Aqueducts of the Chesapeake & Ohio Canal
The builders of the C&O Canal faced a number of challenges. These included creeks, streams, runs, and one river.

These bodies of water couldn’t be dammed up or blocked, because doing so would lead to flooding and washout of the canal. Instead, the canal had to cross them.

The solution was to build over 175 culverts and 11 aqueducts. Culverts were used for the smaller crossings and aqueducts were used for the larger watercourses.

All 11 aqueducts exist today and are highlights of any canal visit. The aqueducts all have unique appearances and histories.

The aqueducts are beautiful examples of 19th century engineering and workmanship. Six are single-arched, four are triple-arched, and one has seven arches.

Two aqueducts – Monocacy and Catoctin – benefited from recent restoration projects. A third restoration project in Williamsport is now underway for the Conocochegue Aqueduct.
The Aqueducts:

<table>
<thead>
<tr>
<th>1. Seneca Creek</th>
<th>Mile 22.82</th>
<th>126 feet long; 3 arches – each with 33-foot span; completed 1832</th>
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</thead>
<tbody>
<tr>
<td>At Seneca, upstream arch lost in 1971</td>
<td></td>
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<tr>
<td>2. Monocacy River</td>
<td>Mile 42.19</td>
<td>516 feet long; 7 arches – each with 54-foot span; completed 1833</td>
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<tr>
<td>At Dickerson, major stabilization and restoration completed in 2003</td>
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<tr>
<td>3. Catoctin Creek</td>
<td>Mile 51.53</td>
<td>130 feet long; 3 arches – 40-foot span center arch and 20-foot span outer arches; completed 1834</td>
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<tr>
<td>At Landers, collapsed in 1973 and rebuilt in 2011, center elliptical arch with outer round arches</td>
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<tr>
<td>4. Antietam Creek</td>
<td>Mile 69.36</td>
<td>140 feet long; 3 arches – 40-foot span center arch and 28-foot span outer arches; completed 1835</td>
</tr>
<tr>
<td>Near Sharpsburg, damaged during Civil War, now stable, elliptical arches</td>
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</tr>
<tr>
<td>5. Conococheague Creek</td>
<td>Mile 99.80</td>
<td>196 feet long; 3 arches – each with 60-foot span; completed 1834</td>
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<tr>
<td>At Williamsport, restoration in progress, future watering and boat access</td>
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</tr>
<tr>
<td>6. Licking Creek</td>
<td>Mile 116.30</td>
<td>180 feet long; single arch – 90-foot span; completed 1838</td>
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<tr>
<td>Upstream from Ernstville, first of six single arch aqueducts, berm wall damaged</td>
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<tr>
<td>7. Tonoloway Creek</td>
<td>Mile 122.96</td>
<td>110 feet long; single arch – 63-foot span; completed 1839</td>
</tr>
<tr>
<td>At Hancock, irregular arch, downstream rests on rock ledge, berm and towpath walls down</td>
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<td></td>
</tr>
<tr>
<td>8. Sideling Hill Creek</td>
<td>Mile 136.56</td>
<td>110 feet long; single arch – 60-foot span; completed 1850</td>
</tr>
<tr>
<td>Upstream from Pearre, steel bracing, towpath wall intact</td>
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<td></td>
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<tr>
<td>9. Fifteen Mile Creek</td>
<td>Mile 140.90</td>
<td>110 feet long; single arch – 50-foot span; completed 1850</td>
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<tr>
<td>At Little Orleans, both walls standing</td>
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<tr>
<td>10. Town Creek</td>
<td>Mile 162.34</td>
<td>100 feet long; single arch – 62-foot span; completed 1849</td>
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<tr>
<td>Downstream from Oldtown, towpath wall intact</td>
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<td></td>
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<tr>
<td>11. Evitts Creek</td>
<td>Mile 180.66</td>
<td>120 feet long; single arch – 70-foot span; completed 1849</td>
</tr>
<tr>
<td>Downstream from Candoc Recreation Area, steel bracing, towpath wall intact</td>
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</table>

Note: Lengths are expressed abutment to abutment – not the full length to the end of wings.
Seneca Creek

Unique among all of the canal’s aqueducts

Combined with a lock

Lock 24 lifted boats 8.5 feet to enter the aqueduct

The aqueduct is constructed of Seneca stone from the nearby Seneca Quarry

A local flood in September 1971 washed extensive debris down Seneca Creek and destroyed the upstream arch

The aqueduct was stabilized before Hurricane Agnes struck in June 1972, preventing further damage

No immediate plans for restoration

Watch out – Copperheads love this area!
Monocacy River

One of the two signature features of the C&O Canal

The 516-foot aqueduct with seven arches took four years to build

*Initial stone used was of poor quality
*The first three piers had to be rebuilt with better stone

Large floods cover the entire aqueduct

*Debris caught on the railing can damage the aqueduct
*The new railing can be removed in event of flood

As with all of the multi-arch aqueducts, debris can build up on the upstream side of the structure

Note the dedication plaque on the berm wall of aqueduct

*Above – Aqueduct downstream view – July 18, 2009
*Background – Downstream view of upstream arch – April 1, 2017
*Below – Aqueduct upstream view – Jan. 8, 2011*
Monocacy River

Storms and floods took their toll on the Monocacy Aqueduct

*Hurricane Agnes caused extensive damage in 1972*
*Steel banding was installed in 1975 for stabilization*

By 1994 it was apparent the banding wasn’t enough

*Monocacy Aqueduct Committee formed – Carl Linden*
*Public support worked with National Park Service*
*Two big floods in 1996*

Designated one of eleven most endangered structures – 1998

Rehabilitation Project 2002 – 2005

*McMullan and Associates*
*C&O Canal Superintendents Doug Faris & Kevin Brandt*
Catoctin Creek

Center and upstream arch collapsed Oct. 31, 1973 due to flood

Restoration project completed in 2011

* Catoctin Aqueduct Restoration Fund – George Lewis
* Public support and American Recovery and Reinvestment Act

Known as the “Crooked Aqueduct” by canal boat crews

* Aligned at angle to towpath
* Boats had to make sharp turns entering and exiting the aqueduct

The first “official” walker across the restored aqueduct was a mule

Left – Collapsed aqueduct and Bailey bridge – Jan. 24, 2009
Right – Aqueduct prism, facing downstream, with sharp bends evident – April 1, 2017
Inset – Mule crossing at aqueduct dedication – Oct. 15, 2011
Background – Aqueduct downstream view – April 1, 2017
Antietam Creek

Built of limestone from a nearby quarry

Three elliptical arches, center arch is wider

The berm wall and part of the towpath wall were torn out during the Civil War
  Gen. Jubal A. Early's forces, July 6, 1864

Berm and towpath walls are in good condition

An extensive population of Cliff Swallows thrives under arches and water table stones

Left – Aqueduct upstream view – March 15, 2014
Right – Detail of center elliptical arch – Jan. 14, 2018
Inset – Cliff swallows under the water table stones – July 11, 2010
Background – Aqueduct downstream view – April 21, 2017
Conococheague Creek

Centerpiece of the Williamsport canal area

Longest of the three-arch aqueducts

196 feet between abutments
Arches are equal lengths of 60 feet
Built with limestone from a nearby quarry
Built 1833-1834 by Michael Byrne & Co.

Aqueduct damaged at least three times during Civil War
First attempt by the Union during Battle of Antietam to prevent Confederates from using it as a bridge
Later attempts by Confederates to disable the canal

Berm wall collapsed partially or fully three times
1865, 1877, 1920
1920 – Boat No. 73 (Capt. Frank Myers) fell in creek
Rebuilt with wooden trunk

Aqueduct features elaborate design details, including limestone pilasters with capitals
Conococheague Creek

The aqueduct will be restored to the appearance and functionality it had during the late canal era

National Park Service, in partnership with state and local governments

Ground broke for project on May 5, 2017 – estimated 18-month project

It will be watered and motorized canal boats will cross it

The aqueduct restoration is the first of several projects in Williamsport

Canal crossing, new rail trail and coal yard restoration are all planned

Left – Aqueduct upstream view – Oct. 15, 2016
Right – Artists rendition of the appearance of the aqueduct after restoration and re-watering.
Image by Peck & Peck Associates, courtesy of the National Park Service
Background – Aqueduct downstream view after light snow – March 4, 2016
Licking Creek

First of the single arch aqueducts

The 90-foot span arch is the longest on the canal

Aqueduct had structural issues from weak stone

*Downstream arch reinforced with concrete*

*Weak berm wall was replaced with wood in canal era*

Remote location is noisy from Interstate 70

Parallel Western Maryland Railway bridge

*Now carries rail trail*
Tonoloway Creek

Located near Lock 52 and the Bowles House (Hancock VC)

Single irregular 63-foot arch

*Downstream end lands on rocky ledge*

Towpath and berm walls both removed

Waste weir on downstream end of berm wall

Parallel Western Maryland Railway bridge; now Rail Trail
Sideling Creek

Located in isolated and attractive setting above Pearre

Single asymmetrical 60-foot arch
  Structural support beams in place
  Berm wall is down

Waste weir on downstream end of berm wall

Parallel Western Maryland Railway bridge
  Brick kiln ruins are located on the berm downstream of the aqueduct

Background – Aqueduct downstream view – Nov. 10, 2014
Fifteen Mile Creek

Best condition of the six single-arch aqueducts

Only single-arch aqueduct with both walls intact

Waste weir is built in to the upstream berm side wing wall

Western Maryland Railway twin-arch culvert is upstream

Easily accessed at Little Orleans

Great view from the Fifteen Mile Creek boat ramp

Area canal workers are buried at nearby St. Patrick’s Church
Town Creek

Town Creek was an active area with many mills in the 18th and 19th centuries.

*Mill ruins are visible just above the parking area at Town Creek*

Abandoned Western Maryland Railway bridge is upstream of aqueduct

*Aqueduct is stable, with berm wall removed*

Located near Oldtown; just below watered section of canal

*Very popular area for fishing*

*Diverse population of dragonflies in area*

*Starting point for odonate walks*

*Left – Aqueduct prism – Nov. 13, 2017*
*Right – Aqueduct downstream arch – Nov. 12, 2010*
*Inset – Blue Dasher Dragonfly (m) – June 23, 2012*
*Background – Aqueduct downstream arch – Nov. 13, 2017*
Evitts Creek

Last aqueduct on the canal

Arch is intact

- Support structure in place
- Berm wall is in place, with some stones removed

Adjacent to culvert under CSX rail yard

- Switching yard is near – it can be quite active

Above – Aqueduct downstream view – Nov. 12, 2012
Background – Aqueduct prism – June 23, 2010
Below – Aqueduct abutment detail – Nov. 12, 2012
Broad Run Trunk

Located at Mile 31.94; upstream from Edwards Ferry

Not an original aqueduct, still noteworthy

Started life as Culvert 44

*Double arch culvert with 16-foot spans*

*The only double arch culvert on the C&O Canal*

*The culvert washed out in 1846*

Rebuilt as a 30-foot span wooden aqueduct

*Remained in that configuration through canal era*

Built with Seneca sandstone
Aqueduct Construction

Here’s a simplified view of some of the parts and details of an aqueduct

Upper Right – Profile of arch and surrounding wall; Antietam Creek Aqueduct center arch – July 16, 2011

Lower Right – Aqueduct end structure and detail; Conococheague Creek Aqueduct – Oct. 16, 2014

Below – Canal prism and wall detail; Catoctin Creek Aqueduct – April 1, 2017

Background – Monocacy Aqueduct original cast iron rail – April 3, 2011
Aqueduct vs Culvert

Park visitors sometimes get confused about the difference between aqueducts and culverts

An aqueduct is a bridge-like structure that conveys a canal over a body of water or hollow
A culvert is a crossing of a road or canal over a road or waterway

If it looks like a bridge it’s an aqueduct; if it’s covered with soil it’s a culvert

If you walk over an aqueduct, the towpath and prism are stone
If you walk over a culvert, the towpath and prism are soil

Culvert 182 at Hancock, at 36 feet, confuses the uninitiated
It’s called “The culvert that wanted to be an aqueduct”

Other culverts, like Culvert 93, have elliptical arches
Similar to some aqueduct arches

Left – Fifteen Mile Creek Aqueduct – Oct. 21, 2016
Right – Culvert 93 upstream arch – Feb. 27, 2016
Background – Culvert 182 downstream arch – Nov. 12, 2016
# Visiting the Aqueducts:

<table>
<thead>
<tr>
<th>Creek</th>
<th>Access Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seneca Creek</td>
<td>Direct access, with parking</td>
<td>at Rileys Lock (Lock 24). Walk short distance upstream from parking area to aqueduct</td>
</tr>
<tr>
<td>Broad Run Trunk</td>
<td>Indirect access, use parking area</td>
<td>at Edwards Ferry (Lock 25). Walk 1 1/10 mile upstream on towpath to aqueduct site</td>
</tr>
<tr>
<td>Monocacy River</td>
<td>Direct access, with parking</td>
<td>on Mouth of Monocacy Road. Walk short distance upstream from parking area to aqueduct</td>
</tr>
<tr>
<td>Catoctin Creek</td>
<td>Indirect access, use small parking area</td>
<td>at Landers (Lock 29). Walk 6/10 mile upstream on towpath to aqueduct</td>
</tr>
<tr>
<td>Antietam Creek</td>
<td>Indirect access, park along Canal Road near Antietam Creek Drive-In Campground.</td>
<td>Walk 1/5 mile downstream on towpath to aqueduct</td>
</tr>
<tr>
<td>Conococheague Creek</td>
<td>Direct access, with parking</td>
<td>at Williamsport Visitors Center. Parking and access limited due to construction; refer to <a href="http://www.nps.gov/choh/index.htm">www.nps.gov/choh/index.htm</a></td>
</tr>
<tr>
<td>Licking Creek</td>
<td>Indirect access and limited parking via Mile Post Lane.</td>
<td>refer to Towpath Guide for details. Walk 6/10 mile upstream on towpath to aqueduct</td>
</tr>
<tr>
<td>Tonoloway Creek</td>
<td>Direct access, with parking</td>
<td>at the Hancock Visitors Center. Walk 1/10 mile upstream from parking area to aqueduct</td>
</tr>
<tr>
<td>Sideling Hill Creek</td>
<td>Indirect access and parking</td>
<td>at Pearre Western Maryland Rail Trail Parking Area. Walk 1/5 mile upstream on rail trail to Lock 56; walk another 1/3 mile on towpath to aqueduct</td>
</tr>
<tr>
<td>Fifteen Mile Creek</td>
<td>Direct access, with parking</td>
<td>at Little Orleans Fifteen Mile Creek Campground. Aqueduct is upstream of campground</td>
</tr>
<tr>
<td>Town Creek</td>
<td>Direct access, with limited parking, via MD Route 51 (marked by NPS sign).</td>
<td>Park along old Western Maryland Railway grade, walk short distance upstream to aqueduct</td>
</tr>
<tr>
<td>Evitts Creek</td>
<td>Indirect access and parking</td>
<td>at Candoc Recreation Area; refer to Towpath Guide for details. Walk 1 1/5 miles downstream to aqueduct</td>
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</tbody>
</table>

Note: Refer to Towpath Guide to the C&O Canal for more detailed information.
Resources and References

_Towpath Guide to the C&O Canal_ – Thomas F. Hahn, Edited by Catherine Baldau
2015, Harpers Ferry Historical Association, www.harpersferryhistory.org

_Monocacy Aqueduct on the Chesapeake & Ohio Canal_ – Robert J. Kapsch, Ph.D., Elizabeth Perry Kapsch

_Chesapeake and Ohio Canal Official National Park Handbook_
2015, Chesapeake and Ohio Canal Association, www.candocanal.org

_Pocket Guide to the Chesapeake & Ohio Canal Official National Historical Park_
2016, Chesapeake and Ohio Canal Association, www.candocanal.org

_The Smithsonian Castle and the Seneca Quarry_ – Garrett Peck
2013, The History Press

_Trembling in the Balance: The Chesapeake and Ohio Canal During the Civil War_ – Tim Snyder
2011, Blue Mustang Press

_The Geology and Engineering Structures of the Chesapeake and Ohio Canal_ – William E. Davies

View this presentation – deansm.myportfolio.com
Download this presentation – bit.ly/2qZqckN

Feel free to contact me about aqueducts or culverts
Steve Dean – cando.culverts@comcast.net
Thanks for visiting, and
– thanks for all you do for the C&O Canal!