## Scientific Methods Assignment 2 – Research Critique

**Bibliographical Entry**

A. D. Barnosky, N. Matzke, S. Tomiya, G. O. U. Wogan, B. Swartz, T. B. Quenta, C. Marshall, J. L. McGuire, E. L. Lindsey, K. C. Maguire, and E. A. Ferrer, “Has the Earth’s sixth mass extinction already arrived?,” Nature, vol. 471, no. 7336, pp. 51–57, 2011.

**Source and Publication**

A preliminary glance at the research at hand displays two immediate implications: the journal it is published in, and the recency of its publication. *Nature* is a peer-reviewed journal of renowned credibility, and hosts one of the largest impact factors of academia. Therefore, the offset presumes a process of multiple verification and inspection. Along with this, the data the research (published in 2011) refers to carries with it the benefit of being most up to date, while at the same time allowing for a period of review and contestation.

Furthermore, the length and credentials of the author list indicates to an above average variation in specialized fields of knowledge. While this may imply a further aspect of peer-review in the process of theorization, one must be careful of implicitly assuming this to be a positive factor without due skepticism of confirmation bias as well. It is up to the reader to calculate which pertains heavier to their consideration of credibility. However, a clear breakdown of author contribution and composition is stated in the references, and such transparency helps favor the validity of the methodology.

**Introduction and Problem**

This article examines the claim of biologists and other scientists that suggest the current pattern of species extinction indicates the emergence of a “mass extinction”. The authors of this article delve into this claim and propose the use of recently accrued paleontological evidence as a means of additional analyses and refinement in the previously existing methods. It analyzes the shortcomings that have existed in the methods of comparison between fossils and modern data, and the conservative measuring of this comparison.

The proposition has been brought forth that due to anthropogenic tampering with the natural processes of ecosystems, biodiversity has been affected beyond nature’s capacity to renew itself in those particular contexts. This has led to a pattern of species decline and extinction, comparable on the scale of the 5 previously noted mass extinctions that define a geological time period. More than 75% extinction is required in a period of compressed time to indicate such a mass extinction, and this is the criteria first identified, which is according to paleontological standards. While the authors address the implications of such extinction, what they fix their focus on is the methodology of the basis for the comparison. This is a research which thus presents implies a more reliable form of understanding and measuring the proposed problem at hand.

The introductory statements of the article begin with the nuancing of the problem at hand, which is both an immediate indication of responsible objectivity and a subtle caveat to the misunderstanding of scientific processes without due notice to its intricacies. The importance in the differences of measurement according to rate and magnitude are mentioned at the forefront with definition, along with a brief explanation regarding environmental changes that assisted in species extinction. Distinction is made between extinction and mass extinction of the five geological epochs of history.

In short, the problems identified in methodology are the problems in the form of comparison. The taxa used from fossil records are mostly oceanic, while the modern records are largely terrestrial. Along with this, there is the gaping un-examining of and lack of study in modern taxa. These are viable criticisms, as they indicate clearly the issues that can result through if not invalid, then unreliable comparisons.

Other factors that influence this comparison with the Big Five are the rate at which the extinction is charted. The authors identify that the conservative nature of the rate in current extinction is due to an inaccuracy in measuring and comparing the two according to the average million-year rate without accounting for the compressed time frame of the current geological era relative to the extension of the fossil.

The paper claims the above shortcomings can be refined by using taxa that are closest to each other in comparison in both fossil and modern records, such as the marine species closest to shore, and examining the regions and biomes where both exist. This indicates a comparison technique of greater accuracy, and one that holds more meaning. Most importantly, it presents the analyses of the anthropogenic affect as a massive game-changer. This is a better approach in accounting for different factors and intricacies of the problem, as human contribution to geo-specific extinction can be considered a continual factor in the calculation of ecosystem and species extinction.

The article suggests that this approach was not being taken into consideration, therefore such suggestions in analyzing through the comparison of the above, coupled with new paleontological evidence all indicate a refined approach at tackling the problem. This is definitely a more holistic approach that both furthers an analysis of the extinction, and also the theorization of the problem. It presents a causal factor to the climatic conditions in current times – anthropogenic contribution.

The paper also presents future questions and areas of research regarding extinction, namely what the continuation in the difference in current rates of extinction will present in the next few centuries and the reliability of extrapolating data of well-studied taxa on to different species in other spaces. The gravest of these is the prior, which indicates the extinction of all taxa currently classified in the endangered species range, thereby confirming entry into the 6th mass extinction.

**Review of Literature**

The article cites a plethora of scientific papers (97 in total) published in peer-reviewed journals and allocates more than one reference to each claim of evidence. This offers validity and reliability and credibility through comparative analysis and verification. Furthermore, acknowledgement is given to various departments that specialize in all the scientific disciplines relevant to the subject of the study.

These factors provide the potential claims of the research with an extended gravity. As the conclusion of the paper indicates a sense of urgency in reforming current trends in anthropogenic waste production and habitat destruction, it would benefit the reader to understand the significance of the research.

**General Analysis**

If information is inadequate, it is immediately mentioned so there is clear distinction in the source of deduction. Along with this, the heavy presence of diagrams as visual aid and the simplification of some jargon (“cetacean (whales and dolphins)”) indicate an attempt of making the information accessible to readers. The breakdown of the paper into clear subheadings also furthers this, and does not present the writing structure as a factor of complication in understanding. Climate change as a topic of conversation and field of information is benefited by such considerations in academia.

Another aspect of consideration is implied politics. This research was funded by the National Science Foundation, which despite being a government agency is not known for furthering a political agenda beyond the scientific advancement of the United States in the fields of non-medical science. This presents the research with the grace of objective freedom from political bias or ideological furthering. As the nature of the issue is one that holds controversy in current global politics, such a meticulous display of scientific analysis presents a standard to meet when presenting information on the issue.

While this research presents solutions to the methods of determining the comparison with the “Big Five”, it does not offer any comprehensive solution to this rate of hastened extinction. The research offers warnings of extinction without complementing it with proposals on the specificities of what exactly must be done to combat the extinction. However, it can be rightly argued that the scope of solutions extends beyond the reach of this particular paper and it was never claimed to pose as such. The few causes that are identified at both the beginning and conclusion all relate to human initiated climate change, and there exists the indication to solution.

There is a visible lack of taxonomy of the current geological epoch beyond the Holocene, which displays the restraint of the authors in using a term informally accepted. This displays a dedicated commitment to the discipline of geology, but makes one wonder if the authors would be more accepting of the term in the years since this article was published. The causal factor is indicated, yet not held in isolated culpability.

This research can therefore be held as a contribution towards an attempt to both understand and remedy. The findings and implications of such research are required to influence the decisions of those who decide the management of carbon emissions and habitat destruction. As indicated by other research in this field, this is a concern of paramount importance, and therefore the contribution of this research can and should be considered a vital contribution to the solution.

Overall, this research article indicates to an appropriate form of inquiry, and can be considered a valuable contribution of knowledge to the field it belongs.