Chesapeake & Delaware (C &D) Canal Watershed

Delaware Bay Basin
This map is prepared primarily for internal DNREC resource management purposes. The information contained herein is preliminary and is subject to change or modification at any time. Use of this information by others is at their own risk and the DNREC in no way guarantees the accuracy of the information.
Watershed: C & D Canal

Basin: Delaware Bay

Watershed Description:

Drainage Area: 41,000 acres
Total Stream Length: 79.0 miles
Mainstem Length: 12.2 miles
Receiving Waterbody: Delaware River

Land Use:
Agricultural: 56%  Brushland: 9%
Forest: 14%  Urban/Residential: 4%
Wetland: 10%  Other: 7%

Summary:

The Chesapeake and Delaware Canal (C&D Canal) water quality watershed includes a portion of the Delaware River between Reedy Point and the Appoquinimink River. The C&D Canal is a man-made navigation channel connecting the Delaware River to the Chesapeake Bay. The canal is 450 feet wide and 35 feet deep. The length of the Delaware portion of the canal is 12.2 miles from Reedy Point on the Delaware River to the Delaware-Maryland state line. The land adjacent to the canal from approximately 1,000 feet south of the canal to an average of 2,000 feet north of the canal is federal reservation land currently designated as a wildlife area. The prominent drainage tributaries to the canal are Scott Run and Joy Run on the south side of the canal and the Lums Pond State Park on the north side of the canal. The eastern extremity of the canal watershed is low marshland utilized primarily as wildlife habitat. Westward from these low tidal marshes, the land rises to a level terrain between 50 to 100 feet in elevation.

Flow and currents in the canal are a function of the differential tidal stages at the two ends of the canal. However, net flow in the canal is from the Chesapeake Bay to the Delaware River. The canal channel penetrates the sands of the Atlantic Coastal Plain and thus intercepts and receives freshwater discharge from these aquifers.

The canal watershed is totally rural in character. The main communities of population within the watershed are Port Penn on the Delaware River and St. Georges on the canal at the Route 13 bridge crossing. The remainder of the segment is rural.

With the exception of the wildlife and tidal marshes and the state park at Lums Pond, the land use in this watershed is still mainly agricultural. Concerns in the watershed include high bacteria counts.

Pathogens (as indicated by elevated Enterococcus levels), nutrients, physical habitat condition, and water supply are the main concerns in watershed.
**Surface Water Quality Assessment:**

In the ponds the average nitrogen, phosphorous, and chlorophyll-a concentrations were moderate. In the remaining waters, the average nitrogen and chlorophyll-a concentrations were considered moderate while the average phosphorous concentration was considered high.

Enterococcus bacteria levels fully supported 100% of the Secondary contact use for the 79 river miles. Enterococcus bacteria levels partially supported 100% of the Secondary contact use and did not support 100% of the primary contact use for the 189.3 pond acres assessed in the watershed.

Aquatic Life use was fully supported in 77.5% of the 79 river miles assessed in the watershed. Nineteen percent (22.5%) did not support Aquatic Life. The stressor for non-attainment was biology. The Fish, Aquatic Life and Wildlife use for the 189.3 pond acres assessed was also fully supported in the watershed. (See graphs below)

**Percent of Use Support per Designated Use:**

The following graph depicts the percent of use support (F = Fully Supported; P = Partially Supported; N = Not Supported) for the C&D Canal.

![Graph showing percent of use support for River and Pond designated uses.](image)

**Nonpoint Source Activities:**

Following is a listing of activities in the watershed that have a potential to contaminate ground and/or surface waters. Included are assessments of the susceptibility of ground and/or surface waters to nonpoint source pollution according to soil types found in the watershed.
Agriculture
55% of total watershed acreage is agricultural land.
Susceptibility according to soils: Low
Activities: Moderate concentration of animal production, dairy, layers. Agriculture is predominantly below the canal. West of Rt. 13, farmers rotate potatoes-alfalfa-vegetable production with corn-soybean-small grain production. East of Rt. 13, wetter Keyport-associated soils confined farmers to corn-soybean-small grain rotation for the most part.

Overall concern rating: Moderate

Initiatives: Designated watershed 1994-1996 for the Water Quality Improvement Program through the Consolidated Farm Services Agency; Also a PL566 project, through the Natural Resources Conservation District, to complete the Pencader Floodplain Management Plan.

Silviculture
14% of total watershed acreage is forested.
Susceptibility according to soils: Moderate
Overall concern rating: Low

Construction/Urban Runoff
Development expected: Very High
Percent impervious area: 2%; considered low

Land Disposal (On-Site Wastewater Treatment Systems)
Total residential area: 1,471 acres
Residential area not sewered: 1,198 acres, by comparison with other watersheds, considered moderate
Susceptibility according to soils: Moderate

Overall concern rating: Moderate
* On-site system failures are chronic as a result of placement/installment, especially east and west of Rt. 13 between Boyds Corner and the Canal

Hydromodification
Area drained by tax ditches:
Existing 11,937 acres (33% of total watershed acreage)
Petitioned 412 acres (1% of total watershed acreage)
Overall concern rating: Moderate
Fish Projects:

Development of Youth Fishing Ponds: Evaluations for small fishing ponds on public lands to increase fishing opportunities through put/grow/take and stocking programs were completed for Blackbird State Forest, Redden State Forest, and Mendenhall Village. Evaluations were also done on DNREC owned ponds at Blackiston Wildlife Area, Augustine Wildlife Area, and Woodland Beach Wildlife Area.

Watershed Initiatives:

Water Supply Plan for New Castle County - The projected water supply need for northern New Castle County in the year 2040 is 1,200 million gallons during a 60 day drought period. Therefore, a proposed desalination facility has been evaluated for a 20 million gallon per day capacity to meet demand during such a drought event. The Christina River, Chesapeake & Delaware Canal, and Delaware River are being considered for desalination source water. Three surface water desalination technologies for a water supply are being considered: reverse osmosis, electrodialysis, and multiple stage flash distillation. The desalination process selection and facilities siting draft was submitted to the Water Resource Agency for New Castle County on April 15, 1997.

Soils/Slopes:

Soil types include the Matapeke-Sassafras association described by the Natural Resources Conservation Service as “well-drained, medium-textured and moderately coarse textured soils on uplands” with “moderately fine or medium textured” subsoils.

Man-made along canals; steep slopes along tributaries and canal banks. Canal banks stabilized with riprap.
## Water Quality Analysis Summary for C & D Canal

<table>
<thead>
<tr>
<th>Watershed: C &amp; D Canal</th>
<th>Basin: Delaware Bay</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Segment</th>
<th>WBS Code</th>
<th>Size</th>
<th>Unit</th>
<th>Station</th>
<th>Assessed Parameters</th>
<th>Fish Advisory</th>
<th>Biology</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DO (mg/l)</td>
<td>pH (SU)</td>
<td>Temp. (°C)</td>
<td>Bact. (#/100 ml)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10%</td>
<td>25%</td>
<td>10%</td>
<td>90%</td>
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<tr>
<td>Canal from Maryland Line to Delaware River</td>
<td>DE 090-001</td>
<td>15.0</td>
<td>Miles</td>
<td>108031 108021</td>
<td>6.3</td>
<td>6.6</td>
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<tr>
<td>Tributaries on canal from MC Line to Delaware River</td>
<td>DE 090-002</td>
<td>17.8</td>
<td>Miles</td>
<td>B715 B720 B729  B730  B733 B757 B760 B773</td>
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<tr>
<td>Tributaries located in the watershed but NOT on the mainstem</td>
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<td>46.2</td>
<td>Miles</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Lums Pond</td>
<td>DE 090-L01</td>
<td>189.3</td>
<td>Acres</td>
<td>108111</td>
<td>7.3</td>
<td>7.8</td>
<td>6.8</td>
<td>7.8</td>
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</table>

* % of Biological Community Index (BCI) -- % of Reference

** % of Habitat Community Index (HCl) -- % of Reference
# Designated Use Support for C & D Canal

<table>
<thead>
<tr>
<th>Segment</th>
<th>WBS Code</th>
<th>Size</th>
<th>Unit</th>
<th>Station</th>
<th>Designated Uses Support</th>
<th>Assessment Type (miles)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F=Fully Supported, P=Partially Supported, N=Not Supported, &quot;--&quot;=Not Designated</td>
<td>Monitored</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>Primary Contact</td>
<td>Second Contact</td>
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<tr>
<td>Canal from Maryland Line to Delaware River</td>
<td>DE 090-001</td>
<td>15.0</td>
<td>Miles</td>
<td>108031 108021</td>
<td>-- F F -- -- -- F --</td>
<td>15.0</td>
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<tr>
<td>Tributaries on canal from MD Line to Delaware River</td>
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<td>17.8</td>
<td>Miles</td>
<td>B715 B720 B729 B730 B733 B757 B760 B773</td>
<td>-- F N (DO) &amp; (biology) -- -- -- F --</td>
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<td>Tributaries located in the watershed but NOT on the mainstem</td>
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<td>46.2</td>
<td>Miles</td>
<td>-- -- F F -- -- -- F --</td>
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<td>0.0</td>
</tr>
<tr>
<td>Lums Pond</td>
<td>DE 090-L01</td>
<td>189.3</td>
<td>Acres</td>
<td>108111</td>
<td>N (Beach Cl.) P F -- -- -- F --</td>
<td>189.3 (acres)</td>
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</table>
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<tr>
<th>Segment</th>
<th>WBS Code</th>
<th>Size</th>
<th>Unit</th>
<th>Station</th>
<th>Total Nitrogen (mg/l)</th>
<th>Total Phosphorous (mg/l)</th>
<th>Chlorophyll-a (ug/l)</th>
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</tr>
<tr>
<td>Lums Pond</td>
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<td>189.3</td>
<td>Acres</td>
<td>108111</td>
<td>1.581</td>
<td>0.958</td>
<td>1.219</td>
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Basin: Delaware Bay

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C & D Canal