Wapiti River and Pipestone Creek Site Map Correlation

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Abstract

Site documentation in the field of Paleontology is a very significant part of a day in the field. One of the first parts of documentation done when you've begun to excavate a site in the field is drawing site maps. Though these site maps are very valuable within the field of Paleontology, they give you a very narrow view of the site, in 1 meter square grids. This project worked to combat this, taking the individual square grids and piecing them together to form a full map of the site, widening your view of the site and allowing for you to see the broader picture of the specimens found at that location. This presentation will show the process gone through in order to prepare and assemble these maps, and some of the issues run into along the way.

Why This Project Is Important

When documenting the fossils discovered at a site in the field, researchers will lay down a 1 metre grid, allowing for them to have reference points while drawing and documenting the specimens within the grid. These drawings help with keeping track of the location that the specimen was found. Compiling the maps together allows for a broader view of the bonebeds and everything that has been found within them (Gibbins, 2021). Because both of the bone beds found in this project are largely made up of the same species, this allows for a broader look at the specimens that build up our understanding of the species and how they were found (Gibbins, 2021).

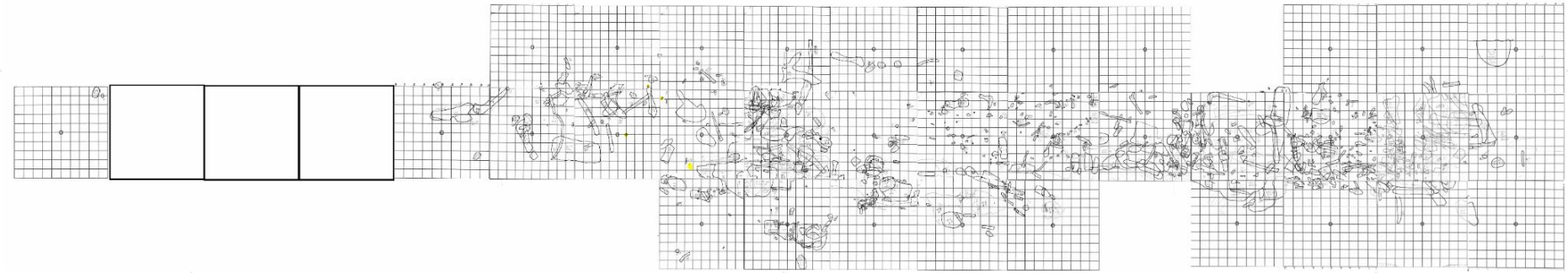
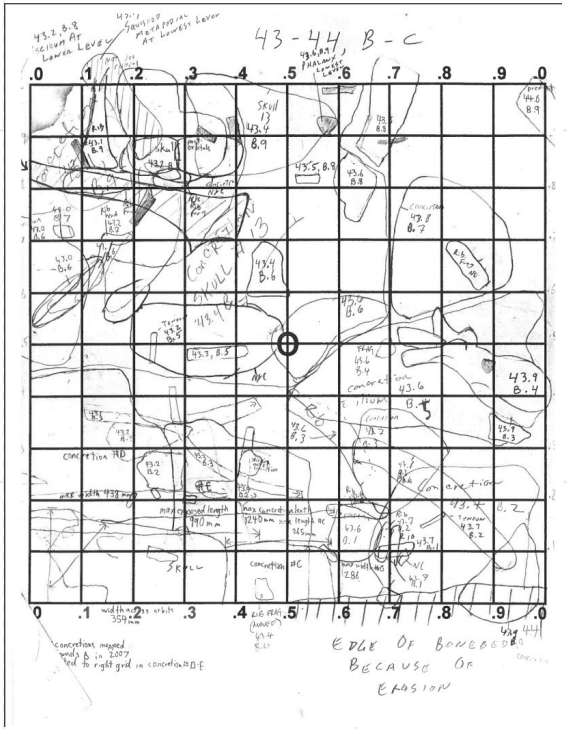


Image of Wapiti River Bonebed Map - 2010

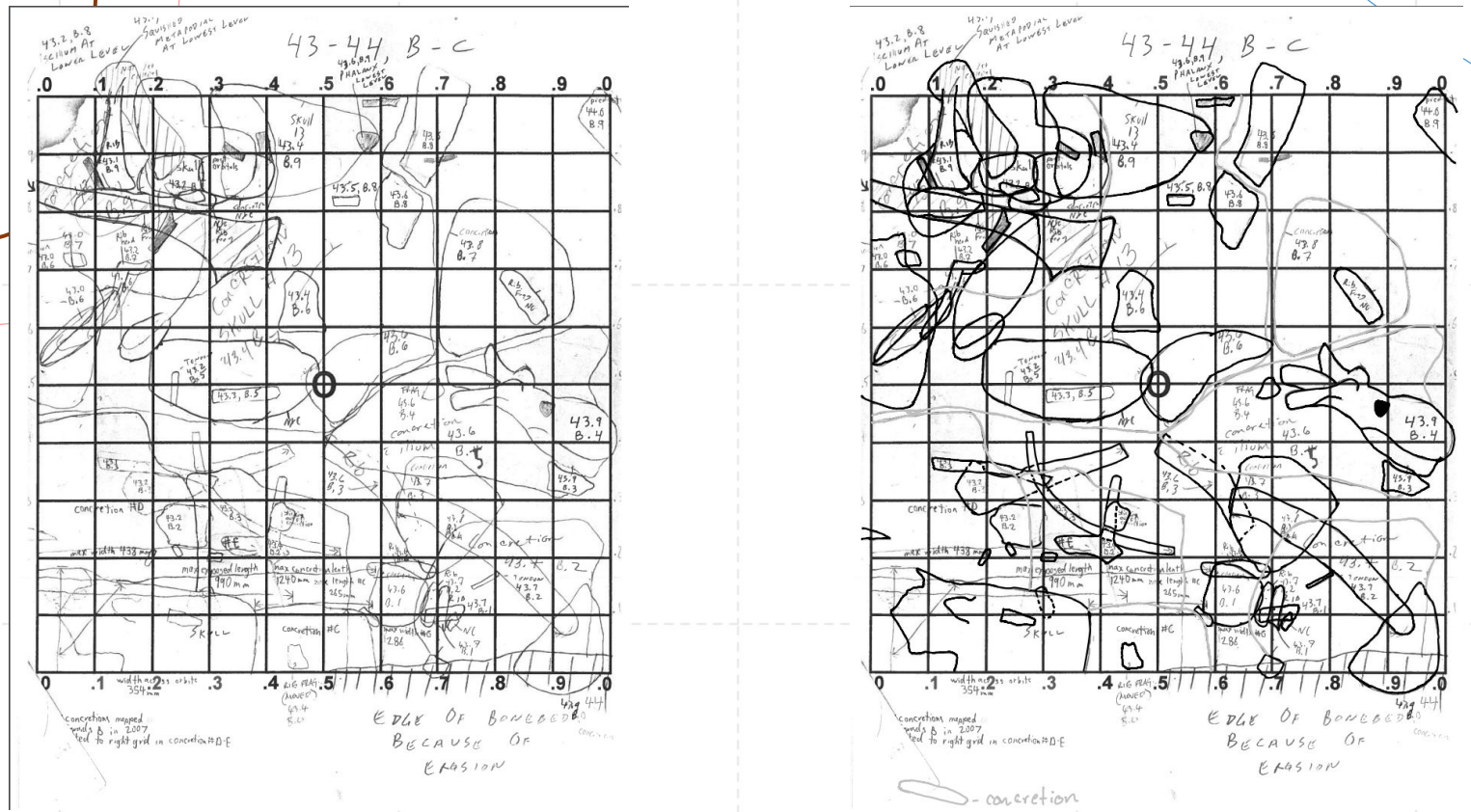
Elements and Progression of my Project

Tracing

The first step of my project was going through the site maps I had received and digitally tracing out the outlines of each of the specimens found at the site again, ensuring that everything on the map was well defined and easy to see.



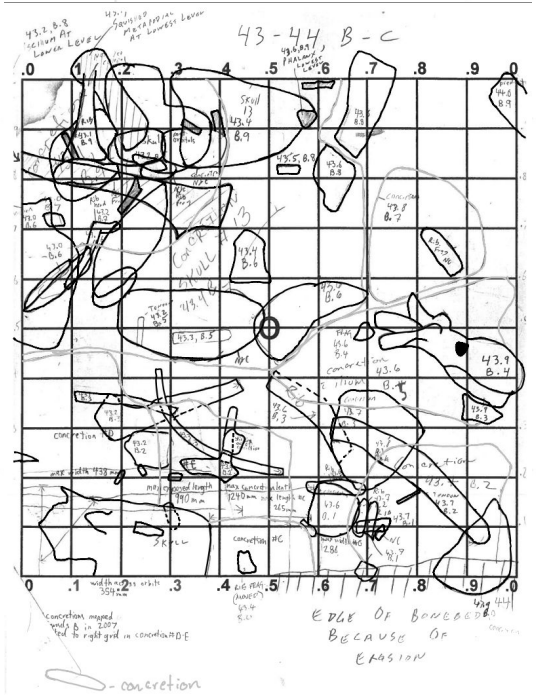
As is visible in the adjacent image, which has not been traced yet, the outlines of some specimens are hard to discern and are faded, making the image look far more jumbled and messy.



Comparison between traced and untraced maps, showing how the tracing makes the maps far easier to decipher

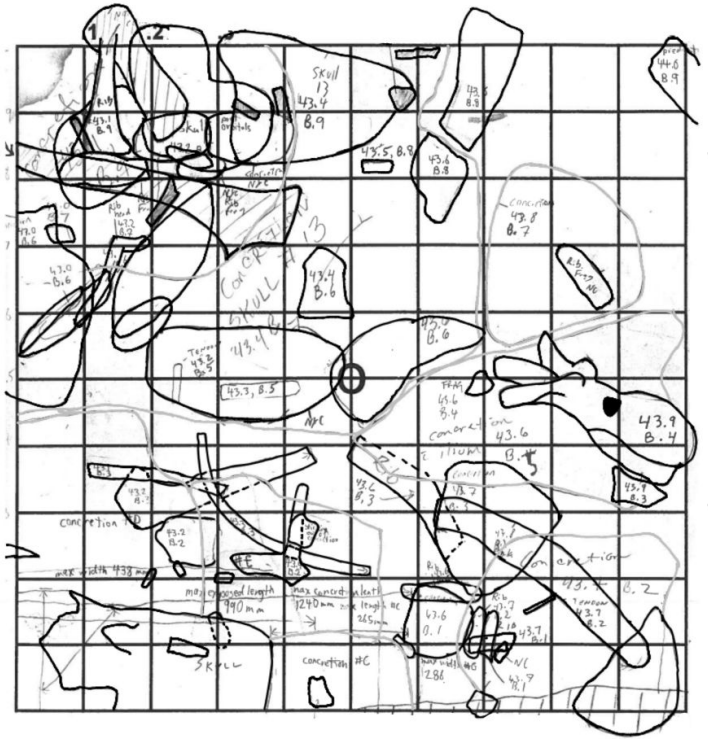
Tracing

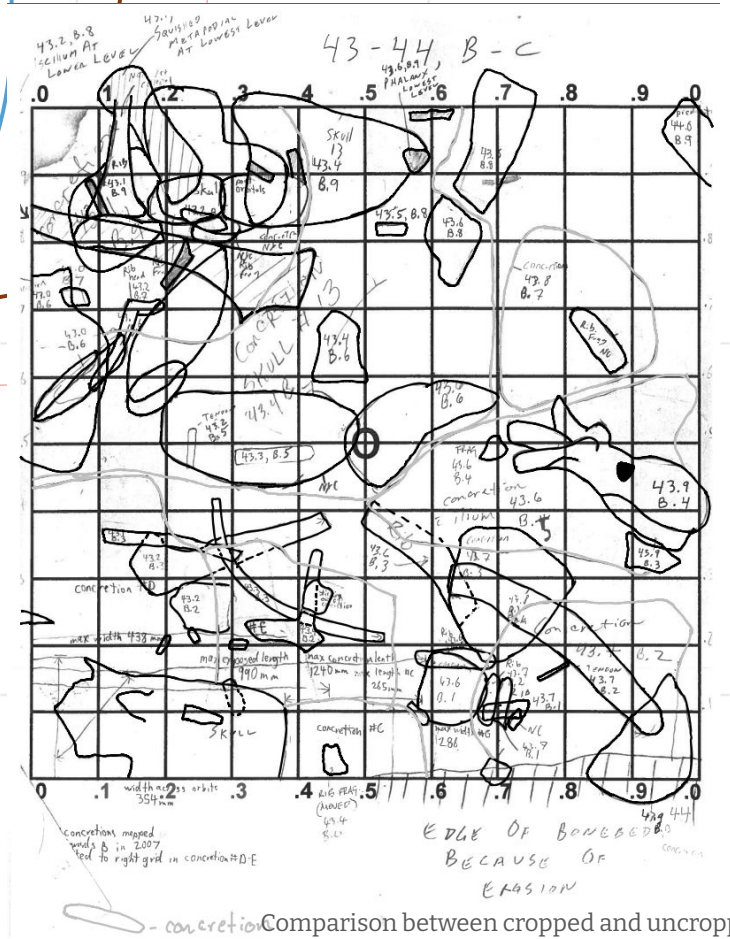
Maps for a new year in the field often start out as a scan of the previous year's maps which can then have new information added for the new years work. This can help to link work between years, and make the process easier since it avoids having to redraw any previously documented specimens. Throughout this process the maps can become quite distorted and blurry. This leads to newer years becoming jumbled, hard to read, and blurred, and makes deciphering the maps quite difficult. It often occurred throughout my project that I ran into the issue of the borders of multiple specimens either fading to the point that it was extremely difficult to see and thus trace, or the borders blurred together, making it very difficult to see where one specimen ended and the next started.

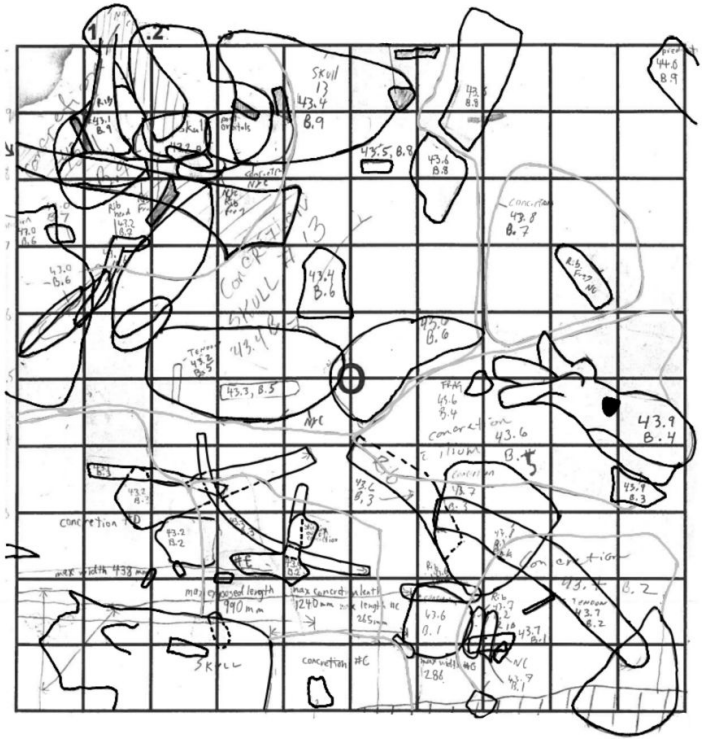


Cropping Images

The second step in my project was cutting down the images of the site maps in order to get rid of the blank borders of the images. This provided its own challenges, as many of the grid squares were not straight on their original pages, therefore making them quite crooked when they were cropped down to size. Quite a few of the images required rotating in order to ensure that they would fit together better in the final image.



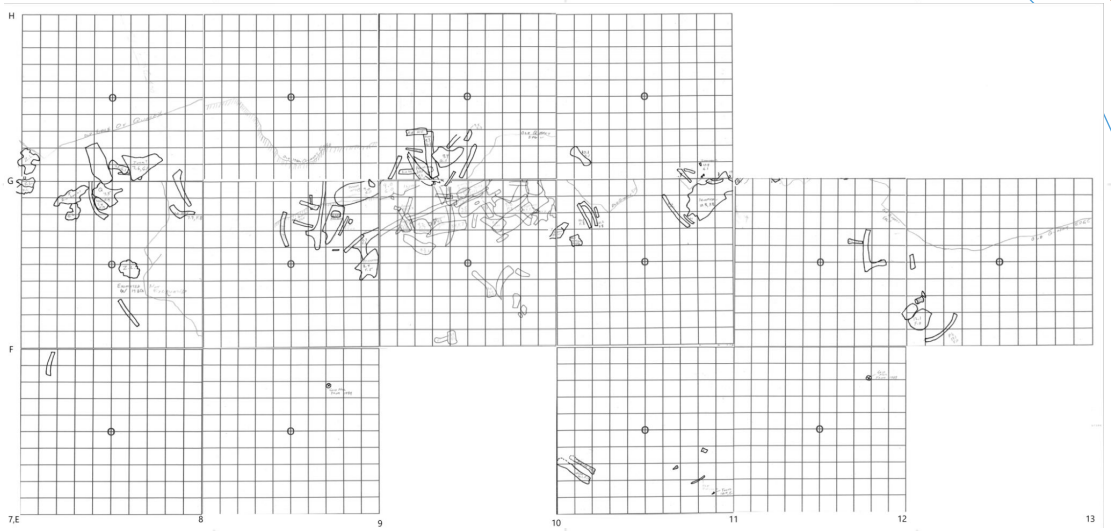




Comparison between cropped and uncropped versions of the maps, showing the excess that is cropped out of the images before piecing together the maps

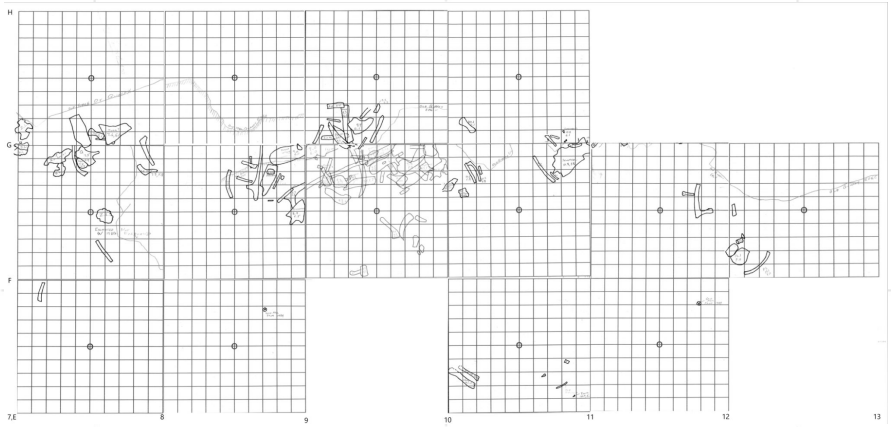
Assembling the Maps

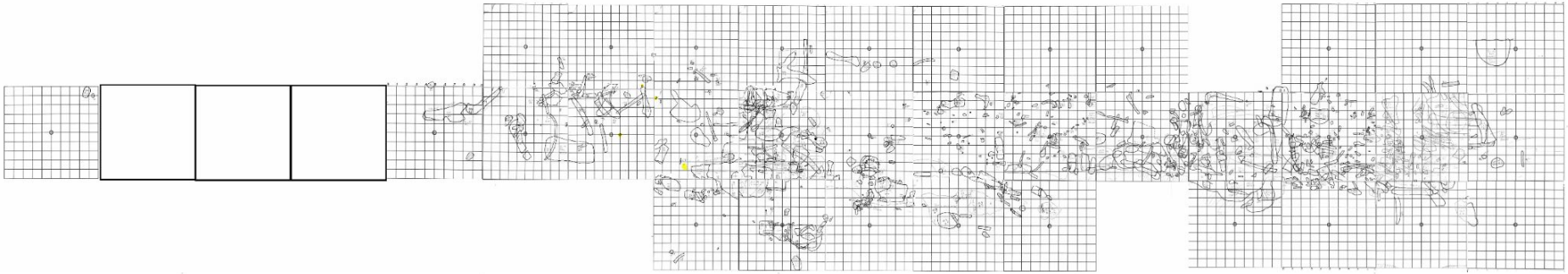
The final step of this project is piecing together all of the grid squares to form the large map that shows the entire bone bed. In order to do this, I took the cropped images of the grid squares and placed them into a very large blank image document in a painting application. The document was made to be so large in order to ensure that it could be used in multiple different ways without losing image quality and becoming grainy or blurry.



Pipestone Creek Bonebed map, labeled with coordinates in order to show how the documents were organized

Due to the way that the grids are labeled, they are also organized on a coordinate system. This allowed for the piecing together of the map to be fairly easy.





Comparison between specimens at Pipestone Creek Bonebed in 2013 (top) and Wapiti River Bonebed in 2010 (Bottom)

Image from Philip J. Currie Dinosaur Museum Media Kit - Image Downloads

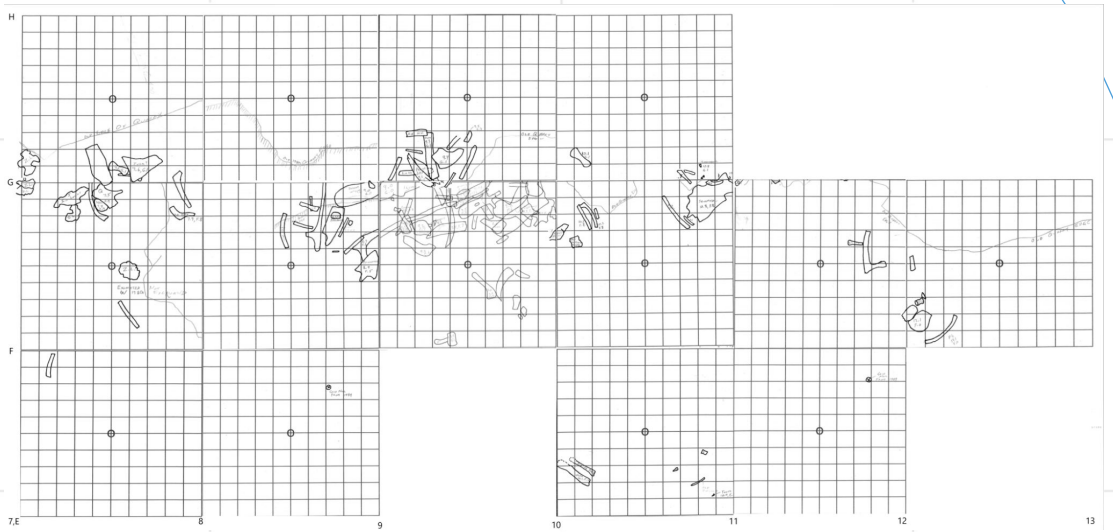


Image of the Pipestone Creek Bonebed and Map of the specimens found in the bonebed in 2013

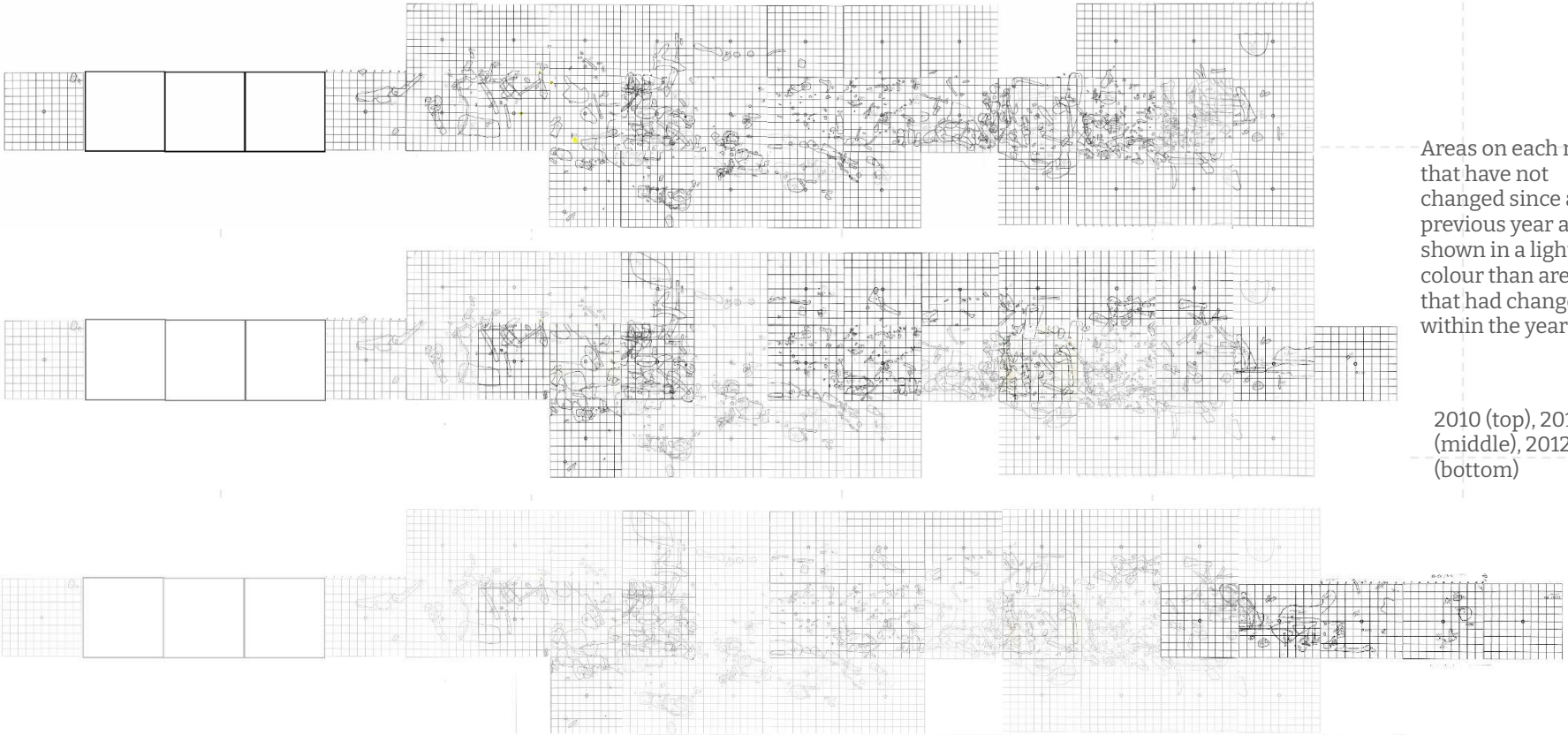
Pachyrhinosaurus lakustai

Pachyrhinosaurus lakustai is the species of Ceratopsian that makes up the vast majority of the specimens found at both the Pipestone Creek and Wapiti River Bone Beds. *Pachyrhinosaurus* is the genus of herbivorous Ceratopsian that are often characterized by their nasal boss, a large bony structure on the face of the animal. *P. lakustai* lived approximately 73 million years ago (Currie, 2014), and on average, was estimated to live to at least 21 years of age(Vice, 2020), though the youngest found in the Pipestone Creek Bonebed was less than a year old (Vice, 2020). The largest documented individual within the Pipestone Creek Bonebed was estimated to have weighed approximately 1690 kg, which makes *P. lakustai* fairly small compared to Its relatives, such as *Pachyrhinosaurus canadensis* (Vice, 2020).

Image from Philip J. Currie Dinosaur Museum Media Kit - Image Downloads

Results

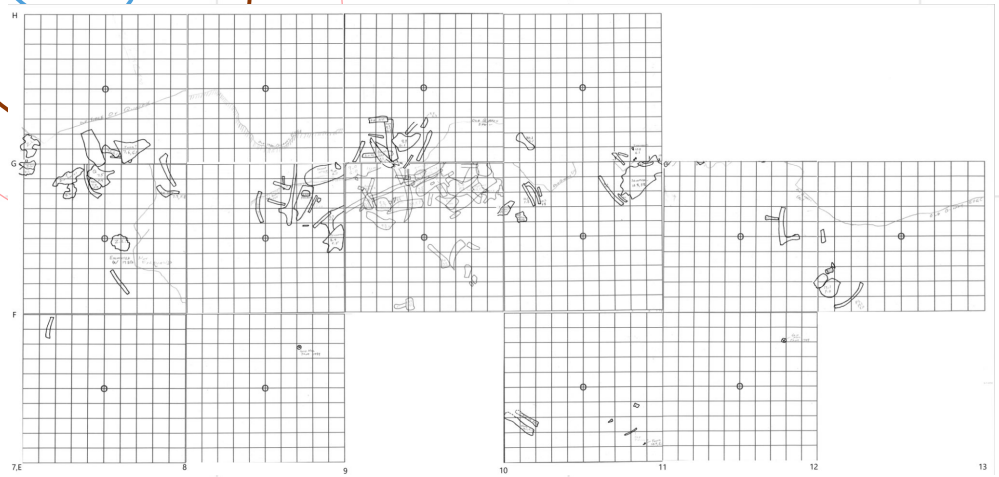
Wapiti River Bone Bed Maps



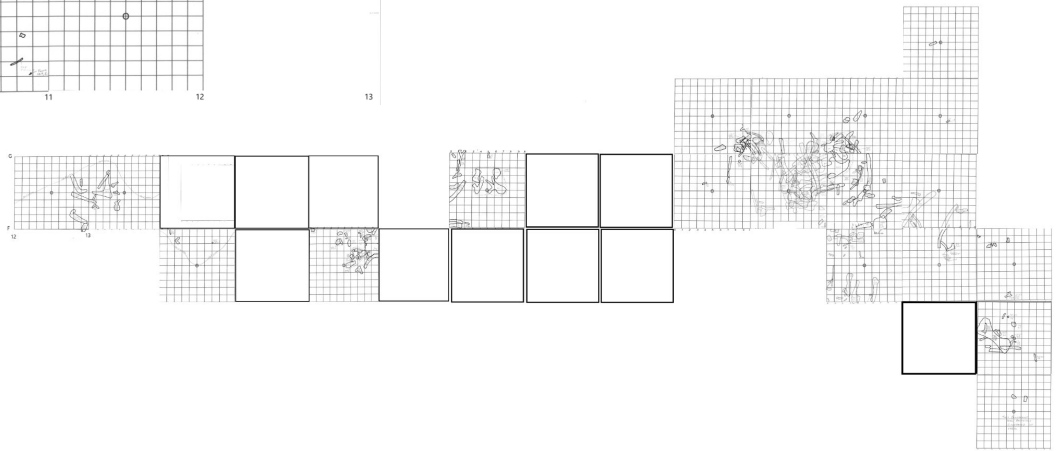
Areas on each map that have not changed since a previous year are shown in a lighter colour than areas that had changed within the year

2010 (top), 2011 (middle), 2012 (bottom)

Pipestone Creek Bonebed Maps



Blank boxes act as stand ins in order to keep spacing fairly consistent.



2013 (top), 2014 (bottom)

Acknowledgements

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Literature Cited

Fanti, F., Currie, P. J., &; Burns, M. E. (2015). Taphonomy, age, and Paleoecological implication of a new pachyrhinosaurus (Dinosauria: Ceratopsidae) bonebed from the Upper Cretaceous (campanian) Wapiti formation of Alberta, Canada.

Vice, R. M.(2020). The Forelimb and Pectoral Girdle of Pachyrhinosaurus lakustai (Ceratopsia, Centrosaurinae).

Gibbins, H., Personal communication, July 5-August 12 2021