



March 20, 2008

Mr. John Gysling
New Castle County
Department of Planning
87 Reads Way
New Castle, DE 19720

RE: Addendum to the Report on Source Water Protection for the Surface Water Intakes in New Castle County (submitted December 11, 2007)

Dear Mr. Gysling:

Enclosed is an addendum to our report summarizing the natural resources protected by the Unified Development Code in the watersheds upstream from the four drinking water intakes in New Castle County. The previous report tabulated the acreage of land protected by the New Castle County Unified Development Code (UDC), in areas upstream of surface water intakes, or "Level 2" areas as designated by the Delaware Source Water Protection Law of 2001. Additionally, the percentages of major land use categories were calculated within these areas. The current report extends this analysis, summarizing the natural areas specified in the first report which fall within Level 1A (100-year floodplains, and/or erosion-prone slopes) and Level 1B (buffer areas 200 feet from each side of streams) zones.

Our analysis indicates that, of the approximately 123 square miles of area upstream from the four intakes in New Castle County, 31.6 square miles (20,224 acres), or 25.6% of the entire watershed, fall within the Level 1A and 1B delineation classifications. The UDC natural resource protection zones and public/private open space protect approximately 29.5 square miles (18,890 acres), or 93.5% of Level 1 source water areas. Please refer to the attached document for a complete breakdown by watershed, and for a map summarizing our findings.

Should you have any questions, please do not hesitate to contact our office at 302-831-4932.

Warmly;

Andrew Homsey

Gerald Kauffman

Cc: George Haggerty, New Castle County
John Barndt, DNREC
Michael Clar, New Castle County

Roy Simonson, City of Newark
Sean Duffy, City of Wilmington
Doug Rambo, DNREC

Addendum
Report on Source Water Protection for the Surface Water Intakes
New Castle County, Delaware
March 20, 2008

Summary

This report summarizes the natural resources protected by the Unified Development Code (UDC) in the watersheds upstream from the four drinking water intakes in New Castle County, relative to the delineation classifications, Level 1A and Level 1B as specified in the Delaware Source Water Protection Law of 2001.

Watersheds upstream of each of the four source water intakes were considered separately. These were:

- Brandywine Creek above Wilmington
- White Clay/Red Clay Creeks above Stanton
- White Clay Creek above Newark
- Christina River at Smalleys Pond

Please refer to Figure 1 for a map of these watershed areas.

Approach

The purpose of this GIS analysis is to assess the degree to which natural areas as defined by the UDC protect those areas designated as important for source water protection under the Delaware Source Water Protection Law of 2001. For each of the data layers representing natural resources targeted for protection under the UDC, acreages within both Level 1A and Level 1B zones were calculated. These layers were considered separately (“non-exclusive”—allowing for overlap), and as a merged unit (“exclusive”—no overlap). Then the areas of natural resources were mapped only in the Level 1A (100-year floodplains, and/or erosion-prone slopes) and Level 1B (buffer areas 200 feet from each side of streams) zones (see Figure 2).

The following list summarizes those areas of natural resources protected by Article 10 of the New Castle County Unified Development Code, and used in this analysis:

- Floodplain (100 year floodplain)
- Wetlands (as designated by DNREC)
- Riparian Buffer (50 ft from floodplain and wetlands, 100 ft from streams)
- Cockeysville Formation WRPA
- Cockeysville Formation Drainage Area WRPA
- Wellhead Class A
- Wellhead Class B and C
- Recharge Area WRPA
- Steep Slopes (slopes > 15% and erosion prone slopes)
- Forests (as designated by DNREC’s Green Infrastructure program)
- Public/Private Open Space
- Reservoir WRPAs (Hoopes and Newark)

Results

Tables 1 and 2 summarize the areas of Levels 1A and 1B, respectively, for each of the four watersheds upstream of the drinking water intakes. Note that the area of the Red Clay and White Clay Creeks upstream of Stanton includes the area of the White Clay Creek upstream of Newark. These numbers are “non-exclusive”, meaning that there is overlap between Level 1 and Level 2 zones.

Table 1 – Areas within Level 1A, 100-year floodplains, and/or erosion-prone slopes, for each watershed upstream of surface drinking water intakes.

	Acres	Square Miles
Brandywine Creek at Wilmington	2,490.78	3.89
White Clay Creek at Newark	997.51	1.56
White Clay/Red Clay at Stanton	8,881.10	13.88
Christina at Smalley's Pond	2,629.93	4.11
Totals	14,001.81	21.88

Table 2 – Areas within Level 1B, buffer areas 200 feet from each side of streams, for each watershed upstream of surface drinking water intakes.

	Acres	Square Miles
Brandywine Creek at Wilmington	2,335.28	3.65
White Clay Creek at Newark	852.78	1.33
White Clay/Red Clay at Stanton	7,983.82	12.47
Christina at Smalley's Pond	2,970.60	4.64
Totals	13,289.70	20.77

Table 3 shows the areas of each of the UDC-specified natural resources within the Level 1B buffer, and indicates the percentage of land within this zone protected by the provisions of the UDC. Since many of these layers may overlap, both the total areas, including those that overlap, as well as the exclusive areas, are shown. Since the Level 1A zones are, by definition, identical to the combination of the floodplain and erosion-prone slopes specified in the UDC, the areas of Level 1A zones protected by the UDC are not enumerated by type. The fact that they are identical is indicated by the fact that in the table, they are listed as being protected 100% by the UDC. The final row of the table indicates the aggregate protection afforded by the specified UDC protection layers within all Level 1 (Level 1A plus Level 1B) areas.

In all, UDC does provide a significant level of protection, relative to the protections recommended by the State of Delaware Source Water Assessment Plan and the Delaware Source Water Protection Law of 2001. Protections are all above 90%, ranging from 90.4% in the watershed above Smalley’s Pond, to 97.9% for the White Clay Creek above Newark. Overall, Level 1 areas are protected at 93.5% by the UDC. Clearly, the difference in protection stems from the variation in the riparian buffers specified by the state versus those by the county. The map in Figure 2 illustrates this.

Table 3 – Summary of significant natural resources in surface water Level 1A and Level 1B source protection areas, New Castle County, Delaware. Acreages are shown enumerated for protections within Level 1B zones only.

	Brandywine Creek at Wilmington	White Clay Creek at Newark	White Clay/Red Clay at Stanton	Christina at Smalley's Pond	
Class A Wellhead	0.7	0.1	4.9	0.0	
Class B Wellhead	0.0	0.0	0.0	75.2	
Class C Wellhead	0.0	42.5	247.8	75.6	
Cockeysville Formation	0.0	0.0	442.8	0.0	
Cockeysville Drainage Area	0.0	0.0	1,051.7	0.0	
Recharge Areas	0.0	0.0	0.0	10.9	
Erosion Prone Slopes	448.3	188.2	1,144.6	125.7	
Slopes > 15%	695.5	354.7	1,972.6	87.9	
Forest	647.0	560.3	2,374.5	1,022.3	
Floodplains	762.6	259.2	3,130.8	1,479.9	
Wetlands	225.1	47.3	725.7	501.0	
Riparian Buffer	1,562.5	551.5	5,680.2	2,306.7	
Public/Private Open Space	385.5	598.5	2,439.0	764.7	
Hoopes Reservoir	0.0	0.0	465.4	0.0	
Newark Reservoir	0.0	0.0	227.8	0.0	
<i>Non-exclusive Total, Acres</i>	4,727.2	2,602.4	19,907.8	6,449.9	TOTAL 31,084.9
<i>Exclusive Total, Acres</i>	2,013.6	822.8	7,382.0	2,586.1	11,981.7
<i>Exclusive Total, Sq. Miles</i>	3.1	1.3	11.5	4.0	18.7
<i>% of Level 1B Protected</i>	86.2%	96.5%	92.5%	87.1%	90.2%
<i>% of Level 1A Protected</i>	100.0%	100.0%	100.0%	100.0%	100.0%
<i>% of Level 1A & 1B Protected</i>	91.1%	97.9%	95.2%	90.4%	93.5%

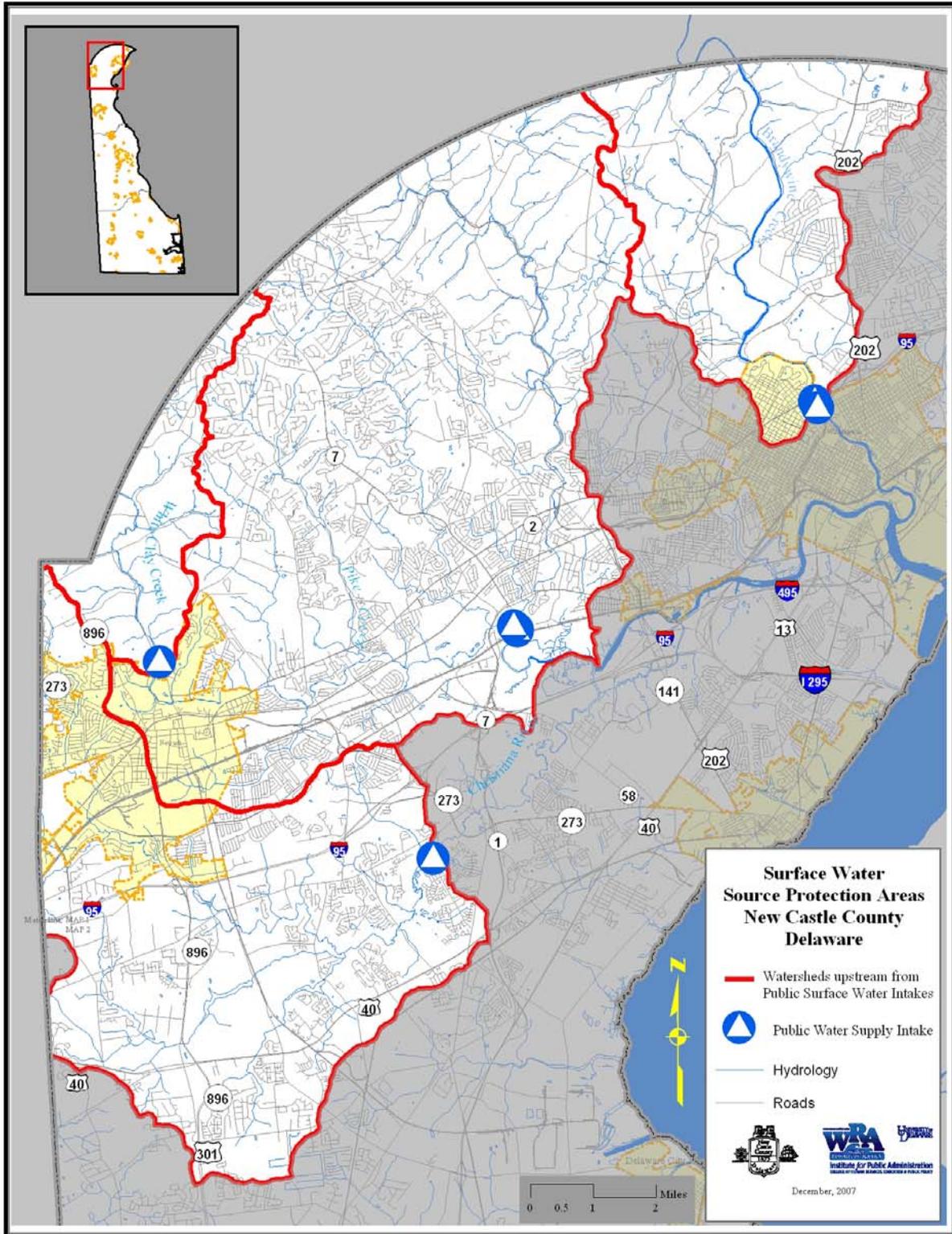


Figure 1 – Surface water source protection areas for New Castle County, Delaware, with locations of public water supply intakes shown.

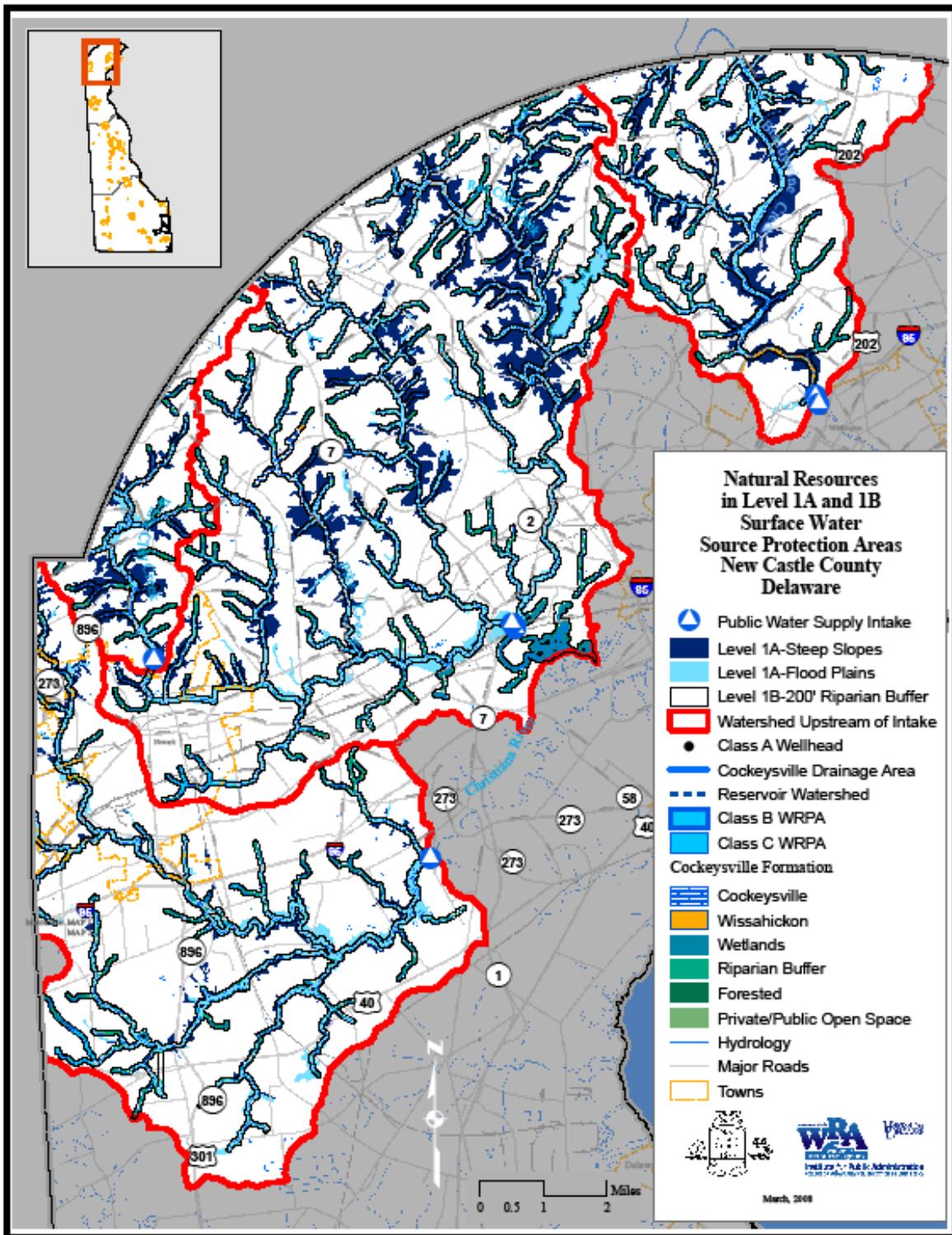


Figure 2 – Areas of significant natural resources within Level 1A and Level 1B surface water source protection areas, including areas protected by the Unified Development Code (UDC) for New Castle County.