

Suggestions for Proposing Changes in Nomenclature in Papers Submitted to “Stratigraphic Notes”

By Nancy R. Stamm

Chapter B of
Stratigraphic Notes—Volume 1, 2022

Professional Paper 1879–1

**U.S. Department of the Interior
U.S. Geological Survey**

U.S. Geological Survey, Reston, Virginia: 2023

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Suggested citation:

Stamm, N.R., 2023, Suggestions for proposing changes in nomenclature in papers submitted to “Stratigraphic Notes,” chap. B of Orndorff, R.C., Stamm, N.R., and Soller, D.R., eds., *Stratigraphic notes—Volume 1*, 2022: U.S. Geological Survey Professional Paper 1879–1, 13 p., <https://doi.org/10.3133/pp1879v1>.

ISSN 2330-7102 (online)

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Abbreviations

BGN	U.S. Board on Geographic Names
GNC	U.S. Geological Survey Geologic Names Committee
lat	latitude
long	longitude
N.	north
NACSN	North American Commission on Stratigraphic Nomenclature
NAD83	North American Datum of 1983
R.	range
SE	southeast
sec.	section
SW	southwest
T.	township
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
W.	west
WGS84	World Geodetic System 1984

Chapter B

Suggestions for Proposing Changes in Nomenclature in Papers Submitted to “Stratigraphic Notes”

By Nancy R. Stamm

Introduction

The “Stratigraphic Notes” series is intended to be an outlet for publication of short papers on stratigraphy, changes in stratigraphic nomenclature, and explanation of stratigraphic names and concepts used on published geologic maps. This report provides authors with suggestions for the content and format of papers submitted to “Stratigraphic Notes” in which geologic names are proposed or their definitions and supporting information are modified. These suggestions are based on the guidance and rules found in the North American Stratigraphic Code (North American Commission on Stratigraphic Nomenclature [NACSN], 2021) and from experience compiling the U.S. Geologic Names Lexicon (Geolex, <https://ngmdb.usgs.gov/Geolex/>). It is with the hope that authors will find these suggestions useful when organizing and presenting their observations and interpretations in a succinct and straightforward fashion, appropriate to “Stratigraphic Notes” (see also, U.S. Geological Survey, 1982, 1984, 1985, 1987, 1991, 1994a, b, 1995).

Appendix 1 contains suggested topics and their section headings and subheadings for papers submitted to “Stratigraphic Notes” on new geologic names or changes to names. Within the body of this report, guidance on the content of these sections is provided; for reasons of clarity, suggestions that pertain to changes to formal geologic names are discussed separately from those for proposing new names. Note that, herein, the term “geologic name” is used interchangeably with “geologic unit” and refers to a three-dimensional body of earth material (rock or sediment), recognized by its lithologic content and its boundaries at the surface and (or) subsurface.

Proposing Changes to Formal Geologic Names

In this section, guidance is offered for designation of a reference section, locality, or area and a principal reference section, locality, or area, followed by guidance on the more demanding changes in nomenclature (age modification, redefinition, revision, abandonment, and reinstatement). Examples of the suggested figures to include in papers are given at the end of this report.

Designation of Reference (Section, Locality, or Area)

A reference (section, locality, or area)¹ may be designated for a formal geologic unit at any time. It is suggested for completeness and so that others may examine varying characteristics and (or) boundaries of a geologic unit that are not clearly evident at the type or principal reference (section, locality, or area). When designating a reference (section, locality, or area) for a formal geologic unit, please include the following information: (1) a description of its geographic location; (2) one or more measured stratigraphic sections (if not a lithodemic unit); (3) a lithologic description of the geologic unit; (4) the nature and placement of its boundaries; and (5) its thickness. The reference (section, locality, or area) should be precisely located and described. See the “Designation of Type (Section, Locality, or Area)” section below for details.

Suggested figures to include when designating a reference (section, locality, or area) are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing the geographic location of the reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (see [fig. 4](#)); and photographs.

Designation of Principal Reference (Section, Locality, or Area)

A principal reference (section, locality, or area) may be designated for formal geologic units that lack a type (section, locality, or area), notably for geologic names proposed in early reports, prior to the Committee on Stratigraphic Nomenclature’s (1933) rules for classification and nomenclature of rock units. A principal reference (section, locality, or area) also may be applied to formal geologic units for which the type has become inaccessible or has been destroyed. In some cases, principal reference sections have been designated because the original type section could not be located or reconstructed (see, for example, Gill and others, 1970, p. 24). When designating a principal reference (section, locality, or area) for a formal geologic

¹The terms “section, locality, or area” placed in parentheses indicate that either “section,” “locality,” or “area” may be chosen as type, reference, or principal reference (for example, “type section” or “reference area”).

unit, include the following information: (1) a description of its geographic location; (2) one or more measured stratigraphic sections (if not a lithodemic unit); (3) a lithologic description of the geologic unit; (4) the nature and placement of its boundaries; and (5) its thickness. The principal reference (section, locality, or area) should be precisely located and described. See the “Designation of Type (Section, Locality, or Area)” section below for details.

Suggested figures to include when designating a principal reference (section, locality, or area) are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing the geographic location of the principal reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (see [fig. 4](#)); and photographs.

Age Modification

When modifying the age of a geologic unit, indicate whether the age is changed regionally or locally, and provide the following information: (1) the reasons for divergence from ages reported by previous workers and (2) the evidence for the age change, which may be based on the following information:

- *Biostratigraphic determinations.*—If so, include (1) sample-locality information; (2) lithologic descriptions of samples; and (3) faunal and (or) floral lists.
- *Numerical age determinations.*—If so, include (1) interpretive statements about what the numerical age represents (such as cooling, exhumation, intrusion, metamorphism, or exposure); (2) descriptions of analytical techniques, calibration methods, recalculations based on new constants, and uncertainty estimates; (3) sample-locality information; (4) lithologic descriptions of samples; and (5) minerals or organic materials analyzed (for example, zircon, biotite, wood).

Sampling sites should be precisely located. Include geographic coordinates (for example, latitude [lat], longitude [long], Universal Transverse Mercator [UTM] projection); datum (for example, North American Datum of 1983 [NAD83] or World Geodetic System 1984 [WGS84]); Public Land Survey System location (section, township, range), if applicable; name and series (scale) of U.S. Geological Survey (USGS) topographic quadrangle; name of county, parish, and so forth; name of state, possession, or territory; and name of federal or state public land, if applicable.

Suggested figures to include when changing the age of a geologic unit are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing locations of samples collected; a measured section showing stratigraphic positions of samples collected (see [fig. 4](#)); and a correlation chart (see [fig. 5](#); note that chronostratigraphic terms [eonothem, erathem, system, series, and stage names] are used for correlations that are based on stratigraphic position, and geochronologic terms [eon, era, period, epoch, and age names] are used for correlations that are based on time).

Redefinition

A redefinition involves a change in the descriptive (lithic) term applied to a stratigraphic or lithodemic unit that does not require a new geographic term (NACSN, 2021). When redefining a geologic name, indicate whether the lithic term is changed regionally or locally. Include reasons for divergence from lithic designations of previous workers and a description of the geologic unit.

Suggested figures to include when changing the lithic term of a geologic name are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing the geographic location of the reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (if not a lithodemic unit) (see [fig. 4](#)); photographs; a correlation chart (see [fig. 5](#)); and a stratigraphic table (see [fig. 6](#)).

Revision

A revision of a formal geologic unit can involve a change to its upper and (or) lower boundaries; rank; formal subdivisions; and (or) assignment to a formal geologic unit of higher rank. When revising a formal geologic unit, indicate whether it is revised regionally or locally and include the following: (1) reasons for divergence from previous workers; (2) a reference (section, locality, or area); (3) one or more measured stratigraphic sections (if not a lithodemic unit); (4) a lithologic description of the geologic unit; (5) the nature and placement of its boundaries; and (6) its thickness. The reference (section, locality, or area) should be precisely located and described. See the “Designation of Type (Section, Locality, or Area)” section below for details.

Suggested figures to include when revising a geologic unit are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing the geographic location of the reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (if not a lithodemic unit) (see [fig. 4](#)); photographs; a correlation chart (see [fig. 5](#)); and a stratigraphic table (see [fig. 6](#)).

Abandonment

When abandoning a formal geologic unit, provide (1) a discussion of the reasons for abandonment, and (2) replacement name(s), which can be formal or informal, as the following example shows (from Epstein and others, 1995, p. 6):

“The original description of the Oranda Formation includes knobby limestone at its base with shale and siltstone, in part calcareous, above. Because of difficulties in recognizing the Oranda as a readily mappable lithologic unit, we are herein abandoning the name. The lower knobby-weathering limestones are assigned to the underlying Edinburg Formation. The overlying calcareous shale and siltstone and shaly limestone are included in the base of the lower member of the Martinsburg Formation, herein named the Stickley Run Member.”

Suggested figures to include when abandoning a geologic name are an index map showing the area of study (see [figs. 1, 2](#)) and a stratigraphic table (see [fig. 6](#)).

Reinstatement

The original definition of an abandoned name may be accepted or modified in the paper. When reinstating a formal geologic unit, include a discussion of (1) the reasons for reinstatement, and (2) treatment of geologic units supplanted. A supplanted unit might be described as geographically restricted, stratigraphically restricted (revised), abandoned, or not accepted (adopted) for use in the study area. If a supplanted name is not used in its type area, it cannot be used elsewhere in the paper.

Suggested figures to include when reinstating a geologic name are an index map showing the area of study (see [figs. 1, 2](#)); a topographic map showing the geographic location of the type (or principal reference) and reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (if not a lithodemic unit) (see [fig. 4](#)); photographs; a correlation chart (see [fig. 5](#)); and a stratigraphic table (see [fig. 6](#)).

Proposing New Formal Geologic Names

A number of requirements are necessary when proposing a new formal geologic unit. Of particular note are derivation of the name, designation of the type (section, locality, or area), and lithologic description and distinguishing features of the geologic unit.

Suggested figures to include when proposing a new formal geologic name are an index map showing area of study and, if possible, including the geographic feature from which the unit is named (see [figs. 1, 2](#)); a topographic map showing the geographic location of the type and reference (section, locality, or area) (see [fig. 3](#)); one or more measured stratigraphic sections (if not a lithodemic unit) (see [fig. 4](#)); photographs; a correlation chart (see [fig. 5](#)); and a stratigraphic table (see [fig. 6](#)).

Derivation of Name

The geographic feature from which a formal geologic name is taken must be at or near the place where the distinguishing characteristics of the geologic unit are best observed. The geographic feature should be officially recognized by the U.S. Board on Geographic Names (BGN) (<https://geonames.usgs.gov/>). The name of a geologic unit should be from a long-lasting geographic feature such as a river, lake, summit, ridge, valley, or incorporated municipality. Do not name a geologic unit after a person, borehole, quarry, or mine.

If a geologic unit is to be named in an area that lacks named geographic features, a new geographic name must first be proposed through and accepted by the BGN. Instructions

and application forms for proposing new geographic names are available at <https://www.usgs.gov/us-board-on-geographic-names/how-do-i>. These forms need to be completed at an early stage in the preparation of a paper.

Authors are responsible for avoiding duplication of names. An author planning to propose a new formal geologic unit should check Geolex (<https://ngmdb.usgs.gov/Geolex>) and associated U.S. Geological Survey Geologic Names Committee (GNC) records (notably, see “USGS Index Cards” at <https://ngmdb.usgs.gov/Geolex/stratres>) to determine that a geographic name has not been used for another previously named geologic unit in the United States. After confirming the availability of the name, the author should reserve the name with the GNC secretary (GNC@usgs.gov).

Designation of Type (Section, Locality, or Area)

The type (section, locality, or area) of a formal geologic unit is designated at the same time the unit is proposed. The type (section, locality, or area) must be at or near the geographic feature for which the geologic unit is named, and it should be precisely located and described.

Location

The location of the type (section, locality, or area) should include geographic coordinates (for example, latitude [lat], longitude [long], Universal Transverse Mercator [UTM] projection); datum (for example, North American Datum of 1983 [NAD83] or World Geodetic System 1984 [WGS84]); Public Land Survey System location (section, township, range), if applicable; name and series (scale) of USGS topographic quadrangle; name of county, parish, and so forth; name of state, possession, or territory; and name of federal or state public land, if applicable.

The location description should include enough detail so that another person could locate the type (section, locality, or area) in the field, as in the following (fictitious) example:

The type section is designated in an east cut bank of an unnamed tributary to the Illinois River, about 500 feet (150 meters) north of State Route 71 (Hiawatha Pioneer Trail) near the western edge of Starved Rock State Park, about 1.5 miles (2.4 kilometers) southeast of the confluence of the Vermilion and Illinois Rivers, and about 1.5 miles (2.4 kilometers) northeast of the city of Oglesby, in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T. 33 N., R. 2 W., lat 41°18'37" N., long 89°02'14" W., NAD83, La Salle 7.5' USGS quadrangle, LaSalle County, northern Illinois.

Unit Description and Distinguishing Features

A formal geologic unit should be described “so clearly that any subsequent investigator can recognize that unit unequivocally” (NACSN, 2021, see Article 9, p. 170). Characteristics of the rocks or sediments may include

lithology (dominant and subordinate), color (fresh and weathered), degree of induration, grain size and shape, mineralogy, bedding characteristics, thickness, nature and placement of boundaries, biologic remains, geochemistry, geophysical properties (including magnetic signatures), geomorphic expression, and structural orientations. Characteristics that differentiate a geologic unit from other units should be discussed.

Important Topics to Discuss when Proposing Changes in Nomenclature

Whether proposing changes to existing nomenclature or introducing new geologic names, the following items are considered important topics to discuss in your submitted paper.

Historical Background of Previous Usage

Please include a discussion on the historical background of previous studies and nomenclature used, especially if the proposed change (for example, naming or revising a geologic unit) partly or wholly replaces an existing formal or informal geologic unit. Include information on the derivation of the name and the type or principal reference (section, locality, or area) from the original and (or) principal publication.

Suggested figures to include when discussing previous nomenclature of a geologic unit are an index map showing the area of study (see [figs. 1, 2](#)) and a stratigraphic table (see [fig. 6](#)).

Boundaries

The nature and placement of the upper and lower boundaries of a geologic unit should be discussed. Suggested figures to include when discussing the boundaries of a geologic unit are an index map showing the area of study (see [figs. 1, 2](#)) and photographs.

Geographic Extent and Thickness

The geographic extent and lateral variations of a geologic unit should be discussed. If known, the maximum, minimum, and (or) average thickness of a geologic unit also should be discussed.

Suggested figures to include when discussing the geographic extent and thickness of a geologic unit are an index map showing the area of study (see [figs. 1, 2](#)); one or more measured stratigraphic sections (if not a lithodemic unit) (see [fig. 4](#)); and a correlation chart (see [fig. 5](#)).

Age and Correlation

If known, the geologic age of a unit, as well as correlations with other units within or near the study area, should be discussed. Include evidence such as biostratigraphic and numerical age determinations. If the age is being modified in the paper, please refer to the “Age Modification” section above. Inclusion of a correlation chart (see [fig. 5](#)) is suggested when discussing the age and correlation of a geologic unit. Chronostratigraphic terms (eonothem, erathem, system, series, and stage names) are used for correlations that are based on stratigraphic position, and geochronologic terms (eon, era, period, epoch, and age names) are used for correlations that are based on time.

Inferred Geologic History

The inferred geologic history of a geologic unit should be supported by evidence (for example, field observations, laboratory results) given in the paper.

Acknowledgments

I sincerely thank Gregory J. Walsh, Robert E. Powell, Robert G. Stamm, Taryn A. Lindquist, David R. Soller, Randall C. Orndorff, and Jenna L. Shelton (all U.S. Geological Survey) for their encouragement, insight, and thorough reviews.

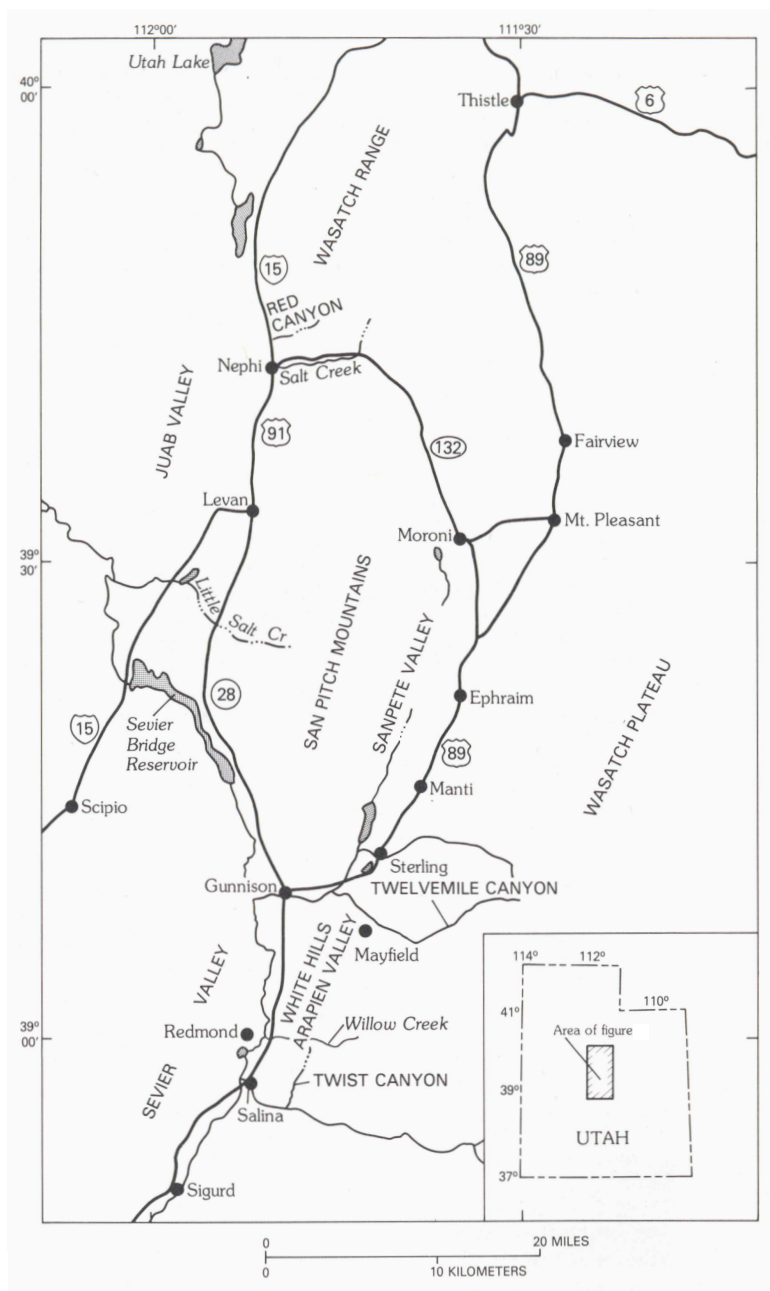


Figure 1. Example of index map showing area of study (entire figure) and locations of geographic features. Modified from Witkind and Hardy (1984, their fig. 1).

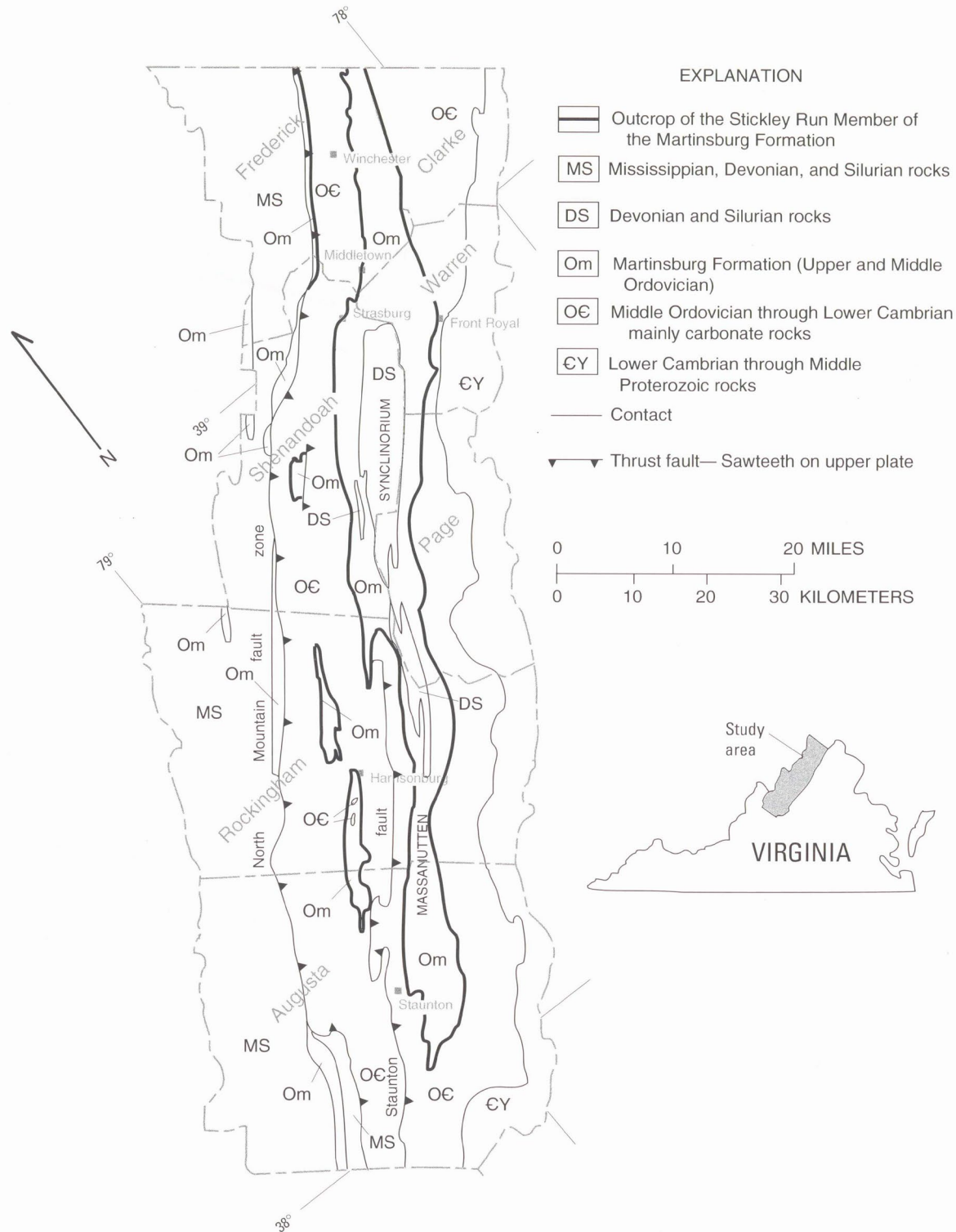


Figure 2. Example of generalized geologic map showing area of study and lines of outcrop of unit (in this case, the Stickley Run Member of the Martinsburg Formation). Modified from Epstein and others (1995, part of their fig. 1).

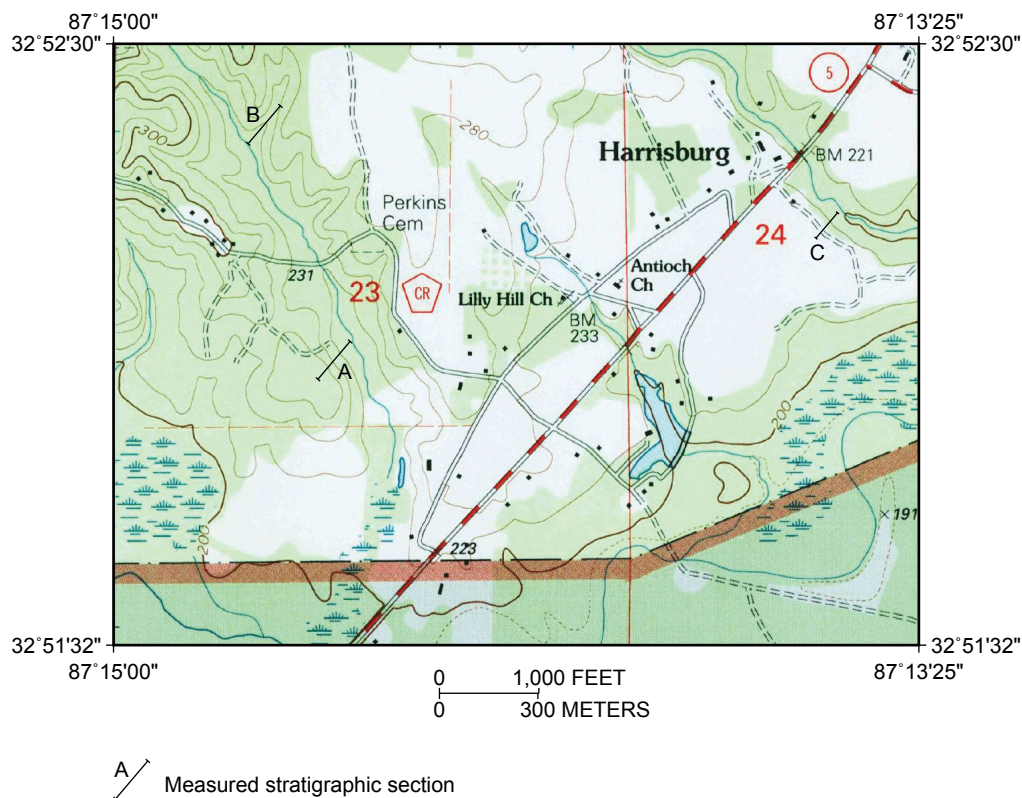


Figure 3. Example of part of U.S. Geological Survey (USGS) topographic map (in this case, northwest corner of Harrisburg, Alabama, 7.5' quadrangle, 2002) showing geographic locations of (fictitious) type (A) and reference (B, C) measured stratigraphic sections. High-resolution GeoTiff of topographic map downloaded from USGS topoView (<https://ngmdb.usgs.gov/topoview>), cropped, and saved as 300-dots-per-inch image file using Adobe Photoshop.

Table 1. Type section of part of the Stickley Run Member of the Martinsburg Formation, along a roadcut on the southeast side of the northbound lane of U.S. Highway 11, immediately east of Cedar Creek, about 2.5 mi (4 km) southwest of Middletown, Va., at lat 39°00'57" N., long 78°18'52" W. (locality a in fig. 3).

[Rock-color terms from Goddard and others (1948). Measurements were made in feet]

Martinsburg Formation (part):		Martinsburg Formation (part)—Continued	
Stickley Run Member (part):		Stickley Run Member (part)—Continued	
	Thickness Feet Meters		Thickness Feet Meters
16. Limestone, thin-bedded and laminated, and calcareous shale; medium-dark-gray (N 4) limestone beds as much as 9 in. (23 cm) thick. Covered above to Cedar Creek	28.0 8.5	5. Shaly limestone, medium-dark-gray (N 4), medium-olive-gray (5Y 5/1)-weathering, very fine grained, containing graptolites; stands out in relief. Abrupt lower contact. Not fissile like underlying shales	0.3 0.1
15. Shaly limestone, laminated to thin-bedded (<0.5–3 in. (1–8 cm) thick), medium-dark-gray (N 4), medium-olive-gray (5Y 5/1)-weathering, very fine grained, interbedded with grayish-black (N 3) calcareous shale	21.0 6.4	4. Calcareous shale, platy to laminated, grayish-black (N 3), and minor laminae of dark-gray (N 3), medium-dark-gray (N 4)-weathering, shaly limestone, which stand out in slight relief. Partly covered near base; may include thin metabentonite. Lower contact with Edinburg Formation is abrupt	<u>13.5</u> <u>4.1</u>
14. Limestone, thin-bedded and laminated, medium-dark-gray (N 4), and calcareous shale	4.6 1.4	Incomplete thickness of Stickley Run Member	139.7 42.6
13. Same as unit 15	10.3 3.1	Edinburg Formation:	
12. Limestone, thin-bedded and laminated, medium-dark-gray (N 4), and calcareous shale; limestone beds as much as 6 in. (15 cm) thick and making up about 30 percent of the unit	7.3 2.2	3. Limestone, medium-dark-gray (N 4), medium-gray (N 5)- to light-olive-gray (5Y 6/1)-weathering, very fine grained, poorly bedded	1.5 0.5
11. Same as unit 15. Some of the limestone beds as much as 6 in. (15 cm) thick	20.8 6.3	2. Limestone, dark-gray (N 3), medium-dark-gray (N 4)-weathering, knobby (nodules average about 4 in. (10 cm) long), very fine grained, interbedded with dark-gray (N 3) to medium-dark-gray (N 4), medium-gray (N 5)-weathering, calcareous silty shale	6.0 1.8
10. Shaly limestone, laminated, medium-dark-gray (N 4)	4.0 1.2	1. Limestone, dark-gray (N 3), medium-dark-gray (N 4)-weathering, very fine to fine-grained, medium- to thick-bedded, unevenly bedded, fossiliferous	<u>51.0</u> <u>15.5</u>
9. Same as unit 15	17.3 5.3	Incomplete thickness of Edinburg Formation ...	58.5 17.8
8. Metabentonite, moderate-yellowish-brown (10YR 5/4)-weathering, sheared, interlayered with calcite slickenside	0.2 0.06		
7. Calcareous silty limestone, medium-dark-gray (N 4), medium-olive-gray (5Y 5/1)-weathering, that stands out in relief	1.1 0.3		
6. Shaly limestone, laminated to thin-bedded (<0.5–3 in. (1–8 cm) thick), medium-dark-gray (N 4), medium-olive-gray (5Y 5/1)-weathering, very fine grained, composing about 8 percent of unit and interbedded with grayish-black (N 3) calcareous shale in graded and upward-fining cycles 1–6 in. (2–15 cm) thick (fig. 5). Base of each cycle abrupt	11.3 3.4		

Figure 4. Example showing measured section of unit (in this case, type section of the Stickley Run Member of the Martinsburg Formation), located near Middletown, Virginia. From Epstein and others (1995, their table 1). Note that “table 1” refers to table in Epstein and others (1995); note also that table title contains important locality information and that “fig. 3” in table headnote and “fig. 5” in bed no. 6 refer to figures in Epstein and others (1995). Rock-color terms (for example, N4, 5Y5/1) are from Goddard and others (1948). Other abbreviations: cm, centimeter; in., inch; km, kilometer; lat, latitude; long, longitude; mi, mile; N., north; Va., Virginia; W., west.

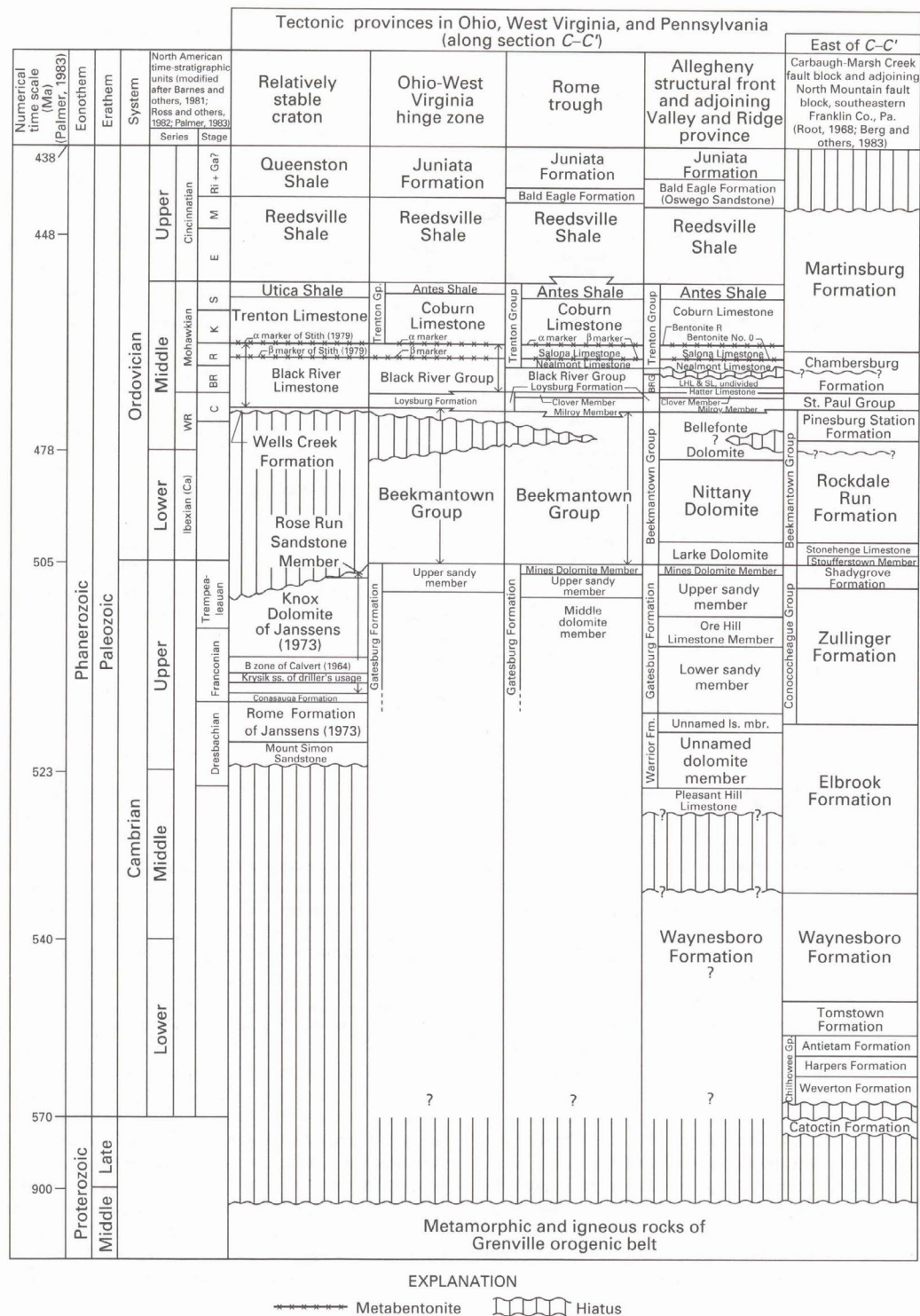


Figure 5. Example of correlation chart showing stratigraphic relations among units (in this case, Proterozoic and lower Paleozoic rocks in subsurface of parts of Ohio, West Virginia, and Pennsylvania). From Ryder and others (1992, their fig. 2). North American series- and stage-name abbreviations: BR, Blackriveran; C, Chazyan; Ca, Canadian; E, Edenian; Ga, Gamachian; K, Kirkfieldian; M, Maysvillian; R, Rocklandian; Ri, Richmondian; S, Shermanian; WR, Whiterockian. Group- and formation-name abbreviations: BRG, Black River Group; LHL, Linden Hall Limestone; SL, Snyder Limestone. Other abbreviations: Co., County; Fm., Formation; Gp., Group; Is., limestone; Ma, mega-annum (or millions of years before present [A.D. 1950]); mbr., member; No., number; Pa., Pennsylvania; ss., sandstone. Note that chronostratigraphic terms (eonothem, erathem, system, series, and stage names) are used for correlations that are based on stratigraphic position, and geochronologic terms (eon, era, period, epoch, and age names) are used for correlations that are based on time.

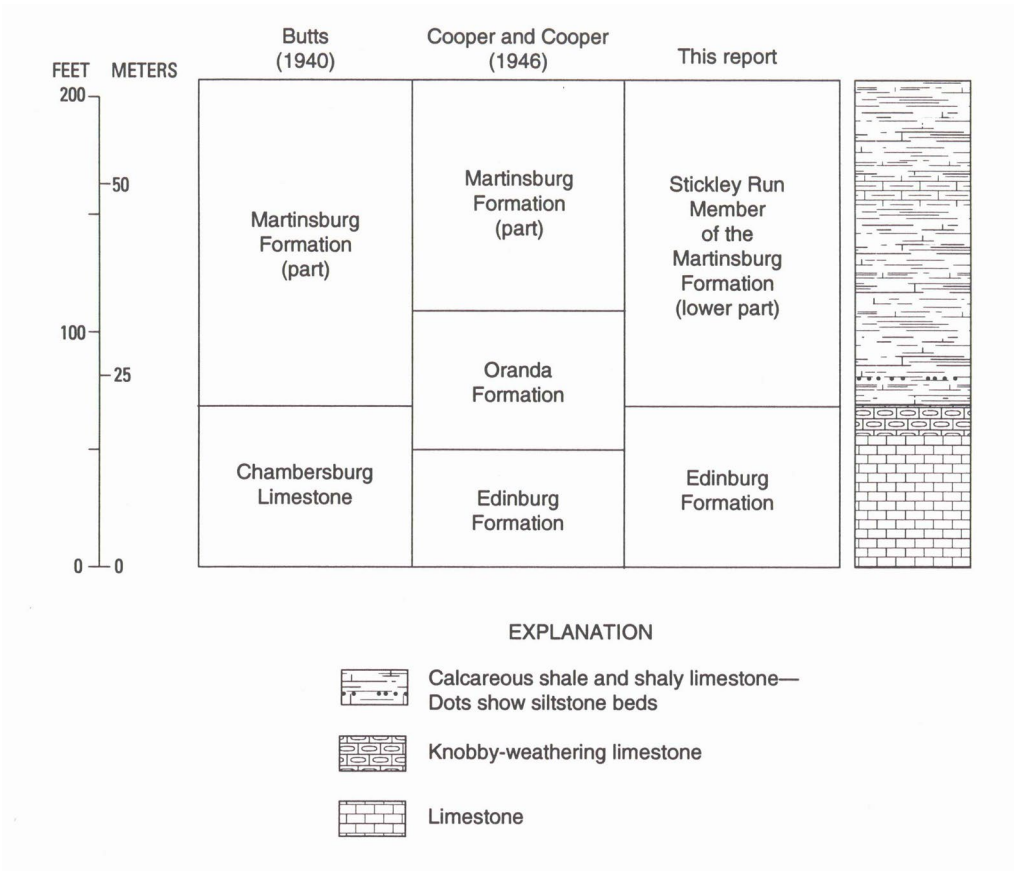


Figure 6. Example of stratigraphic table showing history of nomenclature in study area (in this case, located in northern Shenandoah Valley, Virginia). From Epstein and others (1995, their fig. 2; referred to as “this report” in figure). Graphic columnar section illustrates placement of lower boundary of unit (in this case, the Stickley Run Member of the Martinsburg Formation).

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[Note that titles and authorship for some U.S. Geological Survey’s “Stratigraphic Notes” reports may have been simplified for clarity and ease of use]

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Chapter B, Appendix 1. Suggested Format for Proposing New Formal Geologic Names or Changes to Existing Names in Papers Submitted to “Stratigraphic Notes”

In the introduction section of the paper, provide a brief description of the study area and geologic setting and a summary of the proposed changes to the geologic nomenclature. In the body text, discuss the geology of an area chronologically—the oldest unit first and the youngest last. However, when describing areas in which geologic information is based largely on subsurface records such as groundwater aquifers or oil fields, it may be advantageous to discuss the stratigraphy from youngest to oldest (top to bottom). The following organization is recommended for each instance of a new or modified geologic unit.

[Geologic Name] (Named)

Place the geologic name in the heading, followed by “Named” in parentheses—for example, “Hoopers Island Formation (Named).” Include an introductory paragraph stating the reasons for proposing the new formal geologic name. For clarity, the designation of category (for example, lithostratigraphic, lithodemic) must be stated. The subheadings listed below are topics to be discussed when defining new formal geologic names:

- Historical Background
- Derivation of Name
- Type (Section, Locality, or Area)²
- Reference (Section, Locality, or Area) [optional]
- Unit Description and Distinguishing Features

²The terms “section, locality, or area” placed in parentheses indicate that either “section,” “locality,” or “area” may be chosen as type, reference, or principal reference (for example, “type section” or “reference area”).

- Boundaries
- Geographic Extent and Thickness [indicate if thickness is unknown]
- Age and Correlation [indicate if age is unknown]
- Inferred Geologic History [optional]

[Geologic Name] ([Type of Modification])

Place the geologic name in the heading, followed by the type of modification in parentheses—for example, “Dakota Sandstone (Revised).” Suggested terms to indicate the type of modification are “Abandoned,” “Age Modified,” “Redefined,” “Revised,” and “Reinstated.” Include an introductory paragraph stating the reasons for modifying the formal geologic name. Indicate whether the change in nomenclature is regional or local. The subheadings listed below are topics to be discussed when modifying formal geologic units:

- Historical Background
- Principal Reference (Section, Locality, or Area) [include if designated herein]
- Reference (Section, Locality, or Area) [optional]
- Unit Description and Distinguishing Features
- Boundaries
- Geographic Extent and Thickness [indicate if thickness is unknown]
- Age and Correlation [indicate if age is unknown]
- Inferred Geologic History [optional]