

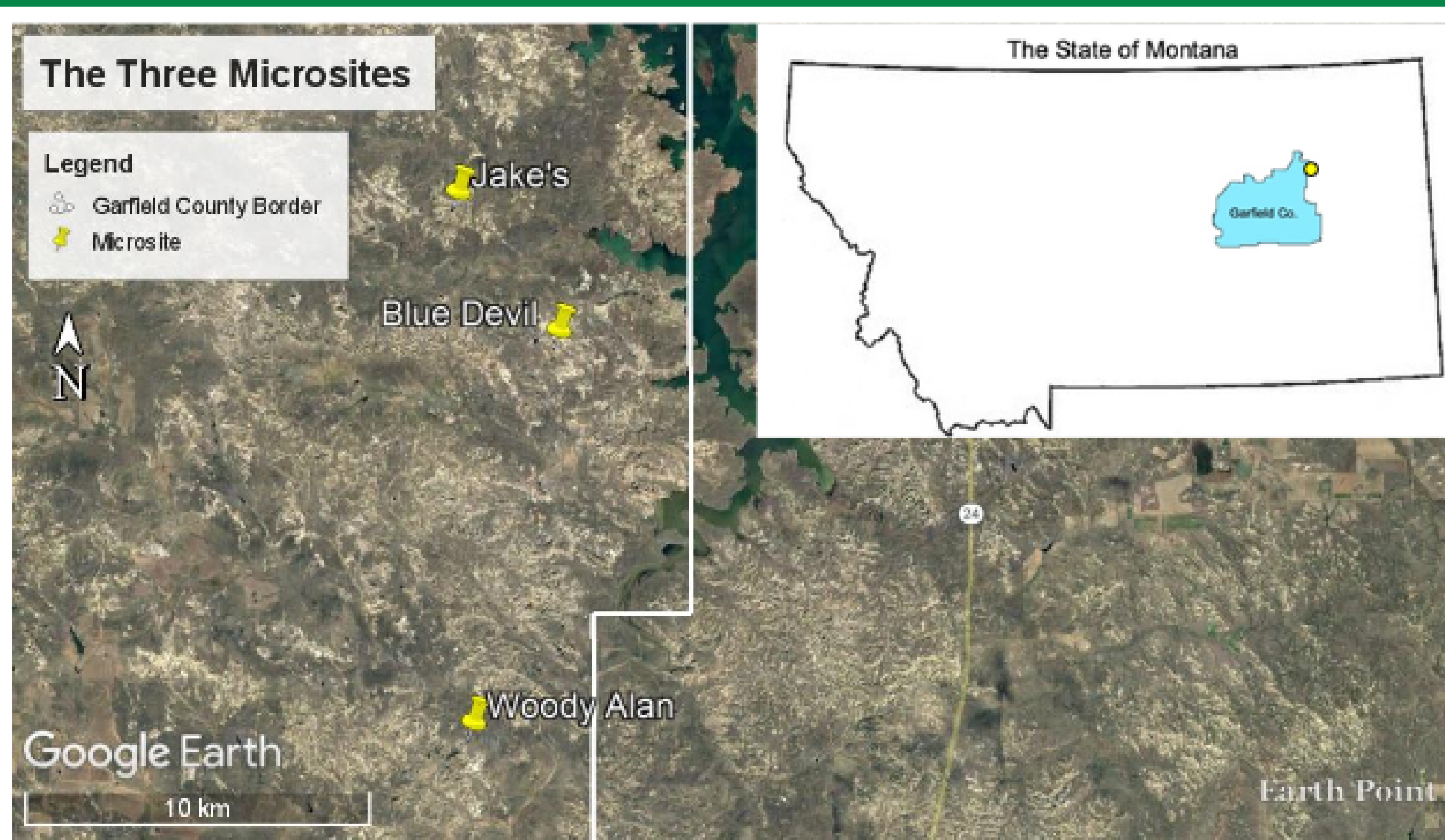
Objectives

Sample three microsites from the Hell Creek Formation in eastern Montana to gather an in-depth understanding of the organisms that lived during the latest Cretaceous time and to interpret the region's depositional environments and paleoecology.

Introduction

The Hell Creek Formation, composed mostly of fine grain clastics, was deposited during the Maastrichtian stage of the Late Cretaceous Epoch, around 68-66 million years ago. The high content of fine-grained clastic materials is not surprising, because this formation was deposited during the final regression of the Western Interior Seaway that spanned parts of the western United States. While being famous as the last formation to contain non-avian dinosaurs before their mass extinction, it also preserves numerous taxa of reptiles, bony and cartilaginous fish, mammals, and amphibians⁽¹⁾. Three microsites located in Garfield County, eastern Montana, were sampled to explore the microvertebrate assemblages preserved in the Fort Butte Member of the Hell Creek Formation.

Study Area



Methodology

- Fieldwork collecting fossils and lithologic data from three microsites.
- Lab work sifting and sorting/cataloging fossils.
- Creating lithographic columns using data measurements⁽²⁾(Fig. 1).
- Qualitative and quantitative analysis of fossils and lithologic data.
- Interpretations

Lithologic Sections

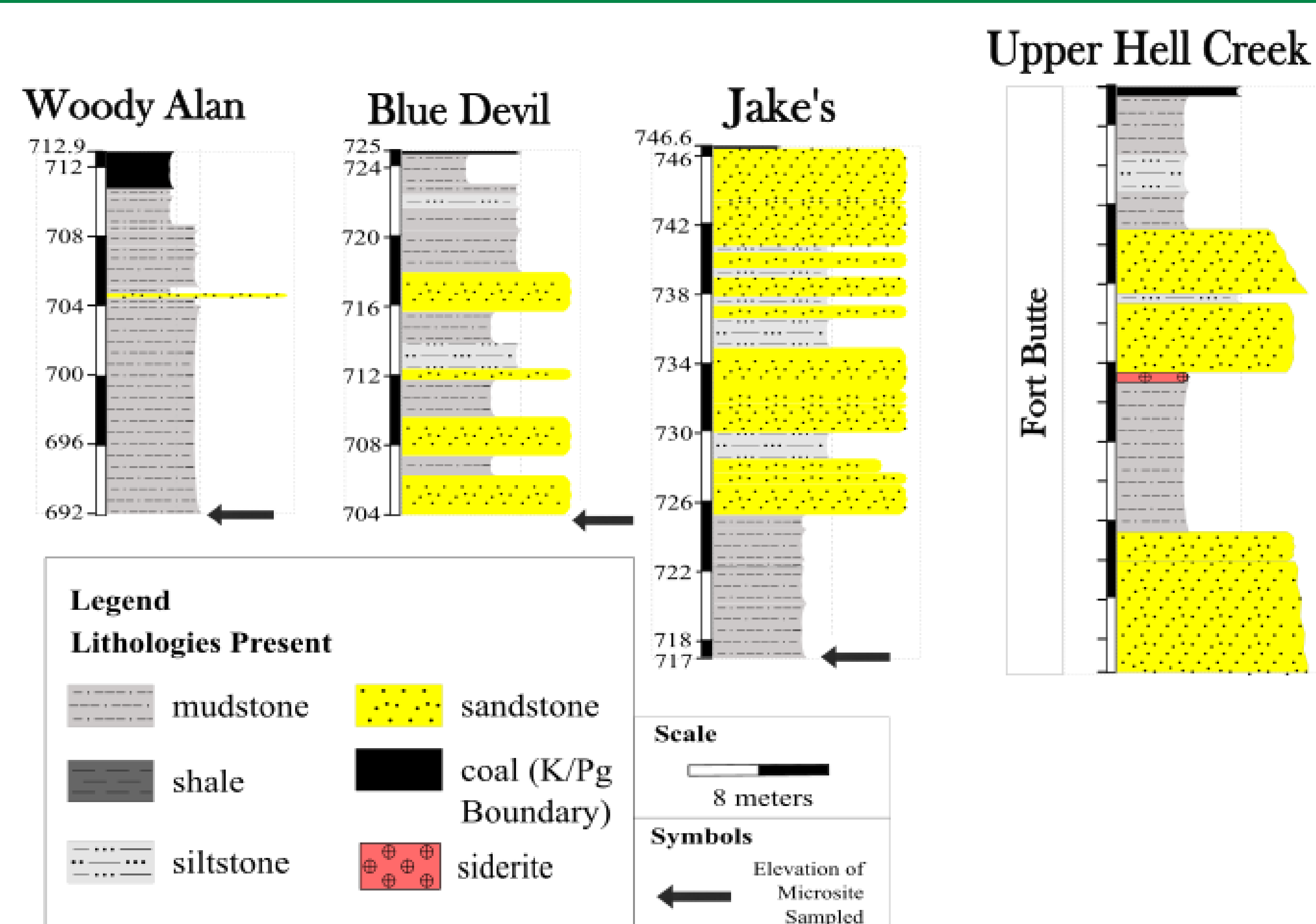


Figure 1. Lithologic columns of the three microsites alongside Fort Butte⁽³⁾. Note the high abundance of fine grained clastics and the differences in the elevations of the microsites.

Sample Images

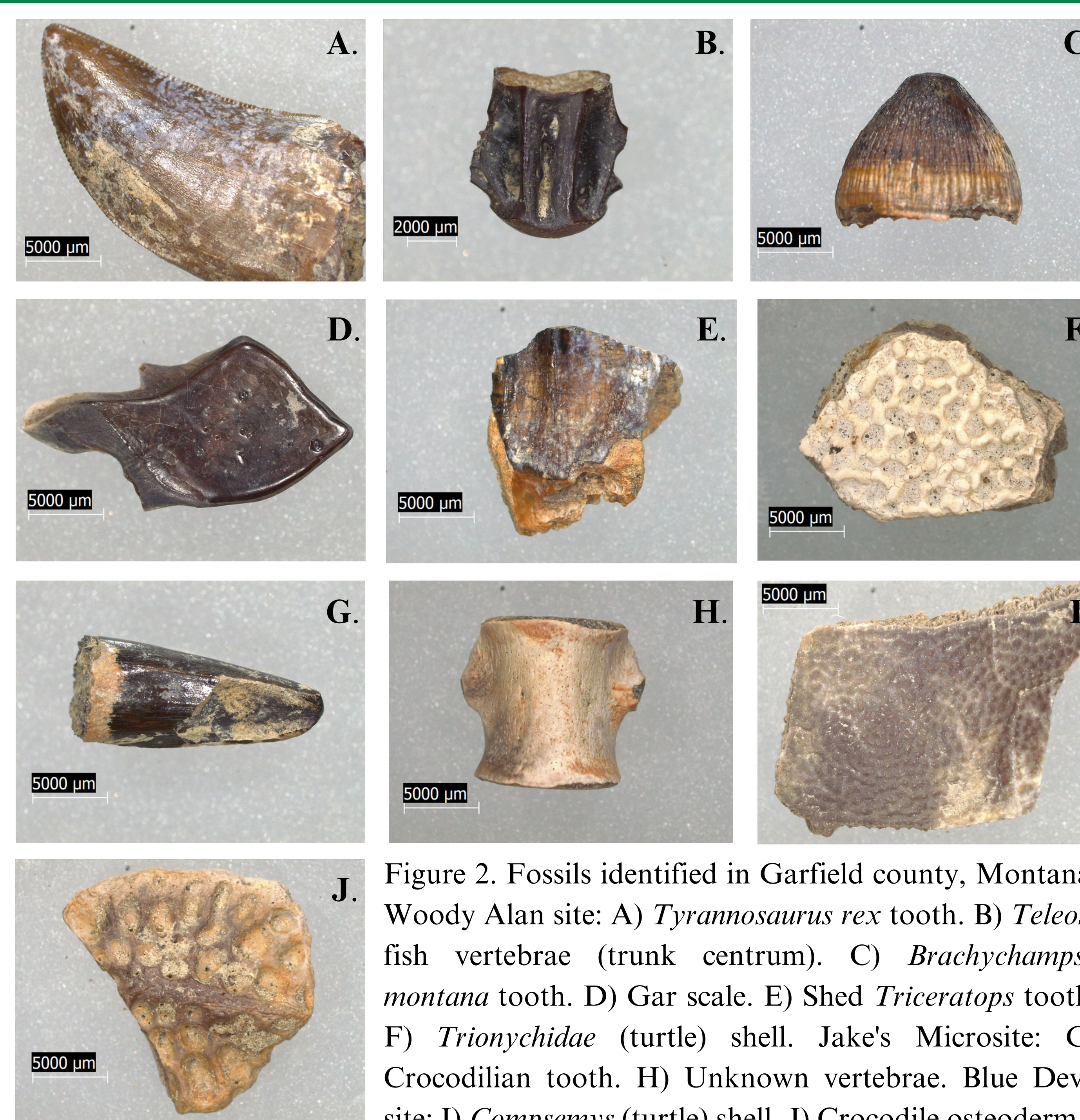


Figure 2. Fossils identified in Garfield county, Montana. Woody Alan site: A) *Tyramosaurus rex* tooth. B) *Teleost* fish vertebrae (trunk centrum). C) *Brachychampsia montana* tooth. D) Gar scale. E) Shed *Triceratops* tooth. F) *Trionychidae* (turtle) shell. Jake's Microsite: G) Crocodylian tooth. H) Unknown vertebrae. Blue Devil site: I) *Compsomys* (turtle) shell. J) Crocodile osteoderm.

Field Observations

- Each microsite preserved aquatic fossils indicative of deposition in a fluvial system.
- The fluvial systems drained the basin from west to east into the Western Interior Seaway.
- The different lithologies, and abundances, types and preservation conditions of fossils at each site indicate unique depositional environments with varying depositional energy levels.
- Woody Alan microsite contains the most abundant and best preserved fossils, including macrovertebrates. Blue Devil and Jake's microsites contain fewer and more poorly preserved fossils.

Results and Interpretations

- An assemblage of fossilized microvertebrates, including teeth, vertebrae, scales, and osteoderm, are present at the microsites (Fig.2).
- Abundant fossil material and clay-sized sediments suggest low energy depositional environment for the Woody Alan microsite, such as a pond of flood plain.
- The large macrovertebrates preserved at the Woody Alan site were likely buried *in situ*.
- The few, poorly preserved microvertebrates and higher sandstone content at Blue Devil and Jake's microsites support high energy depositional environments (e.g., braided river channel).
- The exact placement of each microsite in the Fort Butte Member could not be accurately determined due to lack of fossil data.

References

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