



Broader Context: The Alpena-Amberley Ridge

The Alpena-Amberley Ridge (AAR) is a rocky limestone and dolomite landform that bisects the contemporary Lake Huron basin. Between ~11,000 – 7,500 cal yr BP water levels were lower, and the AAR was exposed, creating a dryland corridor from Alpena, Michigan to Amberley, Ontario. This served as a migratory path for caribou, providing an opportunity for human hunters to encounter caribou herds at an advantageous bottleneck.

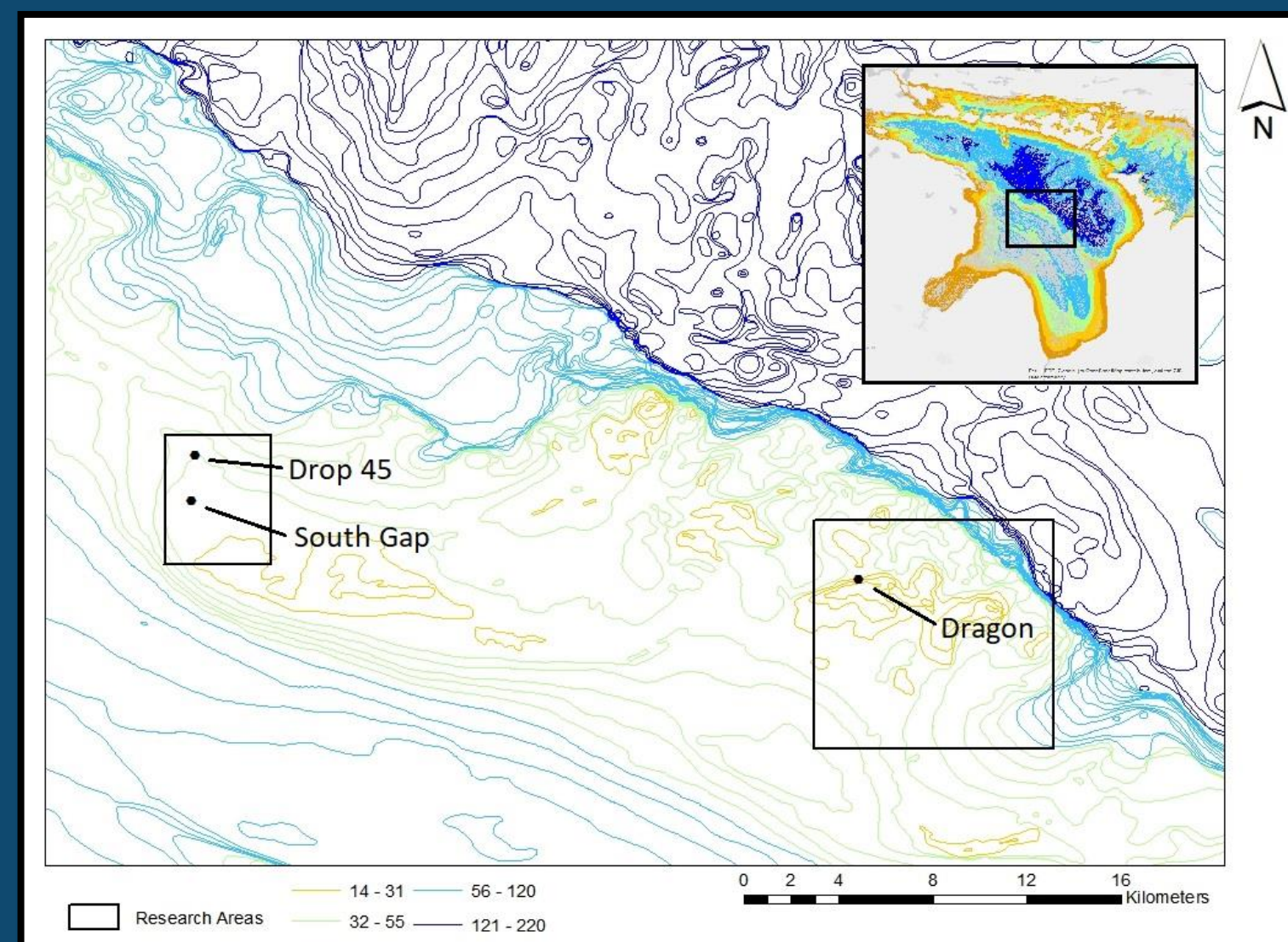


Figure 1. Bathymetric map of the central portion of the AAR including two study areas and three prominent sites.



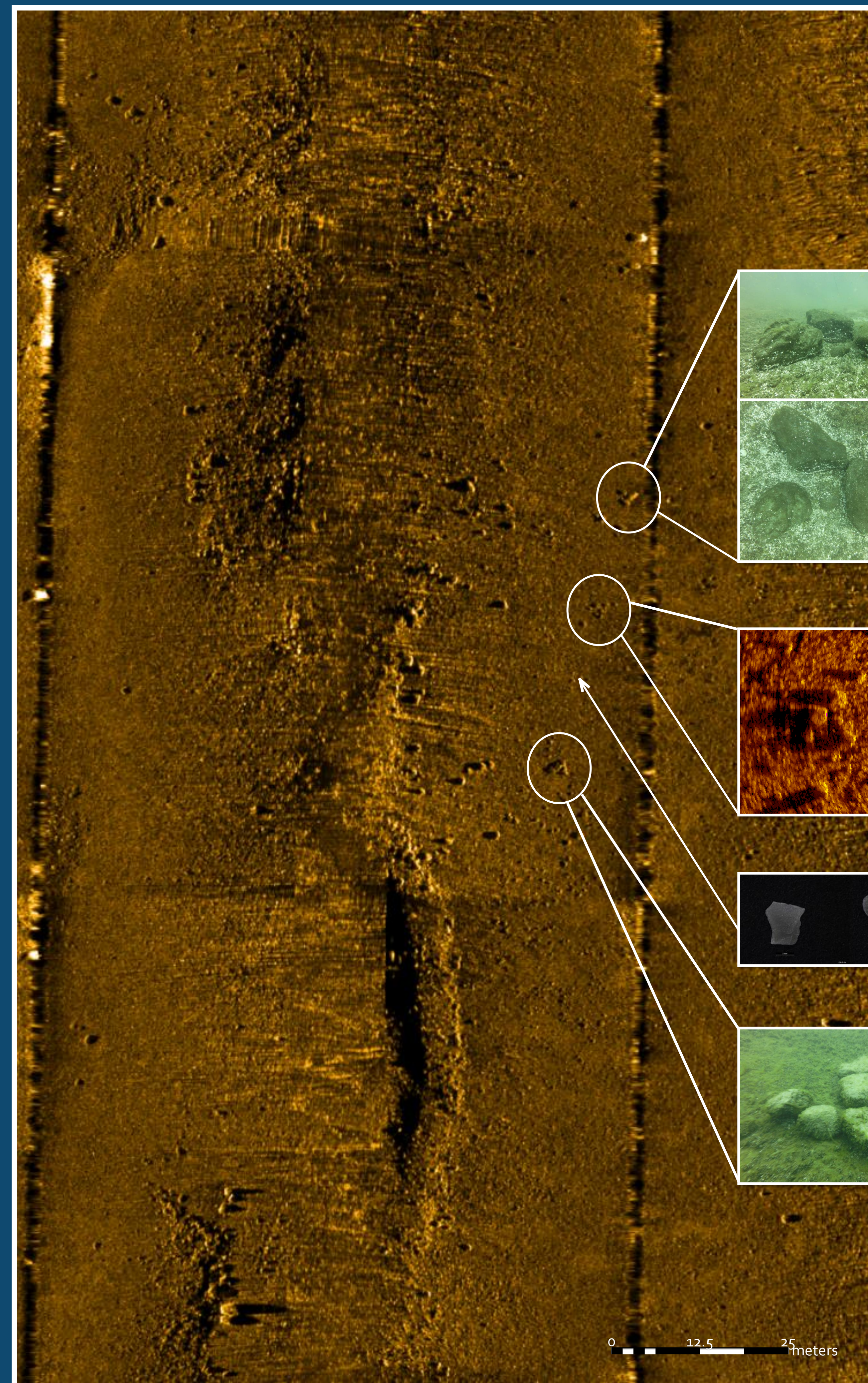
Figure 2. An example of potentially modified preserved wood from the AAR recovered in 2021. Radiocarbon dated to ~9500 (9530-9678 cal yr BP).

Sonar Mapping at the Gap Microregion

The Gap Microregion (150-hectares, O'Shea 2021) on the AAR is an area encompassing a modified landscape of hunting blinds and natural eskers on a rocky surface of glacial till. The recovery of two obsidian flakes sourced to central Oregon (O'Shea et al. 2021) in a sediment sample brought further attention to the area. These data needed to be oriented on a precise and accurate site-level map. Given the submerged setting (i.e. the South Gap Site is 80 feet below water), an autonomous underwater vehicle (AUV) side-scan sonar survey was the best method to accomplish this goal. Results include a map of a smaller area of the micro-region, at finer scale in order to better understand the context of the obsidian flakes and the spatial organization of association of hunting features.



Figure 3. IVER 3 AUV operated by Michigan Technological University



Hunting Blinds

V-shaped structures are the among the simplest landscape modifications seen on the AAR. These structures served primarily as hunting blinds to obscure human hunters. Considering their form, the direction they are oriented provides clear indication of the direction of approaching animals, and thus are informative for understanding seasonality of site use (O'Shea 2014). Here we see three V shaped hunting blinds next to a north-south running esker that would have guided animals such as caribou near the structures. Hunting architecture sites like these on the AAR are placed strategically across the landscape (Lemke 2022).

Site Specific Context: Wagontire Obsidian, Oregon

Two obsidian flakes recovered from the South Gap Site on the AAR beneath Lake Huron are conclusively attributed to the Wagontire obsidian source in central Oregon; a distance of more than **4,000 km**. These specimens, dating to ~ 9,000 BP, represent the earliest and most distant reported occurrence of obsidian in eastern North America. Geochemical sourcing was performed at 3 separate labs: **1) the Field Museum** by Danielle Riebe who performed a compositional analysis with a Bruker Tracer III-SD pXRF and confirmed that both samples are likely obsidian; **2) the Northwest Research Obsidian Studies Laboratory** by Alex Nyers who determined via XRF that the specimens were likely from Oregon; and **3) the University of Missouri Research Reactor (MURR)** by Jeffrey Ferguson who used a combination of the existing data from the previous labs and independent XRF and INAA analyses to determine a precise source location.

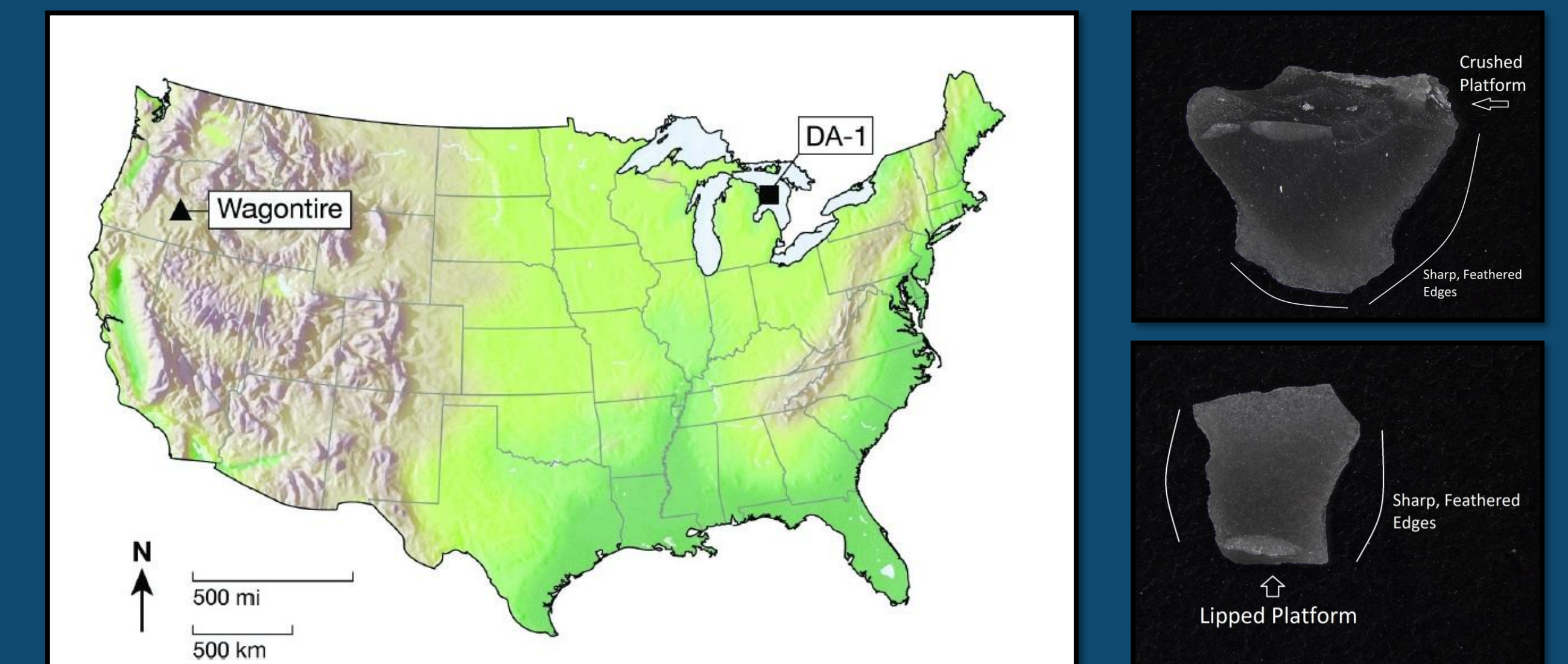


Figure 4. Source results of obsidian sourcing studies and features of the two flakes.

References Cited

Danielle J. R., Lemke, A. K., Ferguson, J. R., Nyers, A. J., and E. P. Sonnenburg, Brendan S. Nash, John M. O'Shea (2022). "Extraordinary Claims Require Extraordinary Evidence: The Role of Inter-Laboratory Collaborations in a Lake Huron Archaeological Discovery." *Obsidian Across the Americas: Compositional Studies Conducted in the Elemental Analysis Facility at the Field Museum of Natural History*. Archaeopress, pp. 7-16.

Lemke, A. (2022). *The Architecture of Hunting: The Built Environment of Hunter-Gatherers and Its Impact on Mobility, Property, Leadership, and Labor*. Texas A&M University Press.

O'Shea, J. (2015). "Constructed Features on the Alpena-Amberley Ridge". *Caribou Hunting in the Upper Great Lakes: Archaeological, Ethnographic, and Paleoenvironmental Perspectives*. Ann Arbor: University of Michigan Museum of Anthropology, pp. 115-137.

O'Shea, J. M. (2021) Micro-regional approaches for submerged site archaeology. *Journal of Island and Coastal Archaeology* 16(1):103-117.

O'Shea, J. M., Lemke, A. K., Nash, B. S., Sonnenburg, E. P., Ferguson, J. R., Nyers, A. J., and D. J. Riebe (2021). Central Oregon Obsidian from a Submerged Early Holocene Archaeological Site Beneath Lake Huron. *PLOS ONE*, 16(5), e0250840.

Acknowledgements: Thank you to Jamey Anderson from Michigan Technological University for operating the AUV during survey. Also, thank you to everyone involved with the obsidian sourcing including Dani Riebe, Jeffrey Ferguson, Alex Nyers, and Elisabeth Sonnenburg. Thank you to Tyler Shultz from Michigan Adventure Diving for running dive operations off the boat and assistance to the project for the many years!