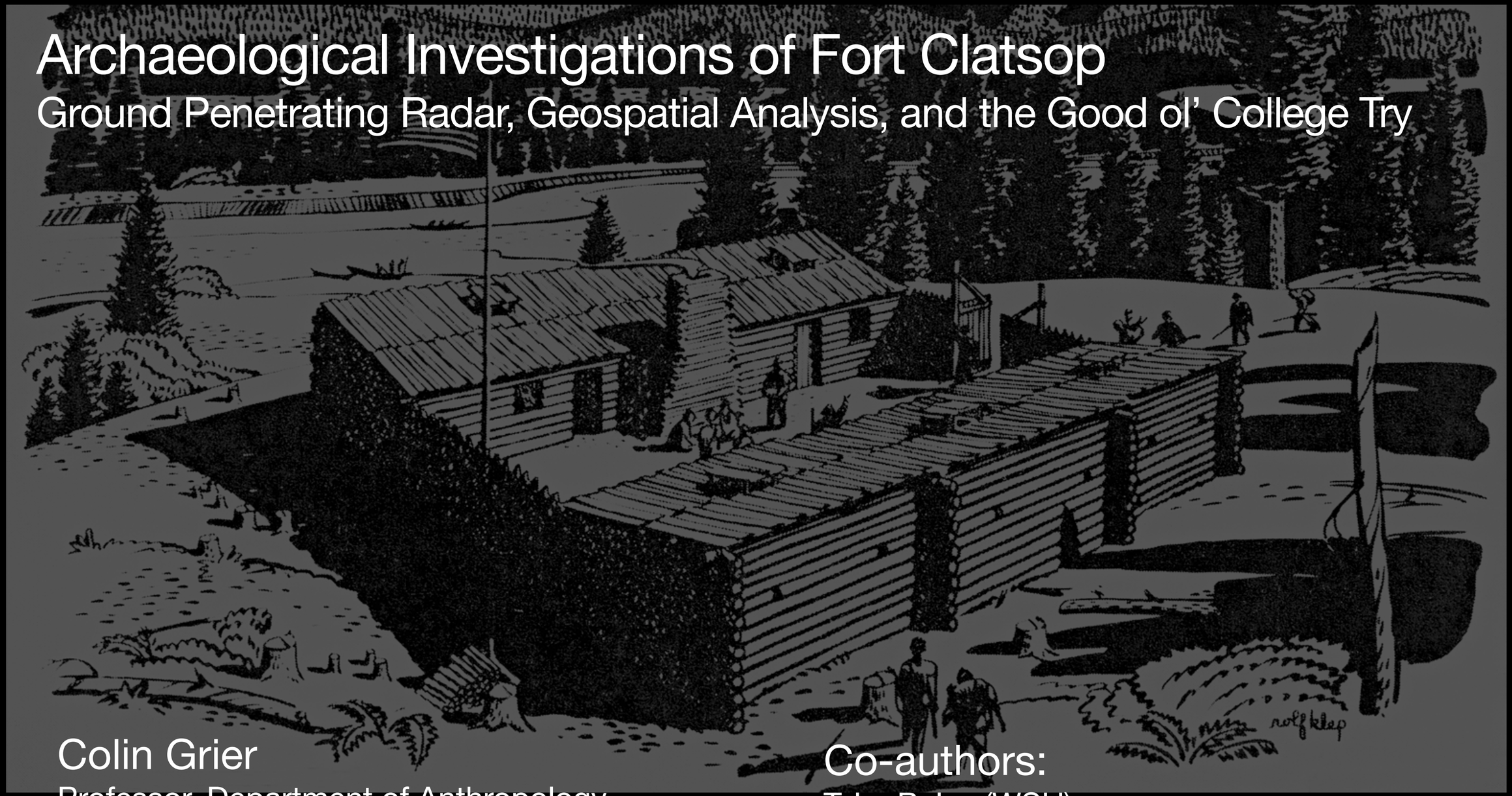
Archaeological Investigations of Fort Clatsop

Ground Penetrating Radar, Geospatial Analysis, and the Good ol' College Try



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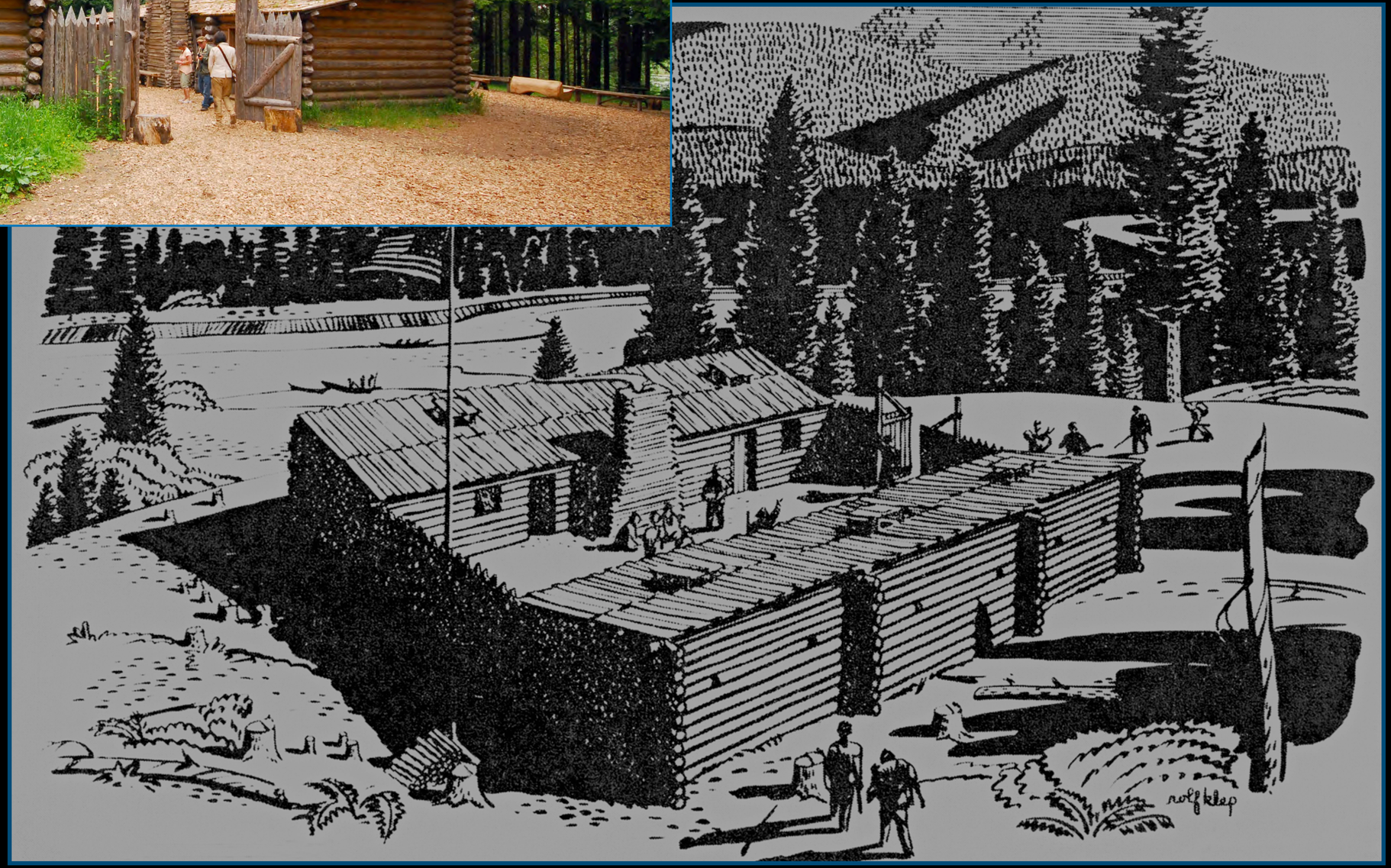
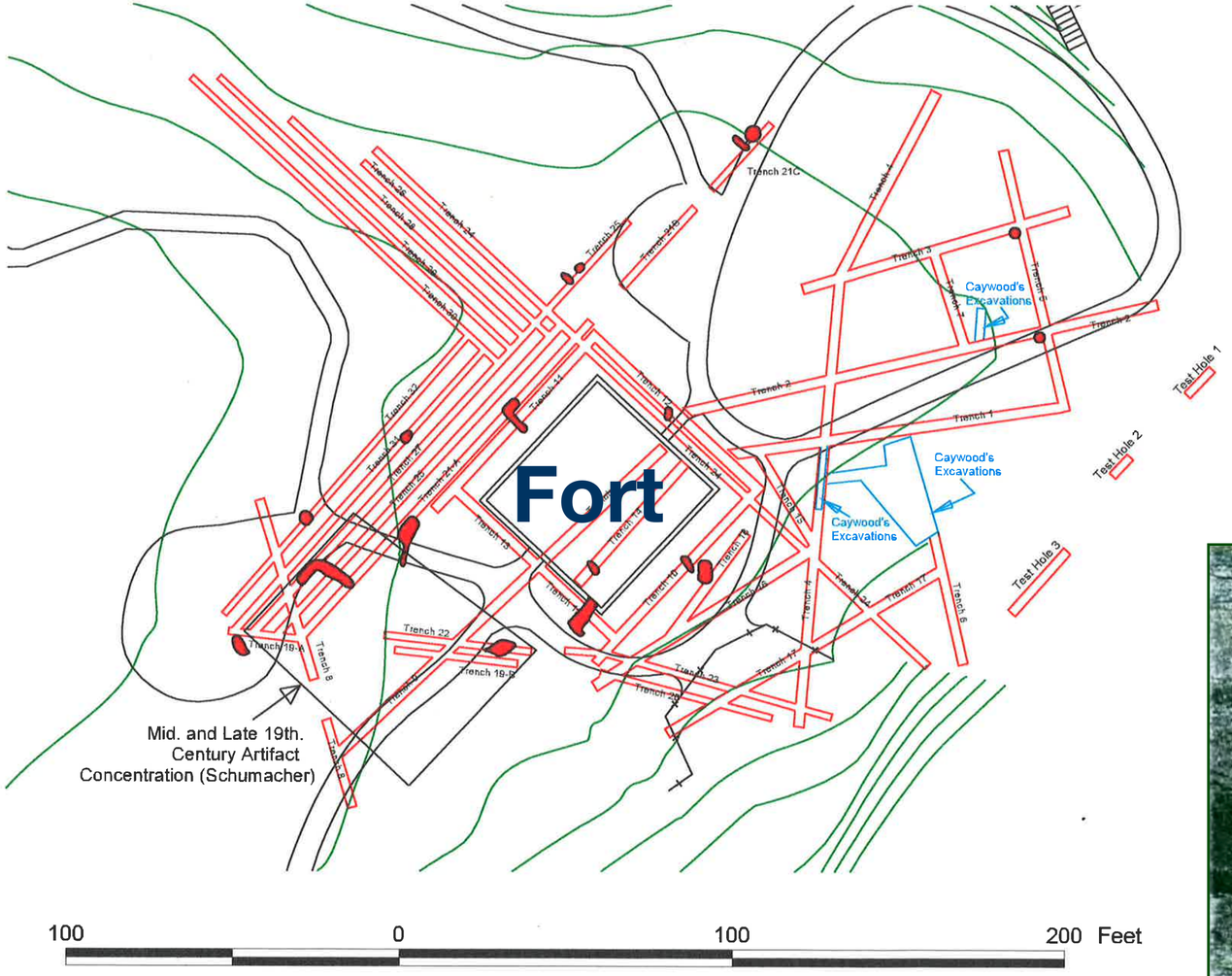
Washington State University (Vancouver)

Co-authors:
Tyler Baley (WSU)
Glen Kirkpatrick (L&C Heritage Trail Foundation)
Rachel Stokeld (NPS - L&C National Historic Park)


rolf klep

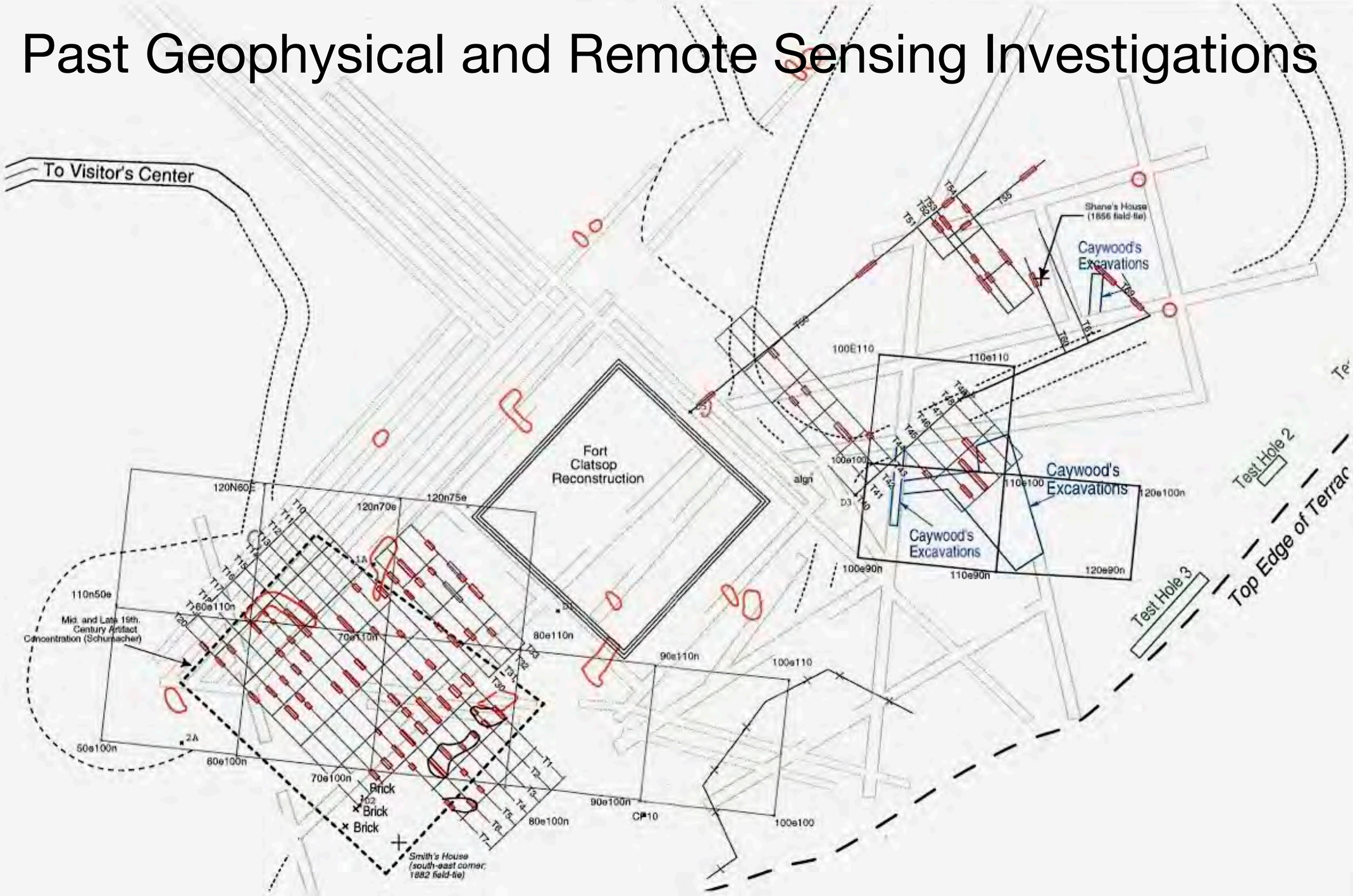
Archeology at Fort Clatsop N. M.



Legend

- Firepits
- Schumacher Trenches
- Caywood Trenches
- Existing Trails & Buildings
- Topographic Contours

Past Geophysical and Remote Sensing Investigations

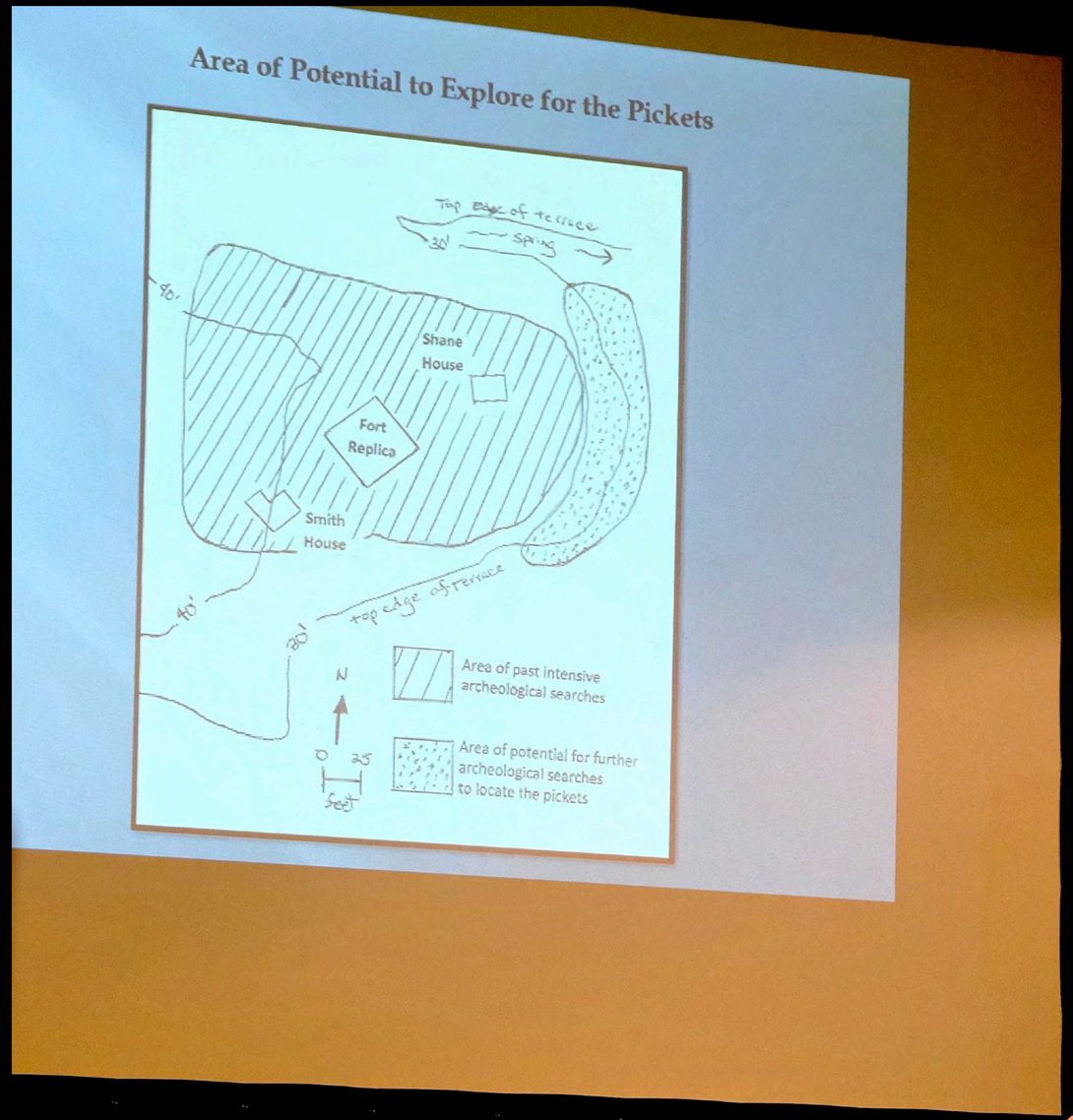


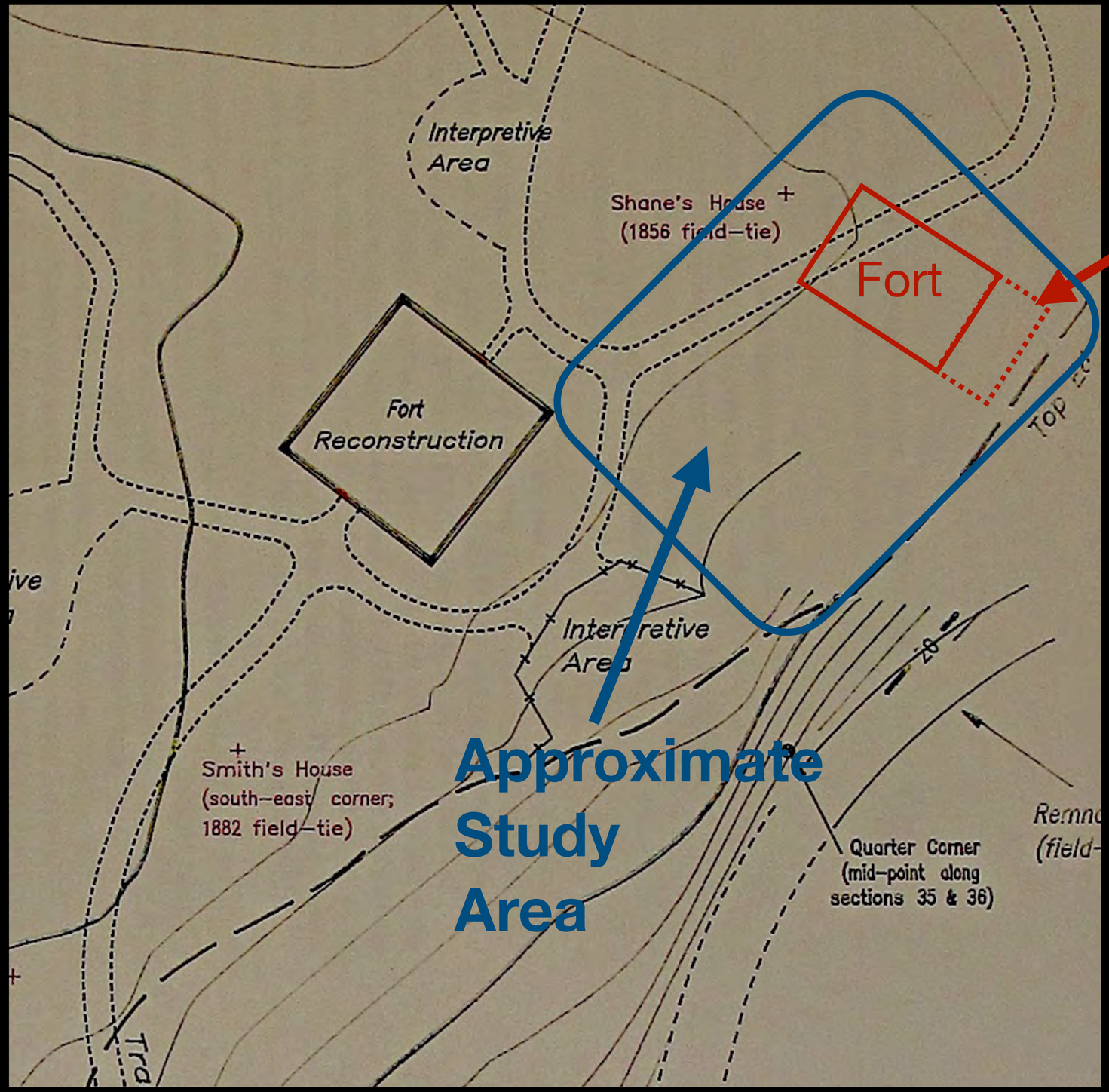
GOAL:

To survey the area north & east of the fort existing replica

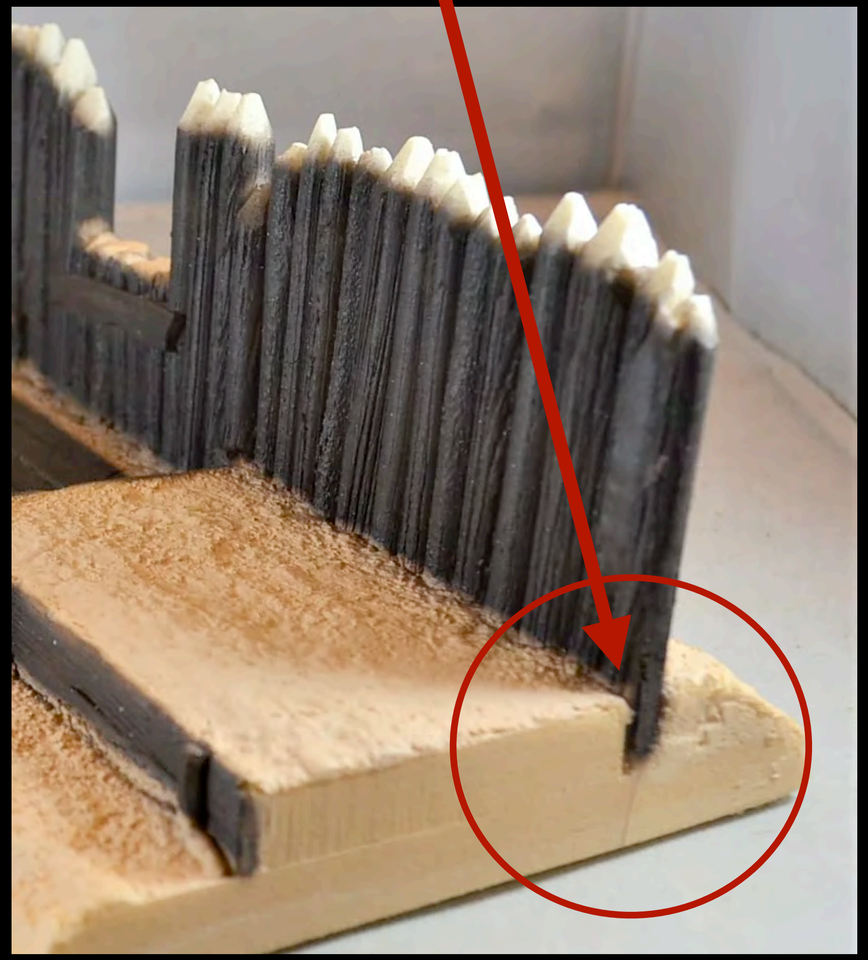
RATIONALE:

new interpretations of L&C journals and re-evaluation of the landform suggest the fort may have been NE of the replica




Interpretive Area
Shane's House
(1856 field–tie)
Fort
Fort Reconstruction
Interpretive Area
Smith's House
(south–east corner;
1882 field–tie)
Approximate Study Area
Quarter Corner
(mid–point along
sections 35 & 36)

Palisade



The Challenges:

The fort was a short term use structure, with limited subsurface impacts of the kind GPR recognizes

The inferred palisade trench would be the only element of the fort that had subsurface impacts (other than perhaps pits and other non-structural elements)

The ground has been substantially disturbed since the fort was abandoned, including by ambitious archaeologists

Past research projects (including remote sensing/ geophysical surveys) were limited, not consistently referenced in space, not fully reported, or carried out with dated equipment (sometimes all the above!)

Fieldwork crew (WSU unless otherwise noted):
Colin Grier (Director)
Marsha Small (Cheyenne Nation, Montana State University)
Tyler Baley
Kate Shantry
Cameron Blumhardt

Funding:
Lewis and Clark Trail Heritage Foundation (lead: Glen Kirkpatrick)
Washington State University
National Science Foundation (Grier's GPR grant)

On the Ground Support:
National Parks Service (Rachel Stokeld)

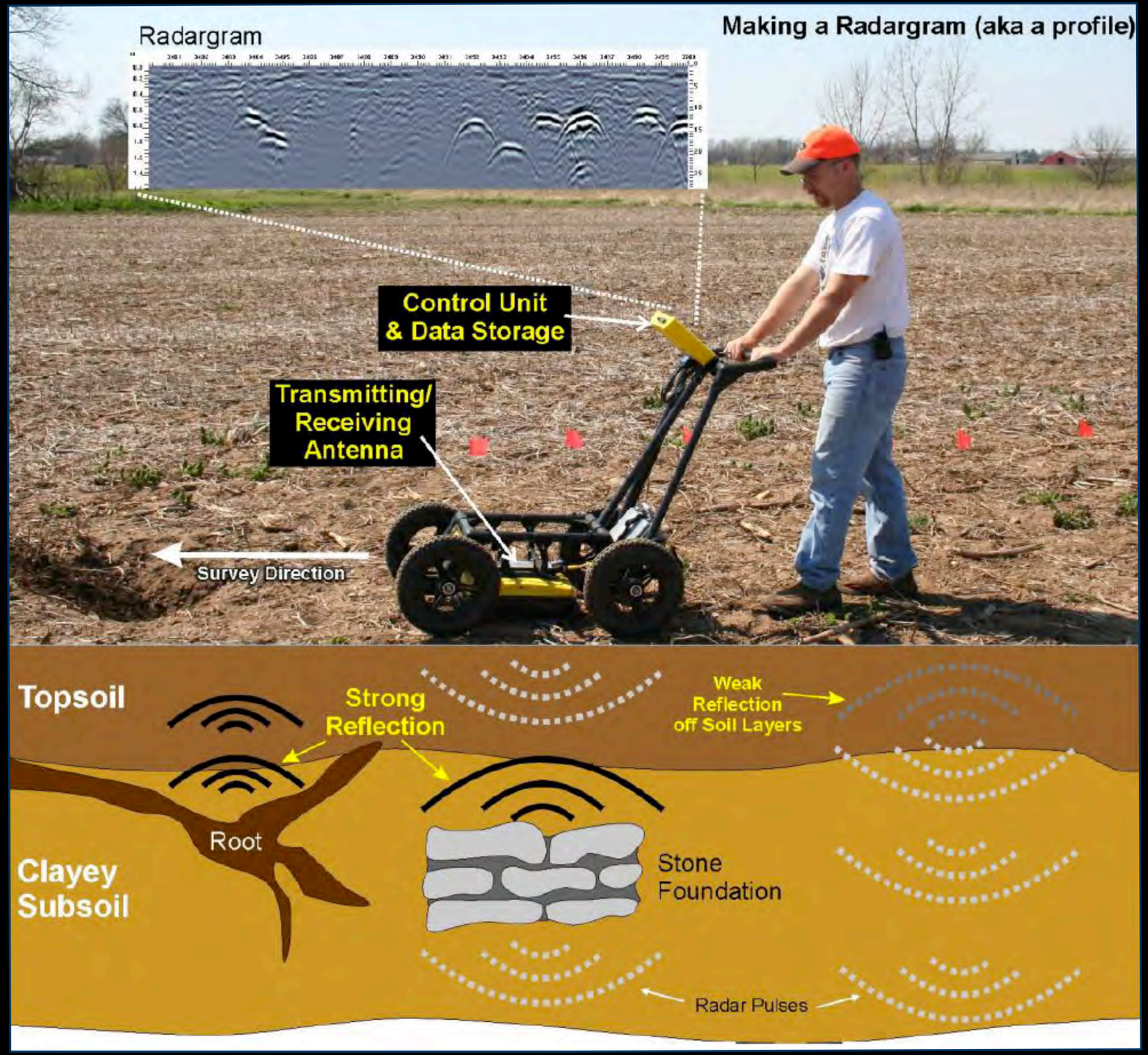
Fieldwork:

2 rounds — April 15 & 16, 2022 and September 23, 2022

fieldwork completed under late winter (saturated) and late summer (dry) conditions

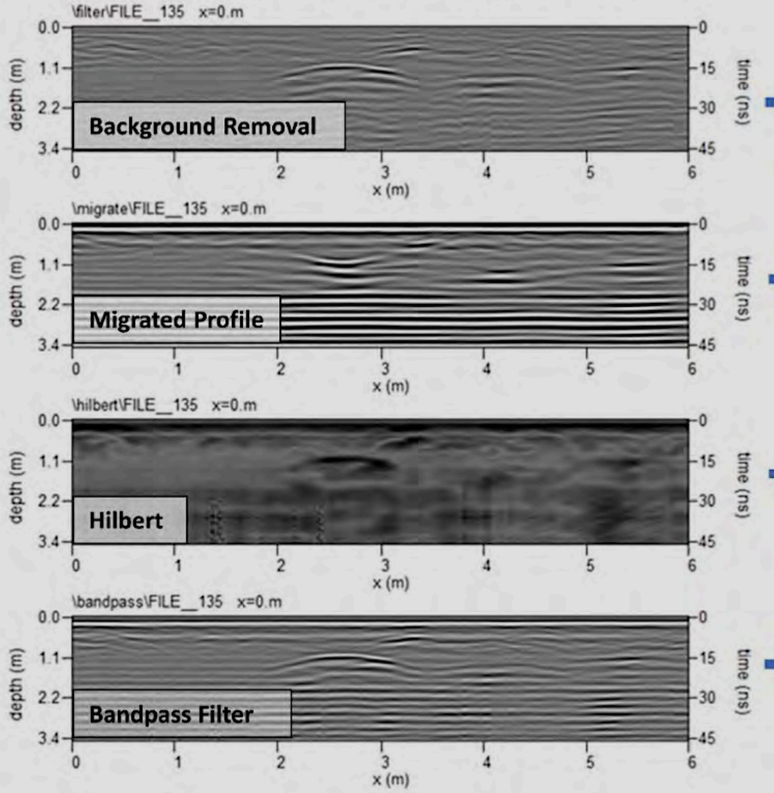
Why? GPR signals respond differently to moisture in different circumstances (typically moisture/water obscures things, as it decreases contrasts)

GPR Fundamentals

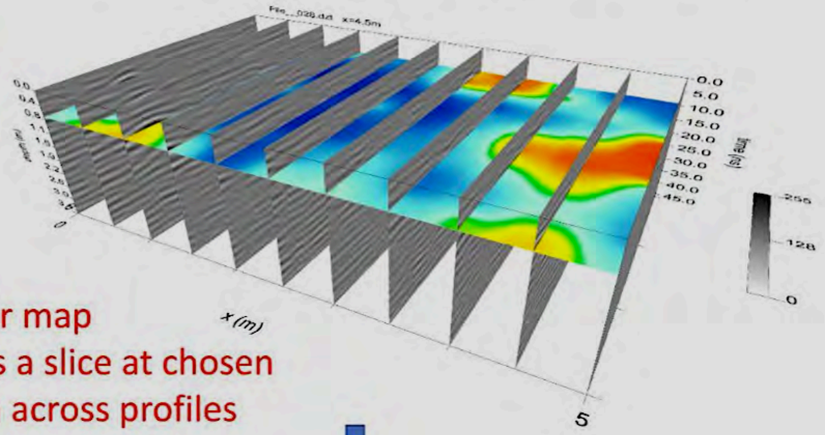


GPR Fundamentals

a Decide on radar processing steps and apply to all profiles

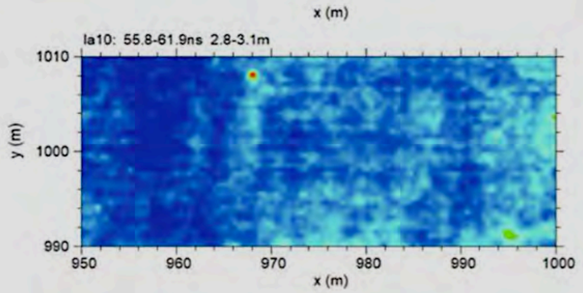


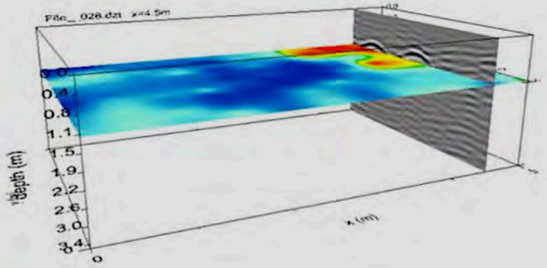
b Line up all profiles into their grid arrangement, and slice at specific depths



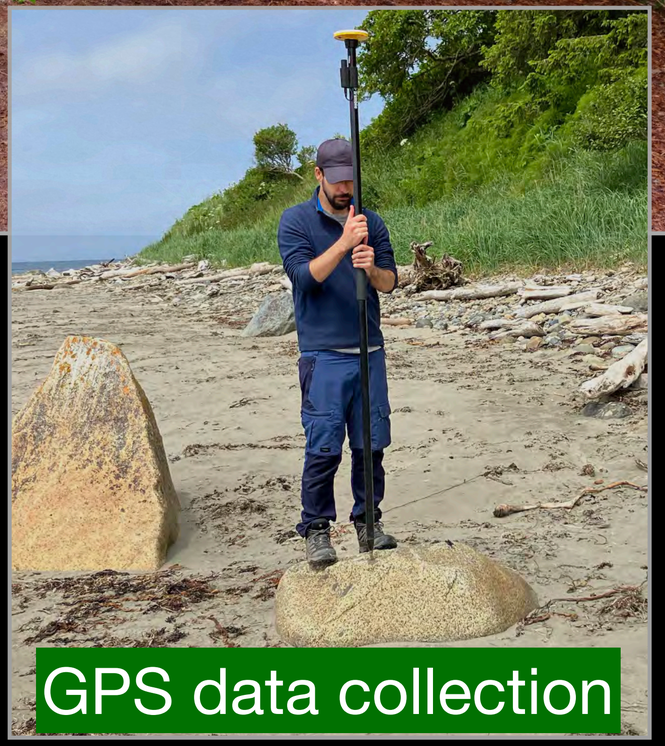
Colour map shows a slice at chosen depth across profiles

C Create final maps and products



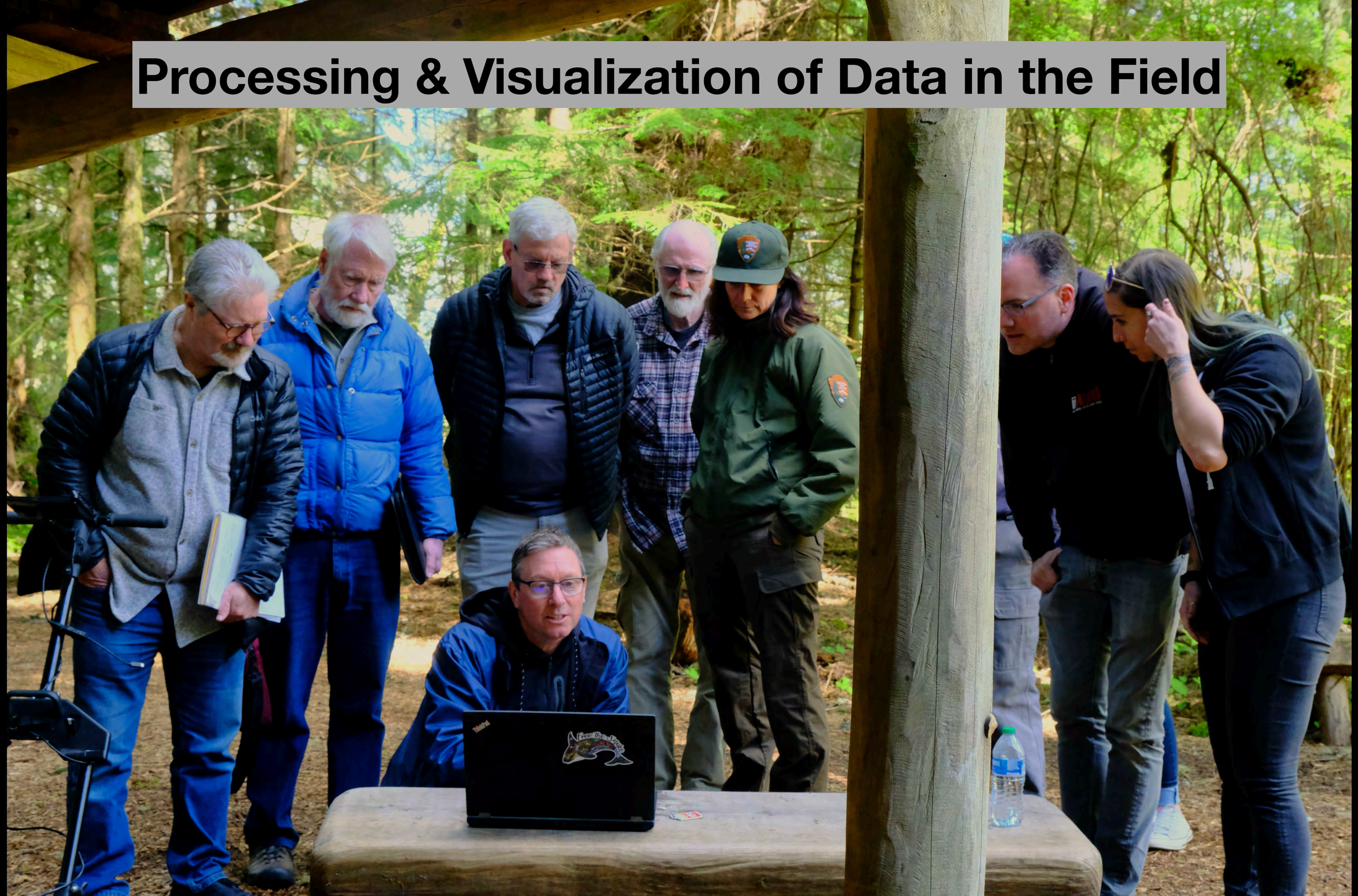


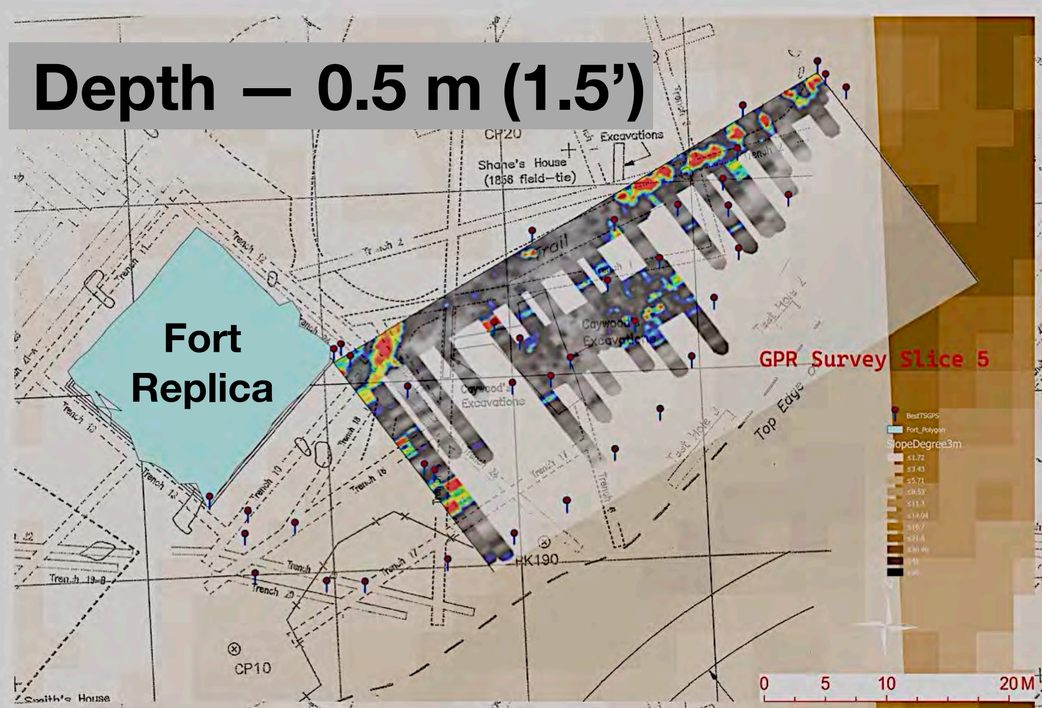
Fieldwork in April 2022

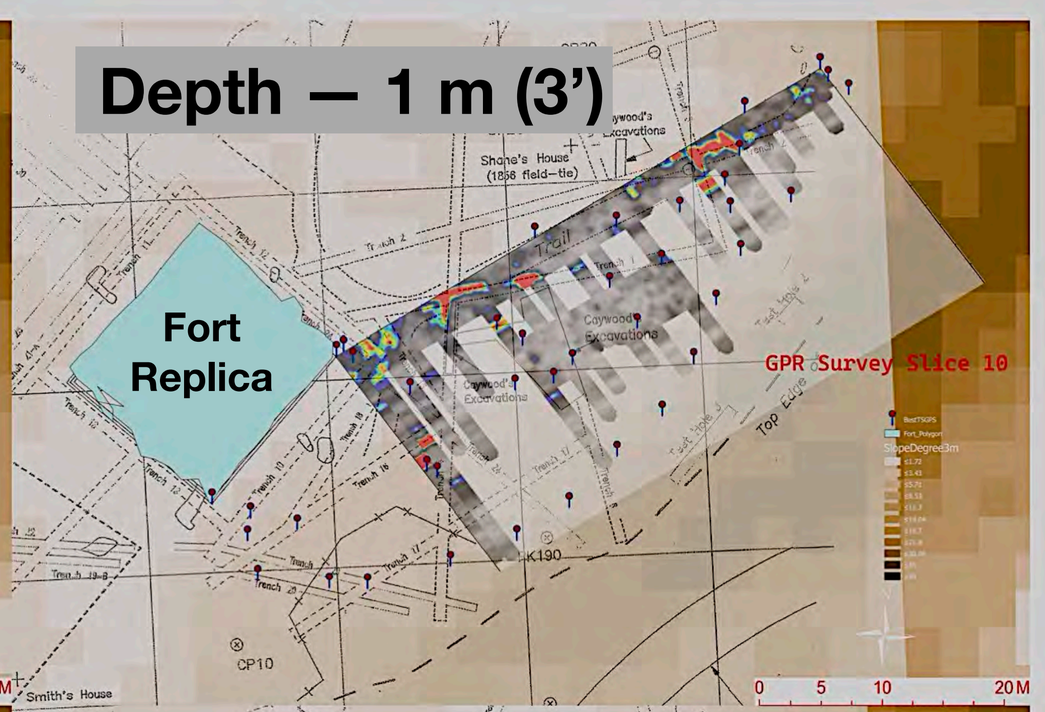


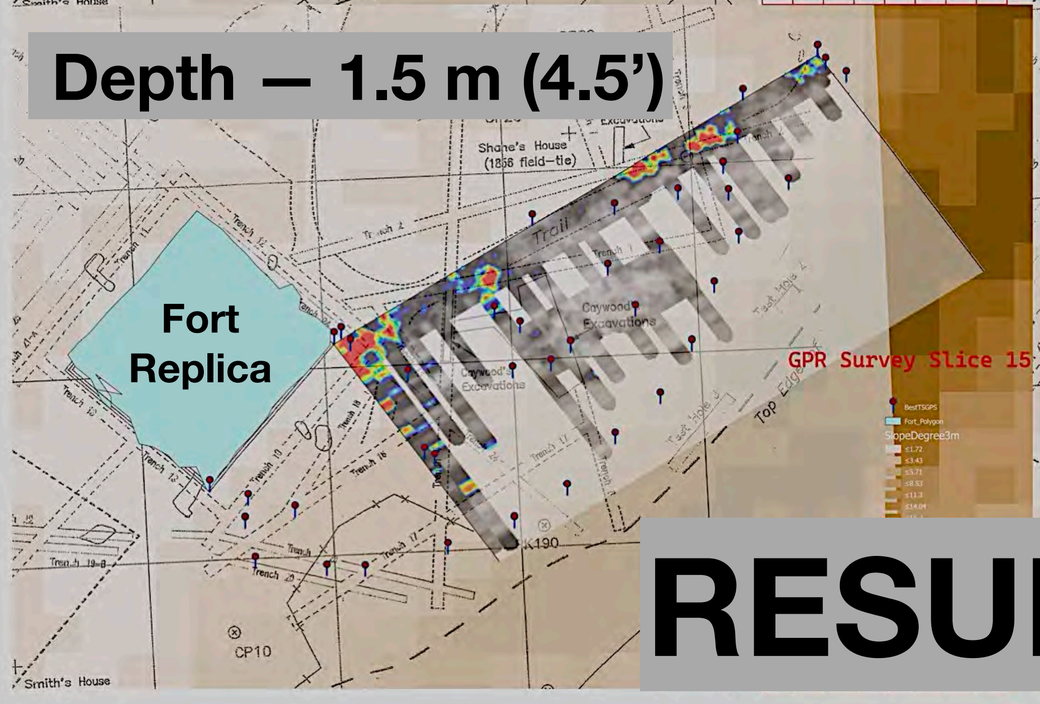
GPR Demonstration on April 23, 2022

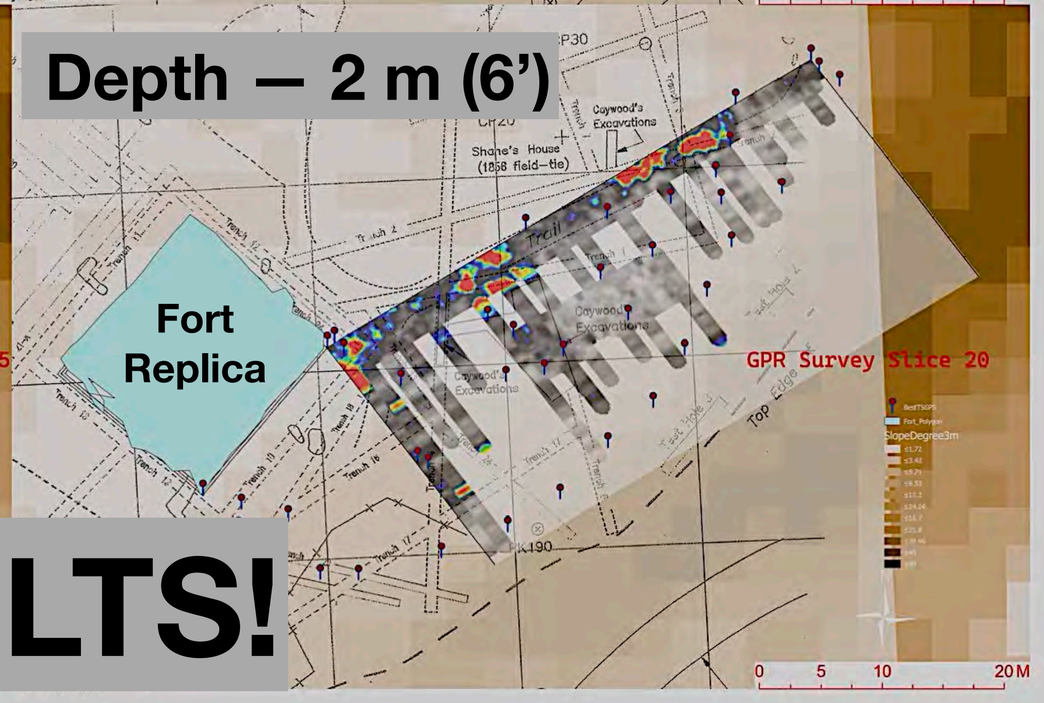
Processing & Visualization of Data in the Field



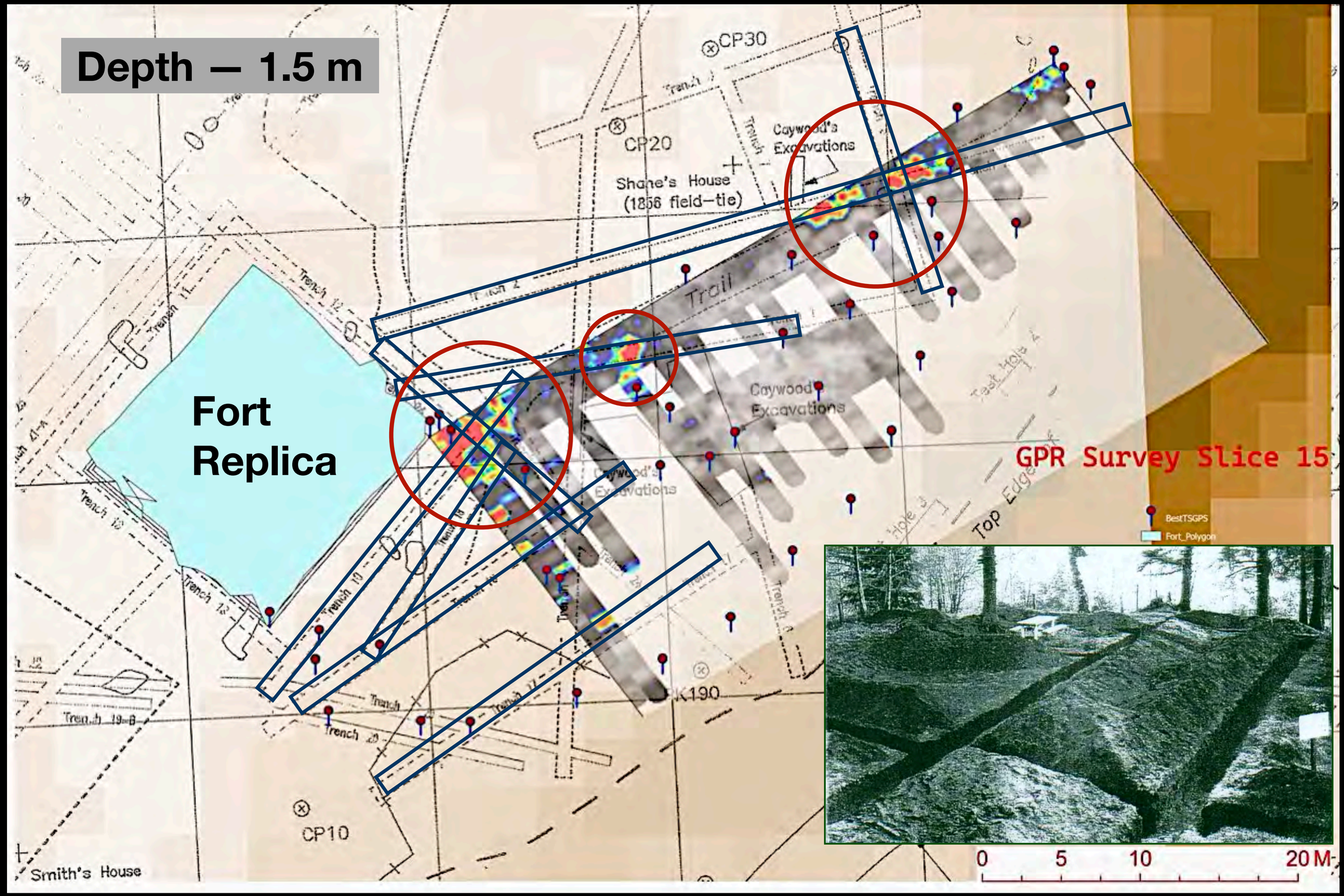

Depth — 0.5 m (1.5’)
Fort Replica
GPR Survey Slice 5
Shane's House (1858 field-tie)
Excavations
Trail
Top Edge
BK190
CP10
Smith's House
0 5 10 20 M


Depth — 1 m (3’)
Fort Replica
GPR Survey Slice 10
Shane's House (1858 field-tie)
Excavations
Trail
Top Edge
BK190
CP10
Smith's House
0 5 10 20 M

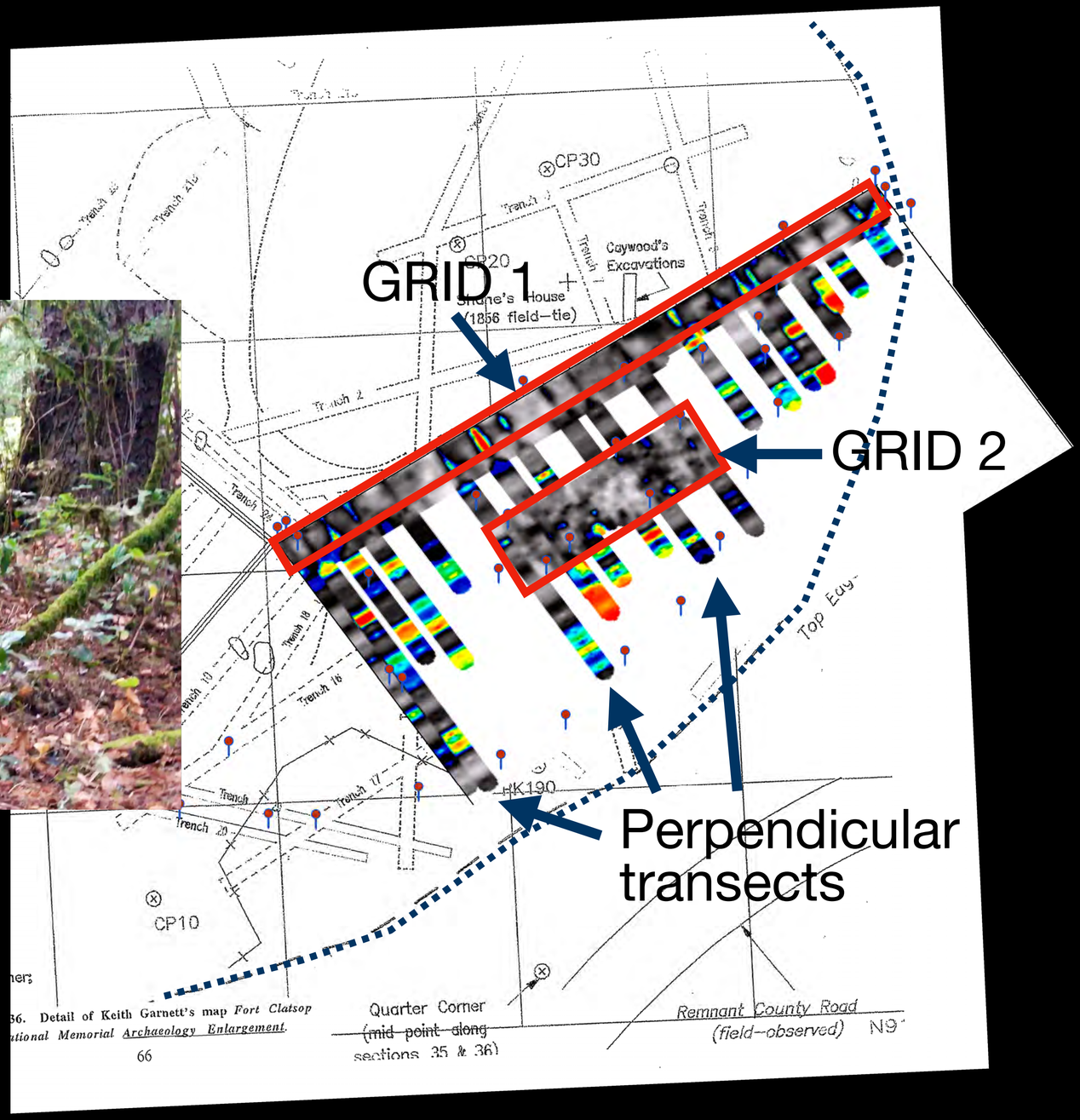

Depth — 1.5 m (4.5’)
Fort Replica
GPR Survey Slice 15
Shane's House (1858 field-tie)
Excavations
Trail
Top Edge
BK190
CP10
Smith's House


Depth — 2 m (6’)
Fort Replica
GPR Survey Slice 20
Shane's House (1858 field-tie)
Excavations
Trail
Top Edge
BK190
CP10
0 5 10 20 M

RESULTS!

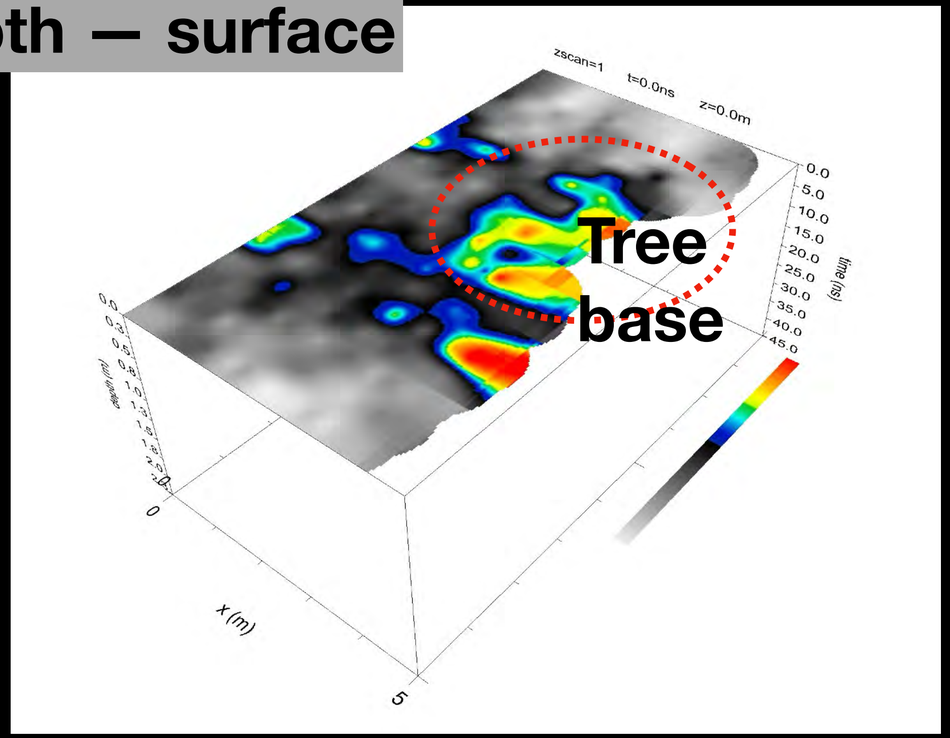

Depth — 1.5 m
Fort Replica
CP30
CP20
CP10
K190
Shane's House (1856 field-tie)
Smith's House
Caywood's Excavations
Trail
Top Edge
Trench 1
Trench 2
Trench 10
Trench 11
Trench 12
Trench 13
Trench 19
Trench 19-B
Test Hole 4
GPR Survey Slice 15
BestTSGPS
Fort_Polygon
0
5
10
20 M

RESULTS — GRID 2

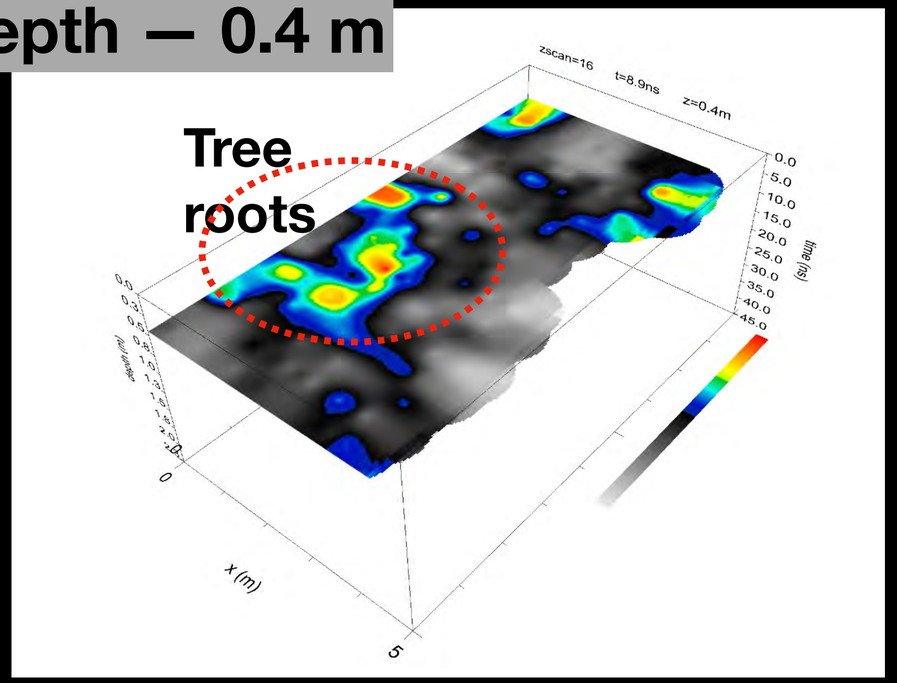


36. Detail of Keith Garnett's map *Fort Clatsop ational Memorial Archaeology Enlargement.*

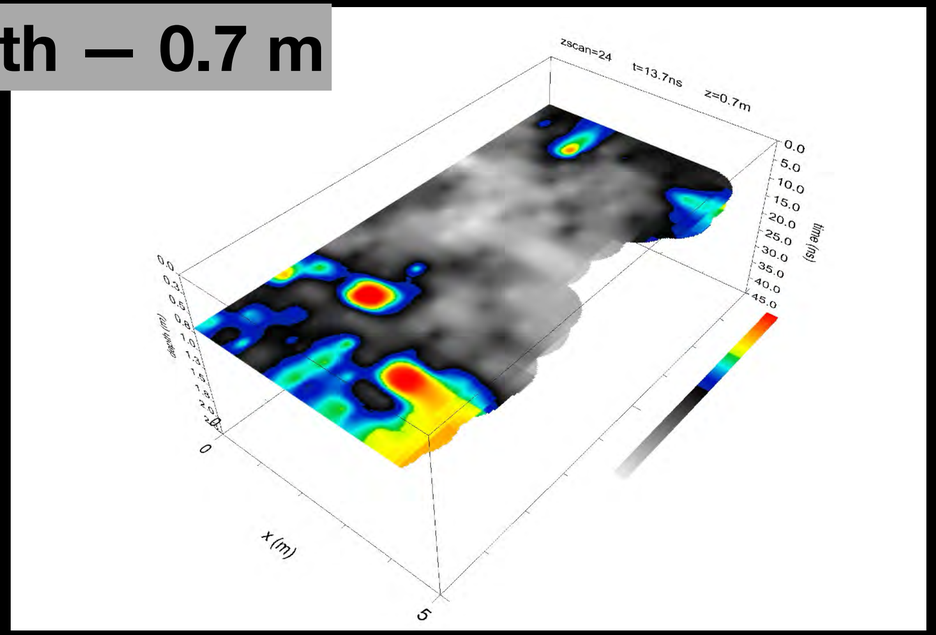
Depth — surface



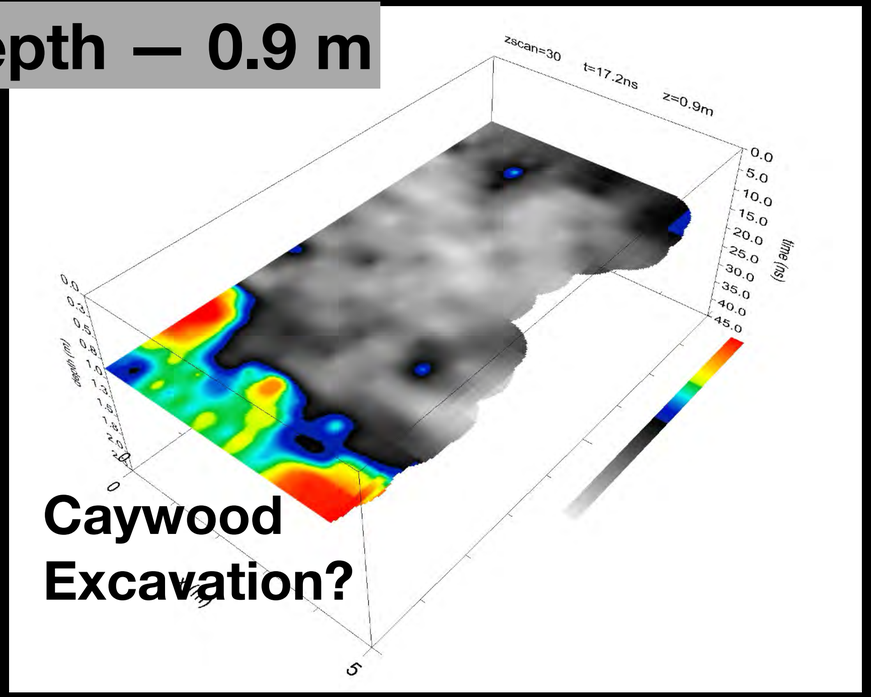
Depth — 0.4 m

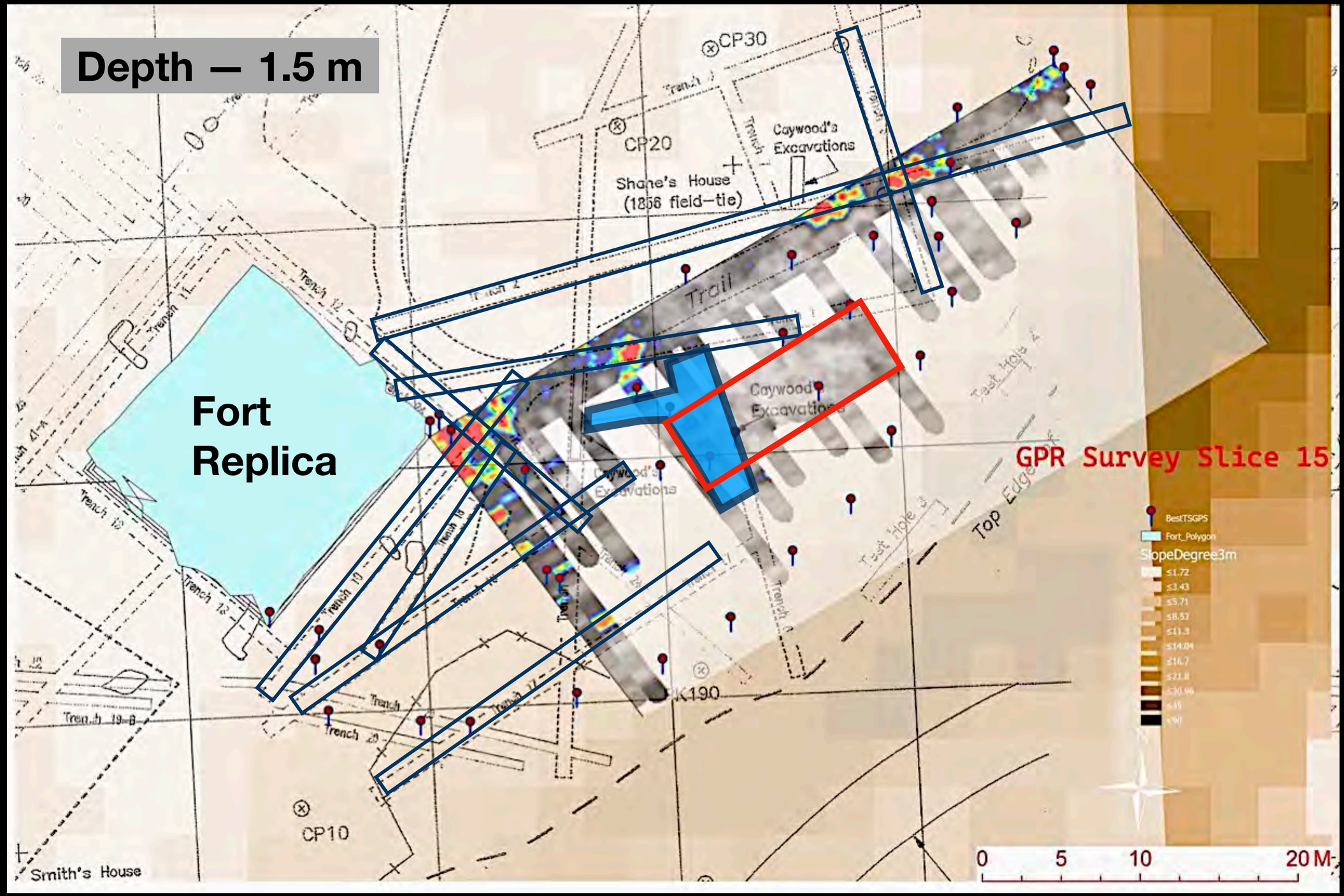


Depth — 0.7 m



Depth — 0.9 m




Depth — 1.5 m
Fort Replica
CP30
CP20
CP10
Shane's House (1856 field-tie)
Caywood's Excavations
Trail
Top Edge
Test Hole 3
Test Hole 4
Trench 10
Trench 11
Trench 12
Trench 13
Trench 19
Trench 19-B
Trench 20
K190
Smith's House
GPR Survey Slice 15
BestTSGPS
Fort_Polygon
SlopeDegree3m
≤1.72
≤3.43
≤5.71
≤8.53
≤11.3
≤14.04
≤16.7
≤21.8
≤30.96
≤45
>90
0
5
10
20 M

CONCLUSIONS — Ground Penetrating Radar

Overall we got reasonably good results.

We were quite limited in the way we were able to survey, given the ground cover situation.

We didn’t find the fort … but hard to say for sure.

We did find other archaeological investigations (excavations, trenches), tree roots, utility features.

ADDITIONAL WORK?

Not a clear path forward for geophysical methods, though a larger project could be mounted (I'd have to hand that off to someone else).

Ultimately, excavations are required to validate geophysical methods in situations like these.

There is some value in narrowing down the haystack — that is, considering more refined approaches to landscape potential (suitability, defensiveness, access) using GIS tools


Questions? Thoughts? Comments?