



Figure 13. Guided paddling trip on the Dragon Run.

Watershed Education

Limited watershed education efforts include workshops, field trips, and publications. Soil and Water Conservation Districts, Virginia Cooperative Extension, and the Natural Resources Conservation Service offer a variety of workshops, seminars, and publications related to watersheds, nonpoint source pollution, agriculture, and forestry. These programs mainly target those involved in agriculture and forestry activities. Rappahannock Community College and the Chesapeake Bay Foundation both lead students on paddle trips. The Friends of Dragon Run offer paddle trips to citizens and decision-makers. Finally, local governments provide publications explaining land use regulations. For example, King and Queen and Middlesex Counties distribute fact sheets about pertinent ordinances to new and prospective property owners.

Infrastructure and Planning

To effectively characterize the watershed's landscape and how it may change in the future, existing infrastructure and plans guiding future development must be assessed.

Future Land Use

Local comprehensive plans are intended to serve as the county's guide to its vision for the future. One of the most important elements of a comprehensive plan is future land use designation. In general, future land use throughout the Dragon Run watershed is primarily designated as rural in the comprehensive plans of the four counties. There exists, however, a wide range of specific land use designations within the watershed, ranging from industrial to commercial to town-like development, rural residential and rural preservation (**Figure 14**).



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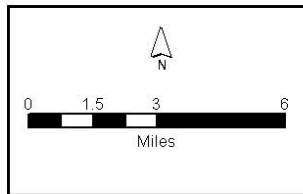
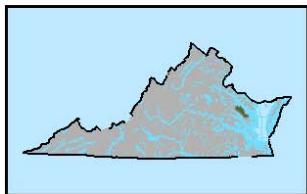


Figure 14. Future land use in the Dragon Run watershed.

Land use designations are tied to existing land uses, infrastructure, and anticipated growth patterns. It is clear through the comprehensive plans that localities expect that the majority of the watershed will remain rural, dominated by farming and forestry. Specific areas, like those along major roadways such as U.S. Route 17 and VA Route 33, are more suited to industrial and commercial development. Conversely, the swamps and streams of the Dragon Run do not lend themselves to development.

Zoning

Zoning is designed to regulate the use of land to ensure land use compatibility. Logically, then, zoning is the regulatory implementation of provisions in the comprehensive plan. Therefore, the Dragon Run watershed is zoned primarily in rural districts, with limited areas in conservation, industrial, commercial and residential districts (**Figure 15**).

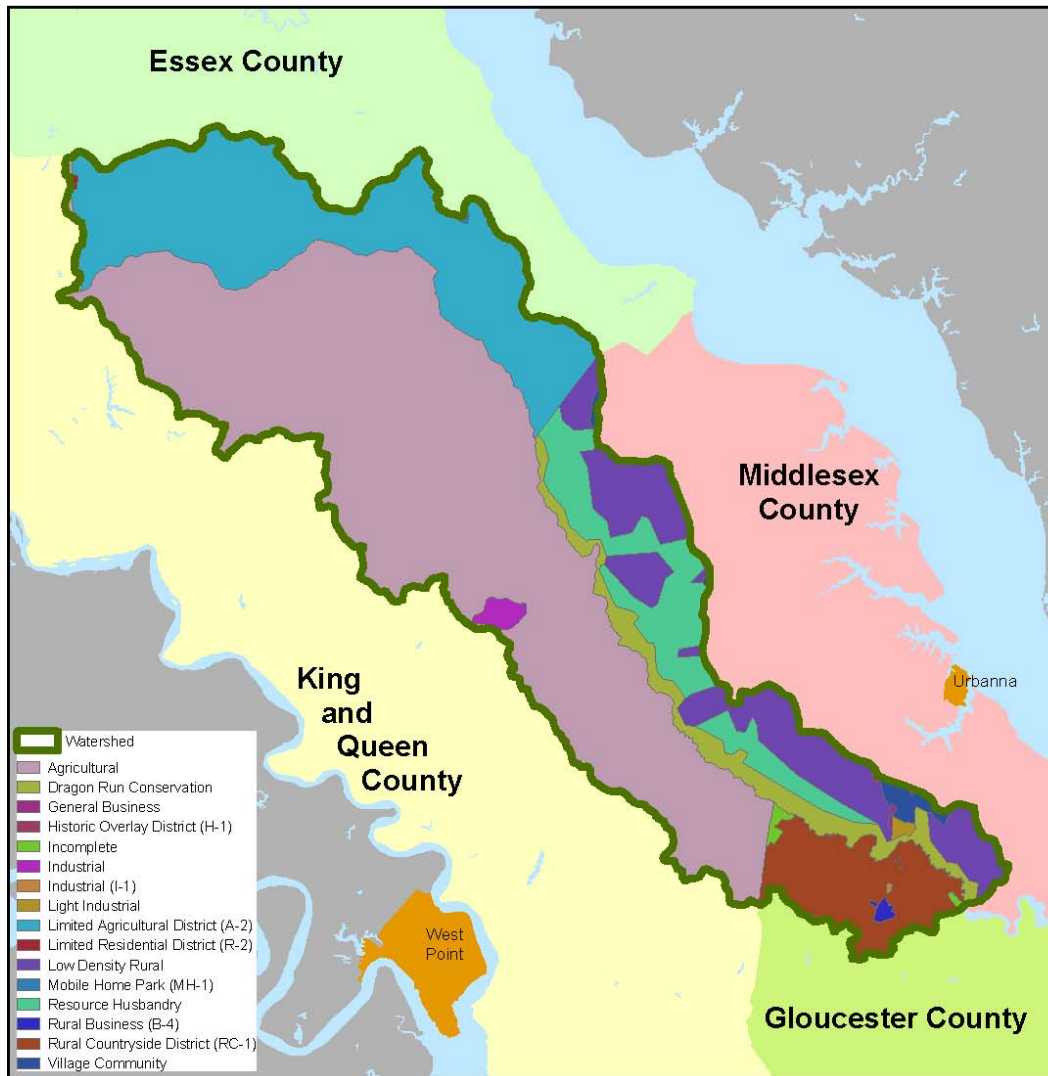
The majority of the watershed is zoned for agricultural uses, with varying restrictions and allowances across county boundaries. Significant commercial and industrial zoning occurs along U.S. Route 17 throughout Gloucester and Middlesex Counties. Furthermore, the landfill in King and Queen County owned by Browning-Ferris Industries is zoned industrial. Both King and Queen and Middlesex Counties maintain the Dragon Run Conservation District along the main channel of the Dragon Run. King and Queen's Dragon Run Conservation District is not mapped.

Distinctions between major and minor subdivisions, density requirements, and permitted uses vary widely across zoning district types and among counties. As a result, on-the-ground conditions can and do vary considerably across county boundaries. For instance, the maximum number of lots permitted by right (e.g. minor subdivisions) in agricultural and conservation districts ranges from 2-6 lots.

Other Ordinances and Regulations

The counties also employ other ordinances and regulations. These include Chesapeake Bay Preservation Act provisions or ordinances, wetlands ordinances, erosion and sediment control provisions and ordinances, subdivision ordinances, and site plan review. Some of the major effects of these regulations include land use restrictions and development standards in Chesapeake Bay Preservation Areas and the prohibition of major subdivisions in agricultural zoning districts.

A major difference between the counties is how the Resource Management Areas (RMA) are defined. Gloucester County defines RMA as any area outside of the Resource Protection Area (RPA) countywide. Essex County effectively applies RMA restrictions countywide, while King and Queen and Middlesex Counties apply a buffer landward of the RPA.



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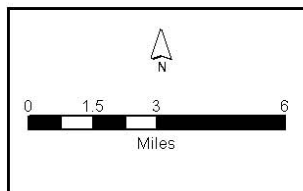
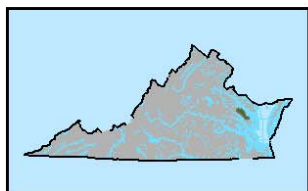


Figure 15. Zoning classifications in the Dragon Run watershed.

Road Network

The road network within the watershed could be described as sparse (**Figure 16**), with few primary highways. The primary highways are U.S. Route 17, which runs north and south through Gloucester, Middlesex, and Essex Counties, and State Route 33, which runs east and west through King and Queen, Gloucester, and Middlesex Counties. Logically, these highways contain the most development within the watershed and are designated for that purpose in the comprehensive plans. These two highways intersect at Glens in Gloucester County and Saluda in Middlesex County, which are both designated as rural business districts. A short length of State Route 198, a primary highway, runs east from Glens in Gloucester County before leaving the watershed.

There is a sparse network of secondary roads, some of which serve as connectors along the road network. Route 603 and Route 602 both cross the middle Dragon Run and connect King and Queen and Middlesex Counties. Route 604 and Route 612 both cross the upper Dragon Run and connect Essex and King and Queen Counties. Route 684 serves as a connector between U.S. Route 17 and U.S. Route 360 in Essex County. Several other secondary roads serve as significant links within the road network. Examples of these are: Route 644 in Middlesex County; Routes 609, 610, 616, and 617 in King and Queen County; and Route 607 in Essex County. Finally, there is a network of unpaved logging, farm, and residential roads that access the more remote parts of the watershed.

Land Parcels

According to data collected in 2001, there are 3,073 parcels of land in the Dragon Run watershed (**Figure 17**) (MPPDC, 2002). The distribution of parcels is: Essex (25%); Gloucester (11%); King and Queen (38%); and Middlesex (26%). The land area within the watershed is distributed as follows: Essex (21%); Gloucester (6%); King and Queen (52%); and Middlesex (21%). Comparing the distribution of parcels to the distribution of land area within the watershed, we find that Essex, Gloucester, and Middlesex Counties have a higher percentage of parcels than of land area, meaning that they have smaller average parcel sizes than King and Queen County. King and Queen County has a much higher percentage of land area than of parcels, indicating a much larger average parcel size than the other three counties.

Land ownership is almost entirely private. A considerable amount of private land is owned by timber interests. For example, the single largest owner, John Hancock Life Insurance Company, owns approximately 26,000 acres (28.9% of the watershed). Much of this timber land is, in turn, leased to hunt clubs. Public ownership includes the College of William and Mary (121 acres) and the Virginia Department of Transportation (fee simple and prescriptive easements for roads and right-of-way).

Conservation

The Virginia Division of Natural Heritage has established conservation planning boundaries (**Figure 18**) around natural heritage resources - rare species and natural communities - based on their habitat needs to ensure their preservation. These conservation sites represent the ideal conservation scenario for these state and globally



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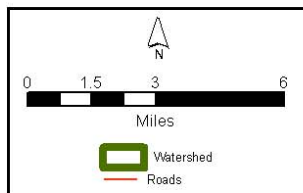
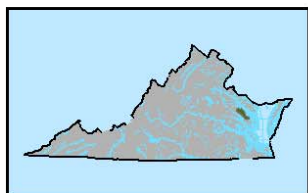
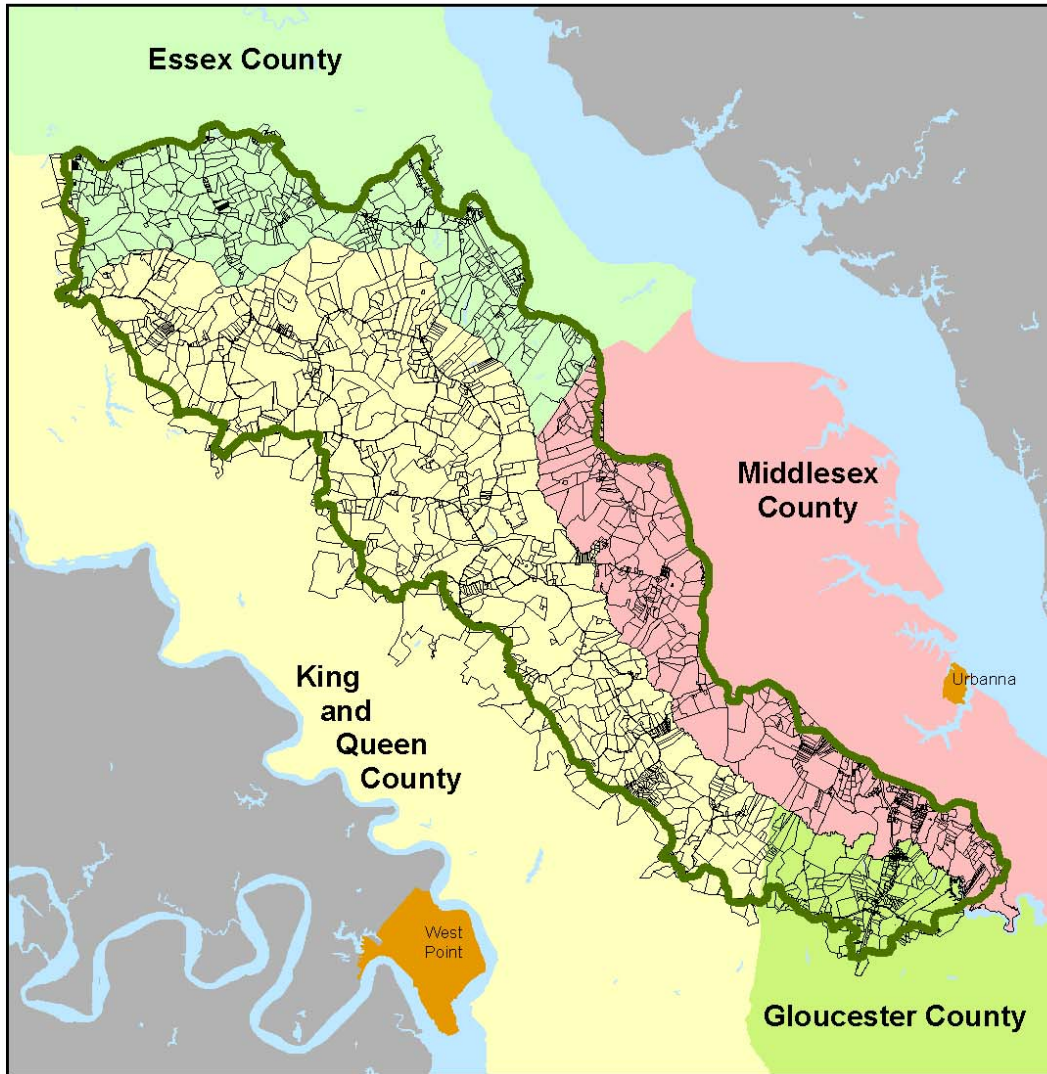


Figure 16. Road network in the Dragon Run watershed.



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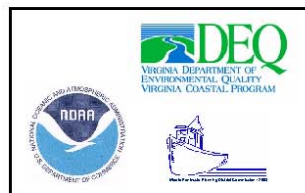
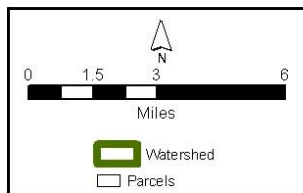
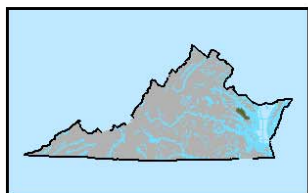


Figure 17. Parcels of land in the Dragon Run watershed.