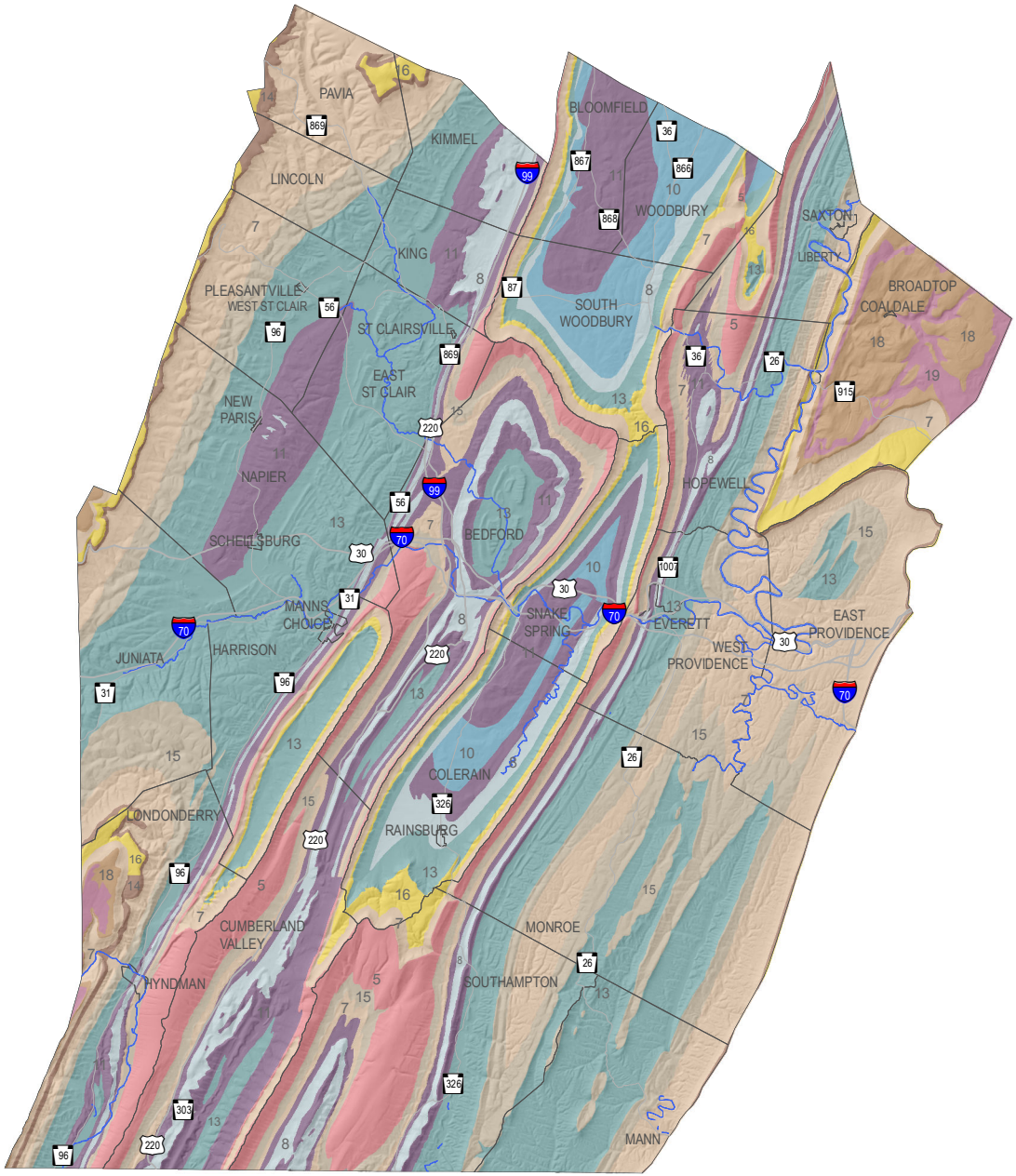

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

BEDFORD COUNTY

April 2008

(layout updated June 2017)

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0 1 2 3 4 5 Mi

0 1 2 3 4 5 Km

Water body

1. Dikes (if present)

Municipal boundary

ROCK TYPES

- 5. Quartzite
- 7. Red sedimentary rocks*
- 8. Limestone
- 10. Limestone and dolomite
- 11. Limestone or dolomite*
- 13. Shale and siltstone
- 14. Sandstone*
- 15. Shale or siltstone*
- 16. Sandstone, conglomerate
- 18. Mixture of rock types*
- 19. Mixture of rock types*

*See page 2 for a complete description.

Rock Types of Pennsylvania

Rocks are divided into three basic groups: sedimentary, igneous, and metamorphic.

Sedimentary rocks are the most common rocks at or near the surface in Pennsylvania. They form by either the deposition of individual grains that have eroded from older rocks and have been transported by water or wind (clastic sedimentary rocks), or by the precipitation of dissolved minerals from water or organic deposition (nonclastic sedimentary rocks). The naming of sedimentary rocks is based mostly on grain size (clastic) and/or chemical composition (nonclastic). Common clastic sedimentary rocks in Pennsylvania are conglomerate, sandstone, siltstone, claystone, and shale. Common nonclastic sedimentary rocks are limestone and dolomite.

Igneous rocks are formed by the cooling of molten material, either lava (above ground) or magma (underground). They are classified by what minerals they contain and the grain size of the minerals (coarse enough to be seen with the naked eye or too fine to be seen). Rocks containing the same minerals but having different grain sizes have different names. Likewise, igneous rocks of the same grain size, but of different mineral composition will have different names. Pennsylvania has had a variety of igneous rocks; however, most of these have undergone metamorphism. On the maps, they are classified simply as dark or light colored. The color is a reflection of the minerals present in the rock.

Metamorphic rocks are those formed by altering igneous, sedimentary, or other metamorphic rocks by heat and/or pressure. The heat and pressure cause changes in the minerals present and rearrange the minerals in the rocks. Metamorphic rock names are based on grain size, organization of minerals into layers (foliation), and composition. Pennsylvania has gneiss, schist, phyllite, slate, marble, and quartzite. The term “crystalline rocks” refers to either igneous or metamorphic rocks. More information about rocks in general, rocks of Pennsylvania, and the minerals in rocks can be found in our publication Rocks and Minerals of Pennsylvania (PDF). Engineering Characteristics of the Rocks of Pennsylvania (ZIP) provides information on the rocks of Pennsylvania by geologic unit.

The compilers of Survey publication Map 63, Rock Types of Pennsylvania (ZIP), delineated 19 different groups of rock types for Pennsylvania. The county maps show these rock types. The descriptions below are modified from Map 63, and the numbers correlate to those on the county maps.

Explanation of Numbered Units

1. Dark-colored igneous and metamorphic (crystalline) rocks: Includes dark-colored gneiss and diabase (and kimberlite, if it is shown on the map). Also includes all dikes, thereby lumping pegmatite, a light-colored rock that is limited in extent, with the much more common diabase dikes.
2. Light-colored metamorphic (crystalline) rocks: Includes light-colored gneiss and pegmatite.
3. Schist, including minor amounts of gneiss, quartzite, and phyllite.
4. Marble.
5. Quartzite.
6. Unconsolidated sediments: Includes coastal-plain deposits, Delaware River gravel, and sand at Presque Isle. Does not include glacial deposits.
7. Red sedimentary rocks: Includes sandstone, siltstone, shale, and some conglomerate. Some nonred rocks may be included.
8. Limestone.
9. Dolomite.
10. Mixed limestone and dolomite.
11. Limestone or dolomite mixed with sandstone, shale, or chert.
12. Slate.
13. Shale and siltstone.
14. Sandstone and minor amounts of shale or siltstone.
15. Shale or siltstone, and minor amounts of sandstone.
16. Sandstone and/or conglomerate.
17. Mixed sandstone and conglomerate; some coal, shale, and siltstone. Includes anthracite seams in eastern Pennsylvania.
18. Mixture of sandstone, siltstone, shale, claystone, limestone, and coal.
19. Mixture of siltstone, shale, sandstone, limestone, claystone, and coal. Includes the most economically important bituminous coal seams.

Glossary

Calcareous. Contains calcium carbonate (calcite) or calcium magnesium carbonate (dolomite). Will fizz when dilute hydrochloric acid (HCl) is placed on a sample. Calcite will fizz vigorously. Dolomite will fizz gently. Limestone, dolomite, and marble are common calcareous rocks. Other rocks may also be calcareous.

Claystone. A sedimentary rock in which more than 50 percent of the particles are less than 0.00015 inch diameter. Grains are too small to be visible as individuals, giving the rock a smooth appearance. It looks like clay that has been hardened into rock. It does not have the fine layering of shale.

Coal. A black, relatively lightweight rock composed of accumulations of plant matter converted by pressure and heat.

Conglomerate. A sedimentary rock with rounded pebbles that are greater than 0.08 inch diameter. It has an appearance somewhat like concrete, with pebbles cemented together by finer grained material.

Dolomite. A sedimentary rock composed of magnesium (Mg), calcium (Ca), and carbonate (CO_3). Also called dolostone. It reacts to dilute hydrochloric acid but not as vigorously as limestone or marble. Surfaces that have been powdered by scratching (or by scraping during drilling) may react more readily. Dolomite is generally gray or tan in color. Grain size ranges from small, visible crystals to grains that are too small to see individually.

Dike. A tabular body of igneous rock that cuts across the bedding or foliation of the surrounding rock. Most dikes in Pennsylvania are composed of diabase, a dark-colored igneous rock.

Foliated. A property of metamorphic rocks where a planar feature exists, due to either the orientation of platy grains or the separation of different minerals into bands. Foliated rocks include slate, phyllite, schist, and gneiss.

Gneiss. A metamorphic rock characterized by alternating light- and dark-colored bands. Color is determined by the minerals present in each layer. One color usually predominates, such that a gneiss can be categorized as either a light or dark crystalline rock. The mineral grains in a gneiss are large enough to be easily visible. Most of the grains are relatively equidimensional, meaning that they are of similar size and shape.

Limestone. A sedimentary rock composed of calcium (Ca) and carbonate (CO_3). Its most obvious defining characteristic is that it reacts vigorously to dilute hydrochloric acid. Limestone is generally gray or tan in color, although it can be dark gray or black. Grain size ranges from small, visible crystals to grains that are too small to see individually. Limestone may contain fragments of fossil shells.

Marble. Metamorphosed limestone and dolomite. Marble is composed of large crystals of calcite or dolomite that sparkle when light reflects off their flat surfaces. In Pennsylvania, marble is white or very light gray and generally contains flakes of golden-brown or white mica. It reacts to dilute hydrochloric acid. Marble can be scratched by a knife.

Mica. A series of minerals that form thin sheets. Mica is found as layers in schist, phyllite, and some gneisses, and as flakes in marble and some sandstones. Several varieties that are common in Pennsylvania are white (usually appears silver-gray), black, or golden-brown. Mica has a glassy or metallic appearance.

Phyllite. A fine- to-medium-grained, layered metamorphic rock. Mica grains are just large enough to be visible. Rock surfaces are smooth and have a satiny sheen. Layers tend to be fairly planar, and the rock splits easily along them. The most common colors are silvery gray or greenish gray.

Quartzite. A very hard sedimentary or metamorphic rock composed almost entirely of quartz. In metamorphic quartzite, quartz grains are interlocked like puzzle pieces. Grains are usually relatively large. In sedimentary quartzite, sand-sized quartz grains are cemented together by fine-grained material of the same composition. Quartzite is generally white or beige. Quartzite is harder than steel and cannot be scratched by a knife.

Sandstone. A sedimentary rock in which more than 50 percent of the particles are sand size (0.002–0.08 in. diameter). It looks like sand held together by cement. Sandstones can be found in a variety of shades of white, red, green, and gray.

Schist. A metamorphic rock dominated by coarse-grained mica arranged in layers. The layers tend to be wavy or bumpy and are separated by granular layers usually dominated by quartz. Large crystals of other minerals are common. One of these is garnet—a dark-red, rounded, pinhead- to pea-size or larger mineral. Rock surfaces have a shiny, sparkly, or sequined appearance. Schist usually appears silver-gray due to the abundant mica.

Shale. A finely layered sedimentary rock similar in grain size to claystone but breaks out into thin sheets or plates parallel to the layers. Shale is found in many shades of gray, black, red, and green.

Siltstone. A sedimentary rock in which more than 50 percent of the particles are silt size (0.00015–0.002 in. diameter). Visually indistinguishable from shale and claystone; it feels slightly gritty between the teeth.

Slate. A very fine grained, layered metamorphic rock that splits into thin sheets. Grains are too small to be individually visible, giving the rock a smooth appearance. Surfaces are dull and tend to be flat. The most common colors are black and shades of gray. Slate is commonly used for roofing and pavers. In Pennsylvania, slate is found only in the southeastern quarter of the state.