

PALEONTOLOGICAL RESOURCE MANAGEMENT: THE ONGOING STRUGGLE TO PROTECT VERTEBRATE FOSSILS IN DINOSAUR NATIONAL MONUMENT

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Introduction:

The Fossil Discovery Trail is a 1.2-mile trail from the Quarry Visitor Center up to the Quarry Exhibit Hall. The Morrison Spur is an approximately 200 foot offshoot of the Fossil Discovery Trail (FDT) that parallels the strike of the dipping Morrison Formation allowing visitors to observe the bones in their 'natural habitat' unaided by excavation work. This is a unique opportunity for visitors, as most fossil parks do not tell visitors where to find fossils, especially vertebrates, as unfortunately it leads to exploitation of the resource.

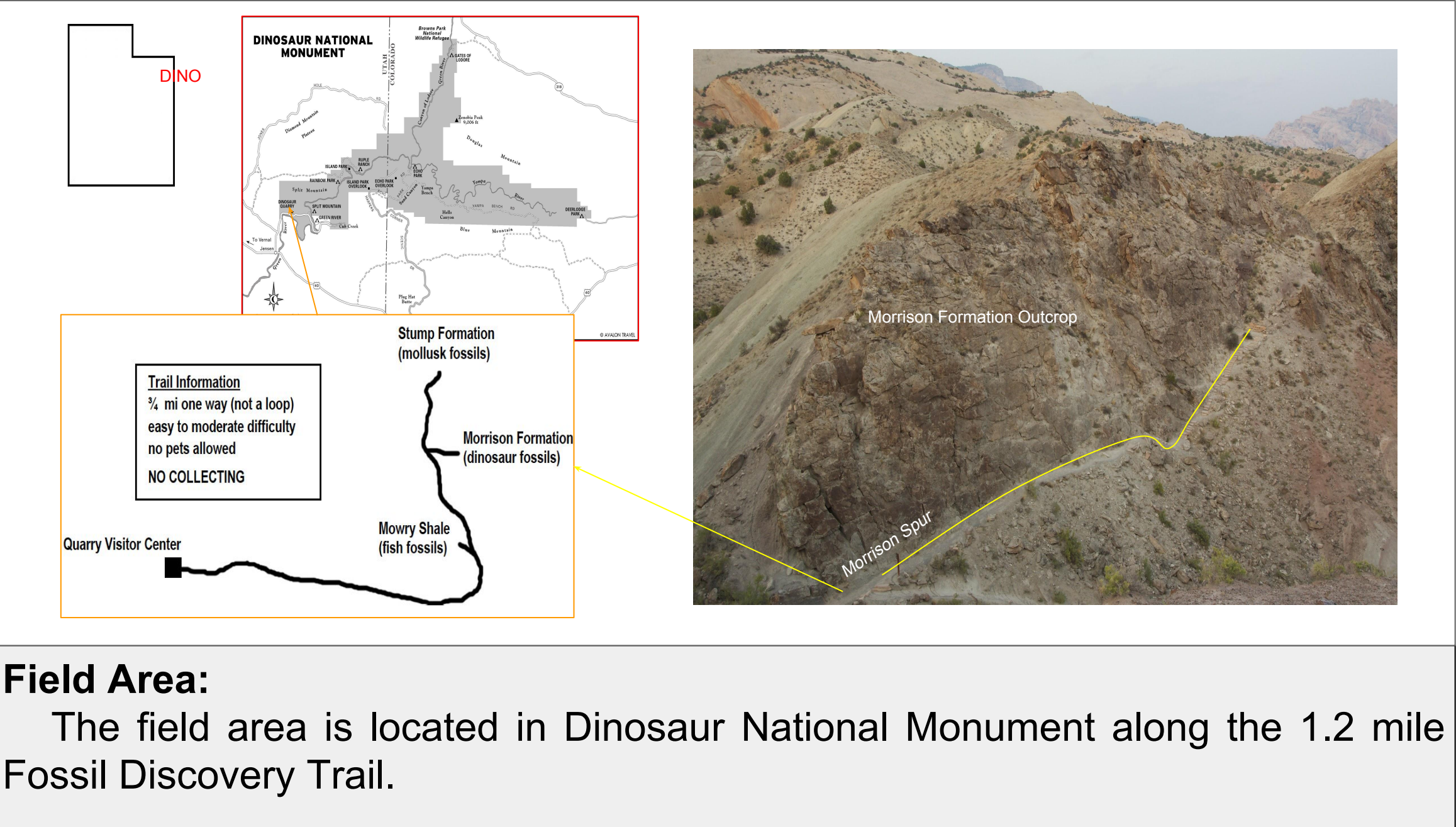
Dinosaur National Monument (DINO) has numerous documented cases of visitors illegally collecting bone and non bone bearing pieces of the Morrison Formation. One case occurring last year, 2014, where a large part was pried off and stolen out of one of the larger exposed bones along the spur leaving it damaged, fragile, and precariously perched. This ultimately lead to the excavation and removal of the specimen in order to properly stabilize and preserve the specimen. This incident lead to the creation of the Fossil Discovery Trail Mapping Project.



In an attempt to mitigate future exploitation along the Morrison spur of the trail, a comprehensive map, and extensive photo documentation project occurred during the summer of 2015. The map established a grid system for the 200 ft Morrison spur and assigned reference numbers linking the map to high-quality photos of the bones. The map and photos will aid interpretive and paleontology staff in monitoring the condition and position of fossils, as well as educating visitors about the tragedy of vandalism.

Objectives:

- Photo document all bones found on the 200 foot Morrison Spur of the Fossil Discovery Trail
- Create a numbering classification to reference bones and photos
- Map the location of each bone
- Make the map readily available to park staff for reference



Field Area:

The field area is located in Dinosaur National Monument along the 1.2 mile Fossil Discovery Trail.

References:

- Avalon Travel, Dinosaur National Monument: <http://www.mappery.com/maps/Dinosaur-National-Monument-Map.jpg> (accessed October 2014)
- Dinosaur National Monument, Walking the Mesozoic: A Fossil Fanatic's Guide to the Fossil Discovery Trail: National Park Service, US Department of Interior, Dinosaur National Monument

Methods:

Step 1: Photo Documentation



240 photos were taken to document bones along the Morrison Spur using a Canon EOS 5D.

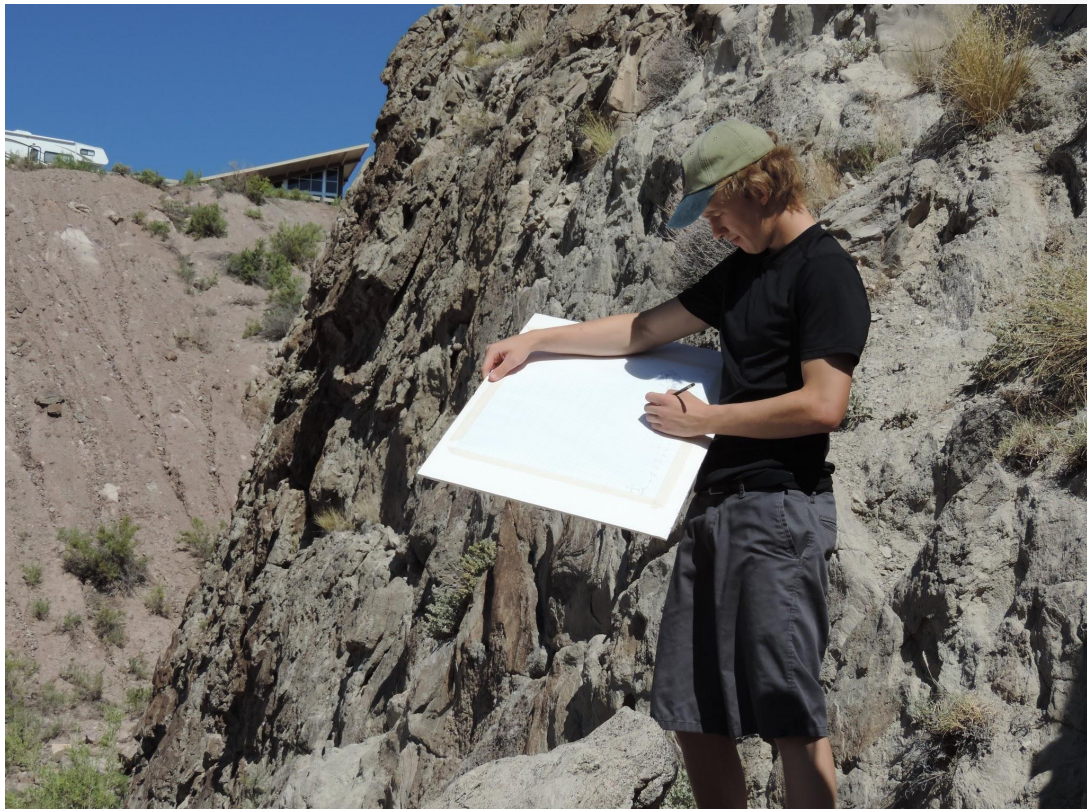
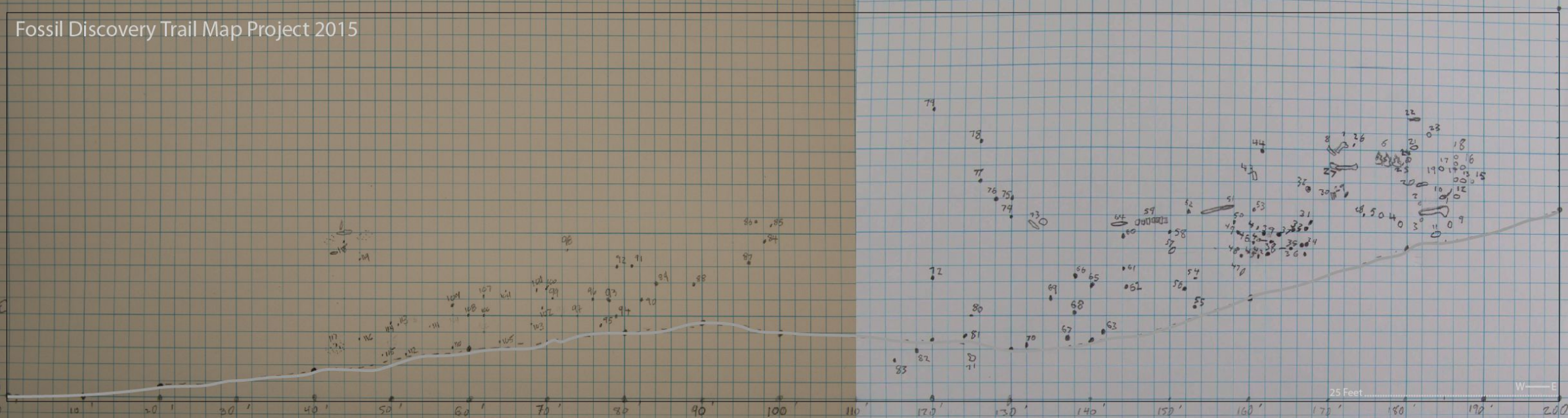


Colored dots were placed near bone fragments to aid in visibility.

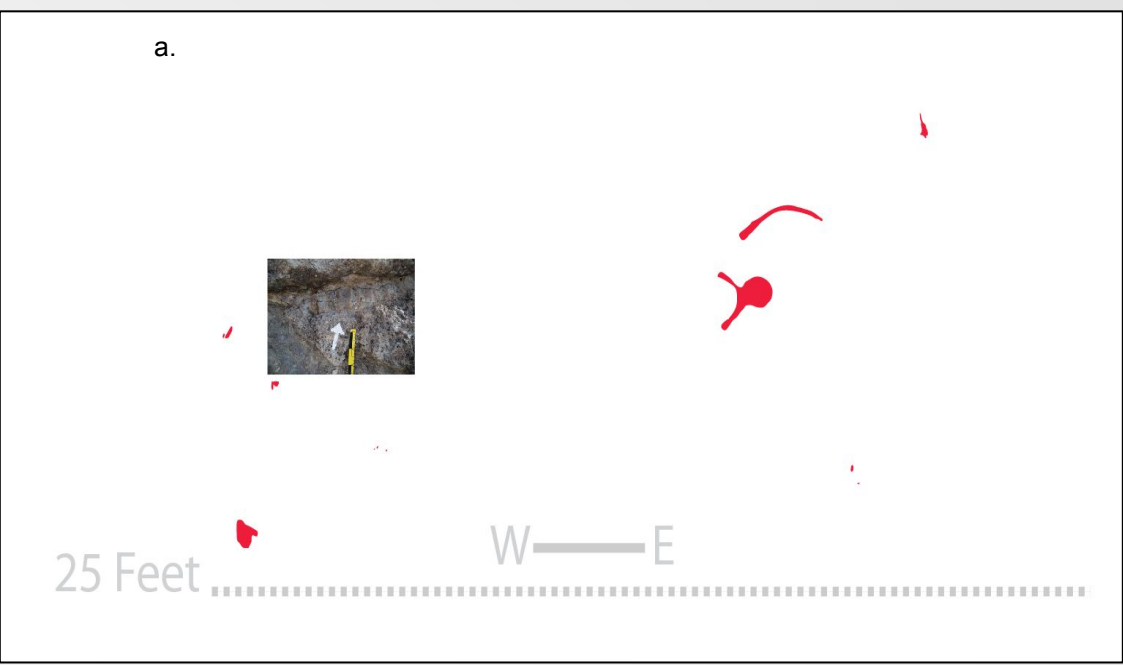


Step 2: High Precision Field Mapping

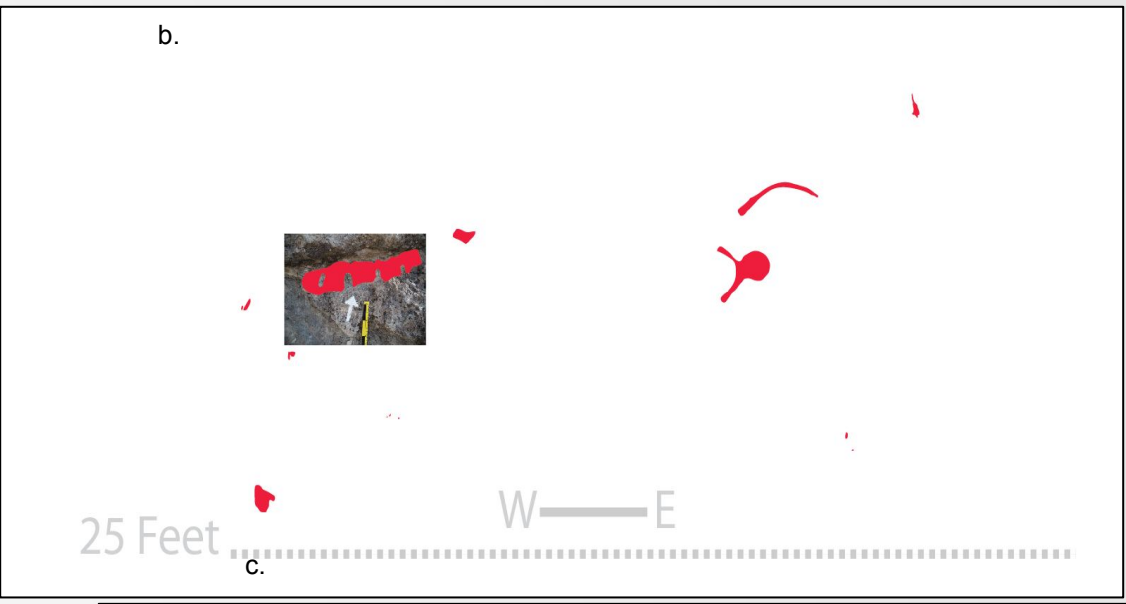
A grid system was established using the distance to the trail terminus as the X-axis and the height off the ground as the Y-axis



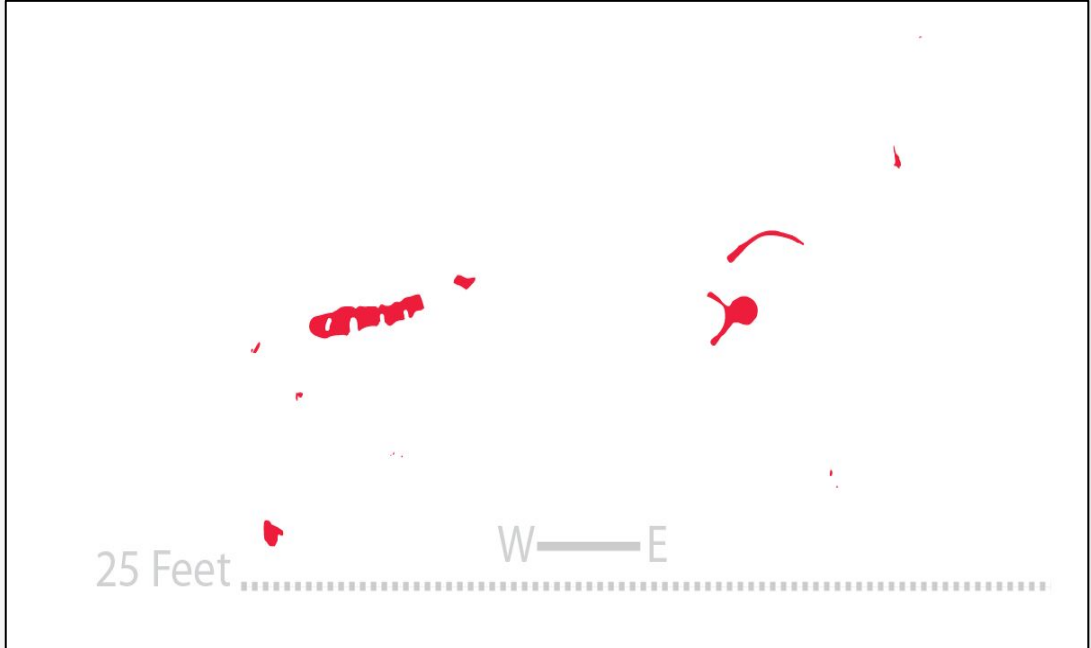
Step 3: Creating a Digital Map using Illustrator



Step 3a: Placing image of a bone in illustrator and scaling appropriately



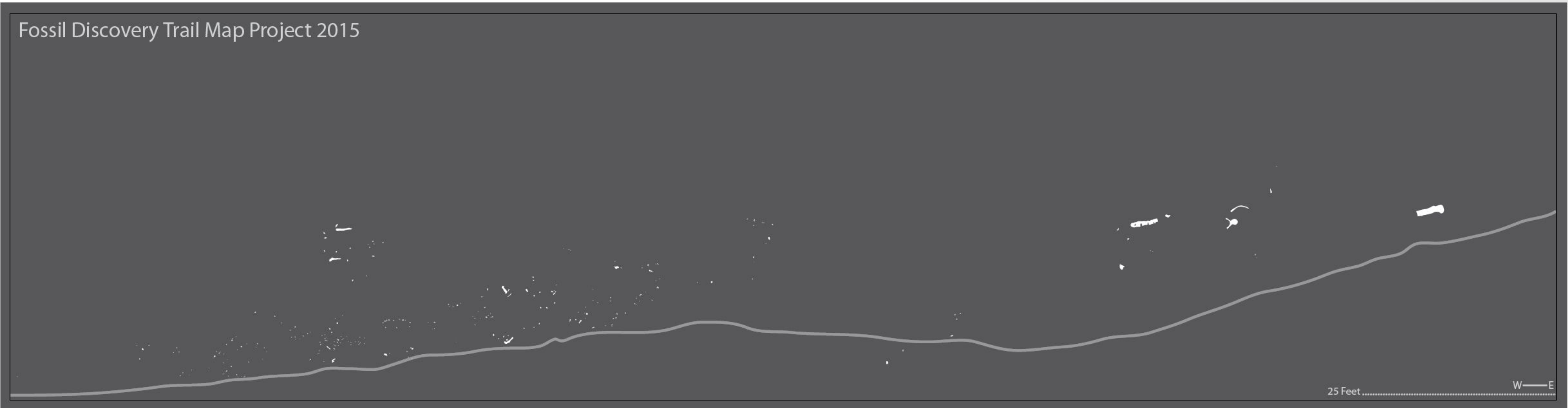
Step 3b: Tracing the bone to show distinguishing features



Step 3c: Labeling the layer and photo appropriately and saving map

Results:

- The production of digital map showing bones, bone fragments and bone impressions along the Morrison Spur of the Fossil Discovery Trail



Conclusions:

Although the digital map is incomplete, the goal of documenting the entire spur was achieved, as photo documentation occurred along the entire extent. In the event that an incident occurs, the bone location would be able to be identified using the map and photos could be cross referenced. Ideally the establishment of a map will mitigate future exploitation of fossils by creating a baseline for all the bones; although, not all degradation is human caused, as natural weathering is still occurring.

Applications:

Not only does this map allow Dinosaur National Monument staff to easily identify degradation of fossils along the Morrison Spur of the Fossil Discovery Trail, but the map and data set can be used in future studies to determine the rate of weathering occurring on that outcrop of Morrison Formation.

Future Work:

- The central portion of the map is yet to be digitized
- Distribution of the map to Interpretive staff via the DINO server
- Incorporation of the map into an interpretive display about ongoing preservation of fossils, and the importance of not collecting.

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