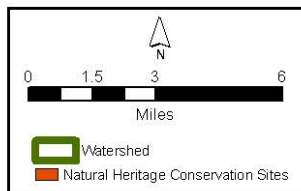
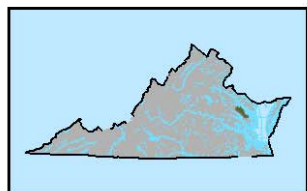




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**Figure 18.** Natural heritage conservation sites for the Dragon Run watershed.

rare resources. Some of these resources have been conserved, either through fee simple purchase or purchase of conservation easements (**Figure 19**). Conservation easements are held on 235 acres by the Virginia Outdoors Foundation, 72 acres by Friends of Dragon Run, and 32 acres by the Chesapeake Bay Foundation.

### Structures

Interpretation of digital orthophoto quadrangles from 1994 revealed that there were 1,311 structures or clusters of structures (e.g. barns and accessory buildings) in the Dragon Run watershed (**Figure 20**) (MPPDC, 2002). As expected, the majority of the structures are located along the primary highways and, to a lesser degree, along the secondary road network. It is likely that population growth and accompanying residential structures will continue to follow this pattern.

### Sustainable Economic Development

Landowners find it increasingly difficult to sustain farm and forest operations. Virginia's River County, the Middle Peninsula's business development partnership, finds that sustainable economic development in the region is limited and the farming and forestry industries are suffering losses (VRC, 2002). Virginia's River Country indicates in its strategic plan that one of its priorities is to promote sustainable growth in resource-based industries (e.g. forestry, farming, nature-based tourism) to preserve natural resources from the pressures of development. In other words, the region has opportunities to develop the capacity to produce sustainable and value-added forest and agricultural products.

### Buildout analysis

A buildout analysis offers an assessment of the potential number of lots allowed by land use regulations. Assessments may be based upon the number of lots allowed by right or upon the number of lots allowed by exception or by rezoning.

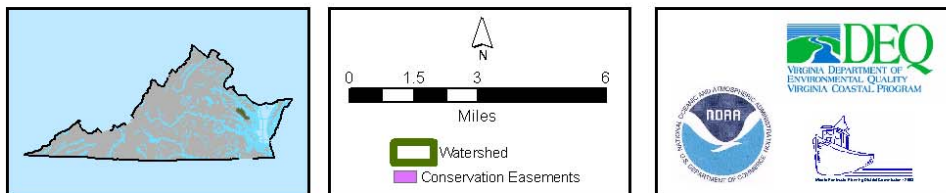
Based on a supplement to the *Dragon Run Land Use Policy Audit* (MPPDC, 2003), it is estimated that there is a potential for 3,916 parcels allowed by right (i.e. without the need for an exception or rezoning). This estimate is founded upon the number of lots and the minimum lot size permitted by right for minor subdivisions. The result represents a 27% increase in the potential number of parcels. An example of potential development under current land use policies in the watershed is featured in **Figure 21**.

As part of the *Dragon Run Management Framework* (MPPDC, 2002), a buildout analysis was completed based on both the potential number of lots allowed by right, by exception, or by rezoning. The analysis evaluated buildout based on both "build-compatible" values (i.e. wetlands) and "environmental" values (i.e. wetlands, topography [slope], floodplains, land cover, conservation easements, threatened and endangered species locations, and conservation species sites). An index was created based on these values and those that ranked low for development unsuitability were assessed for their development potential under current zoning designations. Based on zoning and subdivision rules, "theoretical lots" were then calculated within

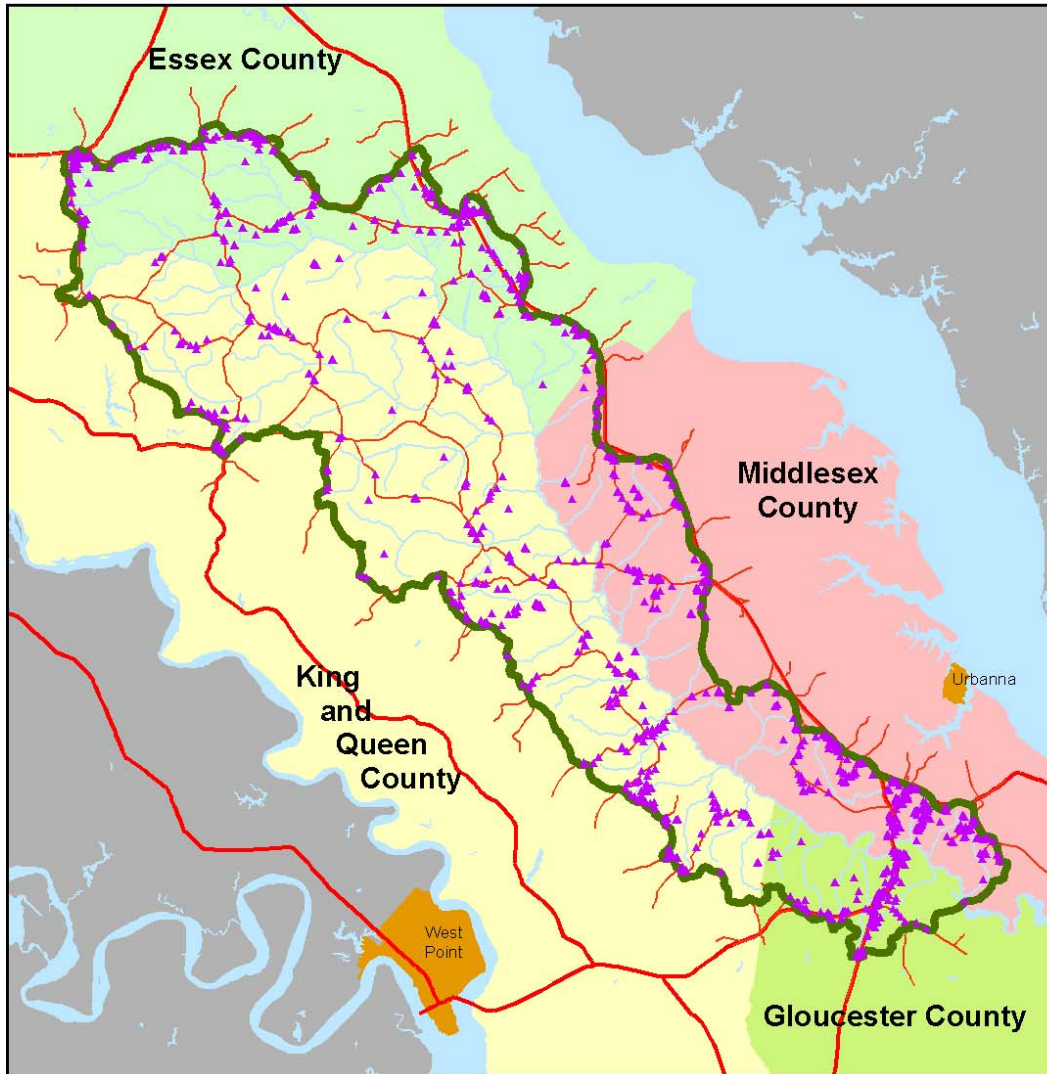


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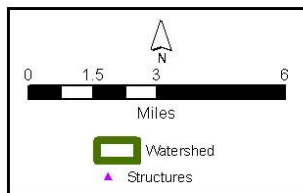
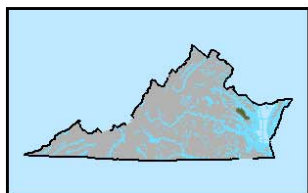


**Figure 19.** Conservation easements in the Dragon Run watershed.

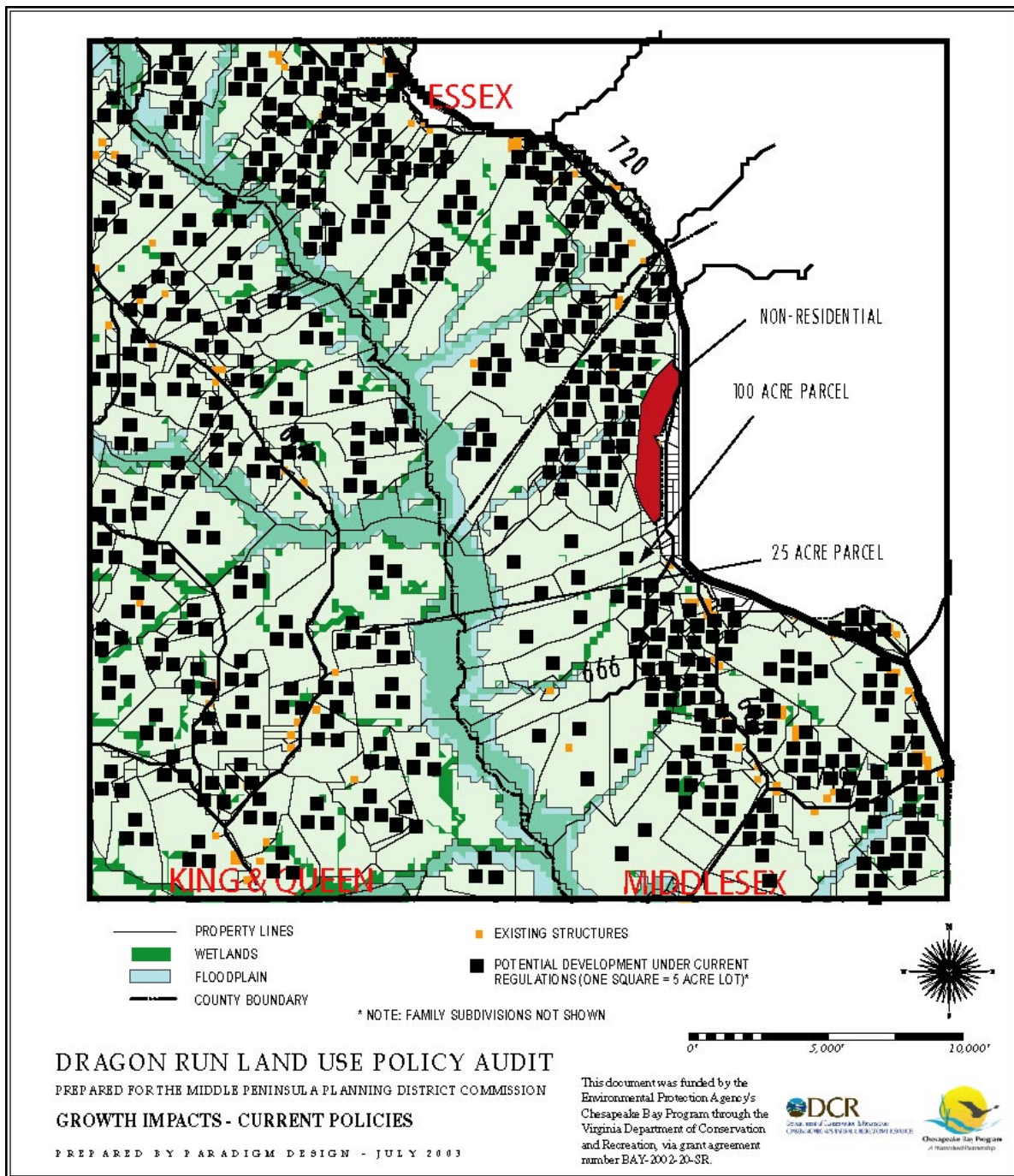


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**Figure 20.** Structures in the Dragon Run watershed.



**Figure 21.** Potential development under current land use policies in the Dragon Run watershed (from MPPDC, 2003).

those areas that were ranked as suitable for development under both scenarios. The “build-compatible” analysis yielded a total of 40,851 theoretical lots that could be developed under current zoning, while the “environmental” analysis yielded 38,208 theoretical lots. The results of the analysis represent a 1,143% increase in the potential number of parcels based on “environmental” values and a 1,229% increase in the potential number of parcels based on “build-compatible” values.

### **Identified Data Gaps**

Several gaps in the available data were identified. Two of these data gaps, fish communities and benthic macroinvertebrates including freshwater mussels, are being addressed by a research project being undertaken by Virginia Commonwealth University’s Center for Environmental Studies (VCU). This project is anticipated to be completed during the fall of 2003. Its final report will also summarize previous data collection efforts by VCU and the Virginia Department of Game and Inland Fisheries.

Natural heritage information is available for the main channel of the Dragon Run and its adjacent swamps, but not for headwater streams and adjacent uplands. This data gap is being addressed by a natural heritage inventory of 14 sites in the upper reaches of the watershed being undertaken by the Department of Conservation and Recreation’s Division of Natural Heritage. A technical report titled “A Natural Heritage Inventory of Fourteen Headwater Sites in the Dragon Run Watershed” will be completed by December 2003.

The status of invasive species in the Dragon Run is partially known. Efforts to gather more detailed information about invasive species, primarily common reed and blue catfish, are underway.

Other data gaps are not being addressed at this time. For example, there is scant information about migratory birds, other than highly specific research (e.g. bald eagle nesting assessment, colonial bird nesting assessment) and amateur observational records. The scope of a research project to comprehensively assess migratory bird activity in the watershed is tremendous and would require funding that is not available at this time.

Another data gap that is not currently being addressed is the source of water quality impairments (e.g. pH, fecal coliform, mercury, lead) for stream segments on the Virginia 303(d) list (DEQ, 2002). It is assumed that pH impairment is from natural sources (i.e. swamps are naturally acidic). Development of Total Maximum Daily Loads (TMDL) for impairments in Dragon Run stream segments are planned by the Virginia Department of Environmental Quality (DEQ) in 2010.

Finally, the effect of tax policies on the viability of farming and forestry operations is not fully understood in the watershed. The impact of tax incentive programs (e.g. land use taxation) and tax policies (e.g. taxation based on full development potential) on the sustainability of agriculture and silviculture has not been assessed.

## **SECTION 7: Resource Needs**

**Section 7 itemizes the resources needed to implement the actions in the watershed management plan. This section also identifies responsible parties and possible funding sources.**

**Table 3** lists Actions (**Section 4**) with responsibilities, estimates of funding needs, and possible funding sources.

<b>ACTION</b>	<b>RESPONSIBILITY</b>	<b>FUNDING</b>	<b>FUNDING SOURCE</b>
<i>1. Land Use and Resource Preservation</i>			
A. Designate a Unified "Dragon Run Planning Area"	MPPDC; Dragon Run Steering Committee; local governments	Minimal to moderate	MPPDC (VA Coastal Program); local governments
B. Implement Tools to Preserve Forest, Farm, and Natural Resources	Local, state, federal government; non-profits; landowners	Varies from minimal (local "right-to-farm") to considerable (PDR program)	Local, state governments; non-profits; EPA; Forest Legacy Program
C. Address Public and Landowner Access Issues	Dragon Run Steering Committee; local, regional, state gov'ts	Varies from low (signs) to considerable (land acquisition, site development)	VA Coastal Program; Public Access Authority
D. Control Invasive Species	Dragon Run Steering Committee; Invasive Species Initiative	Moderate	VA Coastal Program; DGIF; VMRC; DCR; U.S. Fish and Wildlife Service
<i>2. Education and Landowner Stewardship</i>	Dragon Run Steering Committee; local, state, federal gov'ts; citizens	~\$20K/year; programmatic	VA Coastal Program; Dept. of Forestry; USDA/NRCS; DCR; EPA; US FWS
<i>3. Encourage and Support Sustainable Economic Development</i>	Dragon Run Steering Committee; local gov'ts; business	\$18,000 in 2003-2004	VA Coastal Program
<i>4. Monitor Plan Implementation</i>	Dragon Run Steering Committee; local gov'ts	Minimal to moderate	MPPDC (VA Coastal Program); local gov'ts

**Table 3.** Resource needs for Dragon Run Watershed Management Plan.



## **SECTION 8: Progress Benchmarks**

**Section 8 serves as a monitoring framework for assessing the implementation of the watershed management plan.**

**Table 4** lists Actions from **Section 4** and their corresponding progress benchmarks, including responsible parties and anticipated completion time. This table serves as a monitoring plan framework.

<b>ACTION</b>	<b>RESPONSIBILITY</b>	<b>BENCHMARK</b>	<b>COMPLETION</b>
<i>1. Land Use and Resource Preservation</i>			
A. Designate a Unified "Dragon Run Planning Area"	MPPDC; Dragon Run Steering Committee; local governments	Adoption of phases of strategy in all four counties	Level 1 - September 2004; Levels 2 & 3 – 2005-2006?
B. Implement Tools to Preserve Forest, Farm, and Natural Resources	Local, state, federal government; non-profits; landowners	Use 1 or more tools to preserve 50 acres/year	Ongoing
C. Address Public and Landowner Access Issues	Dragon Run Steering Committee; local, regional, state gov'ts	Acquisition of 1 land-based site; erect trespassing signs at access points	December 2004
D. Control Invasive Species	Dragon Run Steering Committee; Invasive Species Initiative	Representation on Council; establish education materials	September 2004; ongoing
<i>2. Education and Landowner Stewardship</i>	Dragon Run Steering Committee; local, state, federal gov'ts; citizens	Establish festival and awards; perform 6 trips/year; post signs along major roadways; develop forest stewardship plans (5/year); enrollment in farm programs (100 acres/year); complete one action-based project/year	December 2004; ongoing
<i>3. Encourage and Support Sustainable Economic Development</i>	Dragon Run Steering Committee; local gov'ts; business	Complete sustainable economic development report; promote Coastal Birding Trail	September 2004; ongoing
<i>4. Monitor Plan Implementation</i>	Dragon Run Steering Committee; local gov'ts	Complete Table 4	As designated

**Table 4.** Benchmarks for monitoring the Dragon Run Watershed Management Plan.

## **SECTION 9: Conclusions**

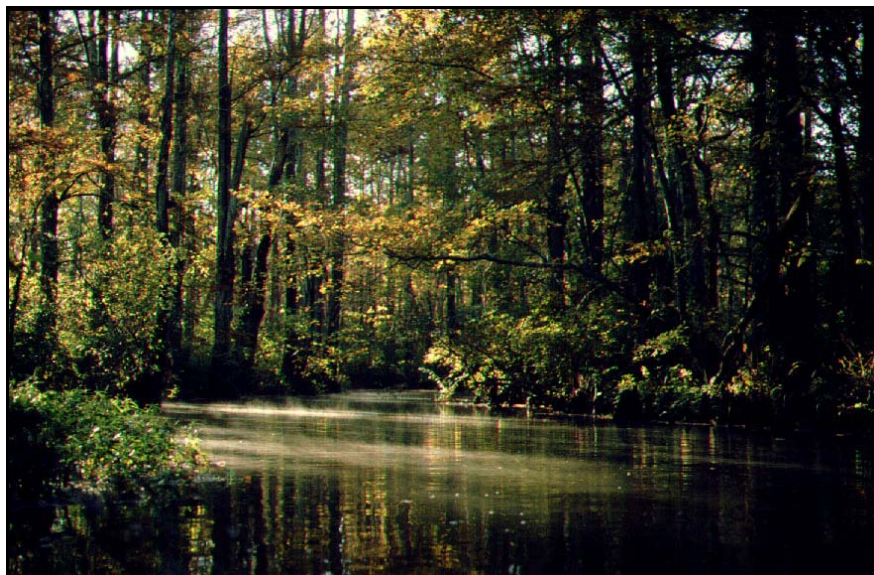
**Section 9 reminds readers of the watershed management plan's purpose. This section recalls the plan's citizen-initiated beginnings and that it serves as a vision for the future of the Dragon Run watershed.**

This watershed management plan for the Dragon Run watershed represents a body of work by citizens, stakeholders, and decision-makers to achieve a common vision for the future – the preservation of the traditional uses and unique resources in the pristine Dragon Run. It is a symbol of regional cooperation and coordination that crosses jurisdictional boundaries. It is the next logical step on the path towards protecting the Dragon Run watershed and preserving its cultural, historic, and natural heritage for future generations.

The plan's goals and objectives (**Section 3**) speak to the major issues at play in the watershed. Its actions (**Section 4**) attempt to address those issues. Together, they are a road map for the watershed.

The plan also captures the current status and state of knowledge of the watershed (**Section 6**). It highlights what we know and what we do not know. It also offers a mechanism for monitoring plan implementation by comparing the baseline watershed information to future results. Progress benchmarks are the basis for this monitoring (**Section 8**). The plan designates responsibility for plan implementation (**Sections 7 & 8**) and estimates costs and funding sources (**Section 7**).

The watershed management plan is not a static document. It is not an end in and of itself. It is a citizen-initiated vision for the future of the watershed that may be modified as situations change or as new information becomes available. It is a vision that harnesses the passion and energy for the Dragon Run (**Figure 22**) of those who live, work and play in its watershed.



**Figure 22.** A misty morning on the Dragon Run (Credit: Teta Kain)