

THE STONY GAP SANDSTONE EXISTENTIAL CRISIS: PROBLEMS WITH USING CHANNEL SANDSTONES TO DEFINE FORMATION CONTACTS

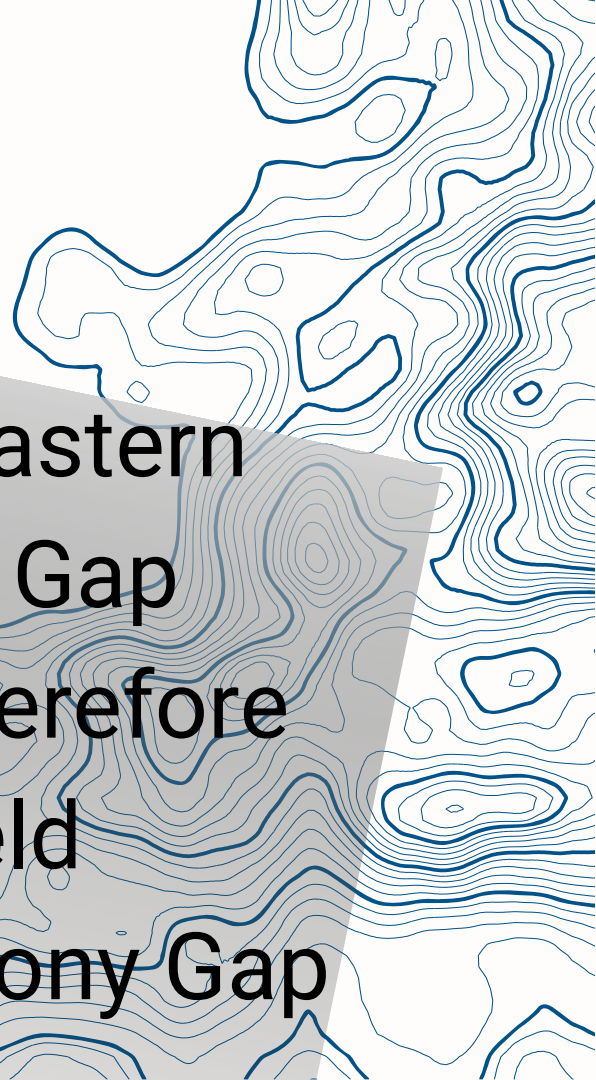
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Problem

- Recent 24k bedrock mapping in southeastern West Virginia has shown that the Stony Gap Sandstone is laterally discontinuous, therefore differentiation of the Hinton and Bluefield formations is not possible where the Stony Gap Sandstone is absent.
- **Recent work:**
 1. Highlights the difficulties in using channel sandstones to define formation contacts
 2. Re-assesses the stratigraphic boundary of the Hinton and Bluefield Formations



Mauch Chunk Group

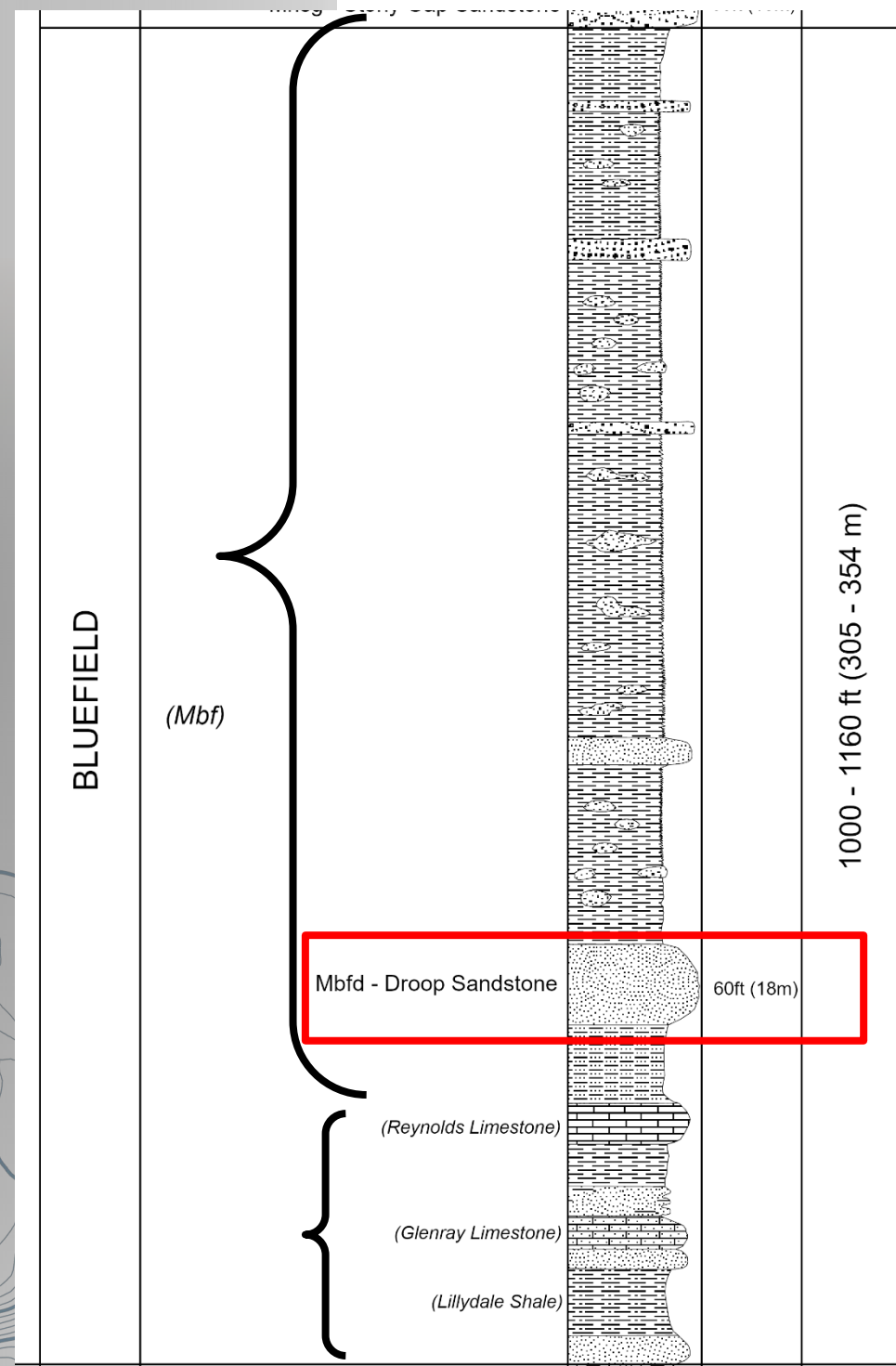
Middle to Late Mississippian

System	Series	Group, Formation, and Member
Mississippian	Upper	Bluestone Formation
		Princeton Sandstone
		Hinton Formation
		Stony Gap Sandstone Member
		Bluefield Formation
		Greenbrier Group
Lower		Maccrady Shale
		Price Formation



Bluefield Formation

System	Series	Group, Formation, and Member
Mississippian	Upper	Bluestone Formation Princeton Sandstone
		Hinton Formation
		Stony Gap Sandstone Member
		Bluefield Formation
		Greenbrier Group
Lower		Maccrady Shale
		Price Formation



Siliciclastic-dominated upper interval;
 everything overlying the Reynolds Limestone, including the Droop Sandstone. Red shale-dominated sequence with interbeds of fine-grained, impure sandstone

Marine-dominated lower interval;
 includes the Lillydale Shale, Glenray Limestone, and Reynolds Limestone

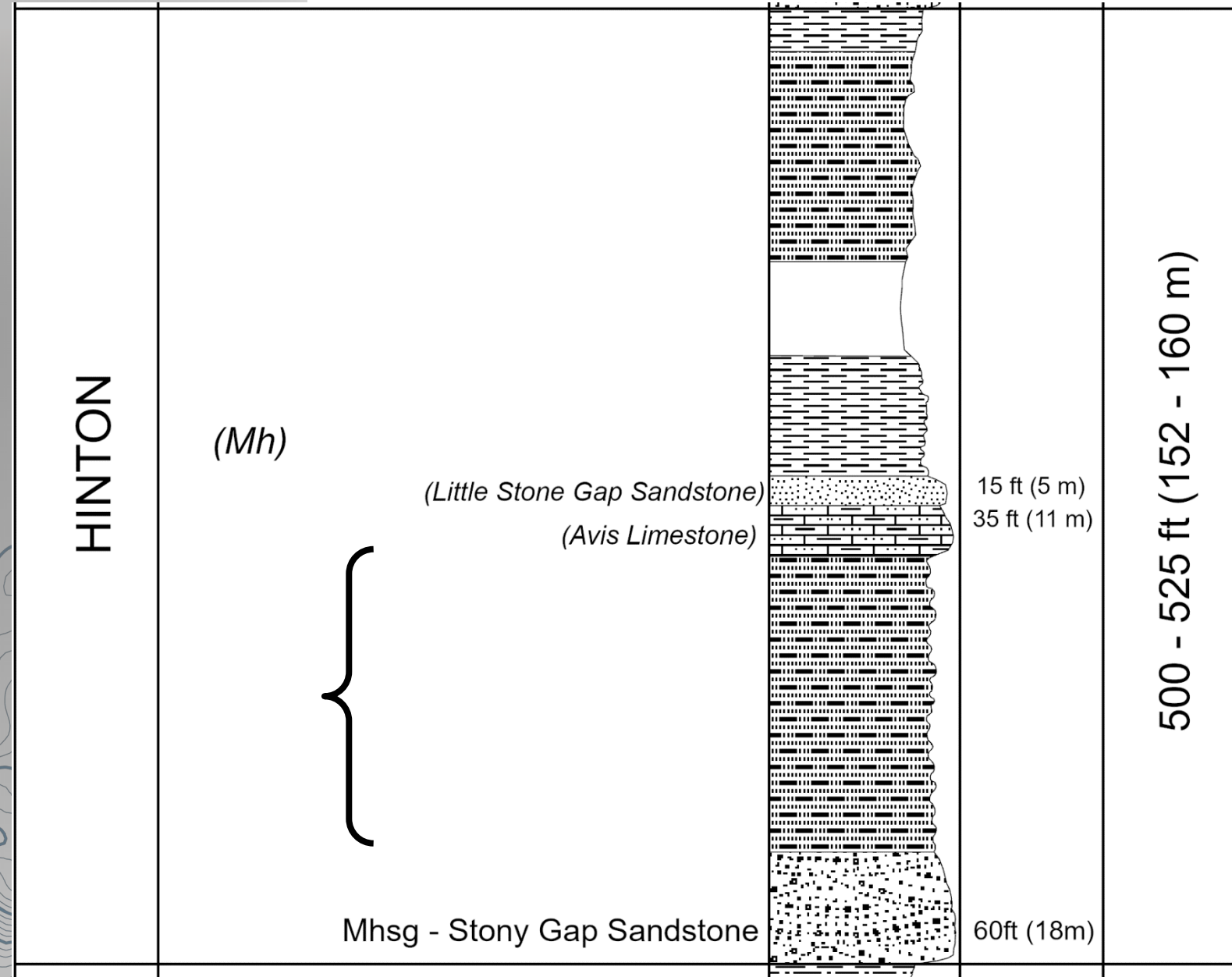
Hinton Formation

Includes basal **Stony Gap Sandstone** member and the Avis Limestone in the middle Hinton.

The Stony Gap Sandstone type section in Stony Gap village, Mercer County, WV



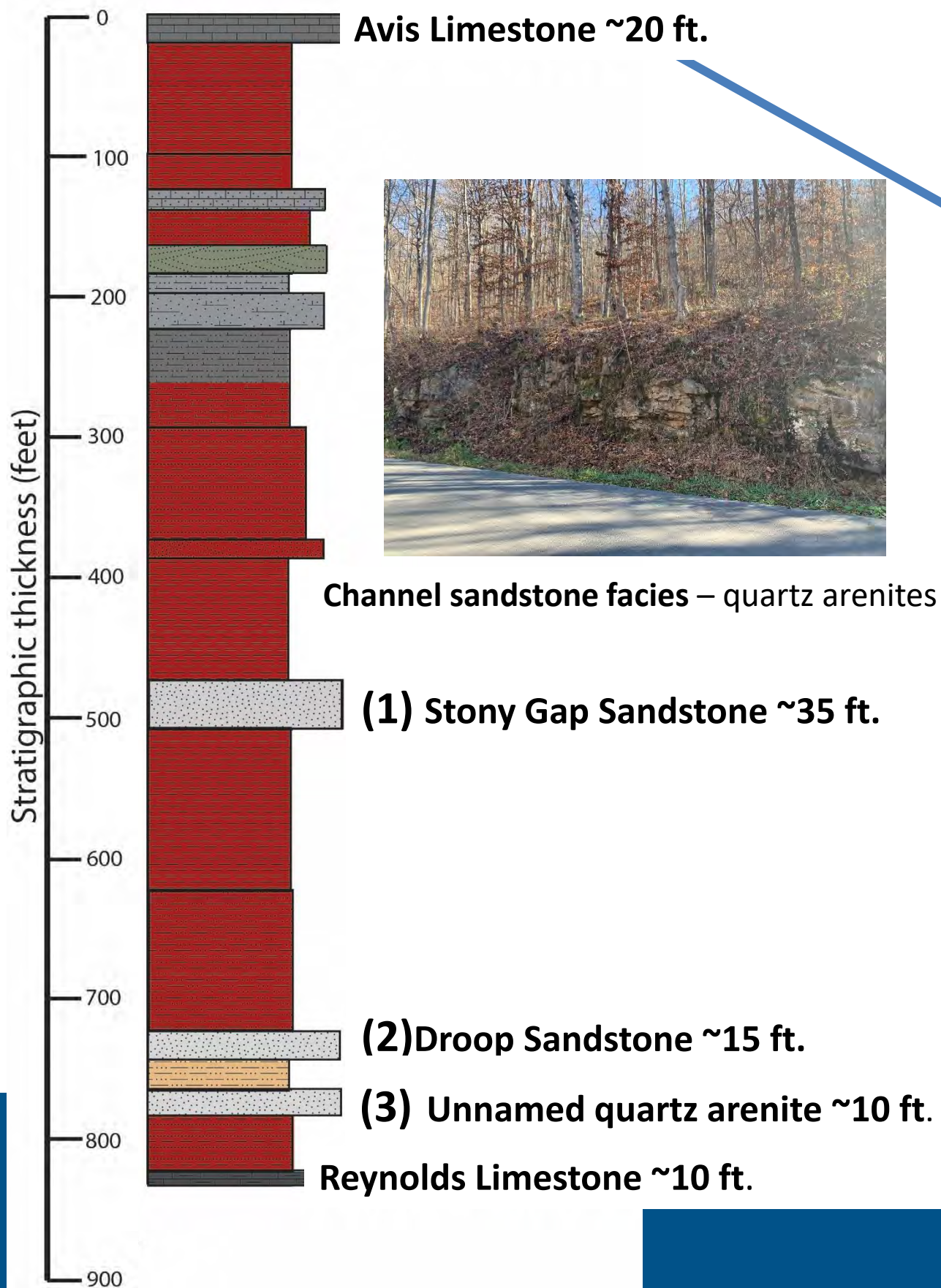
Red shale dominated interval between Stony Gap and overlying Avis Limestone. Contains occasional calcareous mudstones and thin-bedded micritic limestones



Stony Gap lithology:
Light gray to pure white, coarse-grained, massive, extremely hard and quartzitic sandstone.

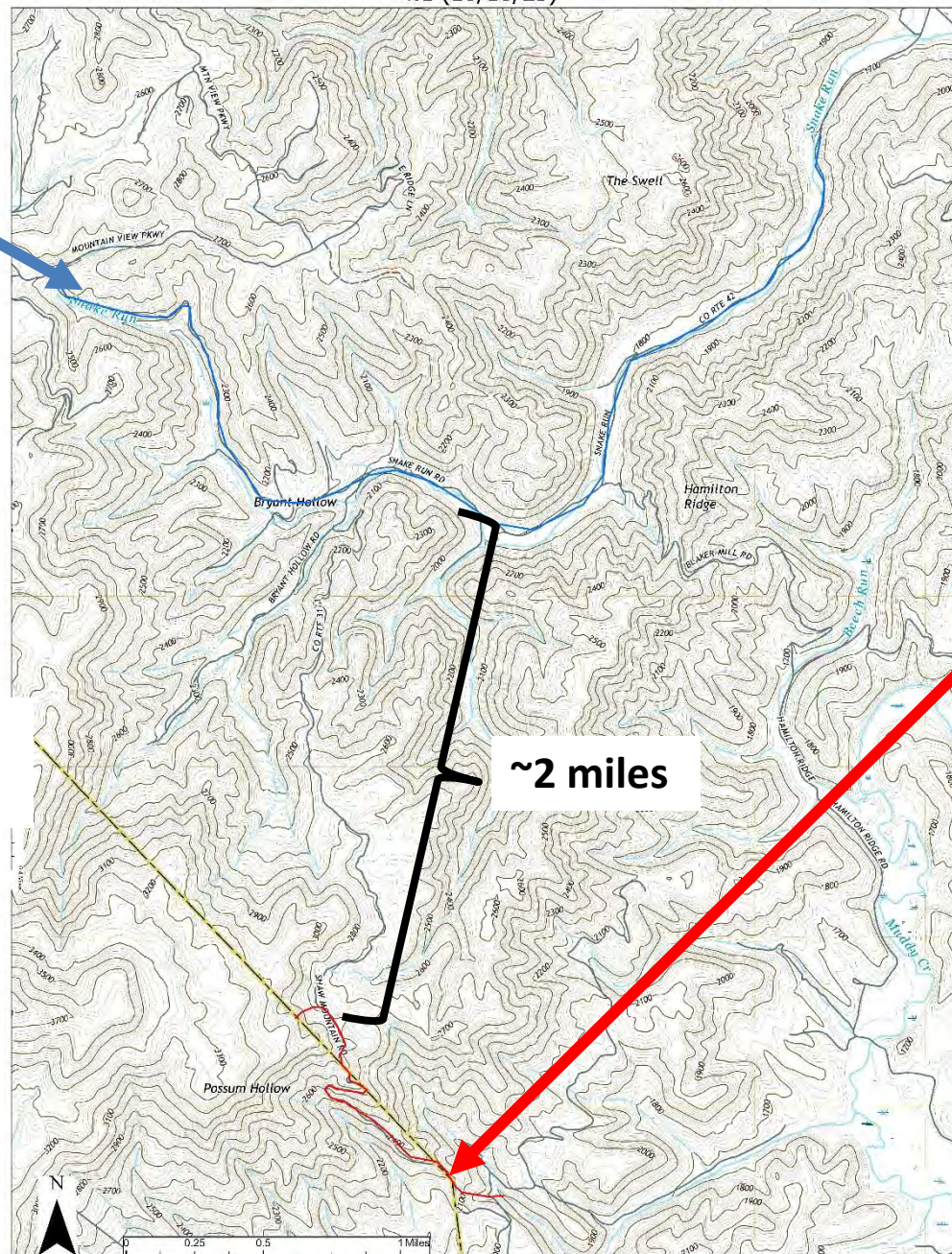
Facies and measured sections

Snake Run Road Section

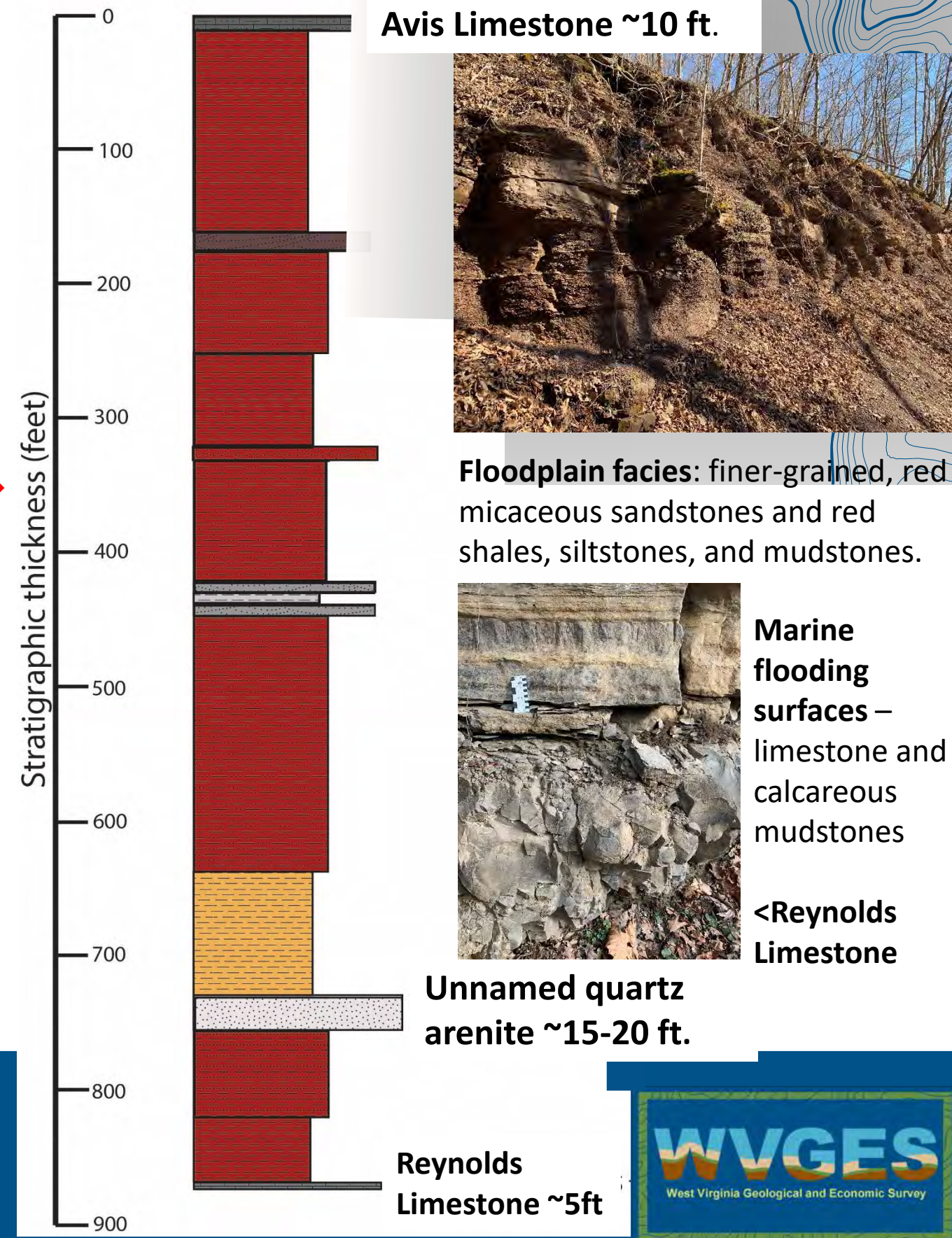


Stratigraphic transects on the Dawson Quadrangle, Greenbrier and Summers counties

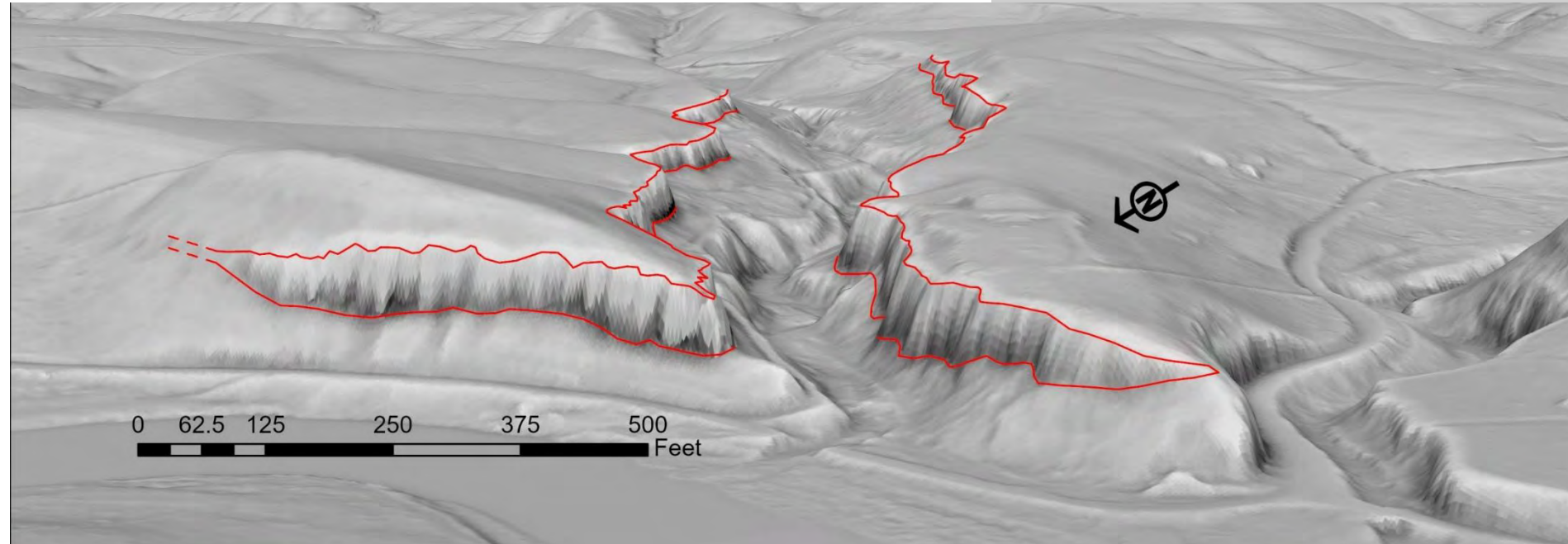
v.1 (10/10/23)



Possum Hollow Section



Evidence of discontinuity



LiDAR imagery of a channelized quartz arenite on the Forest Hill quadrangle in Mercer County. Note how the ridge tapers and pinches out



Roadcut along rte. 20 near the Bluestone Dam. Exposure shows floodplain deposits of the lower Hinton Formation. Note the channelized sandstone deposits, which occur as lenticular beds that pinch out.

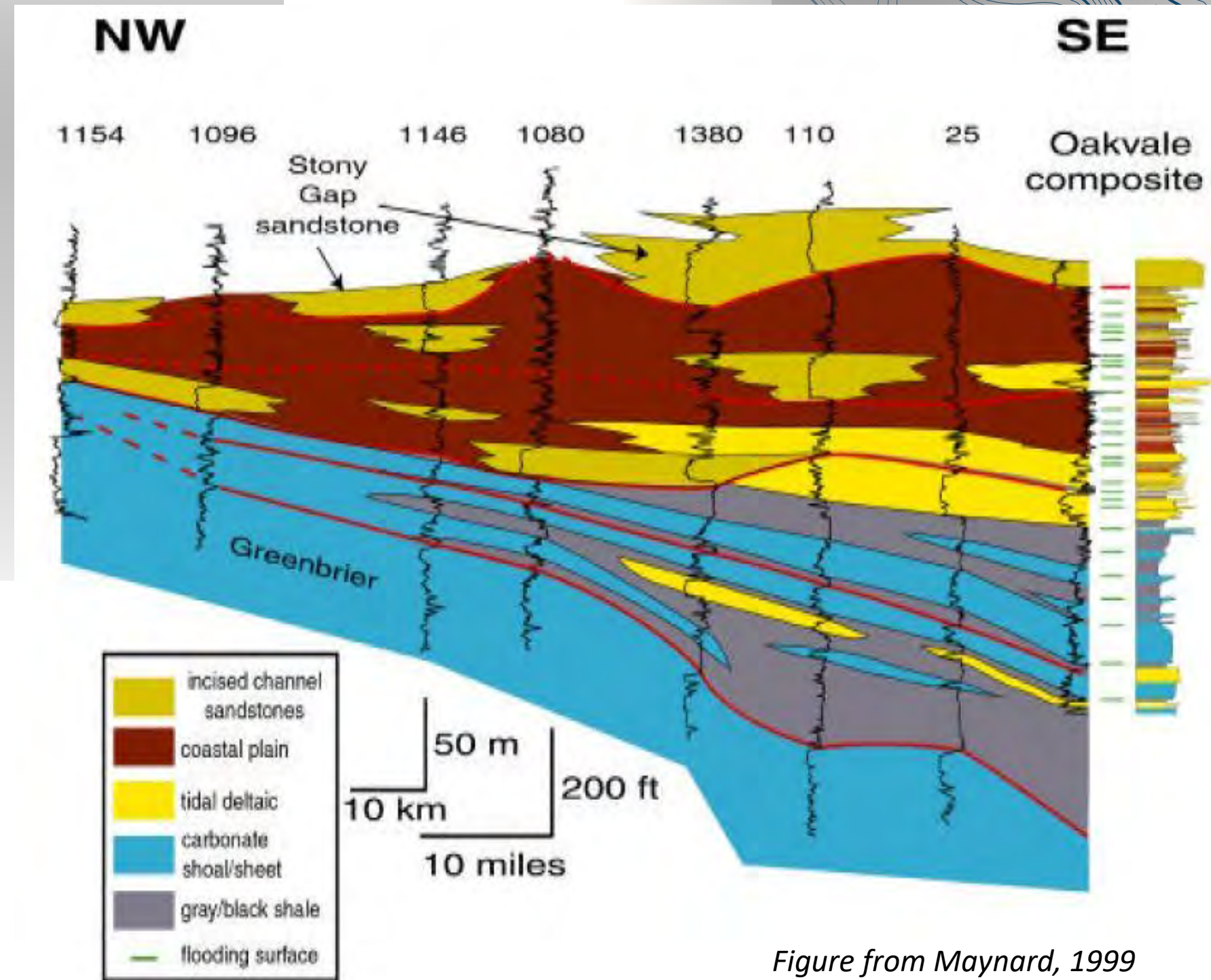


Figure from Maynard, 1999

Mis-map of the Stony Gap



Reasons for mis-mapping:

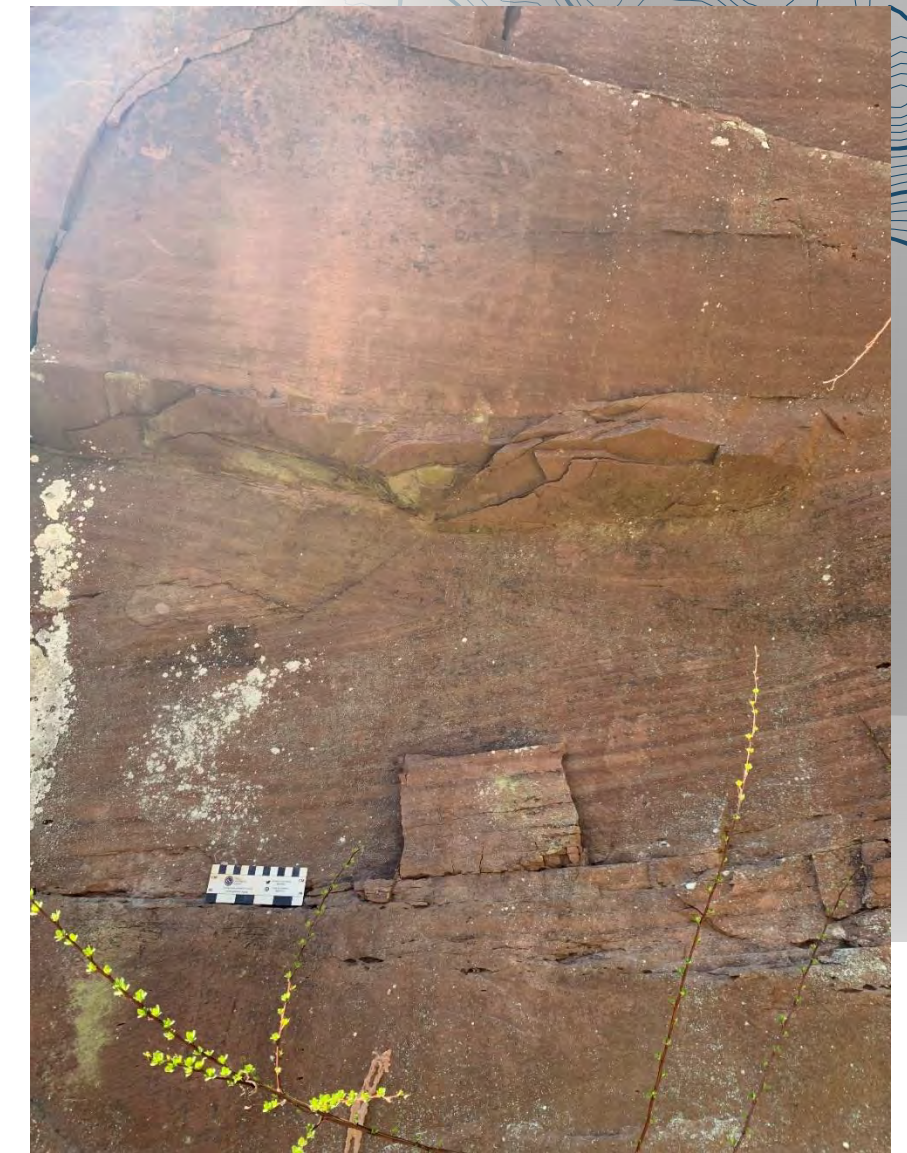
*Other quartz arenites in the lower Bluefield possibly mistaken for the Stony Gap Sandstone

*Non-quartz arenites mapped as Stony Gap to satisfy outdated layer-cake geology model

Unnamed quartz arenite observed in Greenbrier County



Red, laminated sandstone observed in Summers county



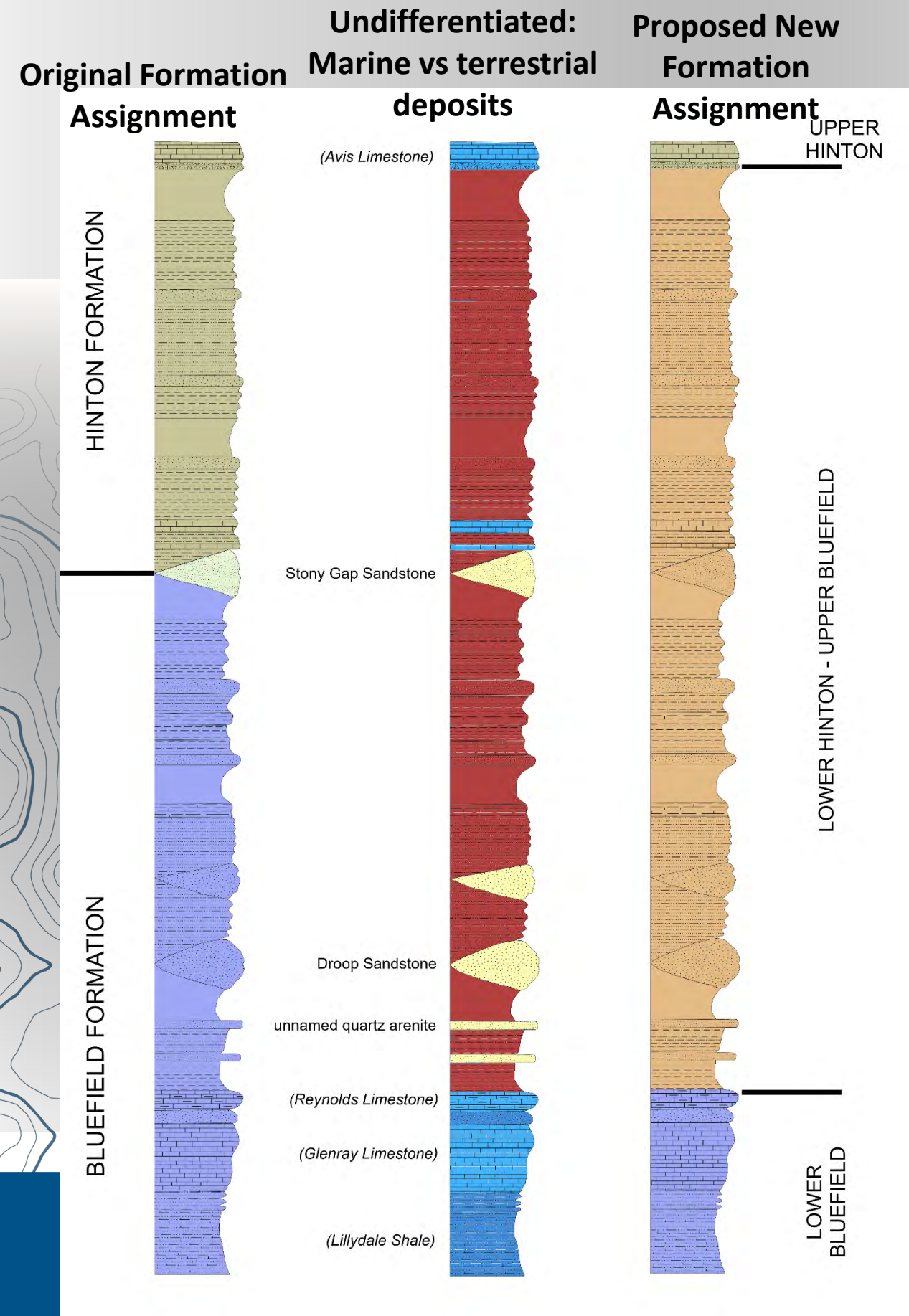
Briery Knob Section, Pocahontas County

Shale, red.....	200	978
Sandstone, Stony Gap, red and brown, cross-bedded, makes bold cliff, shaly at top.....	40	1018
Shale, red.....	174	1144

From Cold Knob measured section of the Greenbrier County Geological Report

Sandstone, reddish-brown, cross-bedded, medium-hard, Stony Gap (top 3115' B.).....	35	1265
Mauch Chunk Series—Bluefield Group (935')		
Shale, red, variegated, with argillaceous part to		

Solutions



*Breaking up formations based on reliable marine units:

The Avis and Reynolds Limestones

- Using 'Upper Hinton Formation' defined by Blake and Beuthin
- **New Mauch Chunk Unit Assignments for 2023 STATEMAP**

Bedrock mapping in Greenbrier, Summers, and Mercer Counties:

- * **lower Hinton and upper Bluefield formations, undifferentiated**
- * **lower Bluefield Formation**

Take aways

Avis Limestone in Summers county



Orthocone nautiloid fossil observed in Avis Limestone

Formation contacts should not be contingent on the presence of a channel sandstone, [in this case, the **Stony Gap Sandstone**] due to its laterally discontinuous nature.

Marine units are laterally extensive and therefore are more reliable for delineating contacts, opposed to sandstones.

Certain rock groups currently being mapped as they were originally defined should be re-examined and potentially formally re-defined in a way that acknowledges the advancement of geologic concepts and principles, since the rocks were first described.

Reynolds Limestone in Greenbrier county



Fossil lag in the Reynolds Limestone >



Thank You!

Geology Underlies it All



References

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