Road Cuts in the Flint Hills: an Overview of Ecological Health and Structural Integrity

Russell Hicks, Tina Keehn, Chris Greve, Sarah Lamm, Logan Hay, and Dr. Arnaud Temme
Kansas State University, Natural Resources and Environmental Science

Abstract

Road cut are a frequent sight around the Flint Hills. A poorly cut or maintained road cut can be hazardous and affect the civilians near them. The goal of this project was to determine what properties affect the deterioration of the road cuts over time. Road cut aspect, vegetation, animals, and rock type were all studied as potential factors. The road cuts studied were composed of shale and limestone. Limestone layers tend to be nearly verticle while the shale layers had slopes between 30°-55°. This study utilized visual qualitative inspection as well as quantitative measurements using Rock Schmidt-Hammers and laser range finders.

Hypothesis

We proposed two hypotheses:

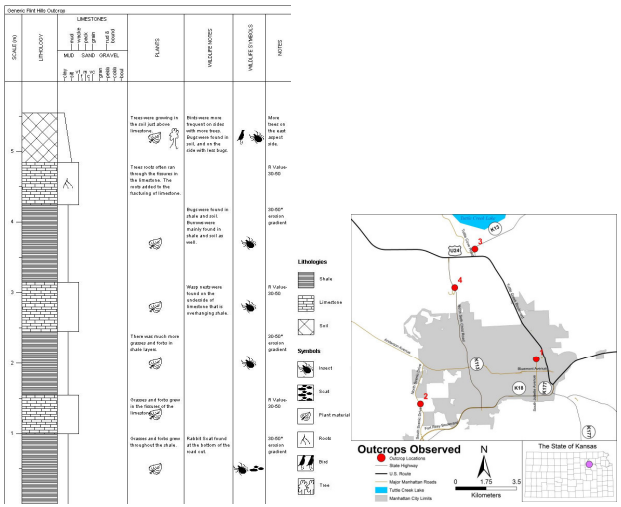
1. Aspect is the most important factor determining ecological health and erosion intensity of road cuts.
2. Ecological health diminishes erosion intensity and vice versa.

Methods

Google Earth was used to locate road cut sites In order to complete a comprehensive assessment of the ecological health and structural integrity of each roadcut, multiple methods were utilized. To assess ecological health, visual surveys were conducted of plant and animal species found. Visual inspection was also used to characterize erosion patterns. Structural integrity was measured with the use of Rock Schmidt-Hammers, and dimensions were measured using a laser rangefinder.

Results

We found that vegetation coverage was higher on the east facing cut that on the west facing cut. Also, fresh rock faces are more vulnerable to weathering than those that have been exposed for a longer period of time. Beds with chert inclusions had the highest R values.



Conclusion

We found evidence that appears to support the hypotheses. However, given the short time frame of the study, the evidence is not enough to definitively say that east-facing slopes are significantly more ecologically healthy and of higher structural integrity than west facing slopes.

Future Direction

To fully and adequately investigate the relationship that aspect has on the ecological health and structural integrity of road outcrops in future studies should take place over a longer time frame. Further, increased quantitative data collection, especially for vegetation coverage and erosion rates would greatly improve the quality of results.

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