We have reached out to our editor in order to gain clarification regarding their concerns on our interpretation of the incorporation of the small (<10mm) bone fragments upon which we have based a significant portion of our analyses. Our editor's comments suggested that they alternatively interpreted these fragments to likely be from recent/modern weathering of currently exposed bones at the CLDQ.

In our Methods section, we describe the process by which these fragments were collected (i.e. disaggregation of 60 kg of bulk matrix from the quarry). This methodology is more akin to microfossil sampling than microvertebrate sampling; these fragments were not picked from the surface of loose sediment. Rather, we quarried blocks of lithified mudstone and disaggregated them under controlled conditions (Figure 4). Within the 60 kg bulk matrix samples we processed from the CLDQ, we collected over 1,000 small bone fragments (Table 2). One such fragment is imaged in Figure 7A - it is still in situ in the lithified mudstone and thus not a product of modern weathering.

We observed that these fragments display varying degrees of abrasion. While admittedly few fragments show extreme rounding to the extent observed in fossils or sediments that have undergone considerable fluvial or aeolian transport (i.e. well-rounded sand grains for example), we produced a scale to categorize the variability observed in our dataset. From this, we also produced Figure 5 to demonstrate examples of the observed variability and our category system. As such, our assessment was not based on only 4-5 bone fragments, as our editor stated, but on over 1,000 fragments that were etched from lithified rock under controlled conditions. Furthermore, these fragments are not found in concentrated clusters (which might suggest post-depositional crushing *in situ*), but are widely dispersed throughout the lithified quarry matrix and are embedded within the rock among the larger and more complete fossil bones in the quarry.

It is based on these observations that we formulated our interpretation that the fragments must be syndepositional to the rest of the bones at the CLDQ. Our reasoning is that since the fragments are embedded and encased in the same rock as the larger bones in the quarry (and not loose at the surface), they must have been incorporated into the deposit during the interval of time that the rest of the skeletal elements of the CLDQ were being incorporated.

However, our editor has remained firm on dismissing this interpretation and stating that there is no way of knowing when the fragments became incorporated into the deposit, suggesting that they may be from modern excavation at the quarry. We find this interpretation completely at odds with the nature of the CLDQ and our reported observations.

We also dispute our current editor's comments regarding our geochemical interpretation of hypereutrophic conditions at the CLDQ. We have based our interpretation on several lines of evidence, given below, to explain how hypereutrophy may have contributed to the taphonomy of CLDQ. In general, our hypothesis is based on the following observations:

- Sulfide minerals are present, demonstrating anoxic conditions. This is typical of high rates of organic matter decay.

- Calcite/barite nodules, which often form in the presence of high amounts of decaying organic matter, are common in the quarry and furthermore found attached to the bone at the sites of tendon and ligament attachment, where the last organic matter is likely to have been present.
- Crushing and bone fracture are relatively rare (30% according to Gates, 2005).
- Gnawing traces are very rare, implying typical freshwater vertebrates were rare.
- Charophytes of brackish affinity are present, implying a high dissolved solute load.
- Heavy metals are present in larger concentrations at the CLDQ than from other Morrison Formation sedimentary rocks in the region.

Our current handling editor has objected to the line of evidence regarding bone fracturing, citing Gates (2005). In our manuscript we acknowledge that some fractures are present, however at lower frequencies than other bone beds from similar sedimentological settings. Furthermore, Dr. Gates was, himself, a reviewer of this manuscript and did not object to our use of his paper in this line of reasoning.

Our editor has also objected to our hypothesis regarding the origin of heavy metals at CLDQ. We provide and address a number of alternate hypotheses within our manuscript; we reference diagenesis/post-depositional processes, by which we mean geochemical processes from the point of burial until the point of discovery, as a likely contributor to some of the metals. We acknowledge that groundwater contact can account for the presence of some heavy metals, however the quarry is not in contact with the local aquifer. Furthermore, if these metals were coming from the local aquifer, we would expect them in other bones from other local sites, which we have demonstrated does not occur. We reference, and provide data to refute, the possibility that the metals are sourced from ash beds emplaced during the Jurassic. At the request of our editor, we further discussed the possibility of mining being a source of the unique geochemical signature, but find it unlikely given that aerial deposition is unlikely and the bones in question are not in contact with local groundwater. We conclude that a likely source of some of the metals is through the bioaccumulation of dinosaur decay itself. Our editor rejected this proposed hypothesis and asked for evidence despite our presenting such evidence in a significant portion of the Discussion section of the manuscript.

For example, we show, via reference of mass graves containing no grave goods, that large numbers of decaying bodies can result in the accumulation of heavy metals in surrounding sediments. Our editor stated that most of the metals found in the soils around these mass graves would come from contamination from present sources, however they did not provide an argument for that conclusion. Furthermore, that conclusion goes against the interpretation of the authors of the cited studies, who find that the bodies themselves are the source of the metals. We go on to explain how the most abundant dinosaur taxon at the CLDQ, *Allosaurus*, as an upper level consumer, would be a potential source of these metals due to trophic focusing (bioaccumulation of heavy metals in upper trophic levels). Despite having laid out these arguments, with references, our editor has repeatedly asked what the basis of our assertion for metal accumulation via organic matter decay is and frequently state that we need references. These references are indeed provided throughout the manuscript.

Furthermore our editor has addressed concerns on our referencing of Goodwin et al. (2007), whereas those authors state that specific researchers have likely made erroneous interpretations of metals associated with vertebrate fossils. In fact, we specifically cite this reference largely in agreement with their conclusions that heavy metals in fossil vertebrate localities are not likely due to *in vivo* toxicity, but rather diagenetic/post-depositional processes. Goodwin et al. do state that modern groundwater is a more likely scenario for the source of metals in the papers they reference. This does not mean, however, that all metals found in all bone beds must have come from local aquifers. In fact, Goodwin et al. also specifically state that their results should not be used as a proxy across the board for all geochemical interpretations for vertebrate fossils, as diagenesis can vary greatly among quarries, facies, and age.

We reference Goodwin et al. to demonstrate that metals, especially arsenic (As), will sorb to bone when in subaqueous settings. We describe a scenario where the sorbtion of metals happened recently following burial as opposed to during contact with modern groundwater significantly after burial, diagenesis, and uplift. Regardless, it relies on the same chemistry: bone apatite in contact with ground water sorbed As ions from solution. Additionally, our editor has referenced our Figure 6 to say that metals are present at other sites. We agree. In the text of our paper, we describe three classes of metals. Some are found in much higher concentrations at CLDQ, but also seen elsewhere. Some metals are seen in equal concentrations at CLDQ and our other sites, and some found exclusively at CLDQ. Our arguments are based on the differences in concentration, not presence/absence. Given that heavy metals are only one line of evidence in our hypereutrophy argument, and that we do summarize other potential sources of metals, we believe that our arguments are robust.