DELAWARE CANAL STATE PARK

Realizing the Future: Post Decade of Flood Repairs

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DCNR Mission, Vision, and Goals

Mission
We conserve and sustain Pennsylvania’s natural resources for present and future generations’ use and enjoyment.

Vision
As Pennsylvania’s leader and chief advocate for conservation and outdoor recreation, we will inspire citizens to value their natural resources, engage in conservation practices, and experience the outdoors.

Goals
We will
1. Improve stewardship and management of state parks and forests.
2. Promote statewide land conservation.
3. Build and maintain sustainable and attractive communities.
4. Create outdoor connections for citizens and visitors.

Delaware Canal State Park Mission Statement:
The primary purpose of the Delaware Canal State Park Complex is to provide public opportunities for enjoying healthful outdoor recreation and serve as an outdoor classroom for environmental education and historic interpretation. In meeting these purposes, the safety of the visitors, employees, and neighbors should be given first consideration while conserving the natural, scenic, educational, and historic values of the parks within the Complex. Stewardship responsibilities associated with the maintenance, repair, and improvement of the facilities should be carried out in a way that protects the natural and historical experience for the enjoyment of current and future generations.
Introduction to the Delaware Canal

A National Historic Landmark and part of a National Heritage Corridor, Delaware Canal State Park tells the story of the growth of America during the industrial revolution and man’s changing attitude towards nature. The central feature of Delaware Canal State Park is the 60-mile long multi-use towpath trail and canal that parallel the Delaware River from Easton to Bristol. The Delaware Canal is the last fully intact towpath canal in America capable of carrying water nearly its entire length. As the canal flows south from Easton, it follows the course of the Delaware River, with its steep cliffs and river islands as a picturesque backdrop, travelling from the Appalachian foothills to the low, rolling topography of the Coastal Plain.

It is a park of many surroundings. Passing from urban character at its Lehigh River headwaters, it meanders through rural areas of lower Northampton and Upper Bucks Counties, touches quaint river towns such as Riegelsville, New Hope, and Yardley, traverses suburban Upper and Lower Makefield, and becomes urban greenspace once again in Morrisville and Bristol. This diversity of landscape character is both opportunity and challenge for the park with regards to its maintenance, audience, and identity. The impacts on the resource are as diverse as the land through which it was constructed. In the north, natural geologic and hydraulic forces are the structure’s primary enemy. As the watercourse enters more populated areas, the forces of man take on a greater role with encroachments, industrial and residential sewage and storm water effects.

The Delaware Canal was once a main artery of commerce and transportation for this region of southeastern Pennsylvania, and is a testament to human industry. The canal is a man-made waterway forty feet wide and five feet deep, and was dug entirely by hand beginning in 1827. From 1832 to 1931, canal boats plied the canal waters, carrying anthracite coal first along the Lehigh River and canal from the mines at Mauch Chunk (now Jim Thorpe) to Easton, then into the Delaware Canal to Bristol, PA, where the tidewaters of the Delaware Bay made
the Delaware River deep enough to be navigable year-round. Sturdy teams of mules walked the towpath, pulling boats laden with up to 100 tons of cargo toward their destinations.

The story of the Delaware Canal is linked with the stories of the Delaware and Lehigh rivers. Without the rivers nearby to act as water sources, the canal would never have been a possibility. While having rivers nearby was a necessity for the canal, it is also a curse. On numerous occasions during the heyday of the canal, river floods caused damages and stopped canal traffic for months at a time. Today is no different. Floods can do immense damage to the towpath and canal structures, and despite society’s best efforts to reduce or mitigate their frequency and impact, floods will never be eliminated entirely as a threat to the canal.

Today the towpath is home to hikers, bikers, joggers, dog walkers, horseback riders, wildlife watchers, cross country skiers, and those simply out for a leisurely stroll. While the canal itself provides the opportunity for canoeing, kayaking, fishing, and ice skating, it also provides a green corridor adjacent to the Delaware River riparian corridor and is of immense value to wildlife. Turtles, herons, bald eagles, muskrats, and many species of fish are just a few of the regularly sighted animals along the canal. The park also contains two natural areas: the Delaware River Islands, comprised of eleven islands in the Delaware River, and the Nockamixon Cliffs, a geologically and botanically significant area of steep slopes and escarpments.

The park provides a variety of day-use recreation including the canal itself, seven canal/river picnic areas, the 60-mile multiuse trail, the sometimes watered and paddle-able canal, a 90-acre pond at the Giving Pond Recreation Area, and the Delaware River as the key recreational features. Two fish passageways in Easton are maintained by the park and enable migratory fish species to pass dams that have blocked access to the Lehigh since 1830.
History

On April 9, 1827, construction of the Delaware Division of the Pennsylvania Canal (Delaware Canal) was authorized by the Commonwealth of Pennsylvania. The bill was sponsored by State Senator Peter Ihire of Easton. The purpose of the waterway was to provide a safe and cost effective way to transport coal from eastern Pennsylvania to the industrial markets in New York and Philadelphia. Road conditions were poor, and train transportation had not yet developed significantly, so the coal provided by canal transportation largely fueled the American Industrial Revolution in Eastern Pennsylvania and beyond.

Construction of the Delaware Canal took place between 1827 and 1832. Laborers were largely Irish and German immigrants working for low wages in dangerous and unsanitary conditions. Many died, especially of cholera during the “sickly season” of July through September. Parts of the canal were navigable as early as 1830, but due to leakage and an inadequate water supply, the first boatload of coal did not arrive in Bristol until 1832. Navigation on the canal continued for 99 years. At the height of its operation, between 2500 and 3000 boats were in use. As canal traffic and revenues began to decline in the late 1850s and early 1860s, the Delaware Canal changed hands several times and ended up being leased to the Lehigh Coal and Navigation Company, its primary user. The last paying boat traveled the canal in 1931.

After this time, the canal fell into disuse and disrepair. In March, 1936 a major flood damaged the neglected waterway and many of its structures, further complicating any potential commercial use of the waterway. On December 18, 1940, the Lehigh Coal and Navigation Company and Delaware Division Canal Company donated the entire canal to the state. The property became known as Roosevelt State Park. Becoming a State Park freed the waterway from many of the development pressures that were quickly filling in and paving over most of the rest of the canal system in the eastern United States, although it was not immune. In 1954 the
lower end of the Delaware Canal was transferred to Bristol Borough. Much of the last mile of the canal fell victim to development, and is now buried.

Congress established the Delaware & Lehigh National Heritage Corridor (D&L) in 1988 as the nation’s third national heritage area. The Delaware Canal comprises 60 of the total 165 miles of rivers, canals, and railroads that make up the D&L. In 1989, the park’s name was changed from Roosevelt State Park to Delaware Canal State Park to more accurately reflect the nature of the park and its historic resource. These significant changes heralded a new era of interest and investment in the park. In 1993 the Corridor was also designated as Pennsylvania’s third state heritage area.

From 1989 to 2002, properties such as the Nockamixon Cliffs, Delaware River Islands, and the Giving Pond Recreation Area were acquired, adding to the park’s value as a green corridor. During this time the shad passageways on the Lehigh River were completed, the Bristol Lagoon was restored, and two major canal restoration projects—the wooden Tohickon Creek Aqueduct in Point Pleasant and Lock 11 in New Hope—were completed.
Re-Defining the Future

Since becoming a state park, management and developmental focus was primarily directed toward watering the canal and not so much recreational use. Efforts were aimed at the reconstruction of aqueducts and locks, repairs to the canal walls, bridge replacements and repairs, and other structural concerns with the long-term intent of restoring the canal to a fully watered condition. This approach was, and continues to be difficult, expensive, and frustrating due to constant setbacks caused by flooding, structural failures, development pressures along the canal and the overwhelming costs involved to reach that goal.

In 1995, DCNR along with the Delaware Canal State Park Caucus and the Delaware Canal State Park Advisory Committee realized that this approach did not fully recognize the recreational, educational and economic development potential of the state park and embarked on a process to develop a comprehensive strategy for the park. The following highlights represent significant events that led to the development of the initial five-year comprehensive plan:

- **Spring 1995** state legislators along the canal formed a Delaware Canal State Park Caucus to work together to address issues.

- **June 1995** the Delaware Canal State Park Caucus presented a mission statement to the Delaware Canal Advisory Committee and the Commonwealth, which states a goal of a fully watered, historically restored canal. The Commonwealth adopted the mission statement.

- **Fall 1995** DCNR formed a new Delaware Canal State Park Advisory Committee with guidance from the Delaware Canal State Park Caucus.

- **June 1996** members of the Delaware Canal State Park Caucus; the Secretaries of Transportation, Department of Environmental Protection, DCNR, and the Executive Director of PA Historical and Museum Commission, and DCNR met to discuss the potential economic impact of the park. DCNR committed to development of a plan.

- **August 1996** DCNR met with the Delaware Canal State Park Caucus to review the status of the park and discuss possible actions.

- **Fall 1996** the Advisory Committee invested three days touring the park, exploring issues and potential opportunities.

- **Winter 1996 and spring 1997** DCNR presented the “Delaware Canal State Park: Opportunities for the Future” containing three options for the future of the state park.
  
  - Option 1 featured a 60-mile, fully watered, and historically accurate Canal from Easton to Bristol, including “daylighting” those sections of the Canal in Bristol and Levittown that had been filled in and built upon.
- Option 2 proposed watering the maximum areas feasible of the Canal while enhancing its recreational opportunities and maintaining the aesthetic quality along the remainder until future watering would be possible.

- Option 3 permanently stabilized some sections of the Canal by filling in where the prism needed support.

Both the Delaware Canal State Park Caucus and the Advisory Committee adopted Option 2 of the plan as consistent with the mission statement that had been adopted by the Commonwealth in June 1995.

- Summer 1997 DCNR presents a five-year implementation plan for Option 2 of the "Opportunities for the Future".

In response to the implementation plan of 1997, the construction of comfort stations at Theodore Roosevelt Recreation Area, the Park Office, Morrisville, and Virginia Forrest Recreation Area were completed. The installation of several canoe and kayak launches to the canal and river were placed, and two phases of trail improvements took place from 2001 to 2004. In 1999-2001 the collapsed aqueduct over the Tohickon Creek in Point Pleasant was replaced by a handsome, state of the art timber frame aqueduct structure. These improvements helped advance the park's signature character as one of the major historic and recreational resources in southeastern Pennsylvania. By 2004, the towpath was completely resurfaced and the canal was carrying water throughout its length, thus bringing reality to the vision set forth in the 1997 five-year plan and the mission statement adopted by the Commonwealth in June 1995. Only the buried sections of the Canal remained dry.

In September 2004, the first of three near-record 100-year floods devastated the Delaware Canal and State Park. Before repairs to the damage caused by that flood could even begin, a second 100 year flood struck in April 2005. Repairs were initiated and well underway when a third 100-year flood hit in June 2006. All told, the canal suffered approximately $28 million in damages and repairs lasted until 2010. In 2011 with towpath repairs completed, the difficult task of restoring water to the canal resumed, but was then halted again due to yet another year of severe tropical storms which further damaged the towpath, canal and its structures. Another series of towpath and canal repair projects began in 2013 at a cost of $7 million.

Now that the most recent flood damage repairs are underway, attention is once again placed on realizing the future of the Delaware Canal. Over the past several months DCNR has reviewed the 1997 Opportunities for the Future document described above, analyzed the
factors that have changed since 1997, and consulted with a number of stakeholders having an
interest in the park, including the Delaware Canal Legislative Caucus, the Delaware and Lehigh
National Heritage Corridor, the Delaware Canal Advisory Committee, the Friends of the
Delaware Canal, and Delaware Canal 21, a relatively new non-profit canal support group.

As a result of these recent reviews and consultations, DCNR has adopted the following
Statement of Goals and Objectives to guide future planning, development, and improvements at
the park. These Goals and Objectives will supersede and replace the language of Option 2.

STATEMENT OF GOALS AND OBJECTIVES – 2014

(a) The ultimate goal for the Delaware Canal State Park is to provide to the public a first-
class, safe, well-maintained and aesthetically beautiful recreational, historical, and
educational facility that will be an asset to the community, will promote economic
growth, increased property values, and will serve the public safety and public good in
numerous ways. The recreational goals include both land-based recreation (walking,
bicycling, cross-country skiing) and water-based recreation (boating, fishing, ice
skating).

(b) With respect to the Canal portion of the park, the ultimate goal is to achieve and
maintain a fully watered Canal, recognizing that because of funding constraints and
other obstacles it will be necessary for the foreseeable future to prioritize DCNR’s
efforts to keep all of the Canal watered. If such funding constraints and other
obstacles could somehow be overcome, DCNR would strive vigorously for a fully
watered Canal as soon as possible. The mission statement adopted by the
Commonwealth in June 1995 has not changed.

(c) Two specific sections of the Canal deserve special mention. Sixty years ago, in 1954
nearly a mile of the Canal at its southern extreme was transferred to the Borough of
Bristol, fell victim to development, and was buried. Subsequently an elementary
school was built on top of what had been the Canal. Similarly a much shorter
section of the Canal in Levittown fell victim to development, was buried, and was
covered over by a shopping center parking lot. Those two sections of the Canal will
be very difficult and very expensive to reclaim. Nonetheless, DCNR is committed to
keeping those projects on its radar screen, and to continue to look for opportunities
to reclaim those sections of the Canal even if it takes a very long time to get there. In
the meanwhile, DCNR will oppose any changes to those sections that would make it more difficult or more expensive to reclaim them.

(d) An interim goal will be to develop and put into place a back-up water augmentation plan and facilities that will minimize the amount of time any particular section of the Canal must remain dry because of flood damage or otherwise. This water augmentation will be to address emergency use and not meant to be a sustainable watering source.

(e) Another interim goal will be to develop and carry out plans for the maintenance of any sections of the Canal that are projected to remain dry for an extended period of time, including vegetation control and preventive maintenance for the Canal prism and Canal structures such as the Tohickon Aqueduct. Nothing will be done or permitted that would degrade or permanently disable any section of the Canal from being capable of carrying water in the future.

(f) DCNR recognizes that additional funding supplemental to what is available through the normal DCNR budgeting process would allow additional maintenance activities to take place, would allow for additional capital improvements to the park, and would allow more of the Canal to be watered. Accordingly, DCNR will be receptive to innovative ideas looking toward supplemental or non-traditional sources of funding to support the Canal and Park, and will work cooperatively with canal support groups and others to explore such possibilities.

(g) Recognizing that future flooding, storm water, and other severe weather events present real threats to the physical infrastructure of the Canal and the Park, DCNR will work cooperatively with canal support groups and others to explore ways to mitigate such events and their impact.

(h) Maintenance is crucial to the well-being of the Canal and the Park, and is also expensive. Accordingly, DCNR will work cooperatively with canal support groups and others to develop pro-active maintenance plans and to find supplemental funding for enhanced maintenance efforts.

(i) DCNR is receptive to assistance from canal support groups and others to conduct long range visioning and planning for the Canal and the Park, and would be receptive to assistance from canal support groups and others in the implementation of such recommendations that emerge from such planning as DCNR deems appropriate and affordable.
This updated implementation plan “Realizing the Future of the Delaware Canal: Post Decade of Flood Repairs” builds on what was previously developed and incorporates the knowledge gained over the flood era just experienced. It is through thoughtful accord among all stakeholders that this plan is created and future projects accomplished.

Based on the foregoing goals and objectives DCNR outlines the following objectives for the next five years:

- To initiate projects to create a first class recreation facility taking advantage of the unique resources of the Canal and Delaware River.
- To develop those sections of the Canal that historically demonstrated a reasonable degree of water carrying sustainability into optimum examples of a historic watered canal environment, maintaining as the ultimate goal a fully watered canal.
- To develop and carry out plans for the maintenance of any sections of the canal that are projected to remain dry for an extended period of time, including vegetation control and preventive maintenance for the canal prism and canal structures so as to prevent deterioration and facilitate future watering.
- To explore with canal support groups and other partners innovative ideas looking toward supplemental or non-traditional sources of funding to support the Canal and the Park.
- To explore with canal support groups and other partners innovative ideas for maintenance, maintenance planning, and sources of supplemental sources of funding for the Canal and the Park.
- To explore ways to minimize and mitigate the frequency and/or impact of future flooding, storm water, and other severe weather events on the Canal and the Park.
- To work with canal support groups and other partners to conduct long range planning and visioning for the Canal and the Park.
- To provide personnel and financial resources necessary to develop, operate and maintain the entire 60-mile length of the park complex.
- To initiate projects designed specifically to increase the total length of “Optimum Historic Watered Canal Environments,” thereby increasing the possibility of realizing a fully watered, historically appropriate canal for the entire 60 miles.

The projects proposed in the updated master plan are fully consistent with the above objectives.
Implementation of the Master Plan

The updated master plan of action will result in visible, significant benefits to the state park and surrounding communities. Emphasis continues to be placed on creating first class recreational opportunities; providing a pleasant, safe environment for visitors; arresting and reversing the current rate of deterioration; enhancing the local economy through tourism and increased property values; enhancing education and interpretation and beginning a systematic program for restoring the historic canal. With all that has taken place in its recent history, the Delaware Canal will continue to move forward in providing a first-class experience to all who visit.

The project list found in the Appendix is a living document which is a list of projects ranging from recreational opportunities, visitor safety, planned maintenance, to water restoration and rehabilitation of deficient structures. For the interest of the implementation plan, some projects found in the project list may not be highlighted in this phased plan. While addressing the proposed phased projects to satisfy the master plan, the need may arise to adjust the list to address emergent project or funding needs. This is a working document to efficiently organize and prioritize the park’s needs so as not to limit the ability for response to unforeseen demand. A full description of all projects can be found in the project list.

The projects listed below are divided into five phases of development. Each phase contains at least one major project, culvert replacement, re-lining, bridge, and canal structure repair. Projects were divided into phases to address safety, maintenance priority, recreation need, and state of disrepair. Attention was also placed on geography to ensure the entire length of canal was considered, thus spreading the focus on the whole canal and not only specific locations. To reiterate, these projects are on the immediate list due to current condition and need. Other projects can, and will be added or deleted as funding and necessity arise.

**Phase One Projects**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Conrail Tunnel</td>
<td>$2.5 million</td>
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<tr>
<td>Replace Smithtown Bridges 3 &amp; 4</td>
<td>$600,000</td>
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<tr>
<td>Replace Lower Lower Limeport Bridge</td>
<td>$400,000</td>
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<tr>
<td>Replace Phillips Mill Bridge</td>
<td>$400,000</td>
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<tr>
<td>Cutaloosa Creek Culvert</td>
<td>$750,000</td>
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<tr>
<td>Dredge Pennacussing Creek</td>
<td>$150,000</td>
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<tr>
<td>Upper Black Eddy Re-lining</td>
<td>$150,000</td>
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<tr>
<td>Phase</td>
<td>Projects</td>
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<td>TOTAL</td>
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<td>Phase Two Projects</td>
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<tr>
<td>Office/Visitor Center</td>
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<tr>
<td>Levittown Sub-Canal Culvert</td>
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<td>Fry’s Run Aqueduct</td>
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<td>Morrisville Overflow Hydraulic Study</td>
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<tr>
<td>Yardley Re-lining</td>
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<td>TOTAL</td>
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<td>Phase Three Projects</td>
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<td>Lock 14 Point Pleasant</td>
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<td>Morrisville Overflow</td>
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<td>Maple Avenue Waste Gate</td>
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<td>Rabbit Run Sub-Canal Culvert</td>
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<tr>
<td>Spar’s Camelback Bridge</td>
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<tr>
<td>Dayuse Restore – 2 pavilions</td>
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<tr>
<td>Dayuse Restore – 2 docks/access</td>
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<td>TOTAL</td>
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<td>Phase Four Projects</td>
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<tr>
<td>Feeder Lock, Easton</td>
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<td>Lock 7 (Yardley Maintenance Area)</td>
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<tr>
<td>Mulligan’s Bridge Replacement</td>
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<tr>
<td>Raubsville Culvert</td>
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<td>Hazzard’s Camelback Bridge</td>
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<td>Phase Five Projects</td>
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<td>Weigh Lock, Easton</td>
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<td>Tinicum Aqueduct</td>
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<td>Woody’s Camelback Bridge</td>
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Partnerships

Only through continued partnerships with friends groups, stakeholders, other state agencies and the public can this plan be realized. The park has only benefitted by the long withstanding support of groups such as the Friends of the Delaware Canal, the Lower Bucks Canal Conservation Committee, the Delaware & Lehigh National Heritage Corridor, East Coast Greenway, the Pennsylvania Environmental Council, the Historic Delaware Canal Improvement Corporation and newly formed stakeholders such as Delaware Canal 21 and New Hope for Our Canal. The park welcomes the addition and action of interested parties who can assist in the planning, maintaining, and funding of this remarkable resource so that all will share in the benefits of improved recreation, education, and tourism opportunities for current and future generations.

Through the implementation of this master plan, the Delaware Canal State Park and its partners will take the steps developed through decades of thoughtful and careful planning to become a first-class recreation facility, the only remaining continuously intact remnant of the canal era, and a 60-mile long canal and river system conservation area for education and recreation.