



PALEOENVIRONMENT OF THE DEVONIAN FOSSILIFEROUS GLENERIE LIMESTONE, ROSENDALE, UPSTATE NEW YORK



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Abstract

The Devonian Glenerie limestone outcrops throughout the Hudson Valley and is believed to correlate with the glauconite-rich Oriskany sandstone elsewhere in upstate New York. Field inspection of well-preserved outcrops in Rosendale, upstate New York, indicated the Glenerie formation to be composed of both thin and thickly-bedded chert, interbedded shale, and both calcareous to arenaceous limestone. The Glenerie formation is dominated by spirifer arenosis fossil, which is the index fossil for this formation. The goal of this research is to determine the conditions of the paleoenvironment prevalent to the deposition of the Glenerie formation. Within the arenaceous layers are the Spirifer arenosis, Rensselaeria, and the Murchisoni fossils, which are shells that were deposited in a shallow marine environment. The calcareous layers are greatly affected by weathering and erosion that exposed fossils and trapped artifacts. The lithology of the area of focus, the inter-lake area of Rosendale, New York, encompasses formations of sedimentary strata ranging from Ordovician to the Devonian periods. The inter-lake area is severely faulted and folded, resulting from the continents of Europe and North America colliding. The Glenerie formation is bordered by the Port Ewen limestone to the east, and the Esopus shale to the west. The lithological and faunal content of the Glenerie formation changed as the depositional environment transitioned from shallow to deep water setting. The fossils indicated organisms with thick shells and presumably provided protection from being winnowed away in a shallow high energy marine environment. The preserved fossil record, along with bedded chert in the Glenerie formation suggest fluctuation in sea level followed by rapid burial of organisms.

Area of Study

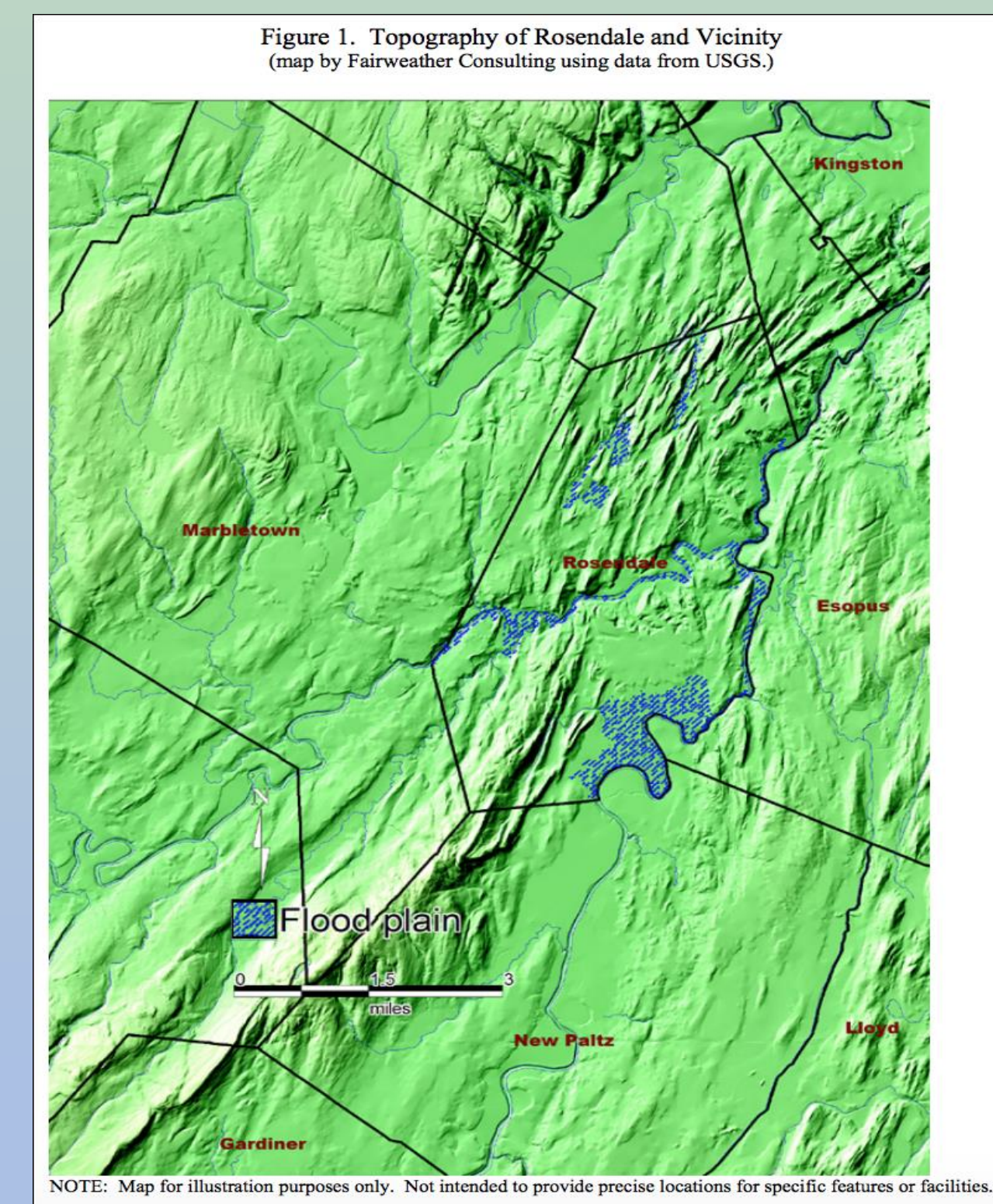


Figure 1. The town of Rosendale, as depicted in a Google image, is located upstate New York in Ulster County, approximately 100 miles North of New York City. The geological coordinates are Latitude: 41.85 N, Longitude: 74.08 W (Rosendale, New York., n.d.). The town was once known for its high grade cement, but today is sought after for its sophisticated Paleozoic geology.

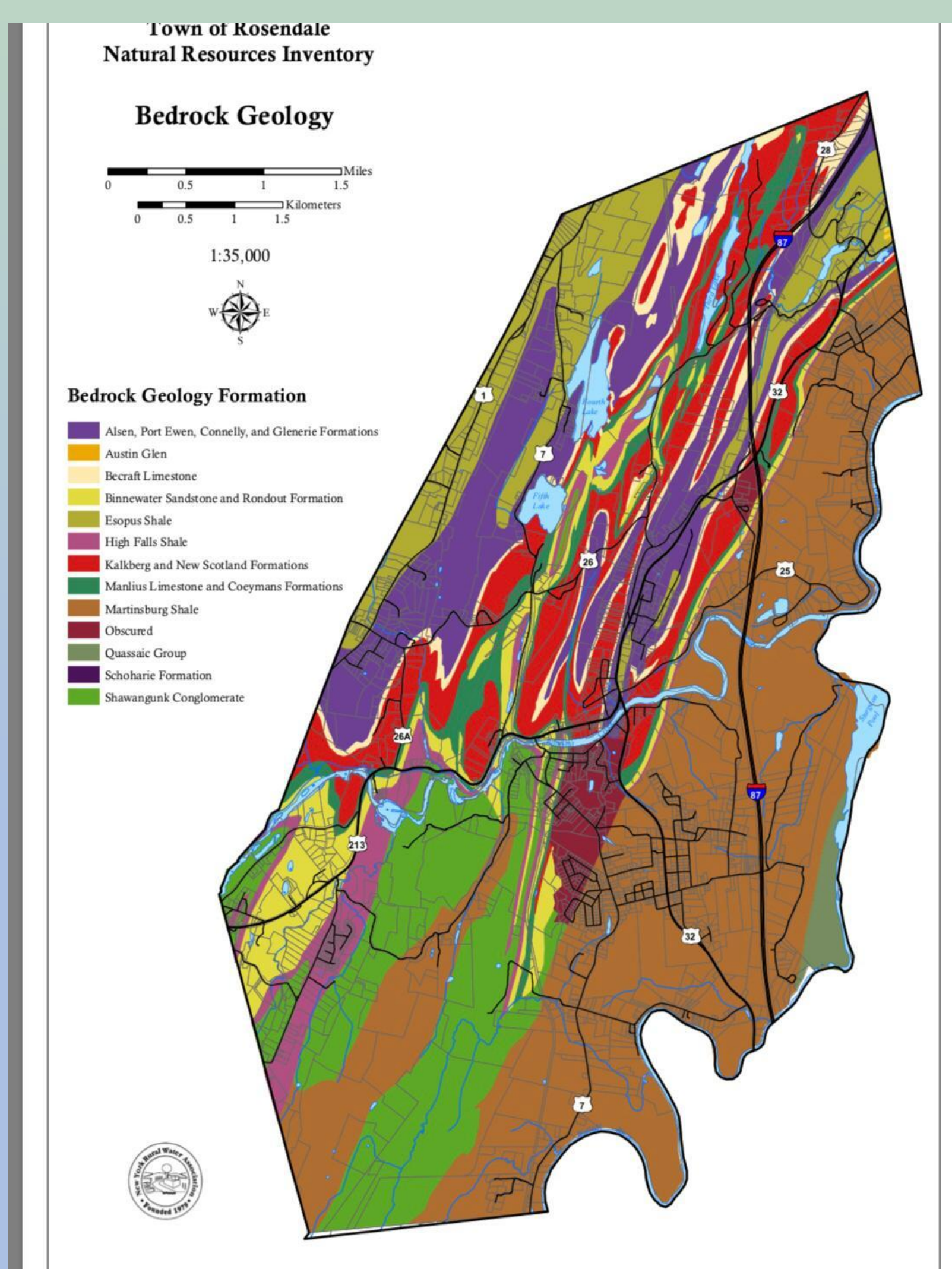


Figure 2. Several major and minor faults systems that extend going south-north not only deform the area, but create unique features such as plunging anticlines, synclines, drag folds and ridges. Majority of the formations are deep underground with the exception of a few out-crops that allow geologist to project and identify each formation.



Figure 3. A topographic map showing the elevations of the Rosendale inter-lake area



Figure 4. Kilns from the old cement mines in Rosendale.



Figure 5. Rust color and thick fossiliferous layer on a weathered surface of the Glenerie limestone.



Figure 6. The Rosendale inter-lake area research team formed by geology students. Field geology brings excitement and supplements text book knowledge.

Field Observations



Figure 7. The index fossil for this formation is the Spirifer arenosis.



Figure 8. Devonian aged brachiopods from the Rosendale area

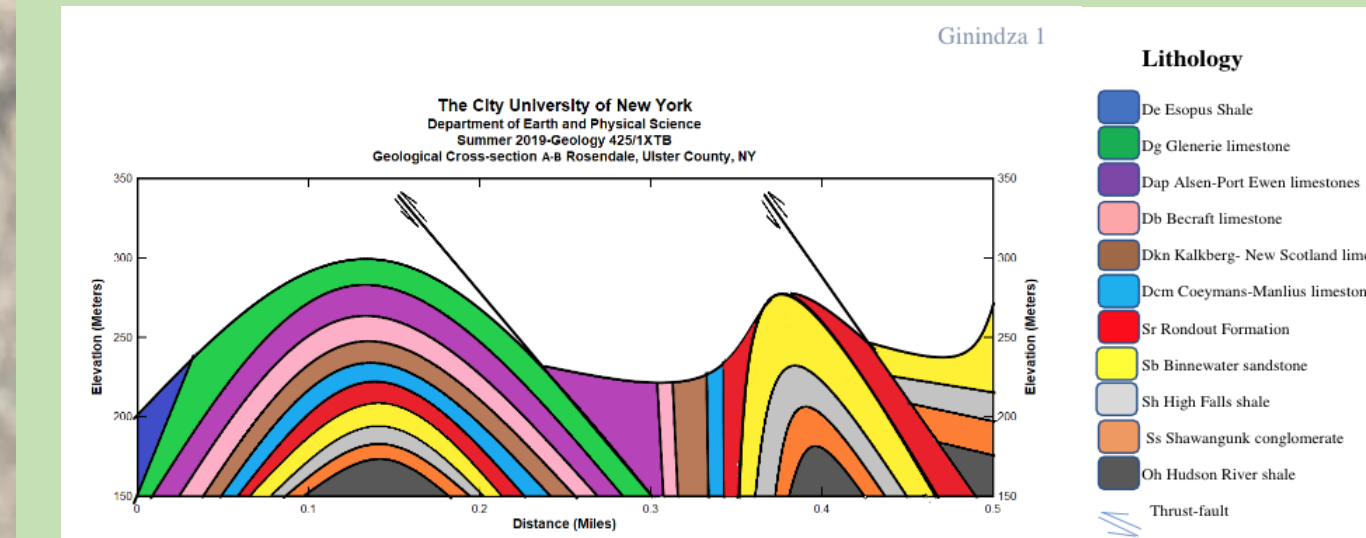


Figure 9. The Glenerie limestone is part of a series of strata that form an anticline in the inter-lake area. It has alternating layers of chert and argillaceous materials. The argillaceous beds are often calcareous. To the west of the anticline the formation is dipping 45 degrees and to the east it is dipping 57 degrees.

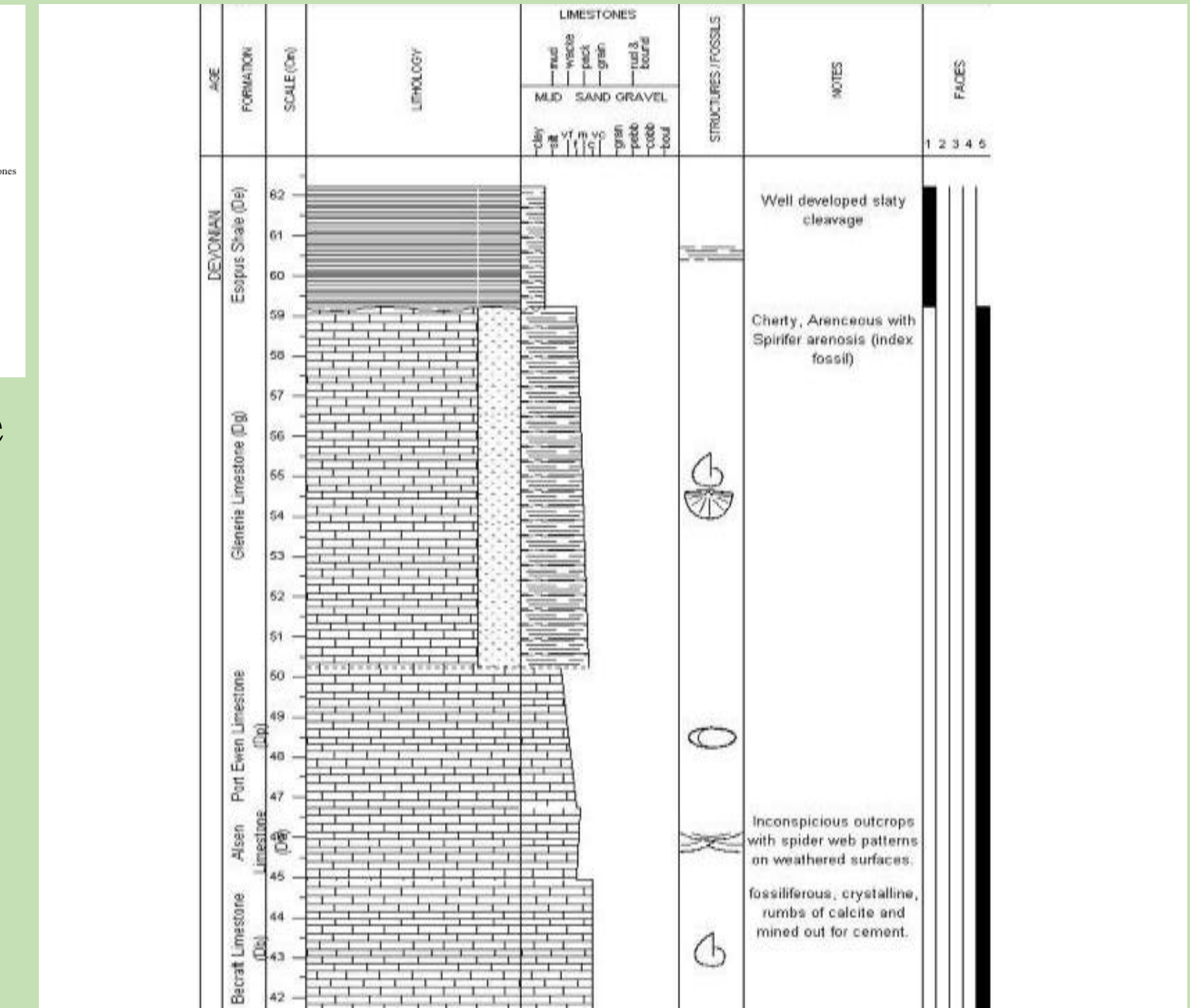


Figure 10. A stratotype constructed and used to interpret the sequence of the Glenerie limestone formation and its characterization.

Discussions

The Glenerie limestone (Dg) formation is an arenaceous, highly fossiliferous cherty limestone with interbedded shale and limestone. Its weathered surface often presents a rust color. The Glenerie limestone is formed in a medium to shallow marine environment. This limestone has thick bands of fossils within the arenaceous layers. The index fossil for this formation is the Spirifer arenosis. It is believed to correlate with the Oriskany sandstone.

Conclusion

The carbonate deposits in the Rosendale area bear well-preserved fossils, indicative of the abundant life and shoreline fluctuations in the ancient Devonian seas. The geology of the inter-lake area provides an insight into the physical or mineralogical history of the area.

References

- Isachsen, Y.W., Landing, E., Lauber, J.M., Rickard, L.V., and Rogers, W.B., eds., 2000, Geology of New York, 2nd ed., New York State Museum Educational Leaflet 28
New York State Museum, New York State Museum Educational Leaflet 28 2000
Rosendale, New York. (n.d.). Retrieved from <http://www.city-data.com/city/Rosendale-New-York.html>
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NYSGA 2009 Trip 1 - Marshak, Burmeister, Sen, Yakovlev and Kuiper
Y.W. Isachsen, E. Landing, J.M. Lauber, L.V. Rickard, and W.B. Rogers, edited