



Compiling Dispersed Geologic Knowledge for Ease of Access and Maintenance

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Introduction

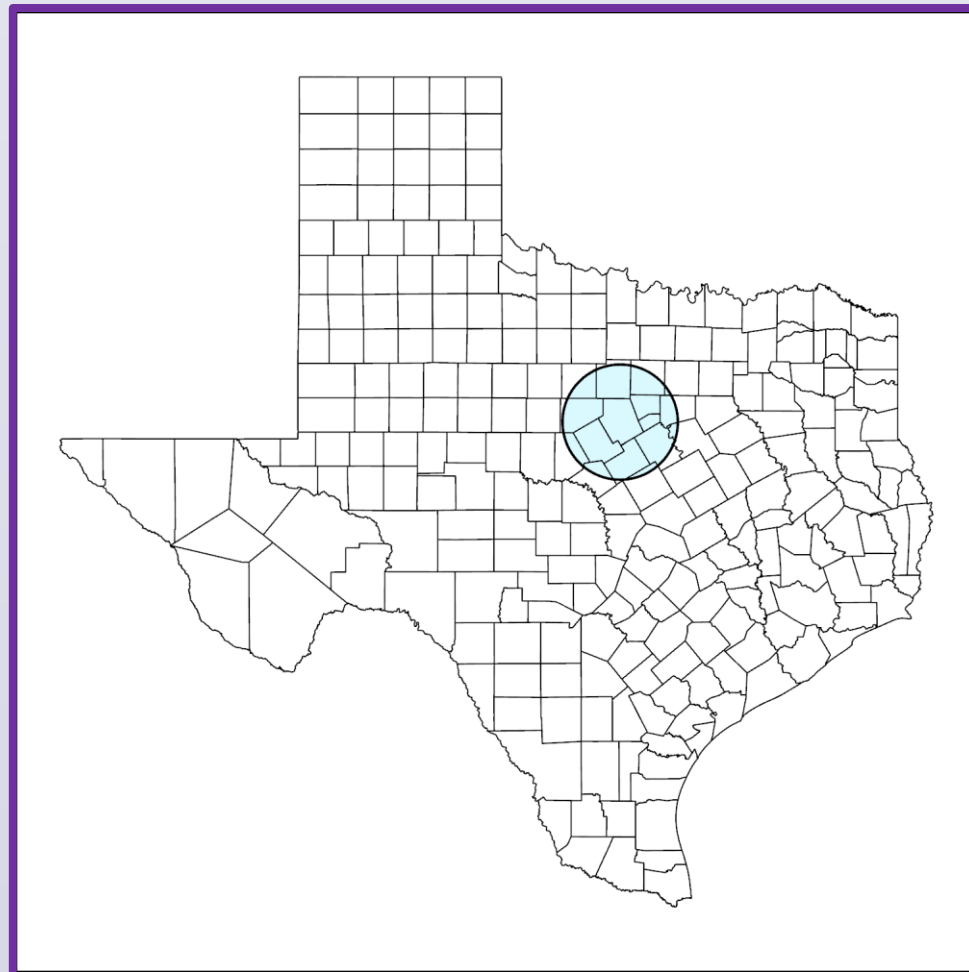
Rock outcrops and other geologic features are essential resources for geoscience instructors and students who wish to study geology as it exists in the field. However, information about these features is often distributed across many sources, such as field guides, academic journals, and personal knowledge.

This decentralization can hamper the ability to maintain up-to-date data: if a site is not well-known, it may not be regularly studied. If it is not regularly studied, it may be damaged or destroyed by natural or human processes without such processes being recorded. If that information is not recorded, the site itself may cease to be useful not only as a site which can be actively studied, but as a site which has experienced such processes. Alternatively, a site may simply be forgotten about. This, too, results in the loss of a useful educational resource.

A method for collecting, cataloguing, and centralizing this information may help simplify the maintenance and study of geologic features, as well as result in the identification of newly-created features or the re-discovery of forgotten features.

Area of Interest

The current area of interest is a 60-mile-radius circle centered on Stephenville, Texas. Most of the features in this area are roadcut-type outcrops displaying Cretaceous sedimentary rocks.

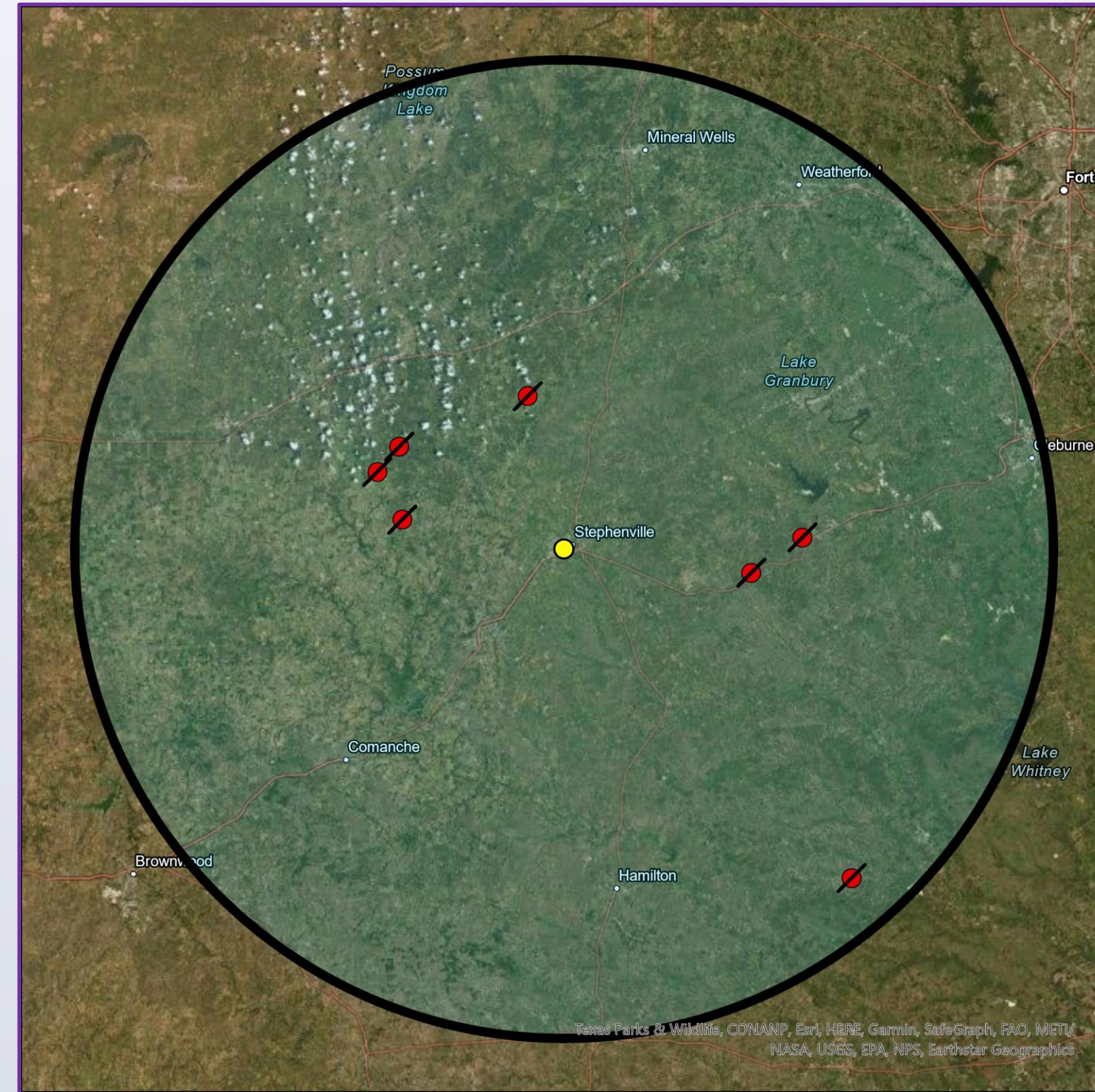


Methods

Field guides and topographic maps were reviewed to identify potential locations of geologic features. These locations were inspected to determine the condition, characteristics, and means of access of the geologic feature. These data were then added to a geodatabase, with sites sorted into subtypes based on their type and condition. Finally, these data were used to create maps of active, deteriorated, and potential future sites for study.

Deteriorated Features within AOI

Several sites described in field guides have deteriorated to a significant extent. This map depicts all features within the area of interest that have experienced substantial deterioration or removal.



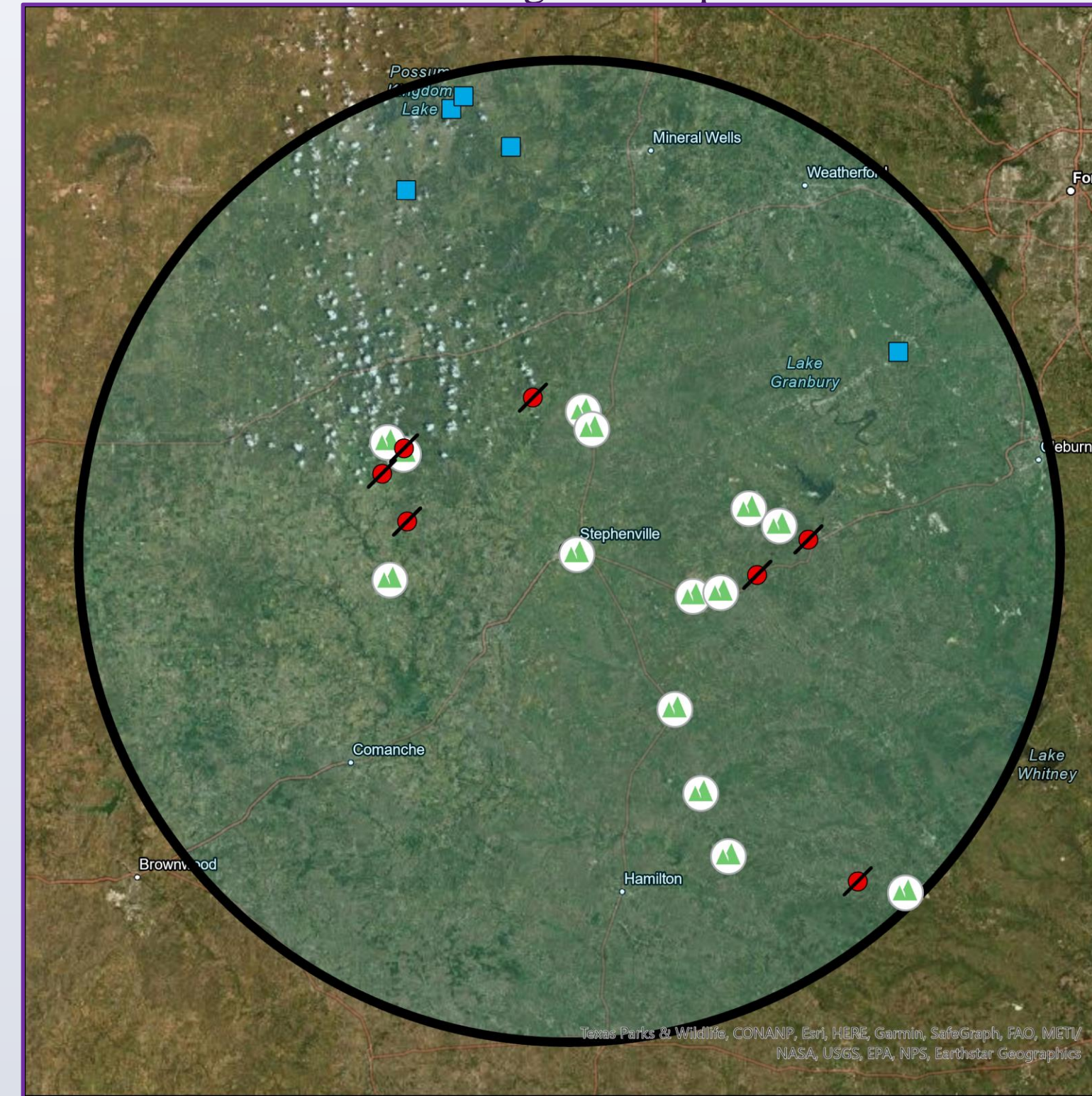
Some locations are approximate, in cases where the original site could not be located with certainty.



Some outcrops [left picture] have been so thoroughly eroded that their original descriptions are unrecognizable in their current state. Others [right picture] are still intact. The previously-gathered data of intact features remains useful because erosion or human development have not fully altered or obscured their previous appearance.

Extant Outcrops and Features within AOI

Within the area of interest, over twenty sites have been verified, mapped, and catalogued. Fourteen sites were found to be in good condition. Circular symbols with green mountains on a white background represent these sites.



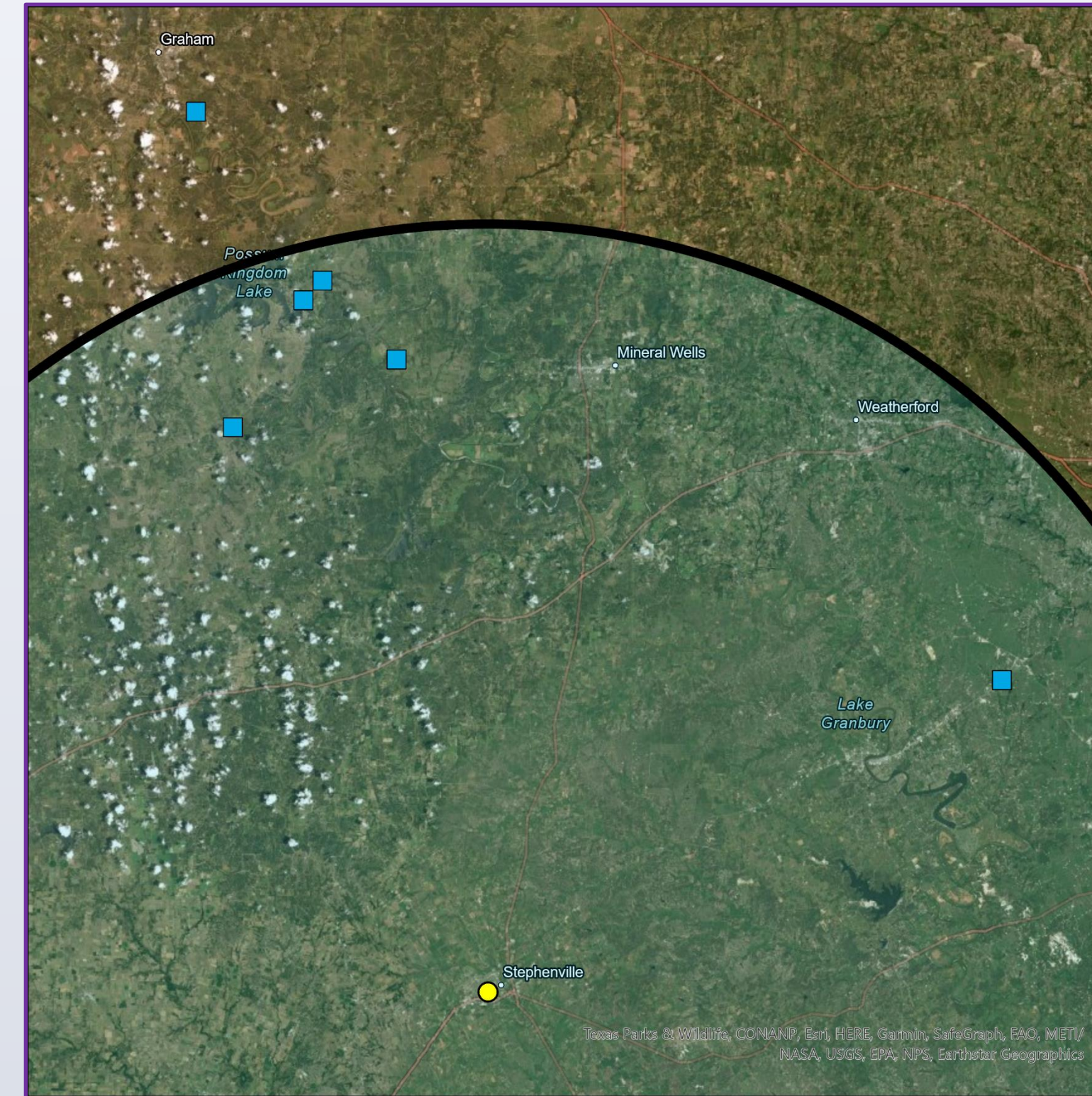
Most are adjacent to highways or roads, making them easy to reach via driving, but many lack the infrastructure to ensure safety and accessibility. Data about the safety and accessibility of each site can enable map users to choose sites that best fit their needs.



The map can be accessed by scanning the QR code above or at <https://qr-creator.com/d/803259792>.

Potential Features Requiring Verification

More features described in field guides and journals have been identified but have not been located and catalogued. This map depicts all such sites within the area of interest.



These locations are approximate and require verification.



This newly catalogued roadcut exhibits several characteristics that make it a useful educational resource. The north face [left picture] contains several beds of fossiliferous limestone, and the south face [right picture] displays an angular unconformity. Its proximity to Stephenville makes it a convenient site for demonstrating these features in the field.

Discussion

The primary field guide used to locate sites in the area of interest, a 1983 publication, detailed many outcrops that have been destroyed in part or full due to erosion and human development. This caused the field guide to be less useful by way of making past observations more difficult to see reflected in these sites in the current day. However, the data regarding the still-intact outcrops remained recognizable; the descriptions matched current field observations. This indicates that a primary concern in maintaining a site as an educational tool is the destruction of the site itself. The degradation of a site can be protected against, or at least accounted for, but that is contingent upon awareness of the site's location and significance. It is difficult for widely-known sites to leave the collective consciousness of geoscientists, but comparatively easy for locally-known sites to be forgotten about. The concern here, then, is keeping the sites fresh in memory, so they can be regularly observed and/or maintained. Gathering data about sites from disparate guides, journals, and personal memories and storing them in a centralized database protects against the loss of that data that could result from one of those sources being forgotten or damaged. Maps produced with the gathered geospatial data can be used as references for instructors and students who want to study the geology of the Stephenville, TX area. They can also be used to identify regions that are understudied or in need of re-examination.

References

- BGS and AAPG, "Geologic Section of the Cretaceous Rocks of Central Texas", Fall 1983.
- AAPG, Southwest Sec., "Field Trip #1, Possum Kingdom Lake", February 1985.
- Whitmeyer, S., Atchison, C., and Collins, T., 2020, Using Mobile Technologies to Enhance Accessibility and Inclusion in Field-Based Learning: GSA Today, v. 30, no. 9, p. 4–10.

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