Regional Lithic Sourcing Database Code Book
by
Linda Stephen Neff

All the data domains (Identification, Description, Characterization, Sourcing, Collection and Documentation, and Laboratory Tracking System) will be contained in one database *table*. Each record in the data base will be a different sample number or sample number subscript. The **bolded** variables in parentheses will be the *fields* for the database and the *marked* values will be in lookup tables as entry choices for each *field*. Once a record or group of *records* has been selected through the *querying* process, each *record* can be printed as a composite *report* with all the information regarding the selected material types.

1. Identification: The assignment of lithic material as to material type and/or its geologic formation based on description and/or characterization (reprinted in Church 1994 from Ives 1985). The following definitions are quoted from the respective sources.

Sample Number (NO) - The number of the sample batch in the laboratory catalogue system. All items within a source sample batch have this number marked on the surface.

Sample Subscript (SUB) - If a sample contains more than one rock type (chert, quartzites, etc.) then a subscript will be added to the sample number (i.e., Sample 47 may contain 47a, 47b, 47c, etc.). To track each specific rock type, an individual record will be entered in the database for each rock type (separate subscript).

Identification 1 (ID1) - The primary descriptive term for the rock type. This first identification is the most general material type name representing a specific material type term or simply an alternate term. More than one name might be used for the sample.

Identification 2 (ID2) - The secondary descriptive term for the rock type. This second identification is either a more specific, alternate term or a commonly used name for the material type. If only one rock type name clearly applies (e.g., obsidian) the same name is entered for ID1 and ID2.

> *Chert* - A hard, extremely dense or compact, dull to semi-vitreous, cryptocrystalline to microcrystalline sedimentary rock, consisting dominantly of cryptocrystalline silica with lesser amounts of micro- or cryptocrystalline quartz and amorphous silica (opal)(Banks 1990:150). It is typically opaque to slightly or moderately translucent. The color is highly variable. Some researchers confine chert to the lighter colors and flint to the darker colors.
> *Chalcedony* - A cryptocrystalline (very fine-grained) variety of chert. It is commonly microscopically fibrous, and is distinguishable from other cherts by its medium to high translucency. It has a nearly wax-like luster, a uniform tint, and a white, pale blue, gray, brown or black color. Chalcedony is often a component of other cherts and frequently occurs as an aqueous deposit filling or lining cavities in rocks.
> *Jasper* - A dense, micro- to cryptocrystalline, opaque variety of chert with a massive structure associated with iron-oxide impurities that give the rock various colors,

characteristically red or yellow. Some varieties may be green, grayish-blue, brown or black.

Silicified Wood - A form of chert where cryptocrystalline quartz replaced the wooden organic material in the process of fossilization. It can be opaque to highly translucent and is highly variable in color. Tend to see the wood structure on the surface (Hamblin and Howard 1980:13).

Opal - A mineral (or mineral gel): $SiO_2.nH_2O$. It is an amorphous (colloidal) form of silica containing a varying proportion of water (as much as 20% but usually 3-9%) and occurring in nearly all colors. Opal is translucent to nearly opaque, and typically exhibits a definite and often marked iridescent play of color. It differs from quartz in being softer and less dense (Banks 1990:153-154). It is also distinguished from other varieties of cryptocrystalline quartz by its highly waxy luster and irridescent color.

Agate - Translucent, cryptocrystalline variety of chert. Variegated chalcedony frequently mixed or alternating with opal, and characterized by colors arranged in alternating stripes or bands, in irregular clouds, or in moss-like forms. Occurs in all colors and commonly occupies vugs in volcanic rocks and cavities in some other rocks (Banks 1990:149).

Orthoquartzite - A sandstone converted to a quartzite with interlocking grains 'cemented only through infiltration and pressure' as opposed to metaquartzite, a quartzite originating mainly through contact metamorphism (reprinted in Church 1994:11; from Tieje 1921:655). Typically, the individual sand grains are predominantly quartz, are highly uniform in size and are visible as a sugary or sparkly surface without magnification or with low power magnification.

Metaquartzite - A quartose rock that breaks across instead of between grains. It is formed by metamorphic recrystallization, as distinguished from an orthoquartzite, whose crystalline nature is of sedimentary origin (Banks 1990:155). Typically, this is a metamorphosed sandstone, altered to the point that the individual sand grains are not visible. The stone tends to be very hard and tough usually with a subconchoidal fracture. Fracture surfaces are typically not smooth or planar but exhibit many small rip and tear features nearly parallel to the fracture surface.

Novaculite - A very dense and hard, even-textured, micro- to cryptocrystalline, siliceous sedimentary rock characterized by dominance of microcrystalline quartz over chalcedony and by accessory minerals such as feldspar and garnet. It was formerly supposed to be consolidated siliceous slime, but it is now considered to be a result of primary deposition of silica under geosynclinal conditions. Folk (1965), McBride and Thompson (1970) and Sholes (1978) include novaculite as a variety of chert. Novaculite was first considered to be light colored and primarily white, but it now is known to include red, brown, and even black colors in addition to lighter colors of white, gray, yellow, pink and green. Sholes (1978) has been able to distinguish aphanic cherts from novaculite in the formation solely on the basis of a coarser texture in the novaculite (Banks 1990:153).

Porcellanite - An indurated or baked clay or shale with an opaque dull, light-colored, cherty appearance (Banks 1990:154). It is softer and less resistant to weathering than chert, often having a more porous, earthy appearance. The artifact surface can weather to a very porous rind. Small gas bubbles can be visible under magnification. Porcellanite can grade into a non-volcanic glass formed under similar conditions. This stone forms in burning coal seams. It is the end result of shale and clay sediments undergoing metamorphism. It is a hard, dense, siliceous rock having the texture, dull luster,

hardness, fracture and general appearance of unglazed porcellain. It is less hard, dense and vitreous than chert. It occurs in shades of gray or red, depending on the heat intensity and degree of oxidation during the baking process. However, yellow, black, banded yellow and black forms exist as well. Luster ranges from vitreous to non-vitreous depending on the heat intensity. Red porcellanite with a vitreous, waxy look is often mistaken as jasper. This form also is mistaken as a product of heat treatment (Fredlund 1976).

Nonvolcanic Glass (Fused Glass) - This stone also forms in burning coal seams. However, fused glass requires extremely intense heat and metamorphism to form, therefore it is rare. It is formed along the burning coal fissures or vents leading to the surface of the vent. Shale metamorphoses into a translucent natural glass. It resembles obsidian in its glassy nature and in spots is highly vesicular. To distinguish it from obsidian, numerous, very small, internal gas bubbles exist. Color ranges from black, green, red, yellow, and gray with black and green as the most common (Fredlund 1976).

Silcrete - Same as *silicified sediment*. This is a silicified soil or other terrestrial near surface (or surface) sediment unit. The grain size is predominantly in the silt size range with possibly some clay or fine sand. It is thought to represent a lithified surface or near surface horizon (paleosol) fused together by the addition of silica (possibly from volcanic ash fall origin). Typically, the stone is light in color, dull, earthy, very tough and has a subconchoidal fracture. Plant root stems or molds are frequently observed. Coarser grained varieties with a uniform fine grain size may take on a sparkly appearance (especially with low magnification). Finer grained forms has the appearance of chert. It occurs in a variety of colors such as, white, light gray, light brown, orange brown and less often in a dark brown, lilac, cream and various shades of red. A fresh break displays a sugary appearance because the quartz fractures through the grains and the opal and chalcedony cement (Porter 1961; 1962).

Limestone - A sedimentary rock consisting primarily of calcium carbonate that precipitated from the sea or lakes forming a texture of interlocking crystals. The texture can be coarse, crystalline, and equigranular. Often the microcrystalline material is banded due to variations in conditions during deposition (Hamblin and Howard 1980:39).

Conglomerate - A coarse-grained, clastic sedimentary rock composed of rounded to subangular fragments larger than 2 mm in diameter (granules, pebbles, cobbles, and boulders) set in a fine-grained matrix of sand, silt, or any of the common natural cementing materials (such as calcium carbonate, iron oxide, silica, or hardened clay. The rock or mineral fragments may be of varied composition and range widely in size, and are usually rounded and smoothed from transportation by water or from wave action (Banks 1990:150).

Siltstone - Same as *mudstone*. A fine-grained clastic rock in which at least 50 percent of the material is 1/16 to 1/256 mm in diameter. They are commonly laminated but burrowing organisms may destroy or obscure evidences of stratification. Silt particles, when viewed under the microscope, appear to be angular rather than rounded like sand. They are composed of quartz grains, with an abundance of mica and clay minerals (Hamblin and Howard 1980:43). Siltstone are much softer and less durable than chert.

Claystone - An indurated clay of the texture and composition, but lacking the fine lamination, or fissility, of shale (Banks 1990:150). Some claystones are much softer and less durable than chert.

Argillite - A metamorphosed claystone formed in a situation of contact metamorphism. It is typically dull and earthy, resembling chert but is softer and less durable. It closely resembles porcellanite but differs in its mechanism of origin.
Soapstone - A metamorphic rock of massive, schistose, or interlaced fibrous texture, and soft, greasy feel, composed essentially of talc with varying amounts of micas, chlorite, amphibole, pyroxenes, etc. and derived from the alteration of ferromagnesian silicate minerals (Banks 1990:156).
Hornfels - An opaque, dull gray to black, fine-grained to aphanic stone with a dull to medium luster. Without magnification it appears to be a chert or extremely fine-grained basalt. Upon magnification, phenocrysts are apparent. Specimens are usually massive, but occasionally exhibit seams or relict bedding planes. This material is thought to represent siltstone, claystone, and perhaps limestone altered by contact metamorphism adjacent to basalt sills that intrude into sedimentary rocks in the region. In many samples, the cortex may appear stream worn.

Rhyolite - A microcrystalline extrusive equivalent of a granite formed at or near the surface. It is characteristically white, gray, or pink and nearly always contains a few phenocrysts of feldspar and quartz (2 to 10%). The texture is aphanitic, the only minerals that can be identified in a rhyolite hand specimen are those occurring as phenocrysts (Hamblin and Howard 1980: 27).
Andesite - A dark colored, fine-grained extrusive rock. When porphyritic it contains phenocrysts mostly of zoned acid plagioclase and one or more of the mafic minerals such as biotite, hornblende, and pyroxene (Banks 1990:149). Andesites tend to be dark gray, green or red. Upon weathering they may become dark brown or reddish brown. Completely aphanitic andesite is relatively rare. Porphyritic andesite is the most common variety of intermediate extrusive rocks. Phenocrysts are composed mainly of plagioclase, amphibole, or biotite set in a matrix of aphanitic plagioclase and some glass (Hamblin and Howard 1980:28).
Basalt - A dark- to medium-dark-colored, commonly extrusive mafic igneous rock composed primarily of calcic plagioclase and clinopyroxene in a glassy or fine-grained ground mass (Banks 1990:149). Basalt is characteristically black, dense and massive. Individual crystals cannot be seen with the naked eye, but under the microscope tiny needles of plagioclase crystals commonly form a felt-like network surrounding crystals of pyroxene and olivine (Hamblin and Howard 1980:29).
Granite - An igneous rock with a phaneritic texture but the average crystal size ranges from less than one-half inch to more than one inch in diameter. Biotite, amphibole, and plagioclase (early formed crystals) are generally euhedral (i.e., have well-developed crystal faces). Most granites are gray, but if potassium feldspars dominates in the rock it may be pink or red (Hamblin and Howard 1980:27).
Diorite - The texture of diorite is essentially the same as that of granite. The two rocks only differ in composition. Whereas granite contains potassium feldspar, quartz and calcium plagioclase, diorite is composed predominantly of plagioclase and ferromagnesian minerals, giving it a darker color (Hamblin and Howard 1980:28).
Obsidian - A massive volcanic glass. It breaks with a conchoidal fracture and has a bright, glassy luster. In spite of its composition, it is characteristically jet black to dark

gray due to the presence of countless dust-like particles of magnetite or ferromagnesian minerals. More rarely, yellow, red, or brown hues are produced by oxidized magnetite or hematite. Although obsidian is not crystalline, it does contain skeletal crystal embryos called crystallites (Hamblin and Howard 1980:30).
Ignimbrite - a highly vesicular obsidian-like material.

Quartz - Macrocrystalline silica: SiO2. Color ranges from clear to brown with a diapheneity ranging from transparent to translucent. The crystal structure is visible on fracture surfaces, and typically the crystal structure interferes with fracture propagation. The fracture is typically distinctly subconchoidal.
Vein Quartz - Macrocrystalline silica: SiO2 that forms in rock veins.

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More Specific or Not Commonly Used Rock Type Definitions
(We will not use these for ID1 or ID2)

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Flint - A homogenous dark-gray to black chert sometimes slightly to moderately translucent. According to Tarr (1938) the term "flint" should either be discarded or reserved for siliceous artifacts, such as the 'flint arrowheads' used by primitive man because rocks described as flint are identical with chert in texture and composition, despite the fact that the term 'flint' has been in use at least since about A.D. 700 for 'anything hard' and since about A.D. 1000 for a 'variety of stone' and that it antedates 'chert' by almost 1,000 years (Banks 1990:151).
Moss Agate - An agate having a dendritic pattern (a branching figure resembling a shrub or tree, produced on the mineral or rock by the crystallization of a foreign mineral, usually an oxide of manganese) (reprinted in Church 1994; from AGI 1976:114).
Carnelian - A translucent blood-red, flesh-red, reddish-white, orange-red, reddish-yellow or brownish-red variety of chalcedony, pale to deep in shade, containing iron impurities (Banks 1990:150).
Sandstone - A cemented or otherwise compacted detrital sediment composed predominantly of quartz grains, the grades of the latter being those of sand (reprinted in Church 1994:10; from AGI 1976:376).
Ironstone - The generic name assigned to the iron-cemented sandstone commonly utilized in the Chesapeake Bay region. Geologically, these ferruginous minerals represent zones of porous sedimentary sands which have been lithified by the precipitation of iron oxide and carbonate (reprinted in Church 1994; from Ward and Doms 1984:45-46).
Quartz Arenite - Consolidated sedimentary rock composed of sand-sized fragments irrespective of composition: e.g., sandstone, graywacke, arkose and calcarenite (Banks 1990:149).
Quartzitic Sandstone - A sandstone that contains 100% quartz grains cemented with silica. The term is essentially equivalent to orthoquartzite (Banks 1990:155).
Siliceous/Silicified Sandstone - A sandstone cemented with silica; a hard quartzitic sandstone (Church 1994:12).

Chert Arenite - An arenite in which chert particles are the dominant rock-particle constituent (Folk 1968:125).
Nova-chert - A term used by Banks (1984) to distinguish the high quality chert derived from the Arkansas Novaculite (that was secondarily deposited in various shale formations and esp. the John's Valley Shale of the Ouachita Mountains) from the novaculite itself and from the other identifiable cherts such as the Big Fork that also occur in the shale deposits (Banks 1990:153).
Jaspagate - A jasper agate, usually applied to jasper agate in which the jasper predominates (AGI 1976:239).
Jasperoid - A dense, usually gray, chert-like, siliceous rock in which chalcedony or cryptocrystalline quartz has replaced the carbonate minerals of limestone. It typically develops as the gangue of metasomatic sulfide deposits of the lead-zinc type. A gangue is a worthless rock or vein matter in which valuable metals or minerals occur. It resembles jasper.
Jaspillite - A rock consisting essentially of red jasper and iron oxides in alternating bands (reprinted in Church 1994; from AGI 1976:239).
Metachert - A metamorphosed chert (Church 1994:16).
Oolitic Chert - A chert that contains ooliths, spherical to ellipsoidal bodies, .25 to 2.0 mm in diameter, usually calcareous, but may be siliceous, hematitic, or of other composition (reprinted in Church 1994:16; from AGI 1976:305).
Porcelaneous Chert - A type of smooth chert which has a smooth fracture surface, hard, opaque to subtranslucent, typically china-white resembling chinaware or glazed porcelain, grades and chalky (reprinted in Church 1994:16; from AGI 1976:338).
Wood-grained Chert - Wood-grained chert is a nodular chert which has internal light- and dark-colored, concentric, three dimensional, compositional banding resembling grain wood (reprinted in Church 1994; from DeCelles and Gutschick 1983).
Dendritic Chert - A chert that illustrates having a branching figure resembling a shrub or tree, produced on or in a mineral or rock by the crystallization of a foreign mineral, usually an oxide of manganese, as in the moss agate (reprinted in Church 1994:16; from AGI 1976:114).
Chalk - Chalk is a soft, porous, fine-textured limestone composed of shells of microscopic organisms, mostly foraminifera. It is normally white or buff and may contain varying amounts of mud (Hamblin and Howard 1980:45).
Travertine - Travertine is a calcium carbonate deposit formed in caves and springs. It is characteristically banded with alternating light and dark layers resulting from minor amounts of iron oxide which accumulate during successive periods of deposition (Hamblin and Howard 1980:46).
Dolomite - A carbonate sedimentary rock consisting chiefly of the mineral dolomite or approximating the mineral dolomite in composition, or a variety of limestone or marble rich magnesium carbonate. Occurs in crystalline and noncrystalline forms, is clearly associated and often interbedded with limestone, and usually represents a post-depositional replacement of limestone. Pure dolomite will effervesce very slowly in cold hydrochloric acid in contrast to limestone (Banks 1990:151).
Gypsum - Rock gypsum is a chemical precipitate composed almost exclusively of aggregates of the mineral gypsum. It is normally white or is delicately colored in various shades of yellow or light red. One of its most distinctive characteristics is that it can be

scratched with a fingernail. Gypsum is commonly massive, but thin, delicate laminae formed by seasonal influxes of clay and are found in some deposits (Hamblin and Howard 1980:46).

Limestone Breccia or *Chert Breccia* A coarse-grained clastic rock composed of large (greater than sand sized, or 2 mm in diameter) angular rock fragments that are cemented together in a finer-grained matrix (which may or may not be similar to the larger fragments) and that can be of any composition, origin, or mode of accumulation. Specific rock types should be referenced when used: e.g. 'limestone breccia' or 'chert breccia' (Banks 1990:150).

Arkose - A sandstone of less than 75% quartz and metamorphic quartzite and more than 25% feldspar and plutonic rock fragments (or whose content of feldspar and plutonic rock fragments is at least three times that of all other fine-grained rock fragments, including chert), regardless of clay content or texture (Banks 1990:149). Arkose is generally coarse-grained, angular, and moderately well sorted. In most arkoses the grain size is commonly in the sand range, but some arkoses are coarse enough to be termed conglomerates (Hamblin and Howard 1980:42).

Graywacke - An old rock name that has been variously defined but is now generally applied to a dark (usually gray or greenish gray, sometimes black) and very hard, tough, and firmly indurated, coarse-grained sandstone that has a subconchoidal fracture and consists of poorly sorted and extremely angular to subangular grains of quartz and feldspar with an abundant variety of small, dark rock and mineral fragments embedded in a preponderant and compact, partly metamorphosed clayey matrix having the general composition of slate and containing an abundance of very fine-grained micaceous and chloritic minerals -- a very hard, dark, clayey, impure sandstone that you can't tell much about in the field (Banks 1990:152).

Shale - A fine-grained clastic rock consisting of particles less than 1/256 mm in diameter. They are characteristically laminated or thin bedded, as is well expressed in both hand specimen and thin section. Quartz, mica, and the clay minerals are the dominant constituents, but the particles are too small to be seen without high magnification. Calcite may be present - usually as a cement - in amounts ranging up to 50% (Hamblin and Howard 1980:43).

Slate - A fine-grained metamorphic rock possessing a type of foliation known as slaty cleavage, a horizontal planar element. In many slates, traces of original bedding are expressed by changes in color or grain size and are commonly at an angle to the foliation. Common minerals are quartz, muscovite, and chlorite, but crystals are generally so small that they can be seen only under high magnification. Slates are characteristically dense and brittle and are colored gray, black, red, or green (Hamblin and Howard 1980:54).

Phyllite - Similar to slates but are distinguished from them by a satin-like luster or sheen developed on the planes of foliation (Hamblin and Howard 1980:54).

Schist - A strongly foliated crystalline rock formed by dynamic metamorphism which can be readily split into thin flakes or slabs due to the well developed parallelism of 50% of the minerals present, particularly those of lamellar or elongate prismatic habit, e.g. mica or hornblende (Banks 1990:156).

Gneiss - A metamorphic rock in which the foliation results from layers of different mineral groups. Feldspar and quartz are the chief minerals, with minor amounts of mica,

amphibole, and other ferromagnesian minerals. Gneisses thus resemble granite in composition, but are distinguished from them by the foliation. The foliation in a gneiss may range from semi-continuous layers of light and dark minerals to highly contorted, well-defined layers (Hamblin and Howard 1980:55).

Metaconglomerate - A conglomerate that has altered under heat and pressure so that the individual pebbles are stretched, deformed and fused together. Commonly, the stretched pebbles will show definite lineation which is related to the orientation of stresses, but the rock is not foliated. Most metaconglomerates are so indurated that they fracture across the pebbles as easily as around them (Hamblin and Howard 1980:56).

Marble - A nonfoliated metamorphic rock composed principally of calcite or dolomite. The crystals are commonly large and interlock to form a dense crystalline rock. Bands or streaks or inorganic impurities resulting from flowage or extreme deformation are common in some deposits. Colors may be white, pink, blue-gray or brown. Like limestone, a marble is characterized by its softness and its effervescence with hydrochloric acid (Hamblin and Howard 1980:56).

Catalinite - A specific type of claystone or perhaps argillite distinguished by a deep red color, sometimes mottled with lighter red. It is derived from a localized source area in SW Minnesota (see Sigstad, J.S. 1973 The Age and Distribution of Catlinite and Red Pipestone. Unpublished Ph.D. disseration, University of Missouri, Columbia).

Gabbro - An igneous rock normally composed of coarse- to medium-grained subhedral crystals. Labradorite plagioclase is the dominant feldspar and usually occurs as elongate crystals. Ferromanganesian minerals (purple and green) are slightly less abundant than feldspar (Hamblin and Howard 1980:29).

Pumice - A very porous volcanic glass. Its texture consists of sub-parallel, silky glass fibers tangled together. It originates when relief of pressure in a volcano permits rapid expansion of gases through the upper part of the ascending column of obsidian lava. The lava swells into a froth or foam with innumerable minute bubbles and solidifies (Hamblin and Howard 1980:30).

Tuff - Fragmental material and droplets of lava expelled from volcanic vents and transported through the air are referred to as pyroclastics. Tuff is the finest grained pyroclastic consisting of fine ash and dust less than one-fourth an inch in diameter (Hamblin and Howard 1980:30).

Perlite - A volcanic glass having the composition of rhyolite, perlitic texture, and a generally higher water content than obsidian. Syn: pearlite; pearlstone (Banks 1990:154).

Pitchstone - A volcanic glass, usually intrusive, with a waxy, dull, resinous, pitchy luster rather than a bright, glassy luster. Its color and composition vary widely; it contains a higher percentage of water than obsidian (Banks 1990:154).

2. Description - a statement of the visual attributes; derived from simple macroscopy (reprinted in Church 1994 from Ives 1985).

Color 1 (COL1) - The dominant color of the rock determined by the terms from the Munsell color chart.

Color 2 (COL2) - The second-most dominant color of the rock determined by the terms from the Munsell color chart.

Color General Description (COLOR MEMO) - Give a general description of the color if the specimen shows more variability than the above color terms. Additionally, discuss the color combinations and patterns.

Munsell Color Code 1 (MUN1) - The dominant color code recorded from the standardized Munsell Book.
Munsell Color Code 2 (MUN2) - The second-most dominant color code recorded from the standardized Munsell Book.
Munsell General Description (MUNSELL MEMO) - Give a general description of the Munsell color if the specimen shows more variability than the above codes. Discuss the ranges of Munsell colors.

Luster (LUS) - The appearance of light reflected from the material (Hamblin and Howard 1980:7; All following definitions from Woolf et al. 1977).

Brilliant - Very shiny.
Vitreous - Characterized by low porosity and usually translucent looking like glass. Light reflects evenly across the surface.
SLTYVitreous - This category -- slightly vitreous -- is midway between vitreous and dull. Light reflects off the surface but not in an even manner.
Pearly - Looks like a pearl - a dense variously colored luster that tends to reflect light evenly. A nearly neutral slightly bluish medium gray.
Silky - A smooth, soft texture.
Greasy - Oily texture.
Waxy - Less greasy than the greasy texture. It would be soft, possibly impressionable or readily molded.
Resinous - Usually transparent or translucent and yellowish to brown.
Dull - Lacking brilliance and low in lightness "earthy."

Luster General Description (LUSTER MEMO) - Give a general description of the luster if the specimen shows more variability than the above choices provide.

Diapheneity (DIAPH) - The ability of the material to transmit light (Hamblin and Howard 1980:7). Translucency thickness will be determined by holding specimens approximately 8 cm from a desk lamp with 75 watt bulb (specimen held at edge of metal shade).

Opaque - No light is transmitted, even on the thinnest edges.
Variable - Light, but not an image, is differentially transmitted through the rock. The translucency varies from locally opaque to medium.
Slight - Light, but not an image, transmits through the rock up to generally 1 to 4 mm.

Medium - Light, but not an image, transmits through the rock more than slight translucency but less than high translucency (5 to 10 mm).
High - Light, but not an image, transmits across a majority of the rock (>10 mm).
Transparent - Objects are visible when viewed through a mineral.

Diapheneity General Description (DIAPHENEITY MEMO) - Give a general description of the diapheneity if the specimen shows more variability than the above choices provide.

Texture (TEXT) - The size and manner of union of the particles of a body or substance. The visual or tactile surface characteristics and appearance, focusing particularly on grain or crystal size (Woolf et al. 1977) .

Glassy - (Aphanic) This texture is similar to ordinary glass. It may occur in massive units or in a threadlike mesh similar to spun glass. Viewed under a microscope, no crystals are apparent (Hamblin and Howard 1980:21).
Cryptocrystalline - (Aphanic) Texture of a material consisting of or having crystals that are too small to be recognized and separately distinguished even under the microscope (although crystalline features may be shown by the use of the electron microscope)(Banks 1990:150).
Microcrystalline - Texture of a material consisting of or having crystals that are small enough to be visible only under the microscope (Banks 1990:153).
Fine-grained - For cherts and quartzites, this term is descriptive for an interlocking texture of a sedimentary rock having crystals whose diameters are in the range of 0.016 to 0.062 mm (Banks 1990:155). Fine-grained rocks have very smooth surfaces but a fingernail will not noticeably grate when scratched across the surface (Morrow 1994:110).
Medium-grained - For cherts and quartzites, this term is descriptive for an interlocking texture of a sedimentary rock having crystals whose diameters are in the range of 0.016 to 0.25 mm (Banks 1990:155). Medium-grained rocks are smoother in appearance than coarse-grained rocks but a fingernail will noticeably grate when scratched across the surface (Morrow 1994:110).
Coarse-grained - For cherts and quartzites, this term is descriptive for an interlocking texture of a sedimentary rock having crystals whose diameters are in the range of 0.25 - 1.0 mm (Banks 1990:155). Coarse-grained rocks have a rough, abrasive appearance and the individual crystal grains can be seen with the naked eye (Morrow 1994:110).
Gritty - A texture that is composed of several hard sharp granules.

Aphanitic - Texture of material where individual crystals are so small they cannot be detected without the aid of a microscope. Rocks of this texture appear massive and structureless but contain small interlocking crystals (Hamblin and Howard 1980:21). Same as aphanic but it refers to igneous rocks in which crystalline components are indistinguishable (Banks 1990:149).
Phaneritic - Texture of materials in which individual crystals are large enough to be plainly visible to the naked eye (Hamblin and Howard 1980:21).
Porphyritic-Phaneritic - Texture of materials in which phenocrysts are set in an aphanitic matrix (Hamblin and Howard 1980:22).

Porphyritic-Aphanitic - Texture of materials consisting of an aphanitic matrix with more than 10% phenocrysts. The phenocrysts are naked with the unaided eye and, if abundant, they may cause the rock to appear at first glance to be phaneritic (Hamblin and Howard 1980:23).

Texture General Description (TEXTURE MEMO) - Give a general description of the texture if the specimen shows more variability than the above choices provide.

Context (CONT) - The original environment in which the rock was found (if known).

Primary - The sample occurs in or was taken from its original place of formation or very near the original place of formation.
Secondary - The sample occurs in or was taken from a place where it had been redeposited or reworked.

Structure (STRUC) - The structure of a rock refers to the color (minerals) patterns and combinations.

PBanded - The interior colors are banded in parallel layers (planar layers).
SPBanded - The interior colors are banded in a subparallel fashion (subplanar layers).
CBanded - The interior colors of the rock are concentrically banded thus rotating in a parallel fashion around a common center.
Variegated - The interior colors of the rock appear to have a variety of different colors.
Mottled - The interior colors of the rock appear to be arranged in blotches or spots in different shades of colors. Refer Figure 1 for detailed mottling descriptions, such as broad mottling, marbled mottling, random speckling, speckled banding, streaking, horizontal banding and concentric banding.
Oolitic - The interior colors of the rock appears to have several concentric circles that form around a nucleus.
Uniform - The interior color of the rock has no variation -- it is homogenous.

Structure General Description (STRUCTURE MEMO) - Give a general description of the rock form if the specimen shows more variability than the above choices provide.

Inclusions (INCLU) - A fragment of a rock that is distinct from the body of the rock in which it is enclosed (Plummer and McGeary 1985:498).

Fossil - The rock appears to contain fossils of non-plant and non-wood origin, including shells and other unspecified fossil remains.
Oolitic - The rock appears to contain several concentric structures that form around a nucleus; it contains multiple small spherical structures or inclusions within the rock mass (Hamblin and Howard 1980:37).
Plant - The rock appears to have of plant fragments (non-wood) embedded within it.

Wood - The minerals in the rock appear to have replaced preexisting woody remains. Thus, the rock has a wood grain appearance. This wood grain appearance is identified by concentric rings or the actual wood cell structures.
Hairline - The interior has several extremely fine small cracks.
Vugs - The interior has quartz overgrowths or crystals that fill rock veins or cavities (Banks 1990; Folk 1980:80).
Moss - The interior contains manganese oxide that has crystallized in a branching pattern: e.g., dark inclusions in a moss-like pattern.
Cavities - The interior contains cavities formed from the escape of gas during cooling processes.
None - The rock does not exhibit any inclusions.

Inclusions General Description (INCLUSIONS MEMO) - Give a general description of the inclusion properties if the specimen shows more variability than the above choices provide.

Induced Cleavage Properties (CLEAV) - The way a material breaks upon application of culturally induced forces (e.g., free-hand percussion flaking).

Highly conchoidal - Extremely curved fracture surfaces. The typical conchoidal fracture properties and features are highly visible and abundant, such as the Hertzian cone, bulb of force, eraillure scars, ripple marks, undulations, and lateral fissures (e.g., obsidian).
Conchoidal - Curved fracture surfaces. The above typical conchoidal fracture properties and features are clear but not as pronounced (e.g., many cherts).
Sub-conchoidal - Partially curved fracture surfaces. The above typical conchoidal fracture properties and features are present but rare or are highly subdued (e.g., metaquartzites)
Non-conchoidal - When a rock does not have any of the above conchoidal fracture properties and it does not have a curved fracture surface, it is non-conchoidal. The above typical conchoidal fracture properties and features are extremely rare or absent (e.g., granite).
Planar - When a culturally induced force strikes a rock and the rock breaks along preferred mineral cleavage planes (e.g., if a stone is dominated by feldspar, the stone may break in any of two directions of cleavage that intersect at 90 degree angles).
Brittle - Crushes or shatters into angular fragments (e.g., quartz).

Cleavage General Description (CLEAVAGE MEMO) - Give a general description of the induced cleavage properties if the specimen shows more variability than the above choices provide.

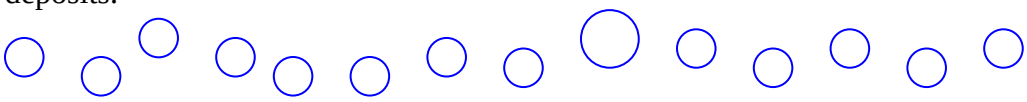
Bedrock Form (BFORM) - The original shape of the rock or rock samples making reference to its natural geological occurrence. The bedrock form refers specifically to the shape of primary context materials.

Parallel - The original shape of the rock was formed as a deposit that followed along parallel planes.

Sub-Parallel - The original shape of the rock was formed as a deposit that followed along sub-parallel planes.

Lenticular - The original shape of the rock was formed as a lenticular deposit.

Nodular - The original shape of the rock was formed as nodular (nearly spherical) deposits.

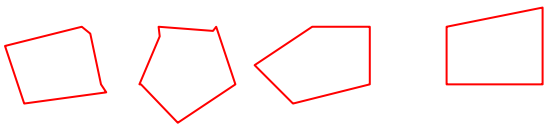


Irregular - The original body of the rock was a large mass that tends to form small irregular pieces.

Secondary Form (SFORM) - The original shape of the rock or rock samples making reference to its natural geological occurrence. The secondary form refers specifically to the shape of the secondary deposit materials.

Tabular - A rock that has exterior flat surfaces.

Blocky - A rock that tends to be relatively cuboidal.



Angular - A rock that is multi-faceted with sharp edges and corners.

Subangular - A rock that has rounded corners and edges but is not spherical.

Rounded - A rock that is rounded to near spherical.

Form General Description (FORM MEMO) - Give a general description of the rock form if the specimen shows more variability than the Bedrock Form or Secondary Form choices provide.

Size (SIZE) - The dominant size class of either the primary or secondary pieces of rock.

Pebble - A general term for a rock fragment larger than a granule (2-4 mm in diameter) and smaller than a cobble, having a diameter in the range of 4-64 mm (size between a small pea and a tennis ball) (Banks 1990:155).
Cobble - A rock fragment larger than a pebble and smaller than a boulder, having a diameter in the range of 64-256 mm (size of a tennis ball to a basketball) (Banks 1990:155).
Boulder - A detached rock mass larger than a cobble, having a diameter greater than 256 mm (greater than a basketball) (Banks 1990:156).
Massive - An rock mass attached to the original geological formation and is a size of a large boulder.

Heat Treatment (HEAT) - Particular rock samples may have undergone recent cultural exposure to high temperatures, therefore changing some of the physical properties. Heated and unheated samples of the same stone will comprise separate records in the database.

Present
Absent

Heat Treatment General Description (HEAT MEMO) - Give a general description of the heat treatment process if that information is available (include temperature of heat treatment).

Cortex 1 (COR1) - This field describes the predominant expression of rock exterior relating to the geological origin.
Cortex 2 (COR2) - This field describes the second most common expression of rock exterior relating to the geological origin.

Cone - The cortex is smooth, rounded and waterworn with evidence of Hertzian cones on the surface.
Wind - The exterior surface of the rock will tend to be smooth and often polished as if waterworn but not rounded. The edges of the stone often meet at sharp angles.
Water - The cortex is smooth, rounded and waterworn without any evidence of Hertznian cones on the surface.
Botroyoidal - The surface appears to have the form of a bunch of grapes. Said of mineral deposits, e.g., hematite, having a surface of spherical shapes; also said of crystal structure in which the spherical shapes are of radiating crystals (Banks 1990:149).
Chalky - The cortex has a white, earthy, porous appearance and occurs as a rind.
Coarse - Cortex has a coarse, granular, porous appearance, occuring as a rind grading into bedrock. It is not white as in the chalky selection.
Gizzard - The exterior surface of the rock is highly polished. The stone tends to be rounded.
Patinated - The rock's surface, although potentially not the original exterior surface, often develops some sort of an organic or inorganic film or a weathering zone that covers its exterior. This zone is referred to as a patina, therefore the cortex is patinated.

MFlaw - The exterior of the rock piece may occur along one of a rock's flaw planes or an interior fracture caused by a weakness in the rock's mineral composition. The flaw plane exhibits an abundance of manganese staining (i.e., a black patina).
IFlaw - The exterior of the rock piece may occur along one of a rock's flaw plane or an interior fracture caused by a weakness in the rock's mineral composition. The flaw plane exhibits an abundance of iron staining (i.e., a red discoloration).
Flaw - The exterior of the rock piece may occur along one of a rock's flaw plane or an interior fracture caused by a weakness in the rock's mineral composition. The flaw plane does not exhibit any staining.

Cortex General Description (CORTEX MEMO) - Give a general description of the cortex properties if the specimen shows more variability than the above choices provide.

Cortex Color 1 (CCOL1) - The dominant color of the cortex determined by the Munsell color code book.
Cortex Color 2 (CCOL2) - The second-most dominant color of the cortex determined by the Munsell color code book.

Cortex Color General Description (CORTEX COLOR MEMO) - Give a general description of the cortex color ranges and patterning if the specimen shows more variability.

3. Characterization - A statement of atomic or molecular structure or composition bounded by quantifiable parameters; specifically those attributes derived from elemental analysis, petrography and thermoluminescense (reprinted in Church 1994 from Ives 1985).

Ultraviolet Florescence (UVFL) - The phenomenon of the glow or florescence of material types when exposed to ultraviolet light (Ahler et al. 1992:72). Specific material types will have distinct UVLF color signatures.

Shortwave Color Chart Code (SUVFL) - The observed florescence will be recorded using a standardized Pantone Color Formula Guide 747XR (Pantone 1990) published by Pantone, Inc., Moonachi, New York (ie: 1395C) (Ahler et al. 1992:79-80).

Shortwave General Description (SHORTWAVE MEMO) - Give a general description of the shortwave color ranges and patterning if more variability exists.

Longwave Color Chart Code (LUVFL) - The observed florescence will be recorded using a standardized Pantone Color Formula Guide 747XR (Pantone 1990) published by Pantone, Inc., Moonachi, New York (ie: 1395C) (Ahler et al. 1992:79-80).

Longwave General Description (LONGWAVE MEMO) - Give a general description of the longwave color ranges and patterning if more variability exists. Additionally, discuss how well the stone responds to the UV light.

4. Sourcing - The assignment of the material of a lithic artifact to a geologic source (Church 1994).

Common Name 1 (COMMON1) - Name used most often.
Common Name 2 (COMMON2) - Name used second most often.
State (STATE) - State initials (TN, ND, SD, etc.) representing where the material came from.
County (CTY) - County name representing where the material came from.
Legal Description (LEG) - The quarter, quarter designations if known for geographical location of material type.
Formation (FM) - The name of the geologic formation where the material came from.
Sample Kind (KIND) - Refers to where the sample came from or what it is.

Place - A place sample is one that originates from a specific area or geographic location (e.g., Missouri River gravels).
Type - A type sample is one that typifies a specific previously named type of rock -- not necessarily referring to its original geographical position (e.g., Knife River Flint from no single location).

Sourcing General Description (SOURCING MEMO) - Be sure to mention if any accompanying documents exist.

5. Collection and Documentation

Name of Donator (DONAR) - Full name (Last Name first) of the person who donated the material.
Institution Affiliation (INSTI) - Name of institution this person may be affiliated with (if any).
Date Donated (DATE) - Date material was donated to the collection (if known).

6. Laboratory Tracking System

Drawer Location (LAB) - The label of the drawer where the material is located in the lab.

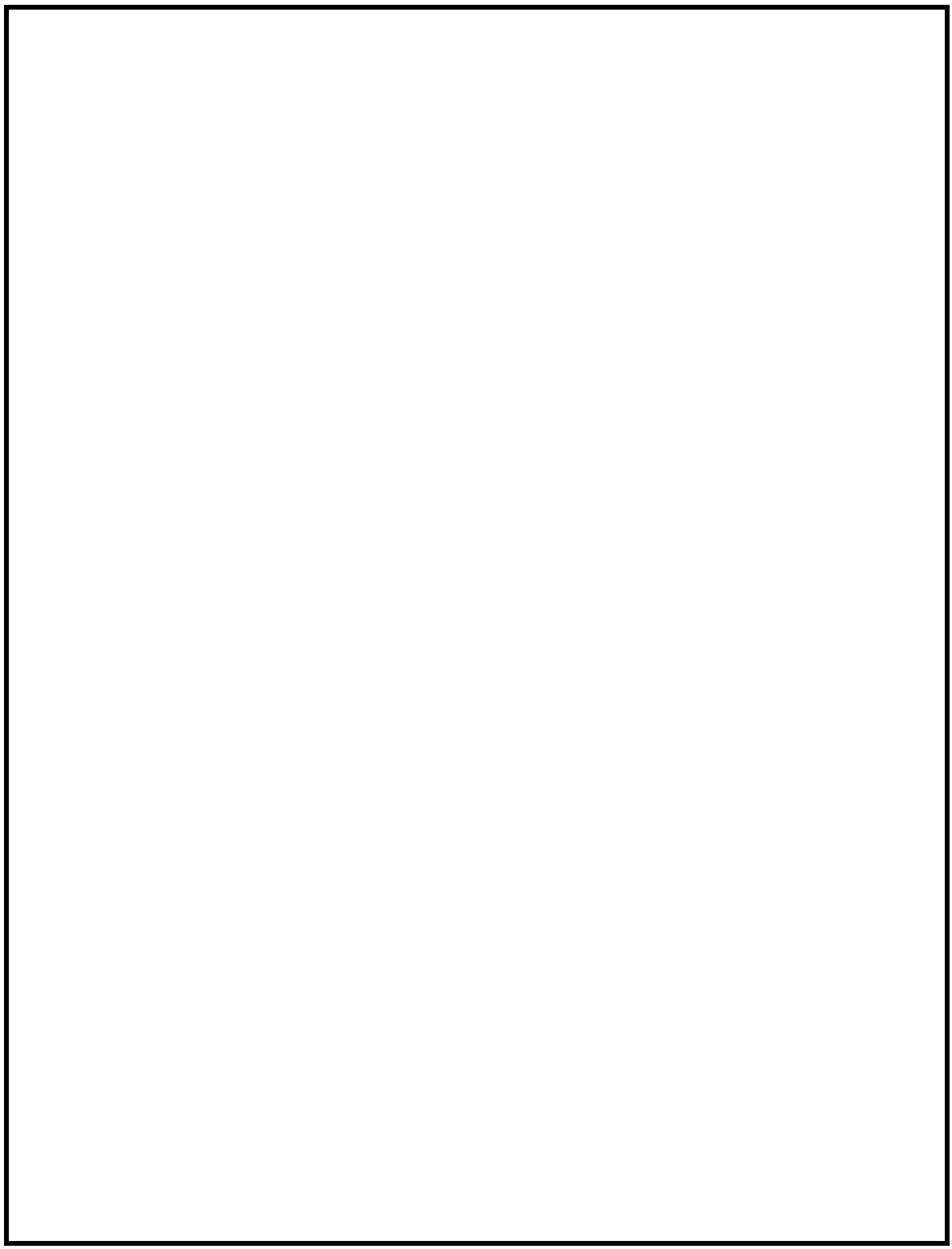


Figure 1. Descriptive Terms for Mottling and Banding Patterns Used to Describe a Mottled Color Structure (from Morrow 1994).