

Figure 1. Maps of the major structures in the Burlington, Headsville, Keyser, Old Fields, Romney, and Springfield 7.5 minute quadrangles, West Virginia

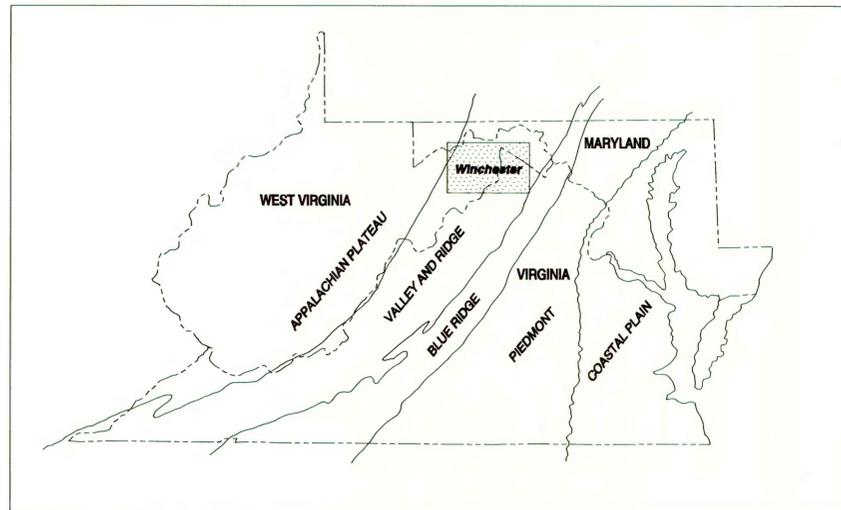


Figure 2. Location of the Winchester 30 X 60 minute quadrangle within the Appalachian Valley and Ridge physiographic province. (Modified after McDowell, 1991.)

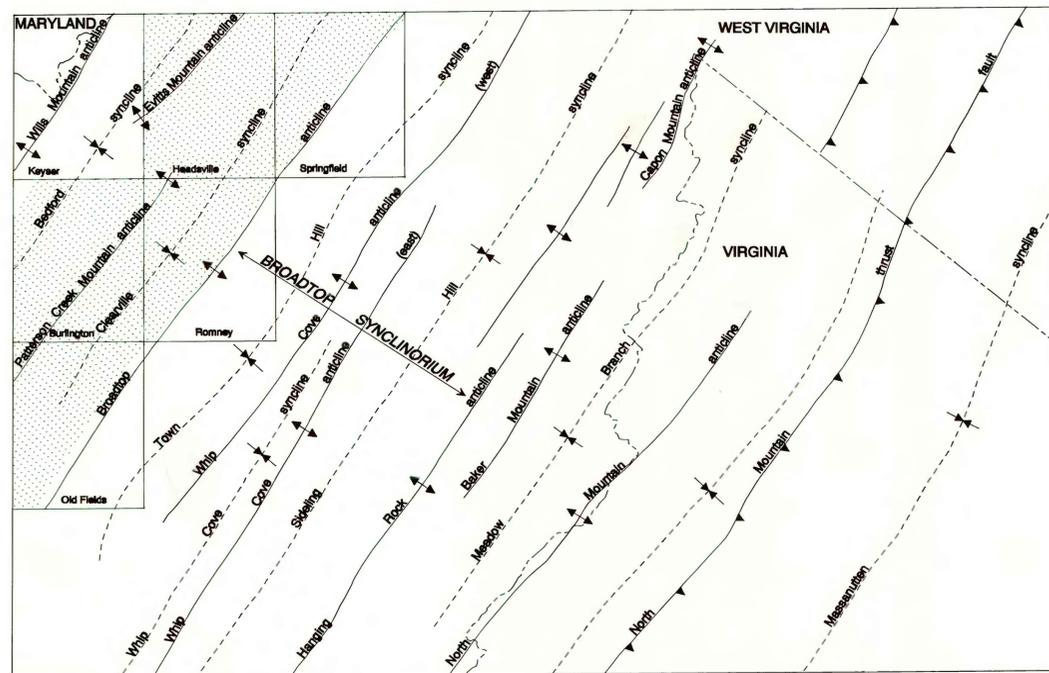
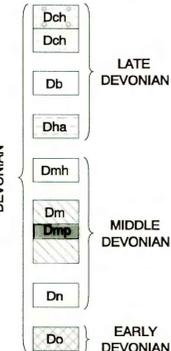


Figure 3. Regional structures within the Winchester 30 X 60 minute quadrangle. The study area within the five, 7.5 minute quadrangles is indicated by a dotted pattern. (Modified after McDowell, 1991.)

The correlation and description of map units and the explanation of map symbols refer to the five, 7.5 minute quadrangles on sheets 2 through 6.

CORRELATION OF MAP UNITS



- Dn** Needmore Shale (Middle Devonian)—consists mostly of medium- to dark-gray and greenish-gray to brownish-black shale, and lenticular beds of resistant, greenish-gray to dark-gray, argillaceous limestone with many layers of dark-gray to medium-dark-gray, argillaceous nodules and concretions occurring in the upper part of the formation. The lower boundary of the Needmore in the few places where it is exposed is marked by a black shale member, the Beaver Dam Member (Willard, 1939), overlying the Criskary Sandstone. The upper contact is sharply defined by black shale in the basal part of the Marcellus Formation. The Needmore Formation ranges from 120 to 150 feet thick in the study area.
- Do** Criskary Sandstone and older rocks (Early Devonian and Older)—consists of resistant sandstone usually sharply defining the boundary between the late Early Devonian rocks and the early Middle Devonian rocks.

EXPLANATION OF MAP SYMBOLS

- Contact—Solid where well established. Dashed where approximately located; dotted where concealed
- Faults—Dotted where concealed. Dashed where inferred; queried where doubtful
- Thrust—Sawtooth on upper plate
- FOLDS
  - Anticline—Showing axial trace and direction of plunge
  - Syncline—Showing axial trace and direction of plunge

PLANAR FEATURES

- Strike and dip of beds
  - 68° Inclined
  - 58° Overturned
  - Vertical
  - Horizontal

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**Dch** Chemung Formation (Late Devonian)—consists of two parts. The lower part consists of a sequence of thin- to thick-bedded siltstone with fine-grained sandstone in beds 5 to 20 feet thick interbedded with greenish-gray shales. The upper part consists of thick- to massive-bedded, medium- to coarse-grained sandstone and conglomeratic sandstone, siltstone, and interbedded shale. The lower part is less resistant to erosion and the upper part typically is a ridge-forming unit. The lower and upper parts respectively are probably equivalent to the Scherr and Foreknobs Formations of Dennison (1970). The Chemung is reported to range in thickness from 2462 feet (Woodward, 1943) to 3880 feet (Dennison, 1953). In the study area it reaches maximum thickness in the Clearville syncline.

**Db** Brallier Formation (Late Devonian)—consists of alternating brown to dark-gray and olive to medium-dark, greenish-gray shale, siltstone, and fine-grained sandstone. The Brallier shales weather into greenish-gray to buff chips and fragments. The siltstones alternate in thin to thick beds as much as 5 feet thick, typically medium- to dark-gray when fresh and light-greenish-gray to buff when weathered. Burrows, flute casts, and ripple marks are common on the base of siltstone beds. The top of the Brallier is gradational with the overlying Chemung Formation. The contact between the Brallier and Chemung is at the base of the lowest, 1 foot thick, fossiliferous siltstone-sandstone bed that grades upward into a sequence of thick-bedded, fossiliferous fine- to medium-grained sandstone and interbedded siltstone and shale of the Chemung Formation. The Brallier Formation ranges from 1700 to 2500 feet thick in the map area.

**Dha** Harrell Formation (Late Devonian)—consists mostly of thin- to thickly-laminated, chippy- to platy-weathering, dark-gray shale and, where present, some fissile, grayish-black to black shale at the base (Burket Member, Butts, 1918). Throughout the map area, the fissile, black shale was restricted to the base of the formation and contained thin lenses of medium-dark-gray limestone and dark-gray, calcitic shale. The Harrell passes eastward into gray shale and siltstone more typical of the Brallier Formation. Although the Harrell is gradational into the Brallier Formation, the chips and plates of medium- to dark-gray shales of the Harrell help distinguish the formation from the light, olive-gray-weathering shales with interbedded siltstones of the Brallier. The top of the Harrell was systematically placed at the base of the lowest discrete bed of siltstone above a sequence of very dark-gray to grayish-black shale. The Harrell Formation ranges from 165 to 240 feet thick in the map area.

**Dmh** Mahantango Formation (Middle Devonian)—consists primarily of an upper part that is mostly fossiliferous, medium-light to dark-gray to light tan shale, even- to irregularly-bedded siltstone and fine-grained sandstone. A sequence of medium- to thick-bedded siltstone and sandstone occurs just below the top of the formation (Clearville Siltstone, Cardwell and others, 1968). The lower part of the formation consists mostly of medium-gray to dark-gray shale with thin, resistant beds of light gray to tan siltstone near the bottom. Spheroidal weathering is very common in the upper part of the formation with spheres as much as 6 feet in diameter. A coral biostrome in a shale matrix (Pokejoy Member, Dennison, 1970) occurs in the upper part just above the fossiliferous siltstone unit. The top of the formation is marked where light olive-gray, thickly-laminated, silty shale passes to thin- to thickly-laminated, platy-weathering, dark-gray shale and siltstone of the Harrell Formation. The Mahantango Formation ranges from 600 to 1400 feet thick throughout the study area.

**Dm** Marcellus Shale (Middle Devonian)—consists of weathered, noncalcareous, black to olive-black shale with layers of resistant, dark-gray, argillaceous limestone beds, limestone nodules, and calcareous shale (Purcell Limestone Member, Cate, 1963) in the middle part of the formation. The Purcell Limestone (Dmp), a marker bed in most of the map area, is shown as a separate map unit to illustrate the structure in the Marcellus. The upper boundary is defined by black shale of the Marcellus overlain by medium- to dark-gray and greenish-gray shale of the lower part of the Mahantango Formation. In the southwest part of the study area, the Marcellus-Mahantango contact was more difficult to define because the interval contains indistinguishable dark-gray to black shale. The Marcellus Shale ranges from 250 feet thick in the northern part of the study area to about 700 feet thick in the southern part.

Geology mapped 1991-1992.  
Computer technology by Todd Heibel.

PRELIMINARY BEDROCK GEOLOGY OF PARTS OF THE BURLINGTON, HEADSVILLE, OLD FIELDS, ROMNEY, AND SPRINGFIELD QUADRANGLES, GRANT, HAMPSHIRE, HARDY, AND MINERAL COUNTIES, WEST VIRGINIA

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