knickpoint: 1 m deep, 3 m wide, 8 m/yr

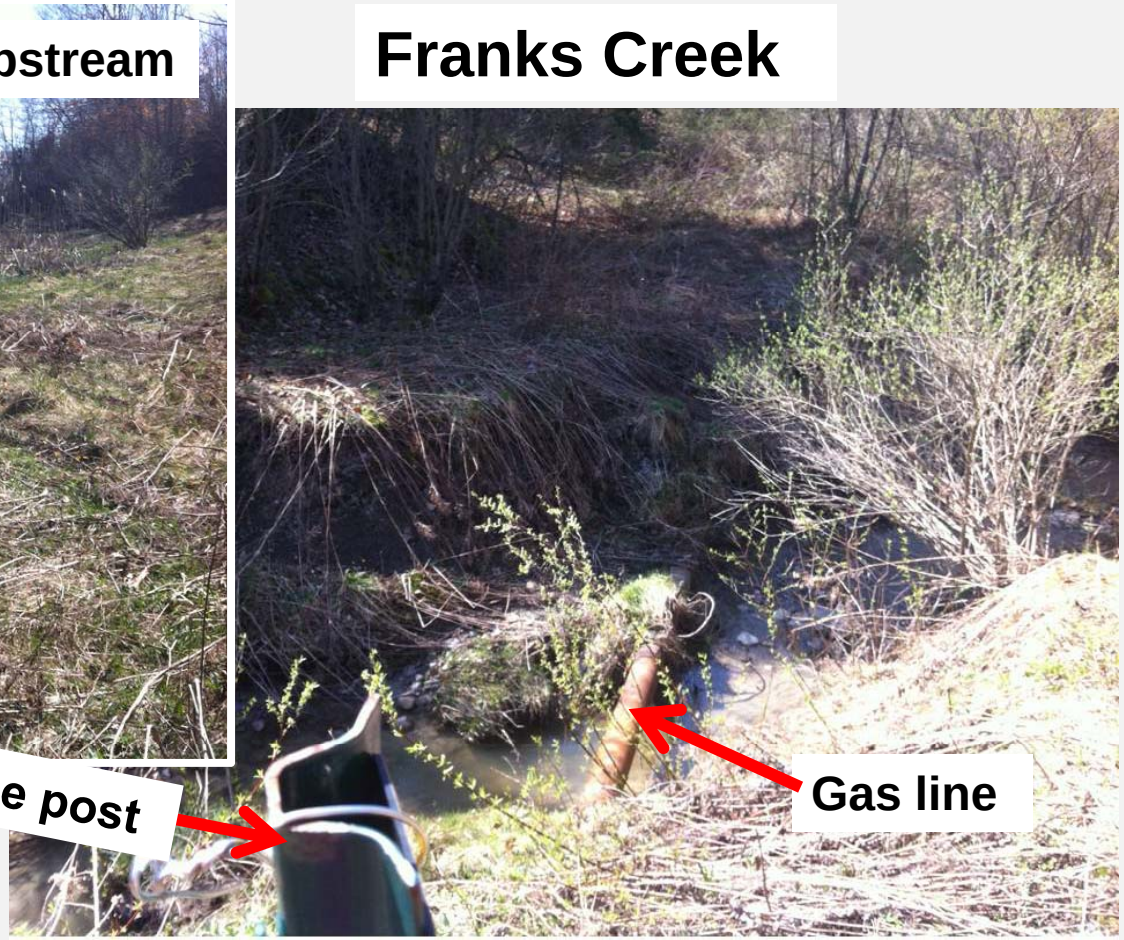
Gully, NE Slope

Slope Failure, Buttermilk Creek

Surface processes are very active on-site, yet significant gaps exist regarding current rates, locations, and potential risks

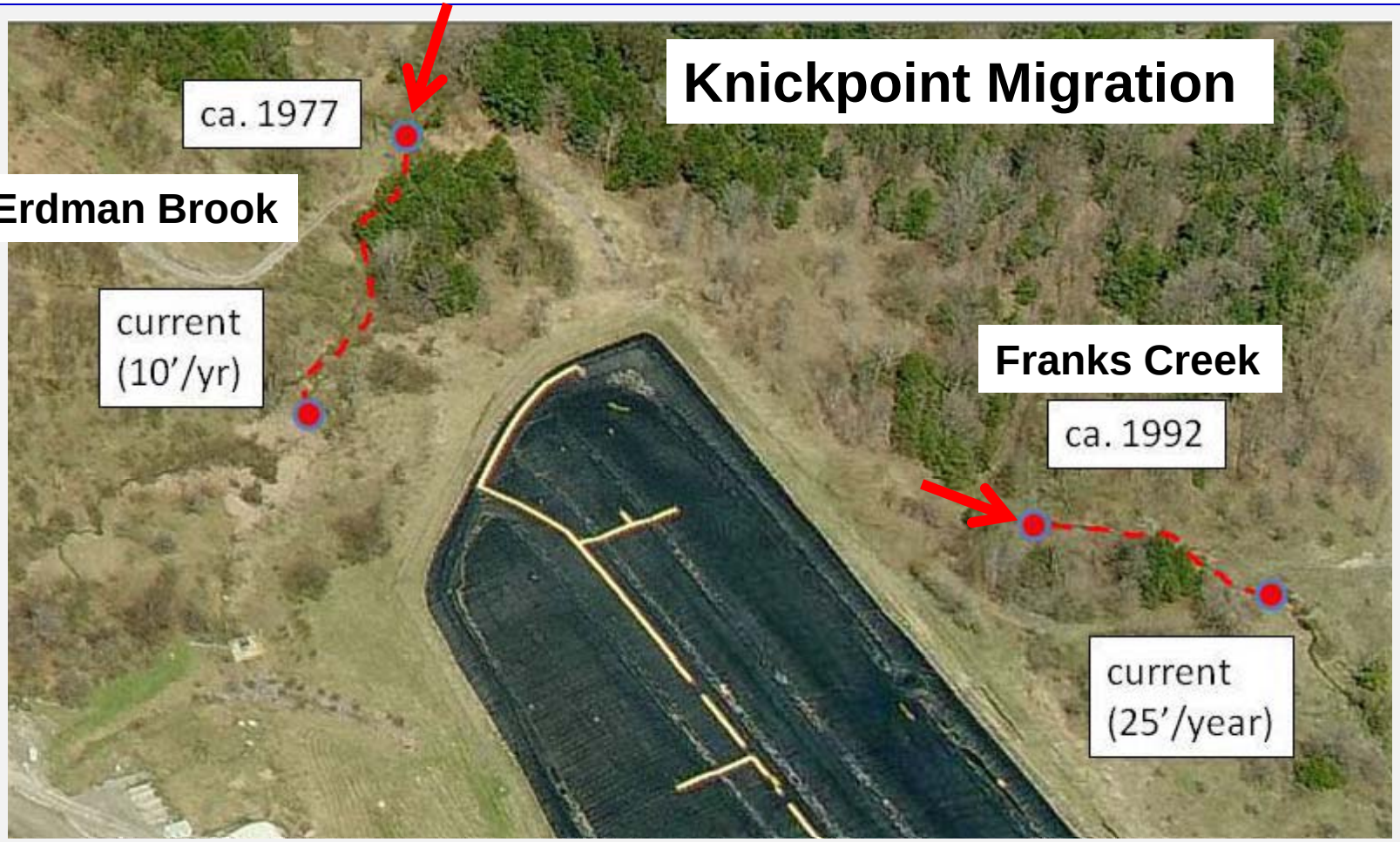
Study 3 – Recent Erosion and Deposition Processes





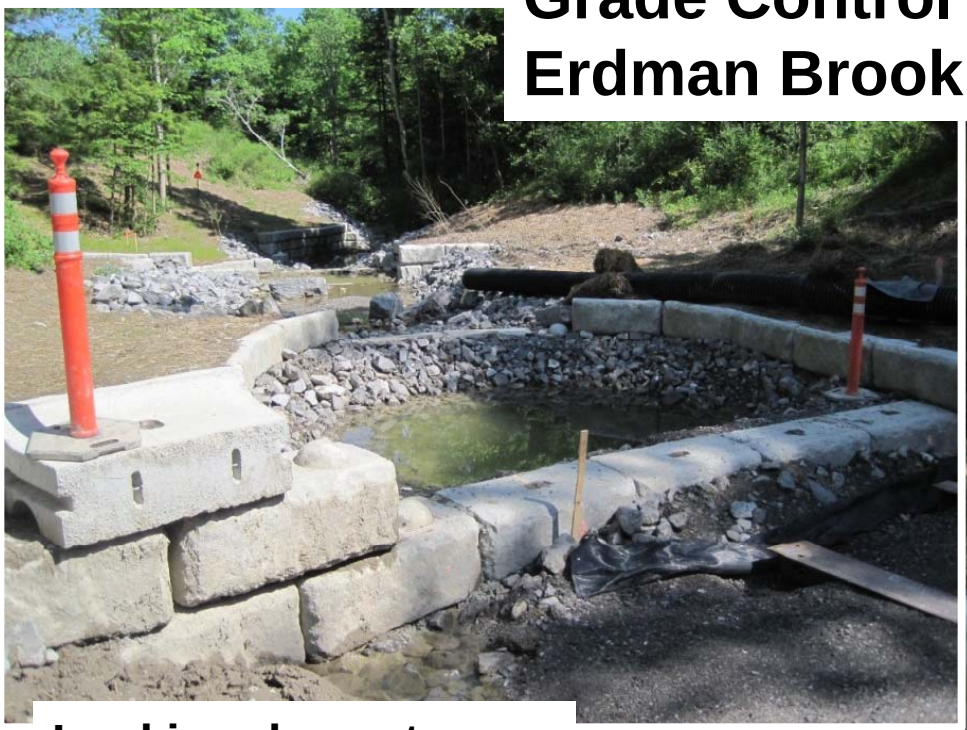
Active bed incision and channel widening due to knickpoint migration causes landscape degradation and destabilization

Study 3 – Recent Erosion and Deposition Processes



Active channel degradation along streams could initiate or accelerate gully erosion on side-slopes of the SDA

Grade Control Structures, Erdman Brook, May 2012



Looking downstream

Looking upstream

Recent channel erosion along Erdman Brook (shown) and Franks Creek (planned) has required active management

Foci of Proposed Study: *(building upon previous work)*

Hillslopes: Determine rates and mechanisms of mass-wasting, assess slope stability

Rills & Gullies: Map locations, determine erodibility and erosivity, monitor water flow and sediment transport

Streams: Define hydraulic and geomorphic stability, monitor flow and sediment transport, assess channel evolution.

Surfaces: Identify postglacial surfaces and forms as well as sites of sediment deposition

Rationale: *Study of current earth-surface processes could afford the following opportunities and benefits:*

- Provides an independent approach to assess past and future landscape trajectories
- Helps support or refute erosion prediction technology, as well as revise and refine the landscape evolution model
- Facilitates in reaching consensus amongst agencies regarding erosion processes

Introduction & Overview

Study 1 – Terrain Analysis

Study 2 – Age Dating and Paleoclimate

Study 3 – Recent Erosion and Deposition Processes

Study 4 – Model Refinement, Validation, and Improved Erosion Projections

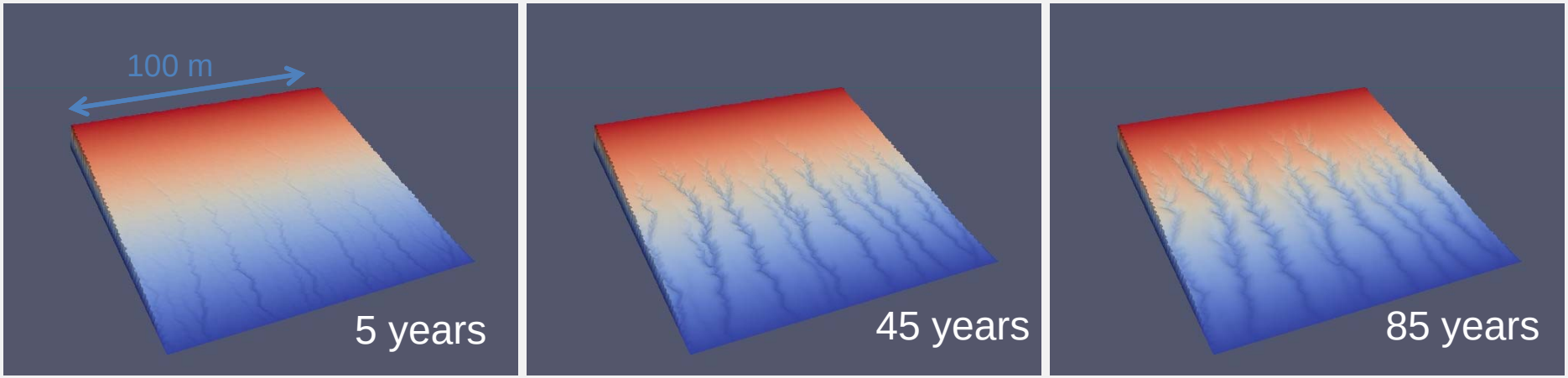
Summary

4. RELEVANT PAST PERFORMANCE

Questions & Answers

Overview of recommended approach:

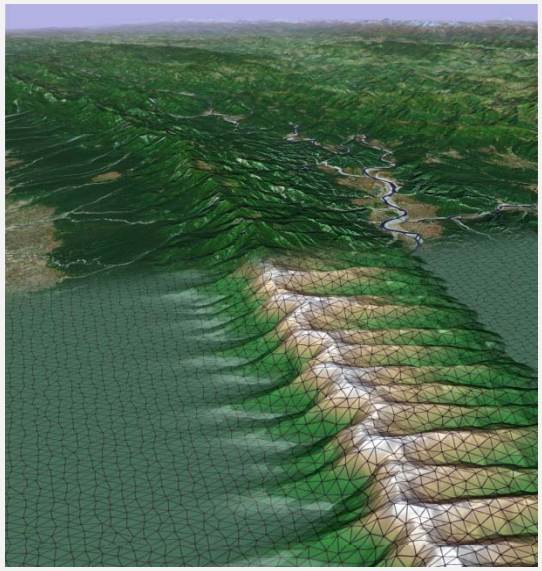
- Using new data from Studies 1-3, run a landscape evolution model to forecast erosion rates and patterns

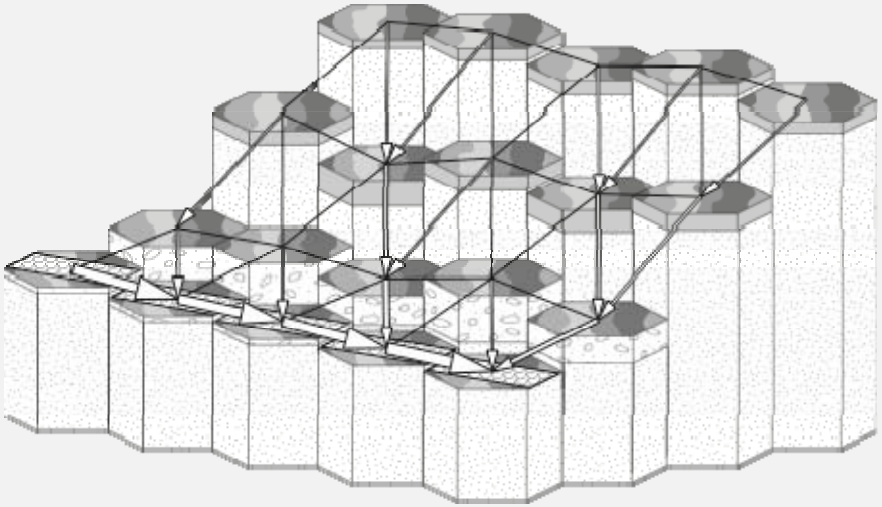


Example computer model simulation of growing gully networks

What is a landscape evolution model?

- Computes the erosional development of topography over time in response to erosional processes
- Represent scientific community's current understanding



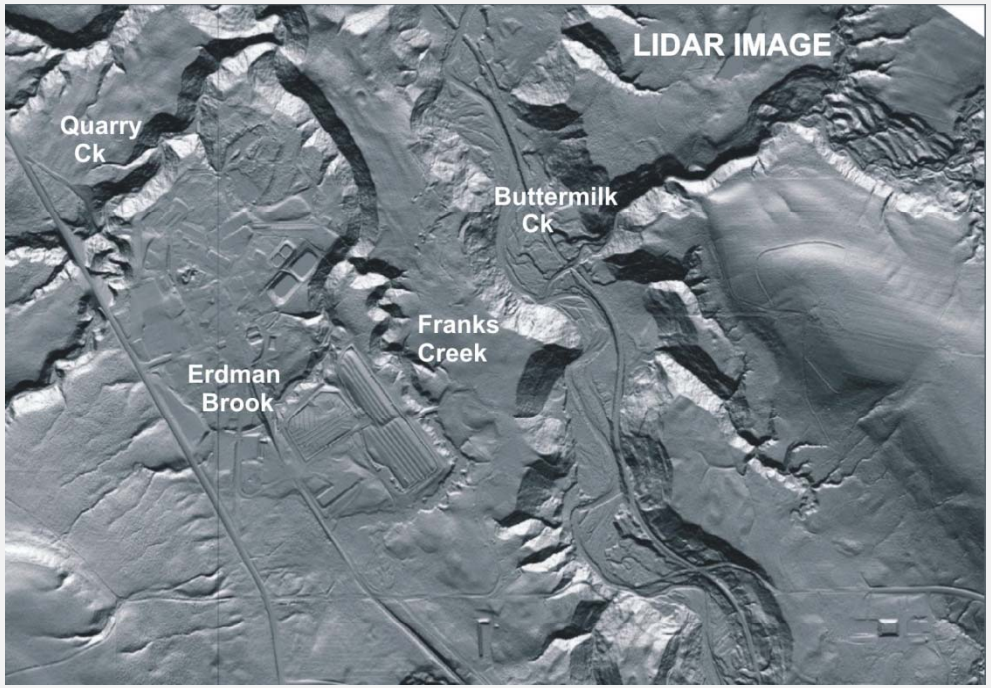


- Recommended model is Channel-Hillslope Integrated Landscape Development (CHILD) model (adapted to site)

Where do input data come from?

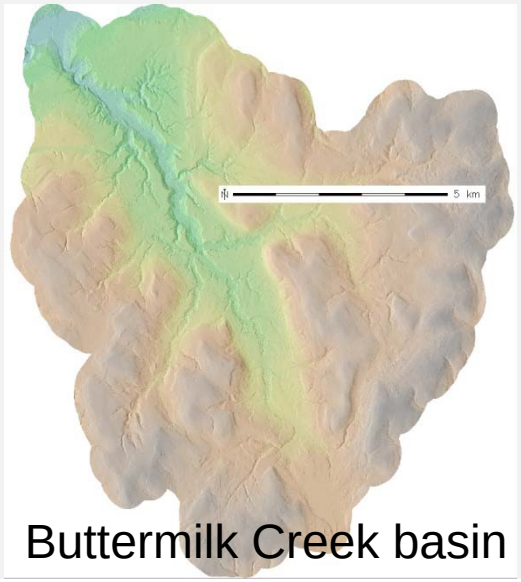
All computational models need input data to represent their starting conditions, outside inputs, and processes

- Lidar topography data
- Scientific literature
- Results from Studies 1-3
- Calibration to modern landscape

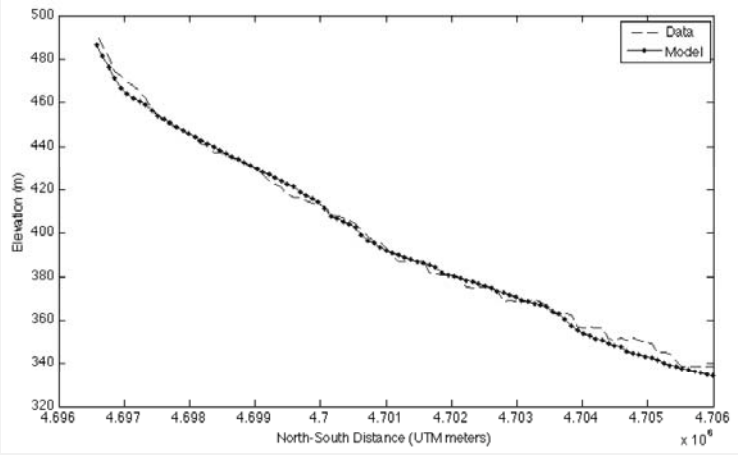


How can landscape erosion models be tested?

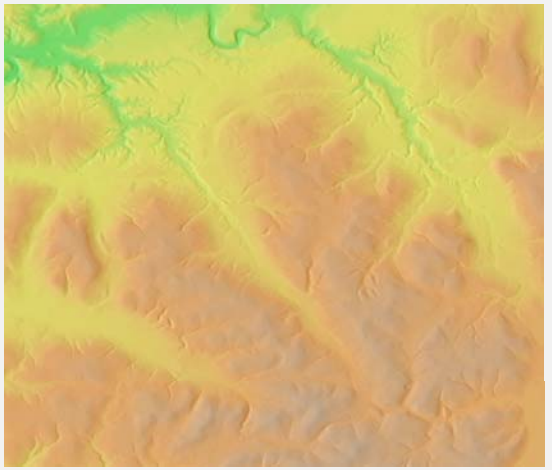
- Reproduce the modern landscape of Buttermilk Creek when run from the end of the last ice age to today
- Reproduce modern topography of a second watershed without re-calibration
- Predict erosion rates & patterns consistent with Studies 1-3



Buttermilk Creek basin



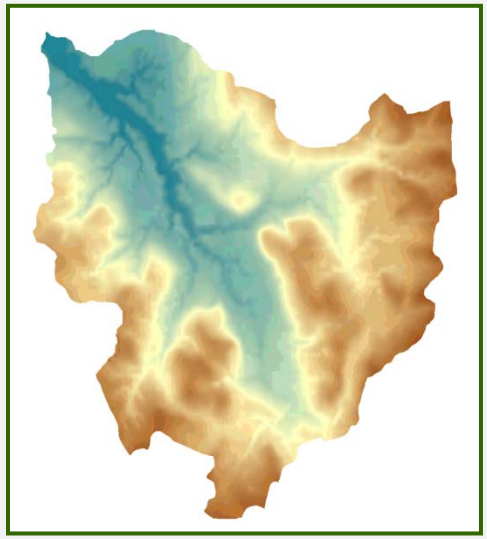
Longitudinal profile of Buttermilk Creek: real vs. modeled (from FEIS)



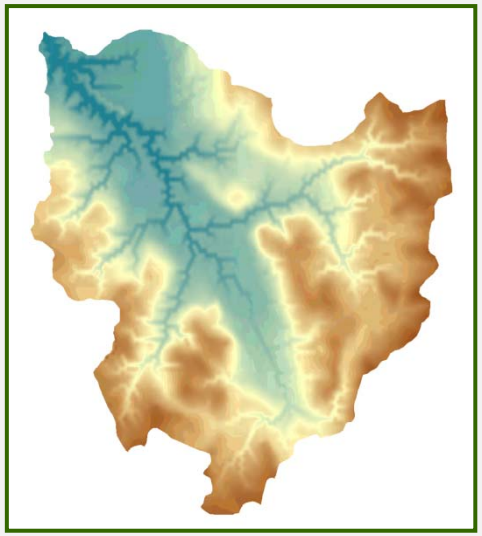
Connoisarauley Creek area

How can model uncertainty be assessed?

- Calibration and validation: what is the range of reasonable input values?
- Sensitivity analysis: how much does uncertainty in each parameter influence the forecast?



Buttermilk Creek

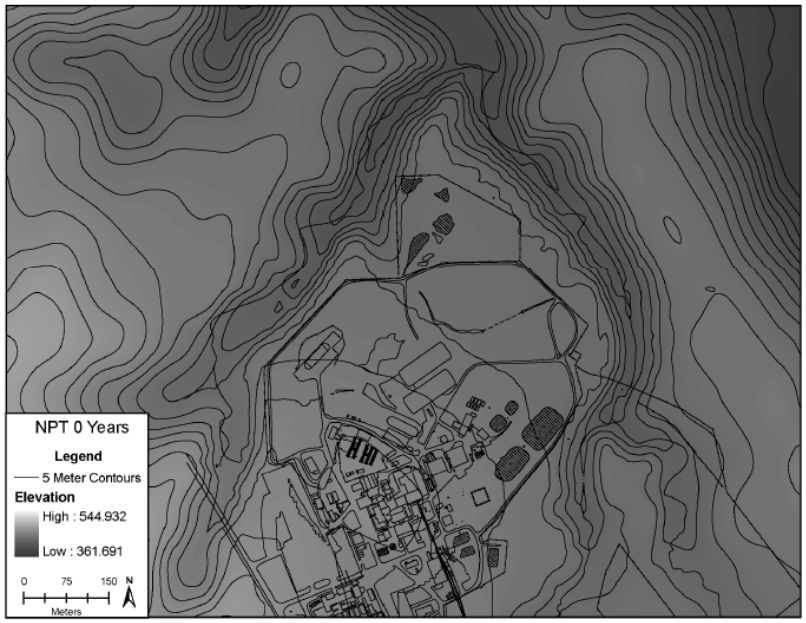


Best-Fit Model (calibrated)

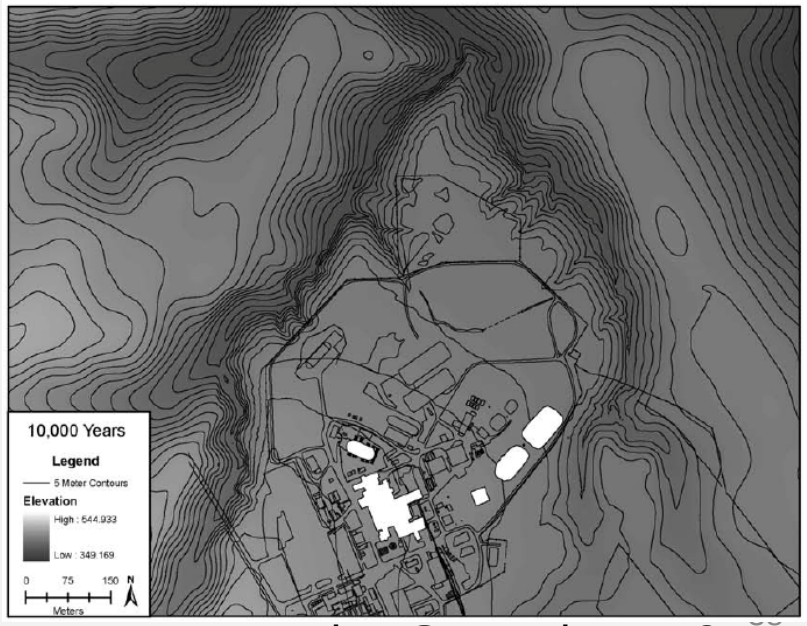
Poor-Fit Model (unrealistically high erosion)

How would potential future erosion be calculated?

- Run model forward from present-day using best estimates for input data and parameter values
- Estimate uncertainty in projections by performing calculations with different sets of plausible inputs



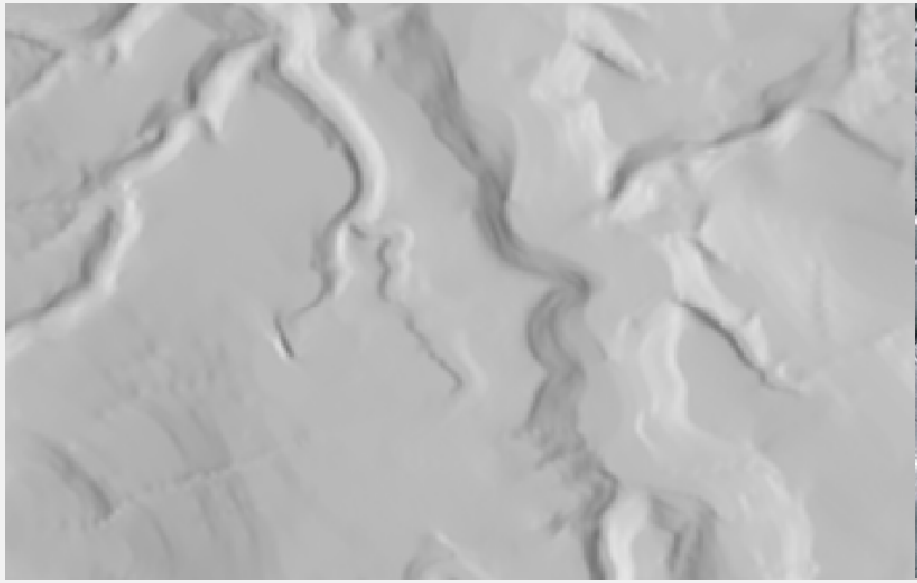
North Plateau, Present day



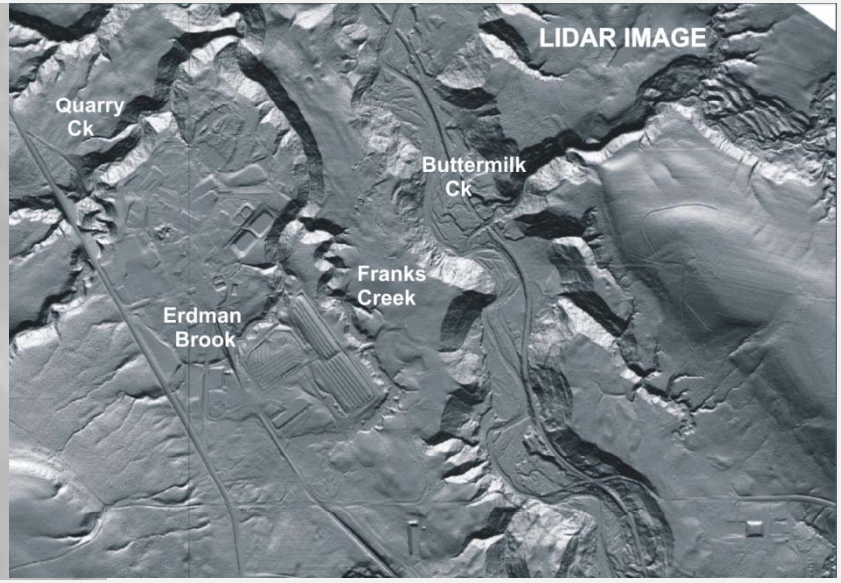
Future Erosion Scenario "NP2"

Summary:

- Refining erosion model testing, calibration, and projection could reduce and better quantify uncertainty by taking advantage of new data from lidar and Studies 1-3



10-meter resolution digital elevation model



Lidar digital elevation model

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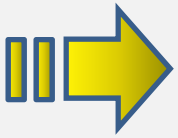

Summary

Questions & Answers

Summary

Presented By Sandra Doty, M.S., P.E.

"In summary, the EWG recommends these studies because together they may improve the scientific defensibility of the assessment of long-term erosion effects based on converging lines of evidence that may reduce uncertainty, strengthen confidence in the results, and facilitate agency consensus."

We Welcome Your Questions . . .

West Valley Demonstration Project
Summary of Quarterly Public Meeting – August 22, 2012

Members of the Public and Others Present

Diane D'Arrigo, Deb Aumick, Rob Dallas, Andy Goldstein, Joanne Hameister, Wendy Kovacs, Steve Kowalski, Paul Kranz, Lee Lambert, Patsy Lane, Eric Lawton, Kathy McGoldrick, Barry Miller, Joe Patti, Dorothy Shaw, Rodney Tolley, Ray Vaughan, Barbara Warren, Eric Wohlers, Jay Wopperer. Via WebEx and Telephone: Paul Rubin.

Agency and Contractor Participants

Department of Energy (DOE): Bryan Bower, Martin Krentz, Ben Underwood, Zintars Zadins.
New York State Energy Research and Development Authority (NYSERDA): Paul Bembia, Lee Gordon, Elizabeth Lowes, Andrea Mellon, Dave Munro.
CH2M Hill B&W West Valley, Inc. (CHBWV): Lynette Bennett, Charles Biedermann, Dan Coyne.
Enviro Compliance Solutions Inc. (ECS): Dhananjay Rawal, Michael Wolff.
Erosion Working Group (EWG): Sean Bennett, Sandra Doty, Robert H. Fakundiny, Joseph Price, Greg Tucker, Michael Wilson, Richard Young.
New York State Department of Environmental Conservation: Patrick Concannon, Ken Martin, Lynn Winterberger, Dennis Weiss.

Introductions and Announcements

The facilitator Bill Logue welcomed all present and reviewed the meeting protocols and documents[1].

Project Update

Bryan Bower of DOE provided a project update. On safety, he noted that the last Recordable Case was in April. Two first aid incidents occurred in July – a splinter and a scratch that was bleeding.

Mr. Bower provided updates for the four contract milestones.

Milestone 1 – High Level Waste Canister Relocation & Storage System. Status: Contract award to NAC International approved ahead of schedule. NAC was founded in 1968 and developed and first licensed the NAC-MPC system for use at the Yankee nuclear facility in Rowe, Massachusetts and the Connecticut Yankee nuclear facility in Haddam Neck, Connecticut. They are looking at onsite fabrication of the storage system.

Milestone 2 – Shipment of legacy waste. Status: For the Year to Date, shipped 42,913 ft^3 of Low Level Waste (LLW) versus plan of 34,050 ft^3 and shipped 623 ft^3 of Mixed Low Level Waste (MLLW). Continuing to process waste in the Vitrification Facility; Submerged Bed Scrubber has been completed. Still processing in Remote Handled Waste Facility; will be working on the dissolver soon, which will take several months to do as it is very large.

Milestone 3 – Demolition and removal of the Main Plant Process Building (MPPB) and the Vitrification Facility. Status: Continuing removal of electrical and other systems and asbestos in MPPB. Continuing removal of systems in the Vitrification Facility that will no longer be needed and prepping for use for canister decommissioning.

Milestone 4 – Complete all work described in the Performance Work Statement. Status: Demolition prep of 01-14 building in process. Pending budget, demolition scheduled for October or November 2012. Currently demolishing old warehouse pad, working on disposition of rubble. Other facilities ready to demolish and will remove this year.

[1] Documents and materials relating to the Phase 1 Studies are available at www.westvalleyphaseonestudies.org and are listed at the end of this summary.

Intermodals were received from Brookhaven National Laboratory. Sludge removal completed in Sewage Treatment Plant and Equalization Basin. Tank 8D-4: liquid and solids samples collected for analysis to determine appropriate disposal. Planning for dam repairs, canal dredging; Lagoon 3 roadway depression determined to be insignificant.

Mr. Bower outlined upcoming activities.

- Continue safe, compliant performance
- Initiate demolition of 01-14 Building
- Demolish Tank Farm Test Tower, Hazardous Waste Lockers, Old Warehouse, Counting Laboratory, Vit Test Facility Waste Storage Pad, and Vehicle Repair Shop
- Continue processing the dissolver (3C-2) in the Remote Handled Waste Facility (RHWF)
- Repackage and ship hazardous and industrial waste
- Finalize canal dredging/dam system repairs
- Complete packaging/removal of waste in the Chemical Process Cell/Equipment Decontamination Room (CPC/EDR)

Questions were raised about the 8D-4 liquids/solids characterization, including whether this was part of a characterization of the whole site. DOE explained that the 8D-4 characterization dates back to suggestions made by EPA. The liquids, containing Gamma radiation, were not as homogeneous as expected. DOE decided to sample the liquids to characterize them and determine how to manage them. A report is being prepared. This is separate work from the site characterization work being done by Safety and Ecology (SEC).

Phase One Studies Update by ECS

Engineered Barriers Potential Area of Study (PAS). Dhananjay Rawal of ECS noted the addition of David Kosson, Ph.D., Professor and Chair of Civil and Environmental Engineering, Vanderbilt University, as a fifth Subject Matter Expert (SME) to the Engineered Barriers Working Group. He joins Craig Benson, Ph.D., Jay Beech, Ph.D., Charles Shackelford, Ph.D., and Ted Johnson. The EBWG kickoff meeting was held July 12th and weekly conference calls are on-going to work on recommendations. All information regarding the EBWG, including resumes and bios are posted on the Phase One Studies website.

Exhumation PAS. The Exhumation PAS now has SMEs designated for specific focus areas. For waste inventory, the experts are Dr. Ralph Wild and Stephen Marschke. For waste removal and handling they are Dr. Frank Parker, Jay Pride and Michael Travaglini. The expert on radiological protection is William Thomas and for waste classification and disposal, the expert will be W.T. Goldston.

Climate Change Workshop. Mr. Rawal provided a summary of the path forward following the August 2nd Climate Change Workshop. ECS will be working with the climate scientists to prepare a *Climate Guidance for Phase One Studies*, which is expected to be published in November. The guidance will summarize the issues discussed at the workshop and recommendations for the path forward for addressing climate change within the Phase One Studies.

Phase One Studies Website. Mr. Rawal noted that the website is the primary tool for obtaining up-to-date information. The Climate Change Workshop Handbook and EWG recommendations have been posted to the site.

Next Steps for EWG Recommendations. Mr. Rawal explained that DOE and NYSERDA are seeking stakeholder input on the EWG recommendations by Sept 7th. Input received will be provided to the Independent Scientific Panel (ISP) for review. DOE and NYSERDA will identify the path forward for erosion studies – target date November 1st.

Upcoming ECS Work Activities. In addition to activities stated above, ECS will be completing a recommended program of work for the Engineered Barriers PAS and complete SME contracts and develop a recommended

program of work for the Exhumation PAS.

Some of the meeting participants raised concerns about the status of comments they had submitted on the current working groups, as they did not see any of the changes they recommended being incorporated. Lee Gordon of NYSERDA indicated that they were in the process of responding to comments. Some concerns regarding running the different working groups concurrently were raised, and Mr. Gordon explained that with the timeframe they are operating in this approach is necessary although challenging. He stated that information will be shared across the groups, as the experts will need to incorporate information from groups. Other questions were raised about communicating with the SMEs and ISP. Mr. Rawal reviewed the process for submitting comments and questions via email to both Moira Maloney of DOE and Lee Gordon of NYSERDA (contact information on the Phase One website). Later in the meeting, ECS and the agencies noted that comments received will be shared via the agencies and technical comments are not filtered before being sent to SMEs/ISP. The Quarterly Public Meetings are also a venue to provide feedback and ask questions. NYSERDA, DOE and the facilitator noted the concerns about the timeframe for responses and the forum for engaging with experts and stated that this would be reviewed.

Erosion Working Group Presentation

The Erosion Working Group (EWG) presented the erosion studies and preferred models they are recommending to DOE and NYSERDA. Members of the EWG include Robert H. Fakundiny Ph.D., Michael Wilson Ph.D., Richard Young Ph.D., Sean Bennett Ph.D., Greg Tucker Ph.D., Joseph Price Ph.D., and Sandra Doty M.S., PE.

Introduction. Dr. Fakundiny explained that the problem the group is seeking to address is a lack of consensus between the two agencies on long-term erosion projections, and that questions about the future landscape and future exposure to radionuclides must be answered. The EWG is recommending a series of independent yet synergistic studies to fill in gaps in data and to strengthen confidence in projections. The studies should take place concurrently when possible.

Study 1 – Terrain Analysis. Dr. Michael Wilson presented the EWG's recommendation of a terrain analysis study to build on previous work and available data, including the work cited in the EIS and the work EWG members have done separate from this process. The EWG proposed reassessing landform elements (terrain) to enhance the characterization and timing of past deposition and erosion events. The objectives of this study are: to enhance understanding of post-glacial geomorphic history, to enable more confident independent projections of erosion, and to provide enhanced context for numerical model calibration and sensitivity analyses. Study components include identifying land elements using Light Detection and Ranging (LiDAR), and other sources such as USDA soil surveys. Comparisons to other counties, walk-overs, test-drilling, trenching, construction of graphics, and examining images over time are potential elements of the study. A goal is enhancing understanding of the history and rates of landscape processes to better define parameters for projecting future erosion of the site.

Study 2 – Age Dating and Paleoclimate. Dr. Richard Young presented the second recommended study, which will serve to provide additional age data taking advantage of available newer technologies to gain a better understanding and/or confirm the EWG's understanding of past rates of stream downcutting, valley rim widening, and post-glacial climate cycles and their effects on erosion processes. Study components will include various dating methods such as radiocarbon, optically stimulated luminescence (OSL), and others performed on samples collected from excavations at strategic locations. Paleoclimate may also be evaluated by coring tree rings. Dr. Young added that some of the dating techniques may not be as useful as others, such uranium-lead dating, but the EWG is considering all potential components of such a study. He added that, for this study, it might be useful to look at global climatic events in order to better pin down when the local landscape began to develop. He highlighted the importance of distinguishing glacial features as a way to then prioritize features, where to find information and in what order. Looking at global events will

help tie local findings to events worldwide or determine whether local findings are isolated occurrences. Age dating will provide more confident estimates of timelines for the formation of observed geomorphic features, and by doing so will provide enhanced context for calibrating the predictive landscape evolution model and will help reduce the uncertainty of model predictions.

Study 3 – Recent Erosion and Deposition Processes. Dr. Sean Bennett reviewed the third recommended study, which will provide valuable perspective to prediction of future landscape evolution. He described this study as an opportunity to look at recent and current measurable rates of erosion to better quantify the processes in operation today and how these processes should be factored into predictions of future erosion. This will provide additional information that was not available when the EIS was prepared. Dr. Bennett described several sites where there are active erosion processes, including Franks Creek and Erdman Brook, where significant gaps exist in data on current rates of erosion, locations and potential risks. He cited potential erosion risks such as exposure of critical infrastructure (gas lines) and the interred waste, and explained that by examining the current rates of erosion the EWG will be able to better determine the extent to which these risks are potential threats, and to enable recommendations regarding management approaches. Management efforts have already begun with grade control structures in Erdman Brook to address channel erosion. The foci of the proposed study will be the rates of change affecting hillslopes, rills and gullies, streams and land surfaces. Multiple techniques will be used to examine what is happening, and short and long-term implications.

Study 4 – Model Refinement, Validation, and Improved Erosion Projections. Dr. Greg Tucker outlined the fourth recommend study, which will utilize the data from the three prior studies to test and run forward a landscape evolution model to forecast future erosion rates and patterns. A landscape evolution model (LEM) computes the erosional development of topography over time. The EWG recommends using the Channel-Hillslope Integrated Landscape Development (CHILD) Model – because it is the best available tool that is most adaptable to the site's specific needs. Input data recommended by the EWG includes data and results from studies 1-3, as well as scientific data and calibration to the modern landscape. Dr. Tucker explained that the CHILD model will be tested by taking three approaches: reproducing the modern landscape when run from the last ice age to today, reproducing the modern landscape of a second watershed without calibration, and finally predicting erosion rates and patterns consistent with studies 1-3. Regarding calibration, he explained that parameters have been adjusted to the real landscape. The model considers the range of what is plausible and valid, and sensitivity analysis examines the extent to which what is unknown affects the degree to which calculations are subject to uncertainty. Future erosion will be calculated by running models with different sets of input as to what can be estimated. The EWG believes that by refining the tested models, results are likely to have a better quantification of uncertainty than in the EIS study.

Summary. Sandra Doty summarized the recommendations of the EWG. The EWG is recommending four Phase One studies, designed to build on previous work and fill data gaps. Ms. Doty explained that the EWG believes the proposed studies will improve scientific defensibility and help facilitate consensus among the agencies. The next step will be to develop study plans. The EWG will provide details of the major components, schedule, and scope for the studies. The EWG intends to view this problem from many angles that should provide converging lines of evidence.

General Discussion

General comments and questions are addressed below.

Several questions were raised regarding future erosion projections. Participants asked about considerations for what will happen when some of the mitigation efforts eventually deteriorate. Dr. Joseph Price explained that the general rule of the approach is that you don't take institutional credit for repeated replacement of these features and would consider what happens without human involvement. Dr. Tucker added that the EWG has not yet discussed this and it

would be determined in the development of the studies. Lee Gordon of NYSERDA further clarified that this may also be a question for the Engineered Barriers Work Group, which will look at containment processes.

Other questions were raised about climate change, short-term regional storms, and major long-term events such as droughts or floods and how the model will incorporate those potential impacts in its projections. Dr. Tucker explained that the CHILD model has an approach to storms and events of different sizes, rather than a standard. He added that climate change considerations will be discussed by the EWG and a plan for how to address these impacts will need to be developed later in the process. Further questions on this topic included whether the model can be tested at 5-10-year intervals to see if predictions are on target and to take into consideration increased frequency of extreme storms. Michael Wolff of ECS responded that the study plans would be developed in recognition of the agency's window of time. This plan could be a part of that window, but this will be driven by the agencies. Additionally, a general question was raised about the timeline for projections. Mr. Wolff responded that the EIS looked at ten thousand years because it is an EPA timeframe. The EWG will be looking at that as well as intermediate timeframes.

A participant referred to a statement that stream cutting has been slowing over time (document posted online). In part of the discussion it was noted that there is evidence that the volume of Buttermilk Valley removal through downcutting occurred shortly after the glaciers receded, prior to the establishment of substantial vegetation, and the downcutting slowed significantly after an initial formation of the creeks and streams. Dr. Wilson added that what information is available does not get into the complexities of what has transpired over time, and this information will need to be revisited by the EWG. A participant requested copies of three digital elevation models (DEM): 1) Glacial model; 2) Current DEM; and 3) Projection for 10,000 years in future with modeling (what was done for EIS) in DEM rather than GIS.

An individual inquired about other activities that might encroach on geology (e.g. fracking, drilling) and whether they would be included in the model. Mr. Bembia noted that a separate PAS group on seismic hazards will be formed and that they will think about what might be important for the EWG to consider. Questions about future projections in the model with regards to geology were also raised. A participant asked about distinguishing bedrock vs. glacial till. Dr. Tucker reiterated that the model has not been run yet, though he noted that in the EIS analysis there was till and bedrock. The EWG was asked whether they had considered including seismic activity in the modeling. Dr. Tucker responded that it could be included, but that it was a level of detail that hadn't yet been discussed. He added that he has not seen people including seismic activity in landscape models.

In response to a question, Dr. Fakundiny responded that sand strata and sand lenses would be part of the EWG's considerations. Dr. Tucker confirmed that models could incorporate this depending on how much data is available. He confirmed that there are some uncertainties when it comes to incorporating groundwater effects, and that this is a technical question the EWG needs to grapple with. Mr. Wolff also added that there would be a separate working group to look at ground water and contaminant transport.

In response to a question, Dr. Fakundiny explained that the EWG will be looking at all data currently available, including the EIS, and determining what data gaps the group will need to fill in conducting the studies. A participant suggested the Full Cost Accounting Study as another data source. Dr. Wilson, an author of the study, responded the issues associated with this study were shared with the EWG.

In response to a comment, Dr. Tucker disagreed with an assertion that the models always drift out of certainty. He mentioned that the EWG would need to discuss how to quantify uncertainty.

Questions were raised in regards to the tasks and scope of the EWG work going forward. Bryan Bower from DOE explained that the EWG recommendations are currently being commented on by the public and the ISP. The

agencies will then review comments and make the decision on what work will be authorized. The EWG will then determine how they will carry out the authorized work, including scope and timeline.

A question was asked regarding whether the scientists in the working groups can speak in opposition to decisions made by the agencies, specifically in regards to the decisions made about which studies to conduct. Dr. Fakundiny responded that each member of the EWG has to respond to his or her own professional and personal ethics. A further question regarding whistleblowers in the event of disagreement was tabled for a later answer.

A member of the public stated that all wastes should be removed and that the agencies should fund advocacy organizations.

Due to the late hour, topics for the next QPM were not discussed.

Documents Distributed

Document Description	Generated by; Date
Meeting Agenda	ECS; 8/22/12
DOE Presentation – Project Update	DOE; 8/22/12
West Valley Phase 1 Studies Update	ECS; 8/22/12
Erosion Working Group Presentation	ECS; 8/22/12