The Hagerman Paleoecology and Tephrochronology Project

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IDigBio Digital Data in Paleontological Research Workshop
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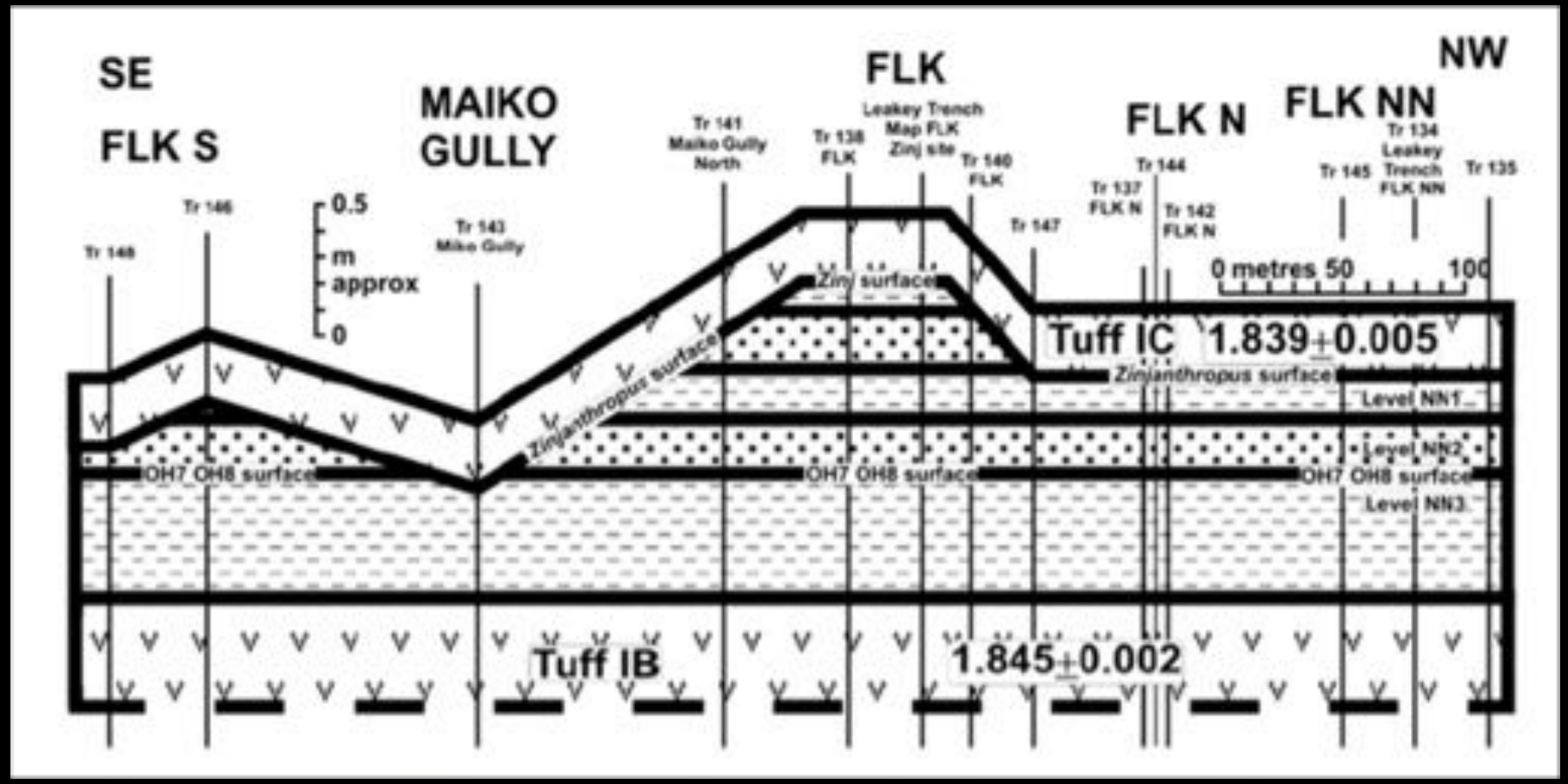
Olduvai Gorge, Tanzania, Early Pleistocene—Hominins, Oldowan and Acheulean stone tools, and cut marked bones (and a lot of fossil flora and fauna)

Olduvai Landscape Paleoanthropology Project	OLAPP
Olduvai Geochronology and Archaeology Project	OGAP
Olduvai Vertebrate Paleontology Project	OVPP
Comprehensive Olduvai Database Initiative	CODI

Olduvai Gorge, Tanzania—Hominin land use across time and space

Channel Peninsula Wetland Edge Wetland Interior



Blumenschine et al., 2012

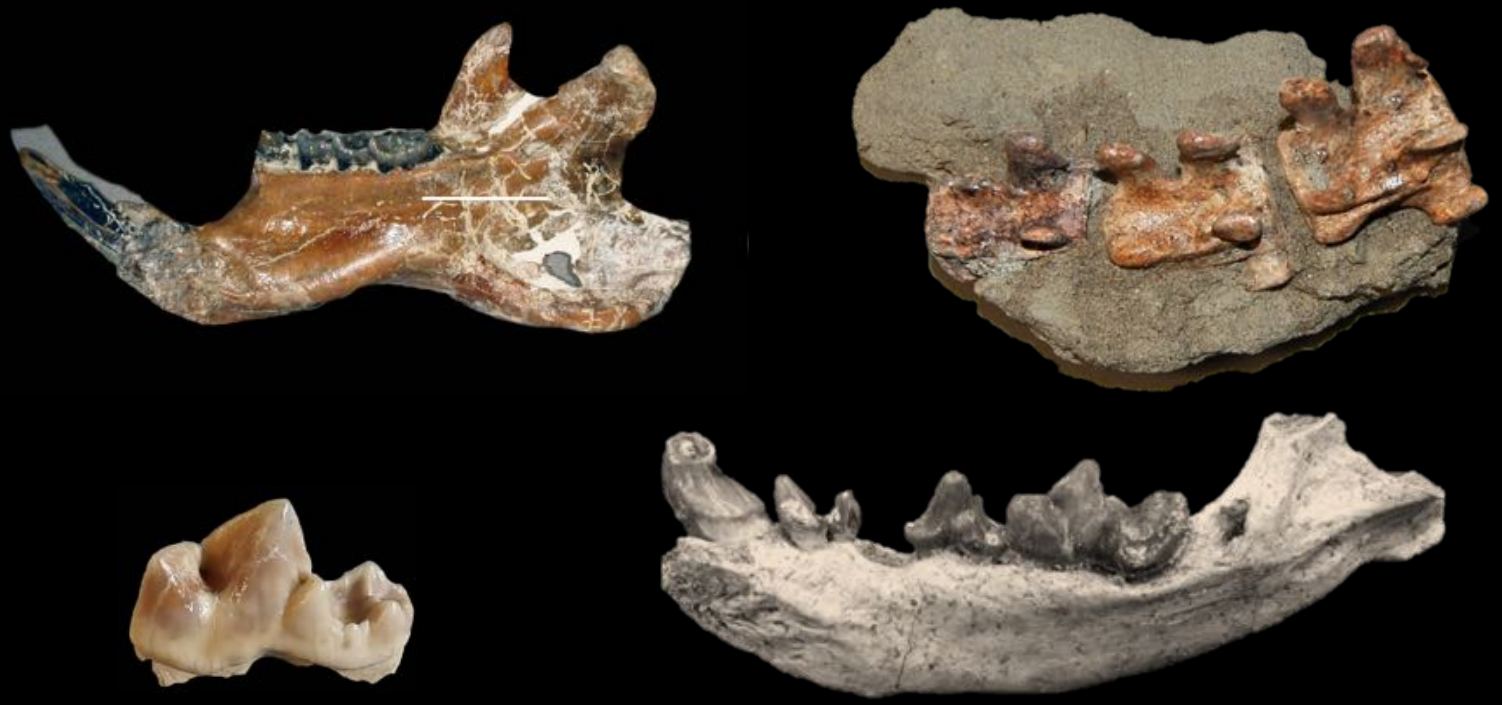
Hagerman Fossil Beds National Monument

Early-**m**iddle Pliocene, Blancan Land Mammal Age (4.2-3.0 Ma)

Steep-sided bluffs exposing up to 600 feet of fossil-rich deposits

Sites spread put across Monuments 4,349 acres extent

Over 70,000 fossils in on-site collections; thousands more at 40 other museums




WASATCH
FOSSIL BEDS
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MONUMENT
HAGGERMAN
VALLEY


WASATCH
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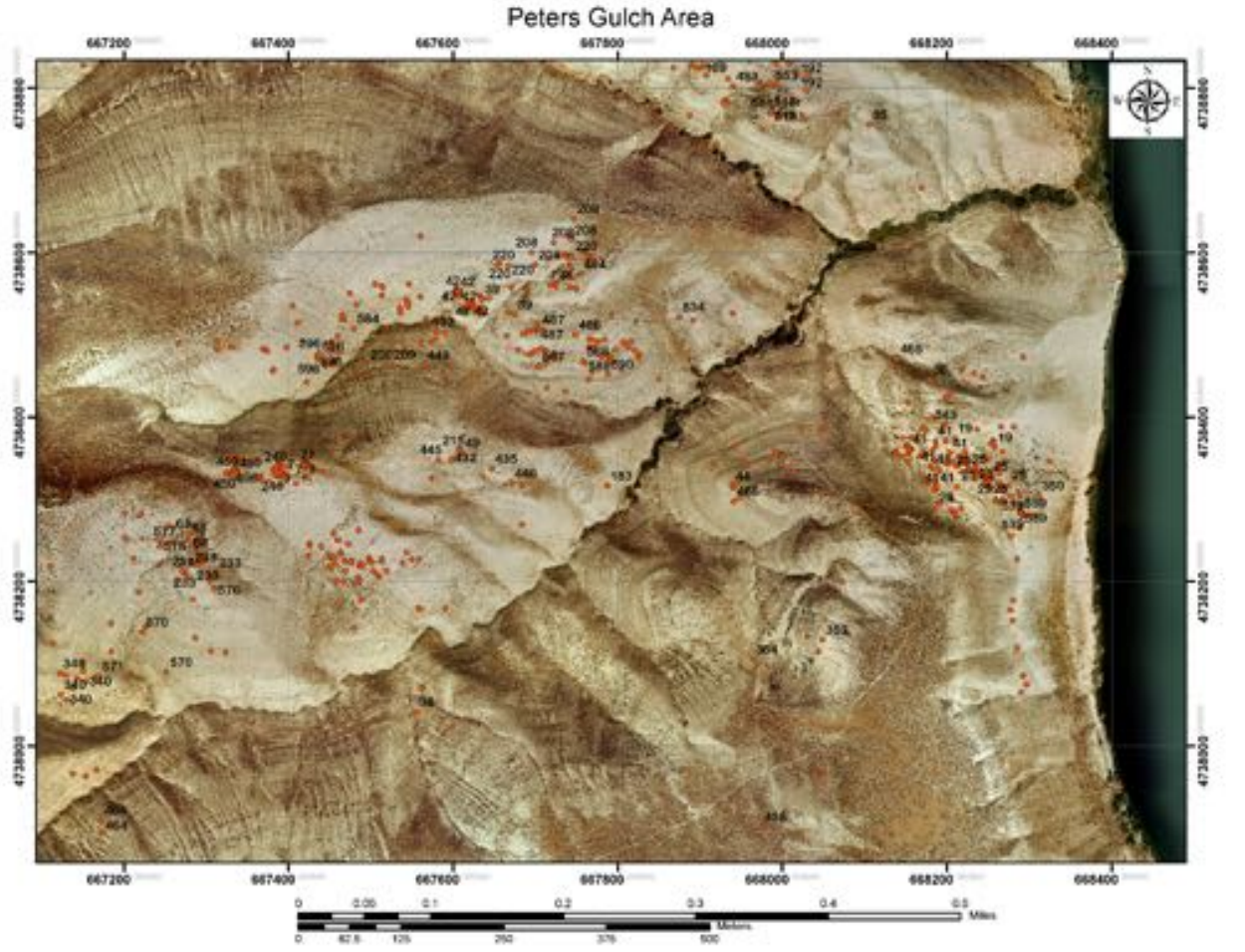

Peters Gulch Area
667200
667400
667600
667800
668000
668200
668400
4738800
4739000
4739200
4739400
4739600
4739800
0
0.05
0.1
0.2
0.3
0.4
0.5
Miles
0
62.5
125
250
375
500
Meters

INITIAL ISSUES

Data collected to be archived/not research ready

Data points represent collection events, not localities (redundancy and overlap)

Attributes tables devoid of useful site/taxonomic information

Collections database (ICMS/NPS) not integrable with GIS platform

OLD ASSUMPTIONS

No subsequent or synsedimentary faulting on the Monument

Our topography was flat and homogenous across time and space

No differential rates of deposition/erosion

Elevation of isolated ash outcrops extrapolated across Monuments extent

MITIGATION STEPS

Park paleontologist gets some much needed GIS training

Sample, source, and date additional ash layers

Trace ash layers across the Monument

Focus on relative dating of 5 “Important” Fossil Localities

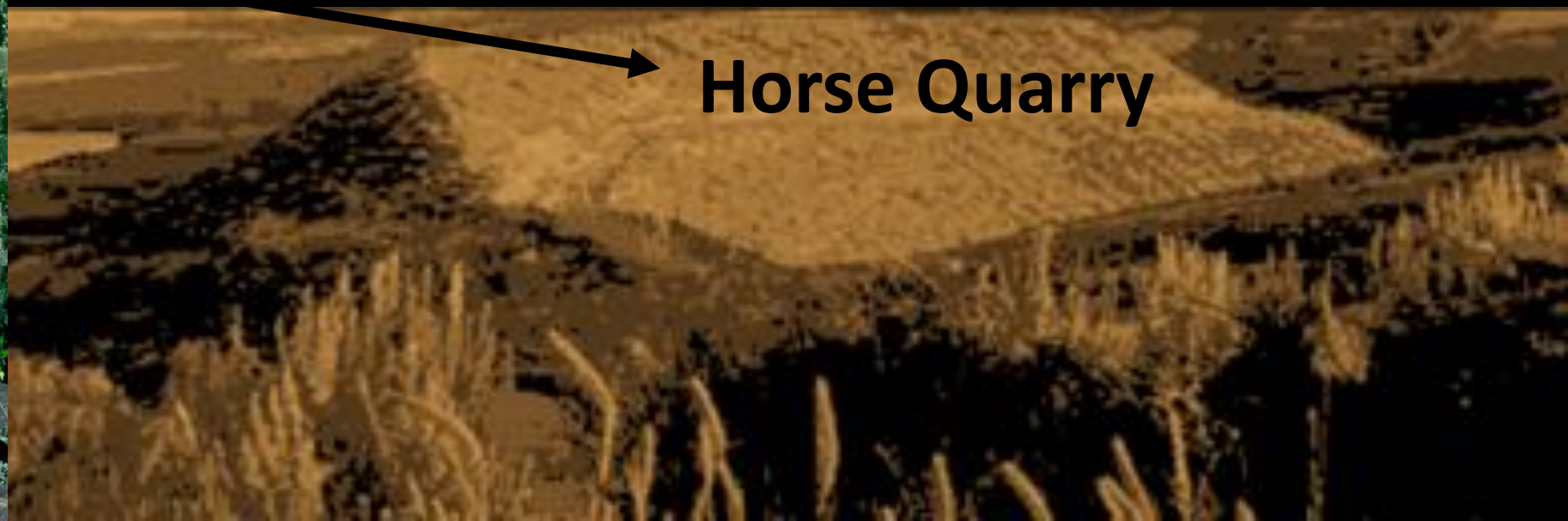
Horse Quarry: numerous papers, largest accumulation of *Equus simplicidens*

Bear: Youngest *Agriotherium* for North America (Samuels et al., 2009, JVP)

Otter: Oldest example of *Lontra* by several million years (Prassack, 2016, JVP)

Dog: New species of *Canis* for the Monument (unpublished)

Peccary: UMMP site, still productive and most southerly major locality at park



PRELIMINARY RESULTS

Laterally discontinuous ashes, but some ARE traceable to an extent

Ashes seem to be largely locally derived, but Horse Quarry from the Cascades

Multiple, small-offset, high angle faults ARE present; complicates stratigraphy

Otter site is at least as old as recently cited by Prassack, 2016 (whew!)

Current

Ground-truthing localities (combine collection points into fossil bearing areas)

Clean and standardize collections database

Create research-based ArcMap with full attribute tables of localities

New Workflow

Data Dictionary

Field Form

GPS coordinates are corrected and transferred at the end of the field day.

Faunal ID and Analysis → Museum Collections Database

GIS Attribute Table and Collections Database are LIVING DATABASE

Data Sharing

Presenting and Publishing

AGU

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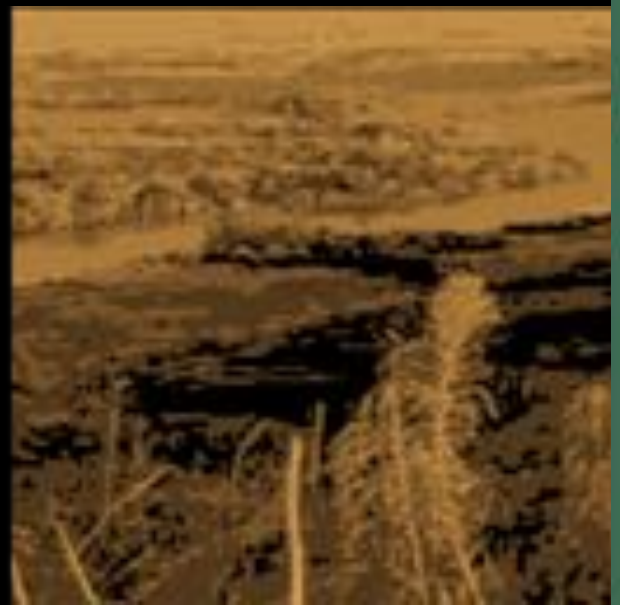
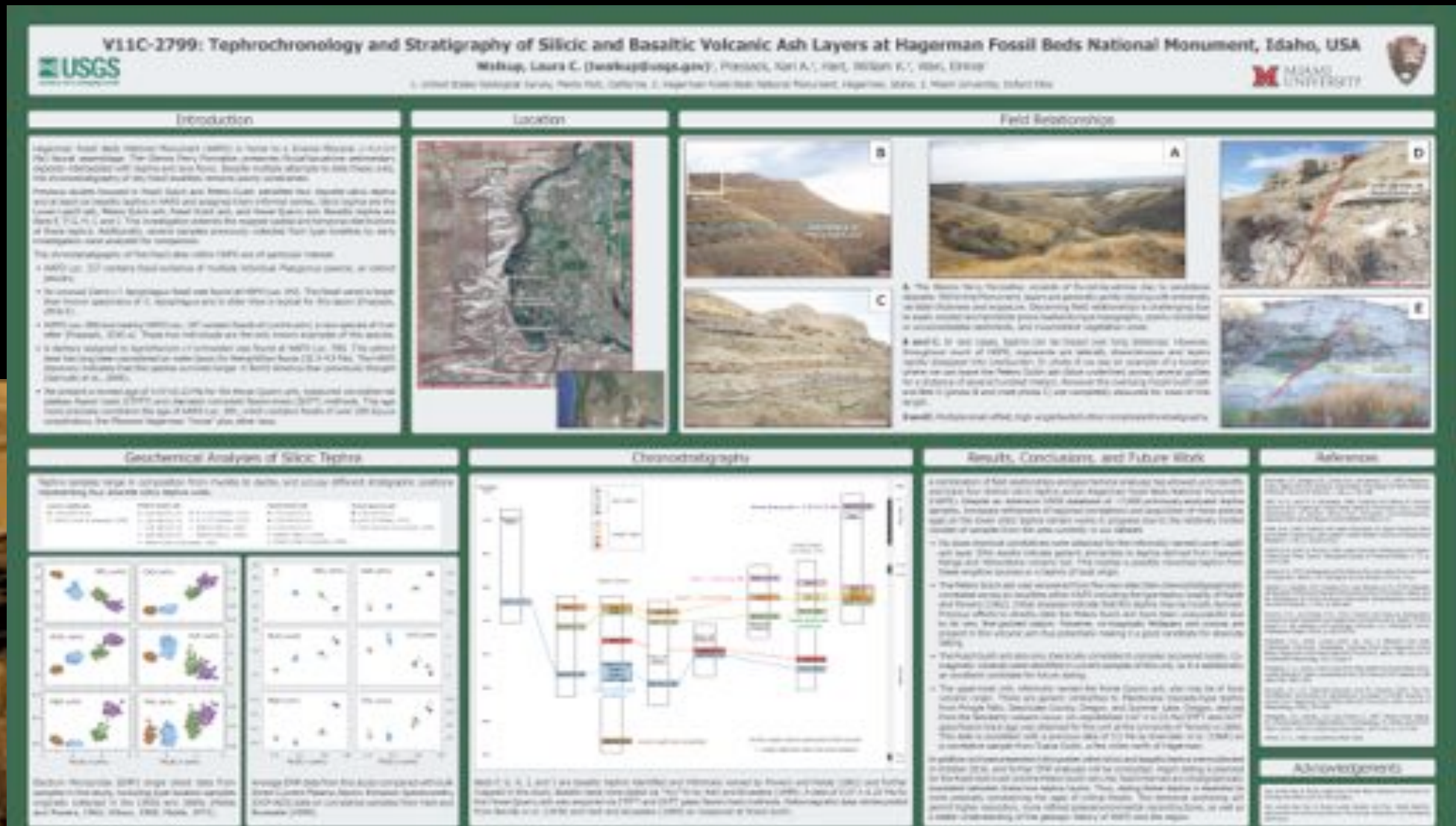




V11C-2799: Tephrochronology and Stratigraphy of Silicic and Basaltic Volcanic Ash Layers at Hagerman Fossil Beds National Monument, Idaho, USA

Introduction

Location

Field Relationships

Geochemical Analyses of Silicic Tephra

Chronostratigraphy

Results, Conclusions, and Future Work

References

Acknowledgements

Future Plans/Goals

Continue field mapping, section measurements, and tephra collection

Trace element analysis to differentiate between Cascades (subduction) and Yellowstone (intraplate) planned for summer 2017

Isotopic analysis (Sr, Nd, Pb)

Radiometric dating (Ar40/Ar39)

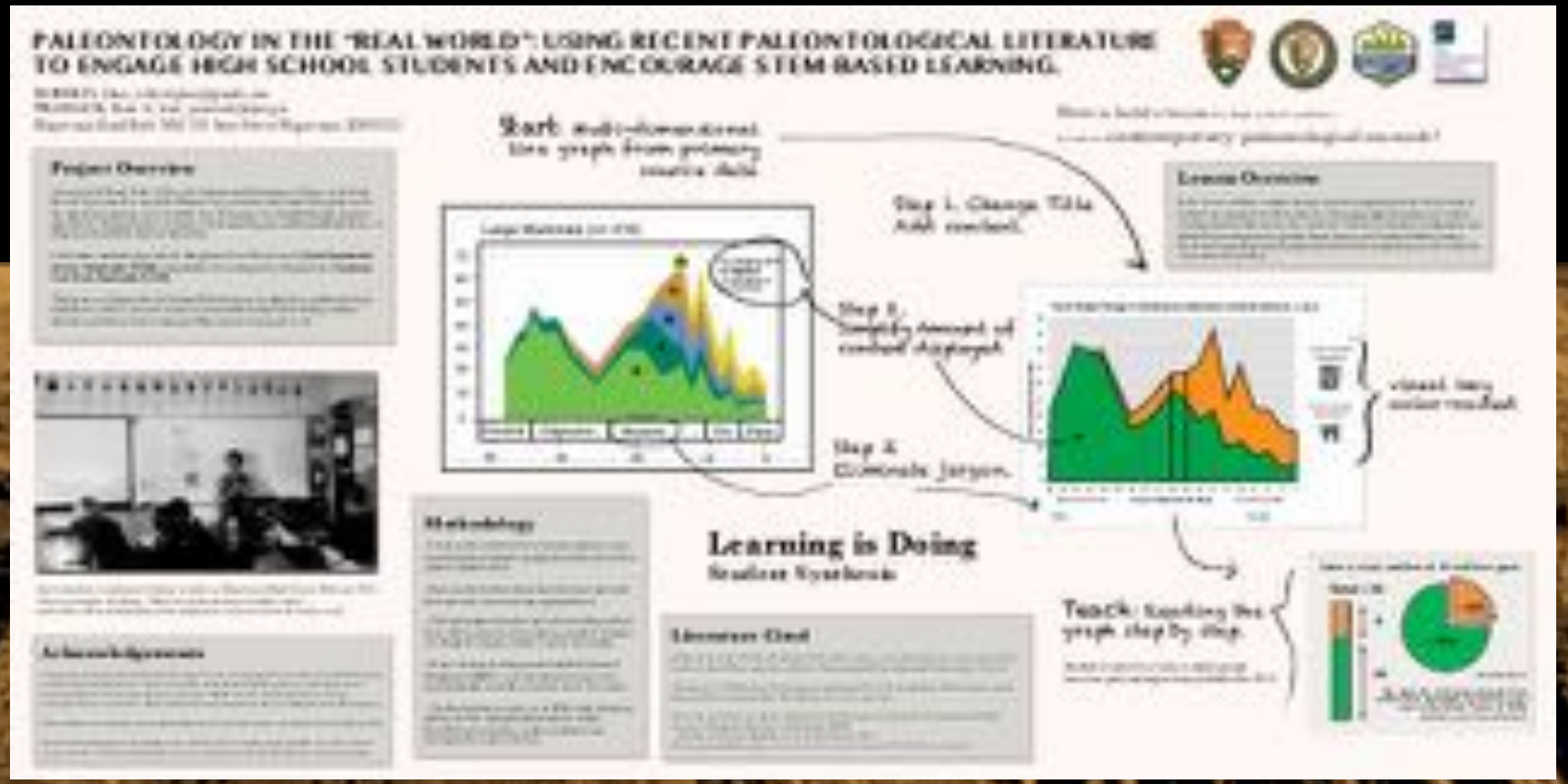
Integrating the ash and fossil locality data in GIS

Data Sharing

Education outreach (curriculum using real data)

Geoscientists in the Park Program Jardine et al. 2012, Palaeo3

www.nps.gov/hafo/learn/education/classrooms/curriculummaterials.htm



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Geoscientist-in-the Park Program