HISTORIC RESOURCE STUDY CHESAPEAKE & OHIO CANAL NHP

6. FLOODS ON THE C & O CANAL 1829–1936

BY HARLAN D. UNRAU HISTORIAN, C&O CANAL RESTORATION TEAM, SENECA DENVER SERVICE CENTER 1976

CONTENTS

I.	INTRODUCTION	277
II.	THE FLOODS, 1829–1889	277
	AUGUST 1829	277
	SEPTEMBER 1829	277
	FEBRUARY 1831	278
	JANUARY 1832	278
	JANUARY 1834	278
	JUNE 1836	279
	APRIL 1843	282
	AUGUST 1843	283
	SEPTEMBER 1843	283
	MARCH 1846	287
	JULY 1846	288
	OCTOBER 1847	289
	APRIL 1852	290
	AUGUST 1855	295
	WINTER 1855–56	295
	FEBRUARY-MAY 1857	295
	APKIL 1859 SEDTEMBED 1950	296
	SEPTEMBER 1859	296
	NUVENIBER 1800	290
	APRIL 1801	297
	ADDII MAN 1862	290
	$\begin{array}{c} \text{AFRIL-MATTROL}\\ \text{ILINE} \\ \text{ILINE} \\ \text{V1862} \end{array}$	290
	$\Delta PRII 1864$	300
	MARCH 1865	300
	OCTOBER 1866	301
	SPRING 1868	301
	SEPTEMBER 1870	302
	AUGUST 1872	303
	FEBRUARY 1873	303
	AUGUST 1873	303
	APRIL 1874	304
	JULY–AUGUST 1875	304
	NOVEMBER 1877	304
	JUNE 1884	308
	APRIL–MAY 1886	308
	MAY–JUNE 1889	311
III.	THE FLOODS, 1897–1936	317
	1897, 1902, 1907, 1914	317
	MARCH 1924	317
	MARCH 1936	318

IV.	CONC	LUSION	322
III.	APPENDIXES		323
	A.	DESCRIPTION OF NOVEMBER 1877 FLOOD AT CUMBERLAND	323
	B.	DESCRIPTION OF NOVEMBER 1877 FLOOD IN WASHINGTON COUNTY	324

I. INTRODUCTION

An effort has been made in this chapter to examine the major water and ice freshets that struck the Chesapeake & Ohio Canal from 1828 to 1936. The focus for this chapter has been an examination of the causes and extent of the freshets, as well as the damage inflicted on the canal by them and the consequent repairs effected on the waterway. Although some portion of the canal was adversely affected by high water virtually every year, this chapter consist of descriptions of those floods which were considered as significant in the company records and in contemporary newspaper accounts.

II: THE FLOODS 1829–1889

AUGUST 1829

The first recorded instance when a freshet affected the construction of the Chesapeake & Ohio Canal occurred in August 1829. Early that month, high water caused by heavy rains in the Potomac Valley did considerable damage to the embankment and locks of the old Potomac Company skirting canal still operating around Little Falls. As the locks and canal were no longer operable, the Chesapeake & Ohio Canal directors learned that persons passing the locks at Great Falls were refusing to pay any tolls. In an effort to restore quickly the commercial usefulness of a canal around Little Falls, the board established a committee headed by Walter Smith to rush the construction of the nearby section of the new canal. Isaac Leach and Company, the contractor on Section F, agreed to complete his works by October 1, 1829, if he were paid more. Goodrich and Company, the contractor for Sections G and H, agreed to a similar modification in its contract. Accordingly, Smith was able to report to the board on August 12 that he had arranged "to expedite the completion of that part of the Canal alongside of the old Canal and which was carried away in many places."¹

Although there is no map showing the locations of Sections F, G and H, documentary evidence appears to indicate that they were the westernmost sections of the eight constructed between Rock Creek and Little Falls. As such they probably included the feeder portion extending out to the river at High Island. The sketchy evidence suggests that the old canal washed out between High Island and present Lock No. 5, because the skirting canal turned inland between those two points and the distance between the canal and the river was narrowest in that distance. In this case, the probable solution was to enlarge the old canal below present Lock No. 5 and bypass the feeder washout by completing the new channel above the lock. Regardless of what actually was done, documentary evidence indicates that the work required no more land than was contained in the 180-foot wide strip of Potomac Company land in that vicinity.²

SEPTEMBER 1829

A freshet occurred in the Potomac during September 1829. The principal damage to the canal works under construction was at Locks Nos. 21 and 23 where the pits were filled with water. As the contracts that had been let for the locks did not contain provisions for additional allowances to

¹ Proceedings of the President and Board of Directors, A, 320–321, 325.

² Steven H. Lewis, *Stabilization Study: Little Falls Skirting Canal, Maryland and District of Columbia*, (NPS Mss., 1966), 13–14.

cover bailing out flood water, Holdsworth and Isherwood, the contractors for the locks, requested, unsuccessfully, such aid.³

FEBRUARY 1831

A heavy freshet struck the newly-completed portion of the canal between Georgetown and Seneca in mid-February 1831 just six weeks before its formal opening to navigation. The flood, which was described as "extraordinary," did little or no damage to the canal where the water had "been admitted or retained in the Canal to an elevation as great as that in the river." The only level on the waterway to be damaged was that "immediately below the Seneca Guard Lock" where "a disaster of some moment" had occurred. The most significant damage was to the culvert below the guard lock which was broken apart by the force of the water.⁴

JANUARY 1832

In January 1832 a heavy ice freshet struck the canal, concentrating most of its fury on the Dam No. 1 complex. According to canal officials, the "accumulation of ice" was "unparalleled" as it reached in some places the height of forty feet above tidewater. During the afternoon of January 10, the ice carried away the guard gate on the Little Falls feeder. A temporary guard gate was installed immediately, but the ice again forced open the gate that night. At the same time, the ice "was flushed over the towpath into the canal at the powder mill on the Little Falls branch. The Little Falls Bridge, which carried a public road over the canal and which was high enough to allow passengers to remain on the top deck of packets using the waterway, was destroyed. At the Peak of the freshet, the water in the canal was near the top of the banks and the ice was several feet higher, but the prism, with one exception, was not damaged. Just as canal officials were preparing to cut away the towpath near the waste weir below Lock No. 5 to prevent further damage, the ice bored a channel through the canal embankments near where the Little Falls Bridge had stood.⁵

When the ice freshet subsided, canal officials found that Dam No. 1 had received extensive damage. The completed portion of the dam between the Maryland shore and Snake Island was nearly destroyed, and the partially-completed section of the dam between Snake Island and the Virginia shore was in need of heavy repairs. Later on July 5, the board authorized canal Superintendent J. Y. Young to repair the structure. The part of the dam between Snake Island and the Maryland shore was "to be rebuilt after the manner of its late construction." This work entailed the reconstruction of the 855-foot arched dam built of loose rubble stone and brush held in place by wood cribbing. The partially-finished portion of the dam between the island and the Virginia shore was "to be restored by the use of stone and brush" prior to its completion. Along with these repairs, the board also directed Young "immediately hang up the new Gate at Guard Gate No. 1"⁶

JANUARY 1834

In mid-January 1834 a heavy ice freshet struck the Potomac Valley centering primarily on that portion of the canal between Shepherdstown and Four Locks. At its peak on January 14, the ice

³ Holdsworth and Isherwood to President and Directors, September 24, 1829, Ltrs. Recd., C & O Co.

⁴..VanSlyke to Mercer, February 24, 1831, Ltrs. Recd., C & O Co.

⁵.Purcell to Mercer, January 11, 1832, and Lockland to President and Directors, May 10, 1832, Ltrs. Recd., C & O Co.

⁶. Proceedings of the President and Board of Directors, C, 182–184.

caused the Potomac River to rise 16 feet in about 12 hours. The ice was "piled" to a height of about 30 feet and 4 miles in length above Dam No. 4. Two bridges across the river near Williamsport were carried away, but there was no reported damage either to the canal trunk or to Dam Nos. 4 and 5, which were both only partially completed. At Dam No. 4, Joseph Hollman, the contractor, lost his boats and some loose lumber. However, the dam, which was then constructed to a height of 21 feet and which was only partly planked on its top, was not injured. Optimistically, Engineer Thomas F. Purcell noted that:

It is impossible that these dams can ever again be exposed to so severe a trial, as that to which they were subjected by the ice freshet of yesterday; and they stand uninjured, a striking refutation of the position assumed as the result of experience on the works made by the State of Pennsylvania, that dams across rivers, to supply canals with water, were insecure & could not be made to stand.⁷

JUNE 1836

During the spring of 1836, the Potomac Valley experienced "an almost unprecedented season of wet weather." In early June, six days of continuous rain swelled the courses of the Potomac's tributaries and caused the highest freshet in the river since 1810.⁸ On the completed portion of the canal, the most extensive damage occurred at Dam No. 4 and Harpers Ferry and from Seneca to Little Falls. Considerable injury was inflicted on the canal embankments still under construction below the Cacapon River.⁹

The course of the 1836 freshet is interesting to follow through the canal company papers and local newspapers as it was the most severe flood to strike the Potomac Valley since the commencement of construction on the canal. In its early stages, fears were aroused concerning the durability of the canal works and the wisdom of building it along the banks of the river. But when navigation was restored along the line within three weeks, the early doubts disappeared as canal officials became even more obsessed with the idea that the canal was immune from all but periodic minor injury from even the heaviest freshets of the river.

On June 1, Superintendent J. Y. Young of the Georgetown Division reported to the board the sudden 3-foot rise in the Potomac below Seneca was largely the result of the heavy inflow of water from the swollen Shenandoah at Harpers Ferry. At that point, the Potomac above the town had risen very little. While little damage had as yet been reported on his division, he noted that the outer side of the heavy embankment on Section No. 11 between Locks Nos. 14 and 15 had slipped. Accordingly, he had ordered his hands to withdraw the water from that level of the canal to ease the pressure on the remaining embankment.¹⁰

⁷ Purcell to Ingle, January 15, 1834, Ltrs. Recd., C & O Co.

⁸ .The only major flood to strike the Potomac Valley in the years 1800–28 occurred in Washington County on November 10, 1810. The flood centered around Williamsport where the Potomac and Conococheague Creek rose to unprecedented heights inundating much of the town and the surrounding countryside. A bridge that had just been built across the creek at the town was swept away as were Towson's Warehouse and quantities of tar and coal. The flood caused little, if any, damage to the Potomac Company works. As this flood was the highest-known freshet to hit the valley in the years prior to the construction of the Chesapeake & Ohio Canal, company engineers generally attempted to construct the waterway above its high-water levels. Thus, they apparently were convinced that they had taken the necessary precautions to protect the new canal from the ravages of the river. John Thomas Scharf, *History of Western Maryland* (2 Vol., Philadelphia, 1882), Vol. II, 1201.

⁹ Alexandria Gazette, June 8, 1836.

¹⁰ Young to Ingle, June 1, 1836, Ltrs. Recd., C & O Co.

That the Potomac continued its sudden rise was attested to by Superintendent Young's report to company officials the following day. By that time water was passing over the towpath below Lock Nos. 5, 7 and 8, and it had completely covered the abutments of Dam No. 1. The deterioration of the embankment on Section No. 11 had increased and new reports indicated that the slippage had extended to Section No. 10.¹¹

On June 3 the *Alexandria Gazette* reported that the "uncommonly high" water had destroyed part of the Potomac Bridge. About 20 or 30 yards beyond the draw, on the Virginia side, the structure had been swept away. Despite the high water, the works at the Potomac Aqueduct, then under construction, were all safe.¹²

As the swollen Shenandoah continued to pour its water into the Potomac, the Harpers Ferry vicinity suffered extensive flooding. By June 3 the lower portion of the town was inundated, and residents living near the banks of the river were moving to higher ground.¹³

After a personal examination of his division, Superintendent Young reported on June 4 concerning the damage between Georgetown and Seneca. Over this 22-mile distance there were six extensive breaches in the waterway. On Section E (just below Little Falls), 5 (above Lock No. 7), 18 (near Crommelin House), and 23 (near Lock No. 22), water had passed from the canal through common earth embankments. In addition, two large breaches had developed when water ran over the Muddy Branch Culvert and the culvert next above it. The six breaches averaged from 100 to 150 feet in length and from 4 to 10 feet below the bottom of the prism. The water from the river passed over the embankments into the canal on Sections G (near Guard Lock No. 1), 7 (near Lock No. 8), 22 (below Lock No. 21), 29 (near Lock No. 22), and 34 (near Lock No. 23). At Section G the canal embankment was not injured, but at the remaining points the top of the embankments was cut away from 1 to 5 feet in depth and from 200 to 400 yards in length, leaving them in "an uneven ragged state." The earth removed from the embankments was deposited in the trunk, thereby creating large sand and gravel bars. With the exception of some dry masonry walls, he was certain that all the masonry works were secure.¹⁴

Along with his report on the damage done to the Georgetown Division, Young informed the board concerning his efforts to repair the canal. He already had his hands making temporary dams around the breaches to force the water through the various nearby waste weirs. In addition, he had sent several messengers out into the surrounding countryside to recruit additional workers and carts to haul materials and to collect provisions. He estimated that 20 men and 12 carts would be needed to repair each large breach and 10 men to remove each deposit from the canal trunk. The repairs would take two weeks after which the navigation could be restored. Mr. McNear, an experienced workman in Georgetown who had a force of carts and hands on the city streets, had been hired to make the repairs on Section E.¹⁵

Although the damage done to the canal between Harpers Ferry and Seneca was not so extensive as that on the Georgetown Division, there were several places over this distance that were hard-hit.¹⁶ At Harpers Ferry the feeder was filled with sand, gravel and earth as a result of

¹¹ *Ibid*, June 2, 1836, Ltrs. Recd., C & O Co.

¹² Alexandria Gazette, June 3, 1836.

¹³ *Ibid*, June 9, 1836.

¹⁴ Young to Ingle, June 4, 1836, Ltrs. Recd., C & O Co. Later on July 28, Young modified this latter assertion in his report by informing the directors that the stone portion of Dam No. 1 between Snake Island and the Maryland shore had been severely damaged. The tumbling waste between the mouth of the Little Falls Feeder and Guard Gate No. 1 was also injured. The cost or repairing these structures, together with added protection walls and embankments, was estimated to be \$1,500. Young to Board of Directors, July 28, 1836, Ltrs. Recd., C & O Co.

¹⁵ Young to Ingle, June 4, 1836, Ltrs. Recd., C & O Co.

¹⁶ Ingle to Elgin, June 4, 1836, Ltrs. Sent, C & O Co.

several breaks in the levels above it and of the washing of the embankments at Lock Nos. 35 and 36. A series of breaches in the canal embankments occurred between Edwards Ferry and Seneca, the most serious of which took place on Section No. 40 (some $2\frac{1}{2}$ miles above Seneca Creek). At various points on the 38-mile distance between Dams Nos. 3 and 2, the high water had washed badly the surface of the towpath and left it in a ragged condition.¹⁷

Because of the limited damage to his division of the canal between Harpers Ferry and Seneca, Superintendent W. S. Elgin was able to report on June 10 that his portion of the waterway was ready for the readmittance of water. All the breaches had been repaired and the embankments raised enough to admit $4\frac{1}{2}$ feet of water.¹⁸

Above Harpers Ferry the only significant damage to the completed portion of the canal occurred at Dam No. 4. A serious breach of undetermined extent took place requiring several weeks of repair.¹⁹

On the portion of the canal between the Cacapon River and Dam No. 5, then under construction, there were two points where the high water damaged the canal works. On Section Nos. 247 (below Lock No. 53) and 252 (between Locks Nos. 53 and 54), the earthen embankments were heavily washed as the level of the river reached the height of the top of the canal. On the former, 1,700 cubic yards of material were washed away, while on the latter 4,100 cubic yards were swept away. It was estimated that it would require the labor of 20 horses and carts and 15 hands for two months to repair the damage on Section No. 252 alone. The embankment material on Section No. 247 was replaced with earth brought to the canal from a point 1/3 of a mile distant at a cost of nearly \$500, while the material for the embankment on section No. 252 was brought from a point less than ¼ of a mile distant at a cost of nearly \$950. As the losses in both cases put the respective contractors in desperate financial straits, the canal company agreed to pay for the repairs although it was not bound to do so by the previsions of the contracts.²⁰

Repairs to the completed portion of the waterway proceeded at a rapid pace. On June 20, Superintendent Young reported that navigation had been restored from Georgetown to Harpers Ferry. Several weeks later on July 6, Superintendent George W. Rogers informed the board that the line between Harpers Ferry and Dam No. 5 was ready for the admission of water.²¹

Despite the damage to the canal from the freshet, canal officials were relieved that the injuries were not as great as had first been feared.²² The optimism that this realization produced was evident in the comments of President George C. Washington to the company stockholders in June 1836:

No interruption of any consequence to the navigation has occurred, until the recent freshet, which raised the waters of the Potomac to an unprecedented height, and carried off some of our embankments. Great apprehension was entertained of extensive and serious injury, but we are happy to state that the damage is not so great as we had feared. Had the board ever doubted the expediency of the location adopted by Mr. Fisk, those doubts would have been wholly dissipated by the results of the recent freshet, as the chief injury sustained by the canal has been at points where it approximates too closely the

¹⁷ Elgin to Washington, June 10 & 13, 1836, Ltrs. Recd., C & O Co.

¹⁸ *Ibid*, June 10, 1836, Ltrs. Recd., C & O Co.

¹⁹ Alexandria Gazette, June 8, 1836, and Elgin to Washington, June 13, 1836, Ltrs. Recd., C & O Co. No details concerning the breach at Dam No. 4 could be found in the company records. See John F. Luzader, *Dam No. 4, Historic Structure Survey* (NPS Mss, 1964), 17.

²⁰ Gorman to President and Directors, June 15, 1836, Ltrs. Recd., C & O Co.; Fisk to Bender, June 20, 1836, Ltrs. Sent, Chief Engineer; and *Proceedings of the President and Board of Directors*, E, 89.

²¹ Proceedings of the President and Board of Directors, E, 77, 89.

²² Alexandria Gazette, June 13, 1836.

river line. The new locations have been made with the view of placing the canal above any rise of the river, and consequently, its entire security. The economy of such locations is evident, both in the permanency of the work, and the assurance of an uninterrupted navigation...The strength of the masonry, and its admirable construction, were fully tested by the recent freshet; and not withstanding the immense pressure on the aqueducts and other masonry, none have been injured.²³

APRIL 1843

In mid-April 1843 the highest freshet since the commencement of the canal struck the Potomac Valley. Occasioned by the rapid melting of heavy snow in the western Maryland mountains, the flood caused destruction to the waterway primarily between Edwards Ferry and Georgetown. On April 18 and 19 the high water in the river ran over all the "low levels" on the Georgetown Division, opening one or more breaches on each of them. In most cases the water passed into the canal at the high or upper end of the levels and out by the breaches below. Precautionary measures were taken by cutting the embankments at points where the least damage would take place.²⁴

Although the damage west of Edwards Ferry was not as severe, the canal between Dams Nos. 4 and 6 was washed in many places by the flood waters which covered portions of this distance by as much as three feet.²⁵ Four miles below Williamsport, the top of the bank and berm sides of a culvert were "carried away to the bottom of the canal."²⁶ Embankments at several other nearby culverts were washed down also. At its peak, the flood water rose to a height of "six inches over the abutment of Dam No. 5," causing three breaches in the level below. The towpath at the dam was "washed away to within 2 ft. of bottom, about 200 ft. in length."²⁷

When the freshet subsided, Chief Engineer Fisk surveyed the damage to the canal and estimated that it would cost \$20,000 to place the waterway below the Cacapon River in the condition that it had been before the freshet. To merely restore navigation, it would take two weeks to repair the Georgetown Level and that portion of the canal above Edwards Ferry, while it would require three weeks to repair the line between Little Falls and Edwards Ferry. The total cost of the immediate repairs needed was estimated to be \$10,000.²⁸

As the financial condition of the company was desperate, canal officials negotiated a \$10,000 loan from three banks in the District of Columbia in May to pay for the immediate repairs. The loan, which was secured by two-thirds of the tolls and water rents collected by the company until the loan was paid, was acquired as follows: Farmer's and Mechanic's Bank of Georgetown, \$5,000; Bank of Metropolis, \$2,500; and Bank of Washington, \$2,500.²⁹

Portions of the canal were reopened to navigation on May 2, and the entire waterway on May 6. Later in July, traffic was suspended for 22 days while work was undertaken to remove the sand bars in the canal prism that had been left in the wake of the freshet.³⁰

²³ Eighth Annual Report (1836), C & O Co., 8.

²⁴ Young to Turner, April 19, 1843, Ltrs. Recd., C & O Co.

²⁵ Fisk to Coale, September, 17, 1843, Ltrs. Recd., C & O Co.

²⁶ Stone to Fisk, April 20, 1843, Ltrs. Recd., Chief Engineer.

²⁷ *Ibid*, April 20, 1843, Ltrs. Recd., Chief Engineer.

²⁸ Fisk to Ingle, April 20, 1843, Ltrs. Recd., C & O Co.

²⁹ Proceedings of the President and Board of Directors, G, 25–26; and Fifteenth Annual Report (1843), C

[&]amp; O Co., 3–4.

³⁰ Sixteenth Annual Report (1844), 21, 40–41.

AUGUST 1843

Extraordinary heavy rains struck several parts of the Potomac Valley in August 1843 causing several streams passing under the canal "to rise to a height unprecedented within the memory of man." The two streams where the heaviest flooding occurred were Tonoloway Creek at Hancock and the Monocacy River. The water of the later overflowed the canal and caused high water to plague the canal all the way down to Edwards Ferry. The flooding at the two areas caused extensive washing of the towpath and heavy erosion of the canal embankments, but no serious breaches were reported.³¹

SEPTEMBER 1843

After several days of heavy rain throughout the Potomac Valley in mid-September 1843, a flood of greater proportions than the April freshet struck the canal. Damage was extensive all along the line from Georgetown to Dam No. 6, then the western termination of the canal, but the lower portions of the waterway suffered most. As the embankments damaged by the April freshet had not yet been raised to their full height and completed, navigation was now suspended for one month and repairs totaling \$30,000 in addition to the amount still unexpended from the April \$20,000 estimate were made to restore the waterway to the condition that it had been in before the spring freshet.³²

On September 19 and 21, Superintendent Young reported on the damage to the canal on his division from Georgetown to Lock No. 26. The Georgetown level had suffered two large breaches—one near Pointers and the other opposite the Alexandria Aqueduct quarry. The estimated cost of repairing the two breaches was \$2,500. From the Alexandria Aqueduct to Dam No. 1 the canal banks had been washed considerably, particularly above the Powder Magazine. Near the dam there was another serious breach and the banks were washed badly. About one-third of the Lockhouse at Lock No. 6 had been carried away, and he assumed that it would go entirely. Above Lock No. 7 there were two breaks, and the embankment below Lock No. 8 was heavily injured where the river overflowed it. The damage on the levels between Lock Nos. 6, 7 and 8 was similar to those caused by previous floods but was far more extensive. On the "log wall" level between Locks Nos. 14 and 15, there was a considerable slide on the riverside of the towpath embankment. Below Great Falls the river reached the top of the high embankment walls and washed out the filling, and the water poured into the canal below Lock No. 16. Taking immediate precautionary measures to prevent the loss of the heavy embankment, Young had cut the banks, thereby minimizing the damage to that level. Above Lock No. 20 there was a breach, and the banks above Lock No. 21 were severely washed. There were two breaches and a similar wash just below Lock No. 22. Between this lock and the Seneca Feeder, there were two breaches at Long Acre, and the whole bank was nearly carried away for a distance of 300 yards in length at the point of rocks just below Lock No. 23. It was the most damaged level on the canal below Seneca except for that at Georgetown, and he feared that it would be difficult to procure the needed materials for its repair. From Guard Lock No. 2 to Great Falls, the canal had been covered with water from 2 to 6 feet deep, the marks of which he had directed to be made permanent all along the line.

Between Seneca and Edwards ferry there were two spots where the freshet had inflicted heavy damage on the canal. About two-thirds of the barrel of the Beaver Dam Culvert was washed away on its riverside along with about 200 feet of embankment on each side of the canal. Although he had cut the embankment to protect the culvert, the water at Edwards Ferry had cov-

³¹ Sixteenth Annual Report (1844), 40.

³² Fisk to Coale, September 17, 1843, Ltrs. Recd., C & O Co.

ered the canal to a depth of 4 or 5 feet. In addition there were three breaches in the canal banks between Locks Nos. 25 and 26. The banks in many places above Seneca had been torn by the water flowing over the towpath, but no masonry works, other than the Beaver Dam Culvert, has been damaged.

Young estimated that the cost of repairs to his division would total more than \$9,000. From Georgetown to Lock No. 8 the repairs would cost \$4,000, from Lock No. 8 to Seneca \$3,000, and from Seneca to Edwards Ferry \$2,300. However, these estimates did not include the raising of the towpath where it was "washed off at a point above high water in the canal," nor did it include the masonry repairs on the Beaver Dam Culvert.

Above Edwards Ferry the canal also suffered damage, although it was not as extensive as the lower portion of the line. The high water caused "east berm corner" of the Little Monocacy Culvert to settle. The abutment was almost entirely undermined and the "upper wall & all the paving" were gone as that the water stood "nearly 4 feet under the culvert." Part of the abutment wall at the upper berm corner had also fallen down.³³

From Point of Rocks to Dam No. 4, the damage was double to that inflicted on the waterway by the April freshet. At Harpers Ferry the water was 2 to 3 feet higher than in April and at Taylor's Landing it was 2¹/₂ feet higher. The embankments adjacent to the Shenandoah River Lock were washed severely, and one of the gates of the lock was torn out. One of the company's house boats near Harpers Ferry was washed over the towpath and lost along with a large supply of tools and provisions. The high water passed around the abutments of Dam No. 4, causing a breach and a severe washing of the adjacent embankment.³⁴

Between Dams Nos. 4 and 5 there were numerous breaks in the canal, but none were very serious in extent and none were below the bottom of the trunk. Most of the damage on this distance resulted from the towpath being washed into either the river or the canal, and in the latter case forming bars that needed to be removed.

The canal above Dam No. 5 experienced about the same amount of damage as it had earlier in April despite the fact that the height of the water was generally at least three feet lower. Some of the sheeting on Dam No. 5 was washed off. There were two serious breaks between Hancock and Dam No. 6, one at Roundtop Cement Mill and the other just below Lock No. 53. The embankments below Dam No. 6 had been strengthened with an outer layer of stone rip-rap the previous summer, and this work was credited with protecting the towpath and the canal trunk below from further injury. Had all the breaks caused by the April freshet been repaired in such a manner on the portions of the line, Superintendent John G. Stone of the Third Division reported that "the damage would have been but a trifling in comparison to what they are now."³⁵

After receiving the reports of damage all along the canal, Chief Engineer Fisk informed company president James M. Coale on September 17 that the total cost of repairs would be about \$30,000 and that navigation would be suspended for 30 days. This sum would be in addition to the unexpended portion of the \$20,000 estimate of repairs from the April freshet. However, he urged the president not to be merely satisfied with repairs but to order further precautionary work to protect the waterway from even higher freshets in the future.³⁶

As soon as the flood waters subsided below Little Falls, the residents of Georgetown pressed canal officials to repair the Georgetown Level immediately. Many of the citizenry were alarmed because the water had poured over the canal banks and inundated sections of the town,

³³ Elgin to Fisk, October 1, 1843, and Eldridge to Fisk, October 18, 1843, Ltrs. Recd., Chief Engineer.

³⁴ Elgin to Coale, September 23, 1843, Ltrs. Recd., C & O Co.

³⁵ Stone to Fisk, September 19 and October 23, 1843, Ltrs. Recd., Chief Engineer.

³⁶ Fisk to Coale, September 17, 1843, Ltrs. Recd., C & O Co. As the company funds were low, the banks in Frederick granted a substantial loan for the emergency repairs.

thereby increasing the chances of an outbreak of cholera. The milling interests were also interested in a prompt restoration of their water supply. Accordingly, canal officials determined to commence repairs on the Georgetown to Little Falls section of the waterway on September 19 and to construct an undetermined number of badly needed waste weirs in the area to prevent future disasters.³⁷ To fund these repairs the Georgetown millers loaned the sum of \$3,000 to the company, and the loans pledged the water rents of the company in the District of Columbia as collateral.³⁸

Repairs all along the line of the canal were commenced as soon as the high water subsided. Superintendent Young informed the board on September 21 that he already had a large force working at the Beaver Dam Culvert. It was his intention to raise the embankments below Edwards Ferry only "above the water mark" in order to restore navigation within thirty days. After the canal was reopened for trade, the embankments could be raised by crews working from boats.³⁹

Repair crews were also at work on the canal upstream within several days. Superintendent Stone informed the board on September 19 that his repair force was on the job above Dam No. 4. As they would have to boat material some distance until the canal navigation was restored, the work would take longer than it had in April.⁴⁰ By September 26 Superintendent Elgin reported that he had two large repair crews working on his division: one at Harpers Ferry consisting of 70 men and 17 horses and carts, and one at Crowley's consisting of 144 men and 34 horses and carts.⁴¹ The canal was repaired to the extent that navigation was restored from Edwards Ferry to Dam No. 6 on October 17 and from Georgetown to Edwards Ferry on November 8.⁴²

Despite the resumption of navigation, the canal was still not in the operating condition that it had been before the April freshet. Further, the devastating floods of 1843 had called into question the security of the entire waterway and its capability of withstanding future freshets. Accordingly, canal officials carefully examined their work during the winter of 1843–44 and determined to commence a program of thorough repair and long-range improvements during the next year.

Examples of thorough repair were such efforts as those at the Little Monocacy Culvert and at the Shenandoah River Lock. At the former, a new foundation and new abutment walls were constructed to not only repair the flood damage but also to give the structure additional strength to withstand future freshets.⁴³

At the Shenandoah River Locks, the board determined to raise the river end of the structure and to elevate the adjacent canal embankment. This work was an effort to prevent future breaches in an area that had experienced serious injuries and to protect the line below from the repeated damage inflicted upon it by water overflowing the banks at this spot. The repairs on this portion of the waterway were completed during the spring of 1845.⁴⁴

³⁷ Ingle to Coale, September 18, 1843, Ltrs. Recd., C & O Co.

³⁸ Proceedings of the President and Board of Directors, G, 113–114.

³⁹ Young to Coale, September 21, 1843, Ltrs. Recd., C & O Co.

⁴⁰ Stone to Fisk, September 19, 1843, Ltrs. Recd., Chief Engineer.

⁴¹ Elgin to Fisk, September 26, 1843, Ltrs. Recd., Chief Engineer.

⁴² *Niles' Register*, LXV (October 14, 1843), 112; *Proceedings of the Stockholders*, C, 230–232; and *Sixteenth Annual Report* (1844), 40–41. During the completion of repairs below Edwards Ferry, the navigation was reopened for light boats along the river between the river locks at Seneca and Edwards Ferry for some 15 days to bypass the heavy breach at the Beaver Dam Culvert.

⁴³ Eldridge to Fisk, October 18, 1843, and Elgin to Fisk, November 28, 1843, Ltrs. Recd., Chief Engineer.

⁴⁴ Seventeenth Annual Report (1845), C & O Co., 17–18.

The most extensive long-range improvements to be made on the canal were those on the Georgetown Level. After an examination of the area by Chief Engineer Fisk in the spring of 1844, the stockholders were informed on June 3 that:

It appears that the length of the level, including that part of the feeder from the Potomac lying below the guard gates, which is connected with it, is $4 \frac{2}{3}$ miles. Of this distance, three-fifths of a mile below the guard gates is usually overflowed by heavy freshets. This occurred twice last year, viz: in April and September. At the last-mentioned freshet, the water ran over the towpath in places to the depth of four feet. Whenever such an inundation from the river takes place, breaches must inevitably occur lower down, by which the surplus water which has entered the canal returns to its natural channel. Such breaches, owing to the great height of the canal, upon that part of it, above the level of the river, are generally very heavy. As a protection against these river freshets it will be necessary, as soon as adequate means (for which we are now negotiating) can be obtained, to raise the part of the towpath liable to overflow, and also the feeder bank below the guard gates, at least one foot above the highest water mark hitherto known in the Potomac; or, in other words, about one foot higher than the rise of the last September freshet. This, with a tumbling waste 500 feet long on the towpath side of the canal, near the fourth milestone, and some few other repairs of minor importance, it is thought would oppose an effectual barrier against the inroads of the river at all times hereafter, and would amply compensate the Company for the cost of the outlay, in the savings from breaches, in the course of three or four years. The repairs of the breaches on this level in 1842 was \$2,242 and in 1843, \$4,053. The proposed improvements, if they had been constructed in time, would have saved all this expense. The entire cost of making them is estimated by the Chief Engineer at about \$9,000, including the reconstruction of the bridge over the canal [just east of the Market] in Georgetown, which is imperatively called for...⁴⁵

After the report was considered, the company agreed to the Chief Engineer's recommendations provided that the Corporation of Georgetown would make available a \$10,000 loan upon a pledge of the company's water rents in the District of Columbia.⁴⁶ When Georgetown demanded "a deed of Mortgage" on canal company property for the security of the loan, the board rejected the loan offer and the negotiations for the loan were terminated.⁴⁷ Accordingly, the board, aware of the financial limitations of the company authorized the construction of a tumbling waste that in the opinion of President Coale and Chief Engineer Fisk "may be necessary to secure the said portion of the canal from damage by the usual river freshets & overflow from the Falls Branch." The directors also authorized the construction of such improvements "as may be necessary" to the security of this level, with the funding for such projects to come from company finances.⁴⁸

On November 4, 1844, the improvements to the Georgetown Level began when a contract for the waste weir and spillway at Falls Branch was awarded to Roberts and Cleveland.⁴⁹ The improvements continued through the winter and into the following spring. The progress of the work was described by President Coale on January 15, 1845:

⁴⁵ Sixteenth Annual Report (1844), 17–18.

⁴⁶ Proceedings of the President and Board of Directors, C & O Co., 154, 163.

⁴⁷ "A Resolution to Authorize a Loan of Money to the Chesapeake & Ohio Canal Company". August 3, 1844, *Ordinances of the Corporation of Georgetown* (Georgetown, 1846), 13–14, and *Proceedings of the President and Board of Directors*, G, 190, 196.

⁴⁸ Proceedings of the President and Board of Directors, G, 196–197.

⁴⁹ *Ibid*, G, 201.

The Board have caused some improvements to be made on that part of the line, and have contracted for others, which are now in progress, and will be completed during the winter. The improvements finished are, the tightening of the Little Falls feeder, by which that level is supplied with water, and the raising of the guard banks of the canal at such points as are most exposed to the overflow of the river. The improvement in progress is the construction of a tumbling waste, two hundred and fifty feet long in the clear which is thought will hereafter furnish a sufficient security against breaches on that portion of the Canal in ordinary freshets. The Board have only been deterred from making this improvement ...by the limited extent of their means...⁵⁰

On April 30, 1845, the improvements on the Georgetown Level were completed when the board passed a final estimate for the tumbling waste, a structure which cost \$1,908.75.⁵¹

MARCH 1846

The first of two major floods in 1846 struck the Potomac Valley in March. The water rose to within 4 feet of the September 1843 flood, but the breaches were "not generally of a serious nature." The heaviest damage was inflicted on the line between Dams Nos. 4 and 5. About 80 feet of Dam No. 4 was carried away by the swollen river. The gates of Locks Nos. 41–44 were either broken or washed out, and some 50 to 60 feet of the sheeting on Dam No. 5 was swept off.

As soon as the flood waters subsided, the few minor breaches in the canal banks between the two dams were repaired. The damage at Dam No. 4 did not interrupt navigation for long as there was a plentiful supply of water in the river during the normally dry summer months, and the remaining portion of the dam was able to divert a sufficient quantity of water into the canal for operating purposes. Restoration work on the dam was still in progress in early July when another heavy freshet occurred.

The damage caused to Locks Nos. 41–44 by the freshet and the frequent breaking of the lock-gates during the day-to-day operations of the canal brought about a slight modification in the construction of the gates. In accordance with instructions issued by Chief Engineer Fisk the new gates had cast iron frames with arms that were framed "with a shoulder of 2 inches on the upper side." This improvement, it was thought, would prevent the "breaking of the tendons of the arms."

At Dam No. 5 improvements were commenced to prevent the structure and the canal below it from suffering more extensive damage in future floods. It was estimated that if the river had risen one foot higher at the dam, the entire length of the towpath down to Lock No. 44, which was rebuilt the previous year, would have been carried away. Accordingly, operations were begun to raise the towpath below the dam and protect it with stone. Plans were made also to raise the coping of Guard Lock No. 5 some three feet and to install a new set of gates of appropriate size. In this manner it was hoped that the structure would "effectually keep out the water of the highest freshet." As was the case with Dam No. 4, these repairs and improvements were still in progress when another freshet struck the canal in early July.⁵²

⁵⁰ Seventeenth Annual Report (1845), 17–18.

⁵¹ Proceedings of the President and Board of Directors, G, 248.

⁵² Nineteenth Annual Report (1847), C & O Co., 6–7; Niles' Register, LXX (March 28, 1846), 64; and Stone to Fisk, March 21, 1846, Ltrs. Recd., Chief Engineer.

JULY 1846

The second major freshet of 1846 struck the canal in July. At its peak the height of the flood waters was 3½ feet lower than that of the September 1843 freshet below Seneca and 14 inches lower at Harpers Ferry. Farther up the river from Williamsport to Dam No. 4 the water was higher than it had been in the 1843 freshet. Despite the height of the water, the flood did only about onefourth as much damage as had the 1843 freshet, due mainly to the improvements that had been made to the line during the succeeding years.

A review of the damage inflicted upon the canal by the freshet demonstrates the value of the improvements that had been made since 1843. One breach occurred in the Rock Creek Basin, and about 10 others were reported on the line from Georgetown to the Monocacy River. The line from Lock No. 8 to Seneca sustained little damage owing to the embankments that had been raised in many places where less freshets had overflowed the banks in previous years. The tumbling waste that had been built at Falls Branch in 1844–45 was credited with saving the Georgetown Level from damage. While none of the masonry works on this portion of the canal were heavily damaged, several locks near Georgetown suffered from the high water and required renovation or considerable repairs.

The only serious problem below the Monocacy was at Broad Run where the high water entirely destroyed the two-arch (16-foot span each) culvert. The arches and the abutments were carried away entirely, and the whole width of the canal for a distance of about 70 feet at the culvert was washed out.

The 18-mile section of the canal from the Monocacy to Harpers Ferry was uninjured primarily because of the improvements that had been made at the Shenandoah River Lock. About the only serious damage to be reported above Harpers Ferry was at Dam No. 4 and the level below it. The repairs on the dam from the March freshet, which were nearly completed, were washed away, and the breach in the structure was widened. The guard bank at the dam suffered \$1,000 in damage as it was not high enough to keep the river out of the company works. The damage below the dam resulted primarily from the fact that the stop plank was not put in the stop lock early enough to prevent an overflow of the canal banks.⁵³

After surveying the damage, Chief Engineer Fisk and Superintendent Elgin on July 8 informed President Coale that it would cost about \$8,000 to restore the canal for navigation purposes. Trade could be resumed in three weeks because many of the breaks had occurred near places where materials were conveniently located for repairs. The only two problems spots were at the Rock Creek Basin and the Broad Run Culvert. At the former, a narrow bank could be put in quickly so that the water could be admitted before more extreme work was undertaken. At the latter, a temporary wooden tank costing in excess of \$2,000 would be thrown over new wing walls that were to be constructed of stone salvaged from the wrecked culvert so that navigation could be resumed quickly. While these temporary repairs would permit an early resumption of boat navigation, the two officials recommended that an additional \$10,000 be expended over the next several months "on work rendered necessary by the late freshets and on the breach in the dam."⁵⁴

Despite a shortage of laborers for the repair crews, the job of restoring the canal to operating condition began as soon as the high waters subsided. Navigation was resumed by August 1, but the major repairs at Dam No. 4 continued until June 1847. Because of the depressed condition of the company's finances, nothing was done to renovate the deteriorating locks near Georgetown

⁵³ Fisk to Coale, July 6 and 8, 1846, and Elgin to Coale, July 2 and 8, 1846, Ltrs. Recd., C & O Co., and Coale to Fisk, July 5, 1846, Ltrs. Recd., Chief Engineer.

⁵⁴ Fisk to Coale, July 8, 1846, and Elgin to Coale, July 8 and August 18, 1846, Ltrs. Recd., C & O Co.

or to reconstruct the Broad Run Culvert. All told the company had spent \$21,327.76 by June 1847 to repair the damage caused by the freshets of March and July 1846.⁵⁵

OCTOBER 1847

In October 1847 a major flood struck the eastern United States causing particularly heavy damage in Ohio, Pennsylvania, Virginia and Maryland. In Ohio the Ohio and Erie and the Miami and Erie Canals were considerably damaged, while in Pennsylvania the Main Line Canal in the Juniata Valley was severely injured. The James River and Kanawha Canal in Virginia was damaged also by the raging flood waters. While the railroads in all of these states were disrupted by the high water, the Baltimore & Ohio Railroad appears to have suffered most, particularly on its 40-mile route between Baltimore and Washington.⁵⁶

The Potomac Valley was not spared from the full effects of the storm as the river surpassed all previous high water marks. John Thomas Scharf one of the most well-known Maryland historians described the flood as a "fearful freshet" in which "bridges were swept away, gardens washed out, and buildings damaged."⁵⁷ While the Chesapeake & Ohio suffered less damage in proportion to its length and resumed navigation earlier than did the other canals in the surrounding states, it nevertheless experienced considerable damage that curtailed its operations for more than two months and cost \$48,201.56 to repair.⁵⁸

The Potomac River began rising on October 7 and alarm soon spread throughout the valley. The following day Superintendent Elgin at Harpers Ferry reported that the river was already near the height of the highest freshet in 1846 and from all appearances he was certain that it would soon be "the highest water ever known in this River."⁵⁹ Later the same day Superintendent Stone at Clear Spring observed that the water was "20 inches higher than it ever has been since I have been on the canal" and the water was still rising. He noted that new gates had been placed in Guard Lock No. 5 only ten days before, which was fortunate for the company as the old gates would not have withstood the freshet.⁶⁰ By October 9 Elgin was informing canal officials that "we have had the highest freshet in the Potomac that I have ever seen" and that the canal at Harpers Ferry was still submerged under water.⁶¹ On the 9th Superintendent John Lambie at Georgetown also notified the board that the water, which had been rising for 3½ days, was 12 to 15 inches higher than the previous high water mark set by the September 1843 freshet and still rising.⁶²

Although there were numerous breaches in the canal banks all along the canal, the most critical damage to the waterway was concentrated in the following areas: Lock No. 7 to Widewater; the levels above Great Falls; Point of Rocks to Dam No. 4; and the vicinity of Dam No. 5. On the Georgetown Division there were two large breaches, one above Lock No. 7 and the other at the high wall near Widewater. At the latter, more than 200 feet of the wall had collapsed. There was some damage done to the Georgetown Level, and there were a series of minor breaches on every level above Great Falls.⁶³

⁵⁵ Nineteenth Annual Report (1847), 6, 8.

⁵⁶ Niles' Register, LXXIII (October 16, 1847), 112, and Twentieth Annual Report (1848), C & O Co., 11–12.

⁵⁷ Scharf, *History of Western Maryland*, Vol. I, 560.

⁵⁸ Twentieth Annual Report (1848), 11–12, 28, and Niles' Register, LXXIII (October 16, 1847), 112.

⁵⁹ Elgin to Coale, October 8, 1847, Ltrs. Recd., C & O Co.

⁶⁰ Elgin to Coale, October 8, 1947, Ltrs Recd., C & O Co.

⁶¹ Stone to Coale, October 9, 1847, Ltrs. Recd., C & O Co

⁶² Lambie to Coale, October 9, 1847, Ltrs. Recd., C & O Co.

⁶³ *Ibid*.

Farther up the valley there were between 8 to 10 large breaches on the line from Point of Rocks to Dam No. 4. At the dam itself, the damage was much greater than that caused by the 1843 floods and the flood waters rose three feet above the previous high water mark. The entire cross guard bank between the stop lock and the dam abutment was carried away, thereby allowing the river to run around the Maryland abutment and the guard lock. The main guard bank had also been damaged, causing Superintendent Elgin to conclude that it would cost more than \$5,000 to restore the area. There was a heavy breach about one-half mile below the dam where the water that was running around the dam abutment was re-entering the river. Accordingly, efforts were made, even before the flood waters subsided, to stop the water from running around the dam abutment.⁶⁴

Above Dam No. 4 there was no serious damage done at any one place, but there were injuries to almost every level. The towpath was washed in many places and there were numerous small breaches in it. The only damage to the masonry occurred where the water carried away the berm end of a culvert and about 30 perches of the Virginia abutment of Dam No. 5 at which point the water had risen to 3½ feet above any freshet since 1828. The culvert would require repairs before the readmission of the water, but the work on the abutment could be postponed. Some of the older lock gates were broken, but they could be mended to handle the boat traffic until the winter. The rest of the season this portion of the canal would have only 3 to 3½ feet of water and it would take until the following spring to have the banks fully restored to their proper height.⁶⁵

Once the damage had been assessed, company officials reported that navigation would be restored in one month at a cost of \$20,000. With the aid of various banks, repair work was begun immediately. Additional work crews and horses were hired and a company agent was dispatched to Baltimore to purchase tools as there was a shortage of such items in some parts of the valley. New freshets in November and December delayed the repairs so that the navigation was not reopened until mid-December below Harpers Ferry and the full canal to Dam No. 6 was not ready for operations until February 15, 1848. By that time \$48,201.56 had been spent to restore the waterway.⁶⁶

APRIL 1852

The worst flood in the history of the Potomac to that date, devastated the entire line in April 1852. The flood was as great a surprise to the canal board as it was a disaster to the waterway itself. In 1849–50 the directors, with the aid of \$200,000 of repair bonds from the State of Virginia, had renovated the canal from Georgetown to Dam No. 6, raising the embankments at the most exposed places above the level of the highest freshets in the history of the valley.⁶⁷ They based their

⁶⁴ Elgin to Fisk, October 10, 1847, Ltrs. Recd., C & O Co.

⁶⁵ Stone to Coale, October 10 and 12, 1847, Ltrs. Recd., C & O Co.

⁶⁶ *Ibid*, and *Twentieth Annual Report* (1848), 11–12, 28. As had been the case after earlier floods, the company attempted to make some improvements that would protect the canal from damage by even higher freshets. Such was the case at Dam No. 5 where in January and February 1848 the Virginia abutment was not only repaired but operations were commenced also to raise it. The work on this improvement included 87 perches of masonry, 1900 perches of dry wall, and 9,700 cubic yards of embankment and its total cost was \$6,790.50. Stone to Fisk, and Stone to Coale, December 27, 1848, Ltrs. Recd., C & O Co.

⁶⁷ Proceedings of the President and Board of Directors, H, 127, 251–257, and Twenty-Second Annual Report (1850), 7–9. This renovation effort was not performed as a result of any one particular flood but rather as a response to the general disrepair of the canal caused by the series of floods in the 1840s, the temporary stop-gap measures taken to resume navigation after each freshet, and the lack of thorough annual maintenance work by the financially-strapped company. As such the major 1849–50 renovation effort will be con-

action on the levels attained in the flood of 1847, which had been the worst since 1784 when operations on the Potomac Company Canals were commenced. The precautions proved to be in vain for in April 1852, six consecutive days of heavy rain caused the river to rise six feet higher at most point below Cumberland than the levels attained in 1847. At Great Falls it reached the unprecedented height of 64 feet. Had the crest been only two or three feet lower, the waterway might have escaped serious injury. As it was, by the time the work of restoration was completed the cost of repairs amounted to nearly \$100,000⁶⁸ The canal itself was weakened by the disaster but the effect on its trade and its financial condition was even more serious, as company officials admitted later to stockholders in June 1855:

The disaster occasioned by the flood in the spring of 1852, was very detrimental to the interests of the company, in causing not only a large debt, and heavy expenses in repairing the canal, and the loss of three or four months revenues during the suspension of navigation that year, but had a still more unfavorable influence by the loss of confidence in the stability and reliability of the work as a means of transportation.⁶⁹

The first intimation of the approaching disaster occurred at Cumberland on April 18 after a heavy thunderstorm and two days of pouring rain. Both Wills Creek and the Potomac overflowed their banks, the latter rising higher than it ever had since 1816. The water passed into the canal basin around the outlet locks and flooded Ward's boat yard and the wharves and warehouses around Shriver's Basin. The water broke through a wall separating Bruce's and Brengle's warehouses on Canal Street and a considerable portion of the town was inundated, including the tracks of the Baltimore & Ohio Railroad.⁷⁰

That same day the Potomac overflowed its banks at Williamsport causing widespread flooding and destruction. The water covered the towpath to a depth of 12 feet and several company houses and canal boats were swept down the river. According to reports in the *Alexandria Gazette*

Car loads of flour, stacks of grain, shanties, trees, logs and timber were seen whirling through the angry waters in rapid succession. The mill of Messrs. Van Lear was sub-merged nearly to the roof, and their loss in flour and wheat is from \$5,000 to \$10,000.⁷¹

The following day, Superintendent Elgin voiced his fears that the continuing rain was bringing the highest freshet ever seen in the Potomac Valley. The water had risen $3\frac{1}{2}$ feet since dawn, and at mid-morning it was rising one foot per hour.⁷²

By the 21st, Superintendent Elgin had examined the canal from Harpers Ferry to the Monocacy River. He found that the canal had been considerably injured with several large breaches between Dam No. 3 and Point of Rocks. It appeared that the canal suffered most wherever there was a curve in its passage through the narrow passes over this distance. At Harpers Ferry the Government Dam had been submerged in water up to fifteen feet in depth (some 5 to 6 feet higher than in 1847) and the river had broken through the embankments around the Maryland

sidered as one of the highlights of the company maintenance efforts in a later chapter of this Historic Resource Study.

⁶⁸ Twenty-Fourth Annual Report (1852), C & O Co., 3–4; Twenty-Fifth Annual Report (1853), C & O Co., 3; and Alexandria Gazette, April 22, 1852.

⁶⁹ Twenty-Seventh Annual Report (1855), C & O Co.

⁷⁰ William Harrison Lowdermilk, *History of Cumberland, Maryland* (Washington, D.C., 1878), 375.

⁷¹ Alexandria Gazette, April 23 and 27, 1852.

⁷² Elgin to Ringgold, April 19, 1852, Ltrs. Recd., C & O Co.

abutment. In returning to the river channel, the water passed over and through the towpath above Lock No. 34 causing damage greater than that done by the 1847 freshet. The level above Lock No. 33 also had experienced more extensive damage and several warehouses and a number of canal boats in the vicinity of the lock had been swept away. From Point of Rocks to the Mono-cacy River, he found the damage quite light compared to what he had expected and generally less than in 1847. In his opinion \$6,000 would be needed to restore the 20 miles below Dam No. 3 for the readmission of 4 to 5 feet of water for navigation.⁷³

On the 22nd reports began reaching canal officials concerning the heavy drainage to the canal between Georgetown and Great Falls. Along the canal in Georgetown many of the wharves and warehouses with their stores of flour, lumber, coal and firewood were destroyed. Both the Little Falls Bridge and the Long Bridge were washed away.⁷⁴ On the Georgetown Level there were four large breaks in the canal banks-a 300-foot cut at the waste weir near the site of the Little Falls Bridge a 70-foot breach about 600 yards below Gillhouses', and two smaller breaks just below Lock No. 5. Between Lock No. 5 and Widewater there were two breaches-a 30-foot cut at the Powder Magazine and a 100-yard break commencing at Lock No. 7 and extending to the small culvert next above it. On the Widewater level there were two serious breaks in the log wall at the lower end of Bear Island where the high embankment connected the island with the mainland. The most critical of these occurred at the same location as the large break in the 1847 freshet. It was 500 feet long, of which 200 feet were swept out to the bottom of the canal. The remaining 300 feet were so badly damaged the removal down to the foundation was necessary. It was estimated that it would take up to \$10,000 and two months to repair this one break alone. About 100 yards above this break there was a 75-foot cut, and because of continuing water seepage there was fear that the two breaches would unite. Some 8¹/₂ miles above Great Falls there were two small breaks that were close to each other-one 20 feet long and the other 40 feet. There was a breach, 130 feet wide and 8 feet deep, in the embankment of the berm side of Guard Lock No. 2. Another breach, 30 feet wide and 6 feet deep, took place across the towpath about 60 feet west of the guard lock. All told, the lower 22 miles of the canal suffered the most destruction from the floods as they had many times before.⁷⁵

Between April 22 and 29 various reports of the damage caused by the flood above Harpers Ferry reached company officials. From Dam No. 3 to Dam No. 4 the damage was generally similar to that experienced in 1847, the most critical breach occurring at the latter site where the river broke over the guard bank and around the Maryland abutment. The canal embankments were washed heavily at a few points between Dams Nos. 4 and 5, but the damage was generally less than in 1847. There were numerous small breaches in the canal embankments between Dams Nos. 5 and 6 but none were serious. Nearly all the filling in Dam No. 5 was washed out. At Dam No. 6 the river broke through the earthen embankment around the Virginia abutment, making a deep breach about 2 feet in length which was sufficient to pass all the water of the normal flow of the river.

From the Cacapon to Town Creek there were eight levels which had been injured. On each of these, there was generally one and in some cases two or three small openings in the towpath near the head of the level through which the water passed into the canal and a breach at the lower end where the water passed through the embankment back in the river. At some points the towpath was left in a ragged state, and at a few places the prism was partially filled by silt deposits. The most serious breach on this section of the waterway was on the lower end of the level

⁷³ Elgin to Ringgold, April 21, 1852, (two letters), Ltrs. Recd., C & O Co.

⁷⁴ Alexandria Gazette, April 22, 1852.

⁷⁵ Page to Ringgold, April 22, 1852, Ltrs. Recd., C & O Co.; Elgin to Fisk, April 25, 1852, Ltrs. Recd., Chief Engineer; and *Alexandria Gazette*, April 23 and 26, 1852.

near a waste weir just above Lock No. 66 where some 10,000 cubic yards of embankment had been washed out, thus submerging the upper end of the Paw Paw Tunnel Lock. Here the drainage was partially attributable to a berm bank that had been built near the waste weir on Section No. 312 causing a revised curve in the line. A second trouble spot was just below the Town Creek Aqueduct where a culvert had given way, causing a cut through both canal banks some 40 feet wide and down to about 3 feet above the bottom of the prism. On the 21 miles from Town Creek to Cumberland there was no damage to the canal banks or to the masonry.⁷⁶

After reviewing the wreckage to the canal, Engineer and General Superintendent Fisk reported that it would cost \$80,000 to repair the line. Of this sum, \$25,000 was needed for the 22 miles below Seneca alone. It would take about 10 weeks before navigation could be resumed in early August. In repairing the waterway he recommended that the breaches at the head of the levels be closed first "as we may have another freshet before the opening at the foot of the levels can be repaired." Hoping to dispel some of the gloom that pervaded the company, he noted that:]

It is proper that I should state that if the late freshet had been no higher than that of 1847, which did damage to an amount not less than \$50,000, the canal, in consequence of work done since to guard against freshet of that height, would have sustained very little injury, and the navigation would have been interrupted for but a very short time thereby. The canal may therefore be considered as having been placed in a condition almost entirely safe against all freshets, except such, judging from the past, as may occur not oftener than every 50 years.⁷⁷

A large force was soon put to work on the repairs, and company officials commenced efforts to secure loans from local banks and town along the line to finance the restoration. By June 16 the company had received \$77k900 in pledges from Corporations of Georgetown and Alexandria, banks in the District cities and Cumberland, water renters in Georgetown, and individuals in Cumberland. In addition, William W. Corcoran and George Washington Riggs promised to provide the company with a personal loan of \$5,000 if it was needed to complete the work.⁷⁸ The loans were advanced to the company on the pledge of its future revenue subject to existing priorities.⁷⁹

LOANS TO REPAIR 1852 FLOOD DAMAGE ⁸	30
Corporation of Georgetown	\$30,000
Corporation of Alexandria	10,000
Bank of the Metropolis	10,000
Patriotic Bank	5,000
Bank of Commerce, Georgetown	2,500

⁷⁶ Dungan to Brengle, April 22, 1852, and Fisk to Board of Directors, April 29, 1852, Ltrs. Recd., C & O Co., Fisk to Dungan, April 23, 1852, Ltrs. Sent, Chief Engineer, Stone to Fisk, June 13, 14 and 19, 1852, Ltrs. Recd., Chief Engineer and *Alexandria Gazette*, April 27, 1852.

⁷⁷ Fisk to Board of Directors, April 29, 1852, Ltrs. Recd., C & O Co. Also see Fisk to Dungan, April 23, 1852, Ltrs. Sent, Chief Engineer.

⁷⁸ Ringgold to Chairman, Committee of Georgetown Corporation, June 16, 1852, and Grason to Corcoran, July 19, 1852, Ltrs. Sent., C & O Co.; Dangerfield to Ringgold, May 10, 1852, Ltrs. Recd., C & O Co.; and *An Ordinance Providing Aid Towards the Repairs of the Chesapeake & Ohio Canal*, May 7, 1852, in *Ordinances of the Corporation of Georgetown* (Georgetown, 1852), 9–10. A statistical breakdown of the loans may be seen on the above table.

⁷⁹ Twenty-Fourth Annual Report (1852), C & O Co., 4.

⁸⁰ Ringgold to Chairman, Committee of Georgetown Corporation, June 16, 1852, Ltrs. Sent, C & O Co.

Far Branch Bank, Alexandria	5,000
Bank of the Old Dominion	5,000
Exchange Bank	5,000
Water Renters, Georgetown	2,000
Individuals and Bank Loan, Cumberland	3,400
	\$77,900

While the repairs were in progress, Chief Engineer Fisk successfully urged the board not only to effect the repairs but also to make additional improvements at five locations where more than half of the entire flood damage had occurred. The five points were located below Great Falls, and Seneca Falls and at Dams Nos. 3, 4 and 6. The purpose of the improvements, which would push the total cost of repairing the waterway to nearly \$100,000, was to make these points covering a distance of less than six miles of the waterway "safe against a freshet as high as the recent one."⁸¹

Good progress was made on the restoration of the waterway, and navigation was resumed in late July.⁸² The repairs and the more permanent improvements, not all of which were completed when the water was readmitted to the canal, cost \$100,000.⁸³ Among the additional improvements that were made was "the substitution of a heavy wall of masonry for the embankment carried away at Dam No. 6"⁸⁴ and the construction of a new guard bank from Guard Lock No. 3 to Lock No. 36 that was several feet higher than the 1852 freshet.⁸⁵ The guard bank below Great Falls, Dam No. 2, and Dam No. 4 had also been raised to heights exceeding that of the flood. New waste weirs were built on all the canal levels that were subject to overflow by high water in the river, and some of the older wastes were extended in length to accommodate more water. The cross-section of a portion of Dam No. 5 was changed so as to "free it from the effects of reaction during freshets, by which it has heretofore been very much injured."⁸⁶

At the annual meeting of the company stockholders on June 6, 1853, Engineer and General Superintendent Thomas L. Patterson attempted to present an optimistic view of the repairs effected after the freshet. Among other comments, he observed that:

It is the subject of congratulation ...that a freshet six feet higher than any ever known attempted to be guarded against, should have done, comparatively, so little damage, cannot fail to give well founded confidence in the security of the Canal, when it is considered, that the points where two thirds of the damage was sustained, have been rendered secure against even a higher freshet...It is not probable ...that the navigation would be obstructed for more than a few days by any freshet not higher than that of last year.⁸⁷

Nevertheless, the disaster not only weakened the canal but also had a detrimental effect on its trade and it financial condition. In fact the flood repairs caused a financial panic among the company officials, forcing them to suspend payment of the semi-annual interest on the construction loans which had been issued for repairs to the canal below Dam No. 6 in 1849.⁸⁸

⁸¹ Fisk to President and Directors, June 5, 1852, Ltrs. Recd., C & O Co., and *Twenty-Fourth Annual Report* (1852), 13.

⁸² Ringgold to O'Neal, December 16, 1852, Ltrs. Sent, C & O Co.

⁸³ Twenty-Fifth Annual Report (1853), C & O Co., 3.

⁸⁴ *Ibid*, 8–9. The stone was quarried in Morgan County, Virginia, and transported to the canal on the Baltimore & Ohio Railroad.

⁸⁵ Fisk to Elgin, May 5, 1852, Ltrs. Sent, C & O Co. The work comprised 1,083 perches of stone wall.

⁸⁶ Twenty-Fifth Annual Report (1853), 8–9.

⁸⁷ *Ibid*.

⁸⁸ Frederick *Examiner*, June 30, 1852.

AUGUST 1855

On the night of August 1, 1855, a flash flood struck the canal in the vicinity of Dam No. 4 washing out a road culvert and causing a partial suspension of navigation for three or four weeks.⁸⁹

WINTER 1855-56

During the winter of 1855–56, several ice freshets swept down the Potomac, causing some damage to the rubble stone dams at Little Falls and Seneca Falls and the masonry dam at Cumberland. Accordingly, the two lower dams were repaired and a temporary plank structure was put at Dam No. 8 to prevent it from further injury while permanent restoration work was underway.⁹⁰

FEBRUARY-MAY 1857

Periodic droughts in the dry summer months coupled with the almost continual leaking of Dams Nos. 4 and 5 had curtailed boat navigation on the canal since the 1830s. When another drought in August 1856 brought a renewal of complaints of low water in the canal below the two dams, the company determined to put an end to the nuisance permanently by replacing them with mew tight masonry dams. Contracts were let for Dam No. 4 in October 1856 and for Dam No. 5 in January 1857.⁹¹

No sooner were the new dams contracted for than a series of four successive freshets roared down the valley between February and May 1857, suspending navigation for more than three months. In February the severe winter weather suddenly warmed, causing "an Ice Freshet such as had not for very many years, if ever, occurred before." Dams Nos. 4 and 5, which had been decaying for some years, gave way, the former being badly damaged and the latter having 500 feet totally swept off its foundation from the Virginia abutment to the more recently repaired portal on the Maryland side. During the next two months a large force completed the repairs on Dam No. 4, which consisted of building temporary cribs to close the gap, filling them with stone, and covering them with wooden sheeting. On April 12 just as the repair crews were preparing to fill the temporary cribs at Dam No. 5, a second freshet occurred, carrying away the short crib connecting the main crib and the old dam. This work previously had been thought to be secure, but the foundation proved to be defective. Repairs on Dam No. 5 had again reached an advanced stage and were within a few days of completion on May 4, when the river rose for a third time and poured over the dam. Although workmen waged a four-day struggle to save the structure, the torrent carried off some 200 feet of the repairs that had been made and weakened what was left. At Dam No. 4 about sixty feet of the old structure were swept away. The repairs were promptly resumed in the hope that navigation could be restored by June 1, but a fourth freshet in mid-May delayed repairs on Dam No. 5 for several days and tore a hole in Dam No. 4. Finally in mid-June boat navigation was resumes, and the construction of the masonry dams commenced in earnest.⁹²

The disasters of 1857 all but wrecked the company financially. It had never been in better than a precarious condition since the completion of the waterway. Debts had continued to pile up during the previous decade to add to the already staggering burden of acceptance, balances due,

 ⁸⁹ Washington *Evening Star*, August 2 and 7, 1855, and *Twenty-Eighth Annual Report* (1856), C&O Co., 8.
⁹⁰ Stake to Board of Directors, June 11, 1856, Ltrs. Recd., C & O Co.

⁹¹ Twenty-Eighth Annual Report (1856), 3–4; Twenty-Ninth Annual Report (1857), C & O Co., 9, 11; and Proceedings of the President and Board of Directors, I, 298–299, 316.

⁹² Washington Evening Star, May 7, 1857; Twenty-Ninth Annual Report (1857), 12–13; and Thirtieth Annual Report (1858), C & O Co., 3–4, 59–63.

scrip, state loan and the repair bills after the floods of 1847 and 1852. Thus, company officials felt compelled to offer to the stockholders the following explanation for their actions during the disastrous spring of 1857:

These repeated frustrations of the confident hopes of the restoration of navigation at the periods indicated, involving as each did a large additional expenditure for further efforts at repair, have severely taxed the patience and feelings of the Board, as well as of all those parties anxiously awaiting the event, but it was plain that no course remained other than to continue to labor—to wait patiently till the Destroyer had passed, and then to survey calmly and carefully the ravages which marked his desolating course, and lose no time from vigorous efforts to blot out those ravages in useless regrets and complainings.⁹³

APRIL 1859

A high freshet struck the canal in the vicinity of Williamsport in April 1859. The flood greatly damaged the partially completed new masonry Dam No. 4. As the old dam just upstream from the new construction site was still in place, timber falling over it hit the uncompleted masonry dam, knocking out a great deal of stone work.⁹⁴

SEPTEMBER 1859

A sudden freshet in the Potomac in Williamsport County again struck the canal in September 1859, causing considerable damage to the partially-built new masonry Dam No. 4 and to the level below Shepherdstown. The high water seriously injured the new 175-foot masonry portion of the Virginia abutment of the dam, removing parts of both the front and the back of the structure. A temporary crib was erected in front of the damaged portion of the dam and a contract was let to Lewis Stanhope on October 28 to construct a permanent crib at that point and fill the space between the old and new dams with stone. These repairs progressed slowly as they were interrupted by two periods of high water in March and April 1860.⁹⁵

NOVEMBER 1860

Heavy rains over the Potomac Valley in November 1860 caused the river to rise rapidly. The river reached its peak at Williamsport where its height was measured at 29 feet above normal. The curbing at Dam No. 6 was injured, and a 25-foot section of the masonry abutment on the Virginia side of Dam No. 5 was swept away. Except for a blunder on the part of the Superintendent of the Antietam Division in failing to put a stop plank in the stop lock near Dam No. 4, damage from the high water would not have been great. However, considerable destruction was done to the guard lock and towpath below the dam, and the Marsh Run Culvert was washed out. Some sections of the canal were filled with silt deposits and debris. On the Georgetown Division the only reported damage occurred at Lock No. 21 where the walls had partially collapsed.⁹⁶

⁹³ Twenty-Ninth Annual Report (1857), 12–13.

⁹⁴ Thirty-First Annual Report (1859), C & O Co., 6.

⁹⁵ Thirty-Second Annual Report (1860), C & O Co., 7, 16–17, and Stone to President and Directors,

Sept. 28, 1859, Stone to Ringgold, March 22, 1860, and Stake to Ringgold, April 10, 1860, Ltrs. Recd., C & O Co.

⁹⁶ *Thirty-Third Annual Report* (1861), C & O Co., 3, 8–9; Charleton to Board of Directors, November 7, 1860, Fitzpatrick to Ringgold, November 6, 1860, and Stake to Board of Directors, November 13, 1860,

The canal navigation was shut down for three weeks while temporary repairs were made. When the canal was drained for the winter in late December, more permanent repairs were made to restore the canal to its operating condition before the freshet. General Superintendent A. K. Stake turned his men to Lock No. 21, giving it a new foundation, replacing the lost masonry and strengthening its supporting embankments. The guard lock and towpath below Dam No. 4 were restored, the wooden trunk over Marsh Run was replaced by a stone culvert, the missing masonry in the Virginia abutment of Dam No. 5 was filled with stone from a nearby quarry, and the curbing at Dam No. 6 was reinforced. Debris and silt deposits were removed from the trunk all along the line. As a result of these efforts, the company looked forward to a prosperous boating season in 1861 despite the looming clouds of the Civil War.⁹⁷

APRIL 1861

Torrential rains drenched the entire watershed of the Potomac Valley beginning on April 12, 1861. The following day H. D. Carleton, the company's agent at Cumberland, reported that "the Potomac is very high. A measurement showed that the river stage was within ten inches of being as high as it had been in the previous November. All that he saw satisfied Carleton that the canal would suffer considerable damage unless the river had crested.⁹⁸

Reports in the Washington *Evening Star* of the same date voiced similar fears for the lower portion of the canal. Already the water had passed over the towpath of the Cabin John Level and there was a break in the canal embankments on the Eight Mile Level above Seneca which would interrupt navigation for at least two weeks.⁹⁹

The Potomac continued to surge upward. Upon the upper portion of the canal, it reached a height only exceeded by the great flood of 1852. At Georgetown most of the wharves along the waterway were soon flooded. Measures were taken at once by General Superintendent Stake to repair the damage. After checking with his division superintendent, Stake discovered that destruction to canal property had been "very much aggravated by the unprotected condition of the embankments near the feeder at Dam No. 4." A number of washes and breaches had occurred on the Cumberland, Hancock, Williamsport and Antietam Divisions, while additional cribbing was required at Dam No. 5. At South Branch the steam pumps were out of order and covered with mud and debris. Damage to the Monocacy and Georgetown Divisions was not as significant as had been feared.¹⁰⁰

Two factors retarded the work of the repair crews. One of these, the straightened financial condition of the company, was to be expected. The other, the secession of Virginia from the Union on April 17, was not. Upon adoption of the Seneca Ordinance by the Virginia Convention, Confederate militia converged on Harpers Ferry, eager to seize the arms and machinery at the United States Armory and Arsenal. Unable to capture their objective before it was fired by the retreating Federal troops, the Rebel army used the area as a concentration point where untrained

Ltrs. Recd., C & O Co.; and Edwin C. Bearss, *War Comes to the Chesapeake & Ohio Canal*, "West Virginia History", XXIX (April, 1968), 153.

⁹⁷ Ringgold to Colston, December 15, 1860, Ltrs. Sent, C & O Co., and *Thirty-Third Annual Report* (1861), 9–10, 14.

 ⁹⁸ *Thirty-Third Annual Report* (1861), 10, and Carleton to Ringgold, April 13, 1861, Ltrs. Recd., C&O Co.
⁹⁹ Washington *Evening Star*, April 13, 1861.

¹⁰⁰ Thirty-Third Annual Report (1861), 10; Washington Evening Star, April 15 and 17, 1861; Bearss, War Comes to the Canal, 154; and Lowe to Spates, June 7, 1862, Ltrs. Recd., C & O Co.

volunteers were organized into a fighting force by Colonel Thomas J. Jackson. Troops were sent across the Potomac into Maryland, occupying Point of Rocks and Maryland Heights.¹⁰¹

Despite the presence of the Confederates around Harpers Ferry, progress in effecting repairs of the flood damage was reported by the division superintendent. Water was back in the entire line by May 14, but the activities of the Virginia militia at Harpers Ferry, Point of Rocks and Alexandria made the coal shippers hesitant to use the waterway until the military situation was clarified.¹⁰²

JULY 1861

Heavy rains at the beginning of July 1861 caused new damage to the canal. Although Union advances in the Potomac Valley had compelled the Confederates to pull back from the river, the repair crews did not want to take any chances. General Superintendent Stake complained that the Rebels seemed determined to oppose any navigation on the canal, and it was "impolitic if not dangerous to attempt repairs." Consequently, the repair of sections that could be attended to without risk would be pushed.

Work was to be commenced on July 8, and Stake estimated that it would require eight to ten days to restore navigation. As the regular work crews that resided along the line of the canal had left, the company would be forced to transport men, supplies and provisions into the areas needing repairs. Stake's fears that the canal would be subjected to damage by marauding soldiers as long as the Union and Confederate armies confronted each other along the Potomac were heightened as he prepared to send the repair crews when he was warned of a threat by the Rebels to "below down Dam No. 6." At the same time a Union officer warned that no repairs should be made to Dam No. 1. If the warning was not heeded, he would have his men destroy the dam. The hazards of repairing the canal were increased by the almost daily habit of roving Confederate bands shooting across the Potomac toward the canal at numerous points along the river.¹⁰³

Despite the hindrances to the work crews, all of the repairs on the canal were finished by July 20, except those at Edwards Ferry, a culvert three miles above Paw Paw Tunnel, and the Oldtown Deep Cut. While the last repairs were underway, the U. S. Government dispatched a company of troops to Hancock to protect the waterway from Williamsport to Cumberland. The repairs at Edwards Ferry were completed quickly thereafter, but it took an 80-man crew with 20 horses and carts some 25 days to restore navigation at the large breach near the aforementioned culvert and the heavy rock slide at the Oldtown Deep Cut. On august 26 water was readmitted to this section, and the canal was again operable from Cumberland to Georgetown.¹⁰⁴

APRIL-MAY 1862

During the last week of April 1862 torrential rains drenched the Potomac Valley. The river and its tributaries rose rapidly, and heavy damage was caused before the river crested at Dam No. 4. Two residents of Williamsport complained bitterly that this was the

¹⁰¹ The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies (Washington, 1880–1900), Series I, Vol. II, 809–810.

¹⁰² Spates to Ringgold, May 6 and 13, 1861, Ltrs. Recd., C & O Co., and *Thirty-Fourth Annual Report* (1862), C & O Co., 3.

¹⁰³ Stake to Spates, July 6, 1861, Ltrs. Recd., C & O Co.

¹⁰⁴ Spates to Ringgold, July 20 and 24, August 1, 13 and 25, 1861, Ltrs. Recd., C & O Co. Available documentation does not provide information relative to the precise identification of the culvert. It is likely, however, that it was located in the vicinity where Little Cacapon River empties into the Potomac.

7th high water within the last 18 months. After every high water, we have had the unwelcome and astonishing news that the plank at the stop lock at Dam No. 4 had either not been put in, or if put in had gone out. Invariably has this been the case for the last 18 months or two years. The last high water proves that with all the sad experience for that length of time with a cost of not less than \$50,000 to the canal but no improvement has been made, for the report is now that several of the plank gave way, and the rushing water has done its usual work of in some places filling up and others sweeping away the embankment.¹⁰⁵

Company officials estimated that it would take two weeks to restore navigation. However, critics led by A. C. Greene, a company director and an agent for the Borden Mining Company, observed that the time lost would be closer to one month. Such disasters, it was charged, had cost the canal its flour trade, two-thirds of which had been taken over by the Baltimore & Ohio Railroad. Millers had complained that no reliance could be placed on the canal for ten days at a time, and they had been compelled to seek a more reliable mode of transportation than the canal.¹⁰⁶

When the full report of the damage caused by the freshet reached Cumberland, Greene exploded:

The concurrence of circumstances against the resumption of canal trade this spring are positively infernal. Not only is the Canal deprived of revenue, but the trade itself is imperiled by the untoward events. I have great fears that the largest and most important buyers of coal will despair of getting anything from us this year.

At the time of the difficulties there were at Dam No. 4 some 1,800 tons of coal afloat and enroute to Georgetown. Greene trusted that every effort would be made to restore navigation as soon as possible, as much depended on the boatmen's ability to deliver the coal in early May.¹⁰⁷

Accordingly, the superintendents of the Williamsport and Antietam Divisions pushed their repair crews hard to shore up the damaged embankments and clear out the obstructions. Continued rains added to their difficulties, but by May 8 water was readmitted to these divisions from the feeders at Dams Nos. 3 and 4, and the entire canal was again open to navigation.¹⁰⁸

Traffic on the canal increased rapidly, but on the night of May 14 heavy rains fell on the upper reaches of the Potomac's watershed, causing a rapid rise on the river above Dam No. 5. The work programmed to repair the damage inflicted on the dam by General Jackson's Confederates in December 1861 had not been completed, and considerable damage was done to that structure by the high water. The news dismayed the Cumberland coal shippers, and President Spates rushed to the scene of the latest disaster. Encouraged by his presence, the work crews were able to effect temporary repairs and prevent any interruption to navigation at this critical period.¹⁰⁹

On June 2 President Spates informed the company stockholders that:

The frequent and heavy rains for some months past have kept the river very high and several breaches in the banks of the Canal have caused interruptions to the navigation, which have, however, been repaired as soon as circumstances would admit, and the Canal may now be deemed in fair navigable condition, but for the want of adequate means to make

¹⁰⁵ Embey and Son to Dellinger, April 26, 1862, Ltrs. Recd., C & O Co.

¹⁰⁶ Greene to Ringgold, April 26, 1862, Ltrs. Recd., C & O Co.

¹⁰⁷ *Ibid*, April 29, 1862, Ltrs. Recd., C & O Co.

¹⁰⁸ Spates to Ringgold, May 2, 1862, Ltrs. Recd., C & O Co.

¹⁰⁹ Greene to Ringgold, May 15, 1862, Ltrs, Recd., C & O Co.

durable improvements and repairs at Dam No. 5; the guard lock at Dam No. 4, and some other points requiring considerable expenditures, we cannot be assured of uninterrupted navigation...¹¹⁰

JUNE-JULY 1862

Heavy rains in the first days of June 1862 caused the Potomac River to reach flood stage. On June 2 a break occurred in the canal near the Antietam Ironworks. The break was so sudden that a work scow was swept through the breach and smashed. First reports indicated that it would take six to eight days to repair the break, but President Spates urged the division superintendent to turn out as large a force as possible, including available boatmen, and to institute round-the-clock working parties.¹¹¹

On the night of June 4 the railroad bridge at Harpers Ferry was swept away, thus severing the Potomac Valley line of the Baltimore & Ohio Railroad.¹¹² The following day the rains ceased and the river fell.

A. C. Greene on June 12 and 21 urged President Spates to rush the repairs on the Antietam Division because the damage to the Baltimore & Ohio and Confederate demolitions at Martinsburg had cut off all transportation of coal from Cumberland to the District cities. It was imperative that coal shipments be resumed as soon as possible on the canal so that demands could be met. Flood damage to the Pennsylvania rail network could be expected to throw upon the Cumberland coalfields a heavy demand and it was of great importance that the waterway be ready to grasp the opportunity. He trusted that attention was also being given to Dam No. 5 where, unless a close check was kept on the pool, there would be insufficient water for navigation now that the rains had ceased.¹¹³

By late June construction crews had a new railroad bridge in operation across the Potomac at Harpers Ferry and the canal above that town was being watered. However, full navigation on the waterway was not restored, because work had dragged at Dam No. 5 and the pool backed up by that structure was too low to supply water to the sections of the waterway between Dams Nos. 4 and 5. A heavy rain on the night of July 1 eased this problem but created another, as "a good amount of sand was washed back into the canal at Dam No. 4," and a breach was opened in the canal embankments above Hancock.¹¹⁴

Work on getting a suitable depth of water in the canal throughout its length continued to drag. However, President Spates reported on July 24 that the breach above Hancock had been repaired and that work on Dam No. 5 was also progressing satisfactorily. Boats laden with coal were now able for the first time since July 2 to make the run from Cumberland to Georgetown.¹¹⁵

APRIL 1864

Heavy rains in scattered parts of the Potomac Valley in early April 1864 caused some flood damage to the canal, particularly on the Monocacy and Williamsport Divisions. On the former, a heavy earth and rock slide occurred near the Marble Quarry about one mile below Lock No. 26.

¹¹⁰ Thirty-Fourth Annual Report (1862), 6.

¹¹¹ Benton to Ringgold, June 3, 1862, and Spates to Ringgold, June 4, 1862, Ltrs. Recd., C & O Co.

¹¹² War of the Rebellion, Series I, Vol. XII, pt. 3, 304, 323, 342, 361 and 362

¹¹³ Greene to Ringgold, June 12 and 21, 1862, Ltrs. Recd., C & O Co., and Edwin C. Bearss, *1862 Brings Hard Times to the Chesapeake & Ohio Canal*, "West Virginia History," Vol. XXX (January, 1969), 445.

¹¹⁴ Thirty-Fifth Annual Report (1862), 8, and Greene to Ringgold, July 2, 1862, and Benton to Ringgold, July 2, 1862, Ltrs. Recd., C & O Co.

¹¹⁵ Apates to Ringgold, July 24, 1862, Ltrs. Recd., C & O Co.

Chesapeake & Ohio Canal Historic Resource Study Unrau: 6. Floods 1829–1936

The level was drained and the rock blasted into powder and removed with wheelbarrows. Although the high water had covered most of the towpath from Seneca creek to Lock No. 26, the canal banks were not washed badly "to stop navigation." As a number of lock gates and balance beams had been broken, a large quantity of timber was purchased at Orleans and Harpers Ferry for repairs. Since the damage was generally light, the division was "in good boating order" within a week.¹¹⁶

On the Williamsport Division the only damage suffered by the canal was the number of sand bars washed into the trunk by the high water. Although the flood waters had covered the towpath on the slackwater behind Dam No. 4 for an unheard of 15 days, the banks had not been significantly washed. Accordingly, the division was ready for navigation within five days.¹¹⁷

MARCH 1865

In March 1865 the Potomac Valley was struck by a heavy flood caused by the simultaneous breaking up of the ice flows in the river and considerable downpours of rain. The canal banks and the towpath were washed in many places, but, with the exception of some logs being removed from the cribs on the Virginia side of Dam No. 5, there were no serious breaches or injuries to the masonry work. After quick remedial repairs, the canal was ready for navigation about March 20.¹¹⁸

OCTOBER 1866

When the Civil War ended in spring 1865, the company resumed operations to complete the new masonry Dam No. 5. By the fall of 1866 one section of sixty feet of masonry was completed and a coffer dam was prepared for a second section of equal length, which was expected to be completed before freezing temperatures arrived. However, a severe freshet in October 1866 carried off the coffer dam and partially injured the completed 60-foot masonry section. The continued high water in the river and lateness of the season prevented the resumption of the work until the spring and summer of 1867.

Optimistically, the board of directors reported to the company stockholders in June 1867 that:

The Canal, it is believed, is now in better condition, and more durable than at any former period, and in evidence of it, but slight damages have been sustained by several unusually heavy floods in the river during the past two years [March 1865 and October 1866], and in no previous years has the navigation been so regular or as briefly interrupted from breaches or other casualties, or repaired in less time, or at less cost.¹¹⁹

SPRING 1868

Two heavy freshets struck the canal during the spring of 1868 causing extensive damage. The first of three, an ice freshet which cannot be precisely dated due to the limitations of the available documentation, wrecked particular havoc on Dam Nos. 1 and 2 and the Rock Creek Basin. While

¹¹⁶ George W. Spates to Alfred Spates, April 16 and 19, 1864, Ltrs. Recd., C & O Co.

¹¹⁷ Masters to Ringgold, April 13, 1864, Ltrs. Recd., C & O Co.

¹¹⁸ Thirty-Seventh Annual Report (1865), C & O Co., 3; Masters to Board of Directors, March 2, 1865, Ltrs. Recd., C & O Co.; and Hagerstown Mail, February 25, 1865.

¹¹⁹ Thirty-Ninth Annual Report (1867), C & O Co., 5–6.

Dam No. 1 and the basin were heavily injured, the chief damage to the canal works was experienced at Dam No. 2 where one-half of the structure was torn away entirely. Repairs to these structures continued until mid-July, but canal workmen effected temporary works at these points to permit the entire length of the waterway to be opened for navigation about April 1.¹²⁰

The canal continued to operate until May 15 when a sudden rise in the river overflowed the waterway "in some places for a great distance, damaging culverts and towpath in many places, to such an extent, as to delay navigation for eight or ten days." Available documentation does not offer more detailed information on the specific sites of major damage or on the repairs effected.¹²¹

SEPTEMBER 1870

A major freshet, known generally as the "Shenandoah Flood of 1870," struck the Potomac Valley below Harpers Ferry on September 30 and suspended navigation on the canal until mid-October. The most significant damage to the waterway occurred between Sandy Hook and Lock No. 33 at Harpers Ferry. Here a breach 850 feet in length was opened in the canal embankment, and the "sea wall" which supported the towpath was greatly undermined. The surface of the towpath between Harpers Ferry and the Monocacy River was severely washed. On the Nine-Mile Level south of the Monocacy, there were five small breaches and the towpath as well as the berm bank was considerably cut down by washing from the river. The Eight-Mile Level between Edwards Ferry and Seneca suffered three serious breaches on the towpath and two on the berm banks.

The Georgetown Division below Seneca also received great damage. The towpath from Seneca Creek to Great Falls was heavily washed, and a considerable breach was opened in the canal bank about three-fourths of a mile below Seneca. One-fourth of a mile below Great Falls there was a breach 86 feet long and 36 feet deep. Near Seven Locks, some five miles below Great Falls, there were two breaches. The towpath near the Cabin John Culvert was cut down three feet in height for a distance of 800 feet by the rampaging water. There was a 176-foot breach in the canal just above Little Falls, and at Lock No. 5 the towpath was washed off to a depth of three feet below its normal grade for nearly 1,760 yards. The guard bank at Dam No. 1 lost nearly six feet of its height for a distance of 450 feet. The towpath near the Chain Bridge was reduced some two feet in height for nearly 1,000 feet. Three miles west of Georgetown the height of the freshet made it necessary for canal officials to cut the embankments in order to protect the high banks and walls of the waterway in the vicinity of the town. This preventative measure, however, created a breach of some 360 feet in length which "cut out some 12 feet below bottom."

Aside from the devastation visited upon the canal prism, the flood damaged ten locks to a greater or lesser degree. The following points of injury were specifically cited by company officials: Lock No. 16, one gate and three balance beams broken and washed away; Lock No. 20, two balance beams broken; Lock No. 22, one gate and three balance beams broken; Lock No. 25, one balance beam broken; Lock No. 27, coping removed and filing behind embankment walls washed out; Lock No. 29, one gate swept away; Lock No. 30, flume destroyed; Lock No. 31, chamber filled with eight feet of sand; Lock No. 32, coping and filing behind both chamber side walls washed away; and Lock No. 33, coping and filing behind chamber walls on towpath side heavily damaged.

As it was late in the boating season, the canal company was anxious to have the waterway repaired as quickly as possible. Accordingly, a large number of laborers were recruited, and by October 9, 1.080 men and 200 horses and carts were working day and night between Harpers

¹²⁰ Mans to President and Directors, July 11, 1868, Ltrs. Recd., C & O Co.

¹²¹ Fortieth Annual Report (1868), C & O Co., 7.

Ferry and Georgetown. The workers were paid \$2 per day plus board, and the price paid for the use of the horses and carts was \$3 per day each.

In preparing the canal for the readmission of the water, the work force repaired the canal embankments, replaced the missing coping, gates and wall backing at the locks, and restored the surface of the towpath to its operating grade. In addition, the men relaid the masonry "sea wall" between Sandy Hook and Lock No. 33 and restored the guard bank at Dam No. 2. Altogether the men repaired breaches and raised the towpath and berm banks of the canal trunk for a total length of 4,218 feet with an average height of seven feet and an average width of twelve feet. The canal was ready for the readmission of water on October 11 and navigation was restored four days later. After the resumption of boating, many of the workers stayed on the line to complete the more lengthy repairs.¹²²

AUGUST 1872

Heavy rain on the night of August 29, 1872, in Washington, D.C., caused Rock Creek to rise suddenly. The rush of water from the creek caused eight boats that were moored in the Rock Creek Basin either to be thrust on top of the dam at the mouth of the creek or to be broken and sunk. Five of the barges, three of which were loaded with stone, were sent down crashing on top of the dam. Of the remaining three, one, which was loaded with stone, was broken in half, and two were sunk. The following day the five boats that were left perched on the dam by the high water were removed without serious injury occurring either to the dam or to the boats. On August 31, the water was drawn off the creek to permit the salvage of the broken and sunken barges.¹²³

FEBRUARY 1873

A heavy ice freshet along the entire length of the river, from Cumberland to Georgetown, in February 1873 raised fears among canal officials that the company dams would be greatly damaged. When the ice had passed off it was found that none of the "permanent" dams had suffered serious injury. However, President Arthur P. Gorman reported to the directors that the freshet has "nearly demolished Dams Nos. 1 & 2 which are merely dikes of loose stone." The dams would require "extensive repairs to enable us to keep up a proper supply of water from Seneca to Georgetown."¹²⁴ Apparently, repair crews had raised the dams to such a height as would provide sufficient water for the canal's operation as the entire length of the waterway was opened for navigation in April.¹²⁵

AUGUST 1873

The freshet of August 1873, taking place in the middle of five years of almost unprecedented profits for the company, showed the precarious nature of the canal's prosperity. A flash flood following fourteen days of rain so swelled the smaller tributaries of the Potomac that the culverts under the canal were not able to pass the miniature rivers. Many of them were washed out by the

¹²² Clarke to Board of Directors, September 30, 1870, Ltrs. Recd., C & O Co. Apparently, some of the repairs were never fully completed. For instance, Chief Engineer William A. Hutton reported on August 1, 1872, that as the damage to the guard bank below Lock No. 6 caused by the Shenandoah Flood of 1870 had not been fully repaired it " should be made up to its full height without delay." *Report of W. R. Hutton, Chief Engineer, As to Condition of Chesapeake & Ohio Canal* (Annapolis, 1872), 22.

¹²³ Mans to Gorman, August 30, September 3, 1872, Ltrs. Recd., C & O Co.

¹²⁴ Gorman to Board of Directors, March 10, 1873, Ltrs. Recd., C & O Co.

¹²⁵ Forty-Fifth Annual Report (1873), C & O Co., 10–11.

torrents. The total destruction was the greatest experienced by the canal from natural causes since 1852, and it was the first time that the canal was damaged so severely by the numerous mountain streams that passed under it to the river.

The most serious damages sustained by the waterway occurred on the Antietam and Monocacy Divisions. On the former, in addition to the flood damage, two breaches were opened in the canal banks that were caused by leaks in the limestone region which had existed since the trunk was constructed. The leaks had given similar trouble in the past, and the heavy rains had weakened the banks to such an extent that they gave way to the undermining leaks.

Within a few hours after the flash flood, several hundred additional men were recruited to repair the damage. The Baltimore & Ohio Railroad aided the canal company by providing extra trains to transport the men and the necessary materials to the damaged parts of the work. Repairs were delayed and in some cases undone by a succession of storms which struck them while in an exposed stage of construction. However, the damage was so far repaired as to pass boats on August 26 less than one month since the flood had suspended the navigation. All told, the company spent nearly \$25,000 to repair the flood damage and lost some \$50,000 in revenue from tolls.¹²⁶

APRIL 1874

During the month of April 1874 heavy rains in the Potomac Valley caused a greater rise in the river than had occurred for many years. The water entirely submerged the canal below Dams Nos. 4 and 5 and at various points on the Monocacy Division. However, the system of general improvements on the canal directed by Chief Engineer Hutton since 1871 had made the waterway's embankments so "solid" and "permanent" that the high water passed off without doing serious injury. Navigation was delayed for several days to effect minor unspecified repairs.¹²⁷

JULY-AUGUST 1875

Continuous rains in July and August 1875 caused considerable damage to the canal. Although no serious breach occurred to suspend the navigation, the banks of the waterway were washed severely and the trunk filled with sand silt. A portion of the dam at the mouth of Rock Creek was destroyed, and one boat loaded with coal was swept over it and sunk in the Potomac. The dam was reconstructed, and a steam dredge was used to clean out the prism from Georgetown to Seneca. Navigation was continued while the repairs were in progress. All told, the company spent some \$3,000 on the flood repairs. Again the company officials, as they had the previous year, credited their general improvement program "that no greater loss was sustained by the unprecedented rains of July & August."¹²⁸

NOVEMBER 1877

Following five days of heavy rain, another great flood swept down the Potomac Valley on November 24, 1877. This one was the worst in 150 years of the recorded history of the region. In its wake it left the canal almost a total wreck and brought trade to an end for the season. The crest of the flood was generally two feet higher than the previous record established in 1852, but at South Branch the freshet's peak was six feet higher. At Great Falls, the water ran over the high guard

¹²⁶ Gorman to Board of Directors, September 10, 1873, Ltrs. Recd., C & O Co.; *Proceedings of the President and Board of Directors*, M, 124–127; and *Forty-Sixth Annual Report* (1877), C & O Co., 4, 28.

¹²⁷ Gorman to Board of Directors, April 15, 1874, Ltrs. Recd., C & O Co., and *Proceedings of the President* and Board of Directors, M, 154–157.

¹²⁸ Gorman to Board of Directors, September 14, 1875, Ltrs. Recd., C & O Co.

bank, the top of which was about 70 feet above the usual low water mark of the river. Damage was scattered all along the line, but the middle section, because of the extremely high rise of the Antietam and the Conococheague, suffered the most. All along the line, quantities of repair materials, stores and cargoes were lost.¹²⁹

Within two weeks after the flood waters subsided, the canal board had received numerous reports of the extensive damage inflicted on the waterway. On the line extending from Cumberland to Hancock, there were fifteen breaks in the canal banks, the towpath was virtually destroyed, and many of the locks were injured. Of the fifteen breaks, the most serious occurred at Hancock where there was a 70 to 80-foot-long breach extending down to the bottom of the canal. Both of the abutments at Dam No. 6 were slightly damaged, but the injuries were not so great as had been feared. Some of the shorter levels were filled with silt and debris from one to three feet in depth, and many boats had been grounded or sunk during the storm.¹³⁰

From Hancock to Lock No. 41 at the head of Big Slackwater, the canal banks suffered innumerable washes. As had been the case above Hancock, some of the shorter levels were filled with silt and debris. The most serious damage to this part of the line occurred at Dam No. 5 where both abutments were heavily injured and on the Seven mile Level near Williamsport, where the embankment was washed away entirely for a considerable distance. All told, President Gorman informed the board that it would cost \$38,850 to repair the 96-mile section of canal from Cumberland to Big Slackwater.¹³¹

The greatest single point of destruction took place at Dam No. 4, the 720-foot-wide and 22-foot-high structure that company officials had considered to be one of the most substantial masonry dams in the nation when it was completed in 1861. It had given way even before the flood waters reached their crest. Nearly 200 feet in length near the center of the dam had been swept away, thus permitting the entire flow of the river to pass through the aperture. Officials were shocked by the destruction here as the dam had been "thoroughly sheathed and backed." As the water had risen, it had swept over the entire guard bank (1¼ miles long and 19 feet height), causing extensive damage to it. At the lower end of the bank, the rushing water had carried away that portion of the bank between the stop lock and the dam abutment. It was estimated that it would cost \$37,000 to repair the dam, its abutments, and the guard bank.¹³²

From Dam No. 4 to the mouth of Seneca Creek, a distance of 67 miles, the canal was utterly devastated. In many places, the towpath and the retaining walls were damaged badly, and the canal was filled with mud and debris. There were several breaks in the embankments in the vicinity of Antietam Creek, which had risen eight to ten feet above its previous high-water mark. At Harpers Ferry, where the river had risen to a height of 26 feet above its ordinary height, the guard bank at the feeder was washed away entirely for a distance of one-half mile. The guard lock and the feeder were entirely filled with mud, gravel and sand. Locks Nos. 32 and 33 were almost totally destroyed, the stone work being torn up and washed out except for the heavy retaining

¹²⁹ *Fiftieth Annual Report* (1878), C & O Co., 3, 9. The flood in the Potomac Valley was part of an extended storm system that struck all along the East Coast of the United States, inflicting heavy losses in property and causing numerous deaths in its wake. It was in this storm that the U. S. steamer "Huron" was lost on the North Carolina coast with about 100 of her officers and crew. Scharf, *History of Western Maryland*, Vol. II, 1202.

¹³⁰ Proceedings of the President and Board of Directors, N, 11–12; and Baltimore Sun, November 30, 1877. In his History of Western Maryland, Scharf describes the situation at Cumberland during the flood, a copy of which may be seen in Appendix A.

¹³¹ Proceedings of the President and Board of Directors, N, 11–12, and Baltimore Sun, November 30, 1877. In his *History of Washington County*, Scharf describes the course of events at Williamsport and throughout Washington County during the flood, a copy of which may be seen in Appendix B.

¹³² Proceedings of the President and Board of Directors, N, 12–14.

walls at the former and the inner facings of the latter. The gates of both locks were carried away and washed down the canal for more than a mile. Above Lock No. 33 the heavy embankments were washed away down to the bottom of the trunk for a distance of 100 yards, and below it the towpath and "sea wall" were wholly destroyed for more than 2,000 feet. The company shops at Sandy Hook were carried away, along with 12,000 feet of lumber. Between Sandy Hook and the Monocacy River there was "scarcely a vestige of the towpath, and large sections of the bank" were "washed bodily out into the river." The damage to the canal on the 20-mile stretch from the Monocacy to Seneca was less severe than any other portion of the waterway. All told, it was estimated that it would cost \$92,518 to repair the canal from Dam No. 4 to Seneca (exclusive of Dam No. 4 itself).¹³³

On the 22 miles below Seneca the canal was also hard-hit by the flood. Four canal boats were swept into the river along with numerous small houses and sheds along this part of the line. Lock No. 23 was severely damaged as its wing walls were carried away and its main walls partially collapsed. This level was seriously injured; its towpath and berm banks were washed, its retaining walls were destroyed, and it prism was filled with mud. Between Lock No. 23 and Little Falls there were a great number of breaks, and much of the masonry and towpath were battered. One part of the most serious breaks occurred at the "Log Wall," a large portion of the wall being swept away. At Lock No. 5 there were a great many breaks, and much of the masonry and towpath were bettered. Below the lock the towpath was considerably washed all the way to Chain bridge, and there was a large break below the bridge. The towpath had been cut for a distance of 80 feet in length above Edes Mill so as to prevent a more serious break and possibly great property loss at Georgetown, but in passing out the trunk the water carried out a large portion of the towpath embankment and puddling of the prism. It was estimated that it would cost \$32,000 to repair the 22-mile section of the canal above Georgetown, thereby making the total amount of estimated repairs on the canal to be \$200,368.¹³⁴

The work of restoration began immediately. Repairs began on the Georgetown Level on November 26 so that the Georgetown millers would have their necessary supply of water. Under the direction of Stephen Gambrill, a large force of hands had the water restored to that level by December 20. In early December Superintendent Fletchall was placed in charge of a large crew assigned to the repair of the canal between Locks No. 5 and 23, with Assistant Superintendent J. R. Mans on the work near Seneca. Superintendent J. J. Moore was instructed to supply 200 laborers and as many stone masons and horses and carts as were needed to repair the guard banks at Dams Nos. 3 and 4. Superintendent Stanhope, an experienced dam builder, was given charge over that portion of the canal between Dams Nos. 4 and 6, and by December 12 he already had a large number of men "employed getting logs to construct cribs" for Dam No. 4. In addition he was ordered to hire sixty men to repair Dam nos. 5 and 6. Asa Williams, the collector at Cumberland, was charged with repairing the canal from the Cacapon River to Cumberland, and he soon had 100 men at work on the line. As an economy measure the company suspended all lock-keepers, collectors and other officials, but most of them probably found employment directing and making repairs.¹³⁵

All winter long the work continued as rapidly as possible. Aided in part by mild temperatures and the absence of high water and ice flows, the repairs progressed faster than had been ex-

¹³³ Baltimore Sun, November 29, 1877; Proceedings of the President and Board of Directors, N, 12–13; Scharf, History of Western Maryland, Vol. II, 1201–1202; and Report of the Standing Committee . . . in the Chesapeake & Ohio Canal Investigation (Annapolis, 1889), 223.

¹³⁴ Washington *Evening Star*, November 26, 1877; *Baltimore Sun*, November 29, 1877; and *Proceedings of the President and Board of Directors*. N, 13–14. All the records and books in the Georgetown Collectors Office were destroyed by the flood. Fawcett to Moore, March 2, 1878, Ltrs. Recd., C & O Co.

¹³⁵ Proceedings of the President and Board of Directors, N, p.114 and Fiftieth Annual Report (1878), 9–10.

pected. All available company resources were used, augmented by loans totaling \$70,000 from various banks in Washington, Baltimore and Cumberland, loans of \$10,000 each from the Maryland, American, Consolidation and Borden Coal Companies and a personal loan of \$5,000 from President Gorman.¹³⁶

In addition to these loans President Gorman went to the state legislature for help. By the terms of an earlier court decision, *Commonwealth of Virginia vs. Chesapeake & Ohio Canal Company*, the right of the company to issue bonds for repairs on a pledge of its revenues was recognized as legally unrestricted. To insure a market for the bonds, however, it was deemed necessary to limit the right to a sum that might be reasonably repaid.¹³⁷ Upon the request of the canal company, the legislature passed an act in February 1878, specifically waiving the state's prior lien on canal property for repair bonds up to \$500,000 in amount. The additional pledge of property for the repayment of the bonds was considered necessary to strengthen the market value of the issue. At first the directors authorized the sale of only \$125,000 of the bonds to pay for the repair costs, for these obligations were not subject to cancellation before maturity.¹³⁸

By April 10, 1878, it was reported that the repairs had been substantially completed and that navigation would be resumed on the 15th, only one month later than usual. Although the repairs to the masonry at Dam No. 4 could not be carried out until the stone was quarried, a temporary crib work had been built that would keep up the navigation for the coming season. Much of the canal had been reexcavated, and the "sea wall" at the Shenandoah River Lock had been replaced. At many points the towpath had been rebuilt, and all of the numerous lock gates that had been swept away were replaced. Since all of the towpath bridges on the canal had been lost, they too had been made to make them serve their purpose for one more boating season. Much still needed to be done to strengthen the embankments and improve the towpath surface, but the waterway was in good enough condition to resume the navigation.¹³⁹

The magnificent effort already had cost the company \$153,923.70 by April 30, and the total cost of all permanent repairs had been revised upward to between \$225,000 and \$250,000. Yet President Gorman was pleased to report on May 15 that the "canal is now in as good condition, or better than it has been for many years past." He allowed that "the embankments and masonry, while in fair condition are not as substantial as they were prior to the flood" and that "much remains to be done to strengthen and complete the work. However, this could "be more economically done during the current year with the regular and a few extra repair hands."¹⁴⁰

The flood repairs continued into the year 1879. By January 1, the expenditures for such work totaled \$199,190.46. Later on June 2, the stockholders were informed that all the repairs had been completed except for the breach at Dam No. 4. Not only had "the work been placed in as good a condition as it was prior to the damage," but at several points where the greatest destruction had occurred such as at Harpers Ferry, "extensive improvements have been made by raising

¹³⁶ Proceedings of the President and Board of Directors, N, 17–20, 68; Fiftieth Annual Report (1878), 11; and Gorman to Board of Directors, May 15, 1878, Ltrs. Recd., C & O Co.

¹³⁷ Baltimore Sun, January 28, 1878.

¹³⁸ Laws Made and Passed by the General Assembly of the State of Maryland (Annapolis, 1878), Ch. 58; Proceedings of the President and Board of Directors, N, 20–23, 26–27, 300; and Proceedings of the Stockholders, E, 302–303.

¹³⁹ Proceedings of the President and Board of Directors, N, 17–20, 66–68 and Fiftieth Annual Report (1878), 10.

¹⁴⁰ Proceedings of the President and Board of Directors, N, p.23, and Fiftieth Annual Report (1878), pp.10–11.

the towpath and constructing high retaining walls so as to prevent damage from like freshets hereafter."¹⁴¹

Finally on June 7, 1880, the board of directors was able to report to the stockholders that every part of the canal "which was damaged by the flood of November, 1877, has been thoroughly repaired and strengthened." The canal was "now unquestionably in better condition than it has been at any time since 1860," and its navigation was "now more reliable than it has been at any time since it was constructed." All told, the repairs had cost the company \$238,500.21, and had left it saddled with a debt of \$196,463.96.¹⁴²

JUNE 1884

The canal company was subjected to heavy financial losses occasioned in June 1884 by one of the heaviest freshets that ever struck Washington County. The waterway from Hancock to Harpers Ferry sustained extensive damage, but available documentation does not specify the particular points of injury or the repairs effected. Additional hands were employed to make the necessary repairs, and the waterway was reopened to trade within one week.¹⁴³

APRIL-MAY 1886

Three freshets within a period of six weeks in April and May of 1886 left the canal in a fearful state of disrepair and the company finances in a precarious position bordering on bankruptcy. On April 1, a flood swept down the entire length of the upper Potomac Valley, tearing a great hole in Dam No. 6, and generally wreaking havoc along the waterway. Four days later, another freshet widened the gap in the dam and added to the destruction of the canal proper.¹⁴⁴

After the flood waters subsided, the board ordered that a complete report of the damage and recommended repairs be made by Stephen Gambrill, the company treasurer, and G. W. Smith, a well-known Potomac Valley civil engineer. On April 22, the two men reported to the board concerning the damage they had found, some of the repairs that were already underway, and recommendations for the reconstruction of Dam No. 6. On the Georgetown Level there were two extensive sand bars in the canal prism near Chain Bridge that were already being removed with a steam dredge by George Latchford and his 12-man crew. The slope walls of Locks Nos. 1-4 had been heavily washed. At the upper end of the level above Lock No. 5 the towpath was washed away almost entirely for a distance of 200 yards, with much of the sand, gravel, and dirt now filling that portion of the trunk. Just above Lock No. 6 there was a break in the towpath 44 feet long and 12 feet deep, and the towpath surface on this level was washed severely for a distance of one-half mile. There were 26 men and 6 carts repairing the damage on this level. On the Cabin John Level the tumbling waste was half gone and the towpath badly damaged. Fourteen men were reconstructing the portion of the waste that had been swept away and bringing the towpath up to its operating grade. The level above Great Falls was damaged severely; there was a large leak at the waste weir, nearly all of the towpath on the level was carried away to a depth of from three to five feet, and there were two small breaks in the embankments extending down to the bottom of the trunk. Thirty men and nine carts were at work on these repairs under the direc-

¹⁴¹ Fifty-First Annual Report (1879), C & O Co., 9.

¹⁴² *Fifty-Second Annual Report* (1880), C & O Co., 8 and 10. On March 18, 1879, a contract was let to Lewis Stanhope to reconstruct Dam No. 4, and operations were completed on October 10. *Report on Committee on Construction of Dam No.* 4, September 27, 1879, Ltrs. Recd., C & O Co.

¹⁴³ Proceedings of the President and Board of Directors, N, 272–273.

¹⁴⁴ Fifty-Ninth Annual Report (1887), C & O Co., 5–6; Washington Evening Star, April 2, 1886; and Thomas J. C. Williams, History of Frederick County, Maryland (2 Vols., Frederick, 1910), Vol. I, 395.

tion of Superintendent Elgin. Lock No. 21 had been undermined and its walls endangered. On the Three-Mile Level above Lock No. 21 there was a break on the towpath near the culvert thirty feet long and extending to the bottom of the trunk. The culvert was somewhat damaged, and the tow-path near Lock No. 22 was washed away. On these repairs Elgin had 100 men at work under the direction of Lockkeeper Pennifield. The towpath below Seneca was considerably washed.

The towpath on the Eight- and Nine-Mile Levels above Seneca were washed severely in many places, and repairs were proceeding with a work crew of eighteen men under the direction of Messrs. Collier and Reneberger. From the Monocacy River to Harpers Ferry, the towpath was torn and battered in many places. On the Four Mile Level above Harpers Ferry there were heavy washes on the towpath, two small breaches, and several sand bars. Forty men and sixteen carts were at work on this section under Mr. Drenner. A serious 50-foot break near the tumbling wash on the Mountain Lock Level had taken place, and the canal for a distance of 120 yards was filled to a depth of two feet with sand, silt and debris. There were two more fills at Shepherdstown and at a point just below the river lock, both of which were 150 yards in length and 2 feet in depth. Just above the river lock the canal was filled with silt to a depth of three feet for a distance of 150 vards, and the towpath on the One-Mile Level was damaged seriously. On the Five-Mile Level above Lock No. 39 there were four specific problem areas: a break 40 feet long and several feet below the canal bottom; a fill 180 feet long and 2 feet deep; a small break at the foot of Lock no. 41; and the severe washing of the towpath face all along the level. Eighty men and 32 carts were at work on this section under the superintendence of Mr. Morrow. On the level above Lock No. 40 there was a break just above the lock some 40 feet long and extending to the bottom of the trunk, a sand bar 100 yards long and two feet deep, and three fills each 300 yards long and 3 feet deep. In addition, the entire length of the towpath on this level was washed to a depth of one to two feet. Sixty-four men and nineteen carts under the direction of Mr. Burgan were at work on these repairs.

From the head of Big Slackwater to Williamsport the towpath was considerably damaged in many places and there were two small breaks. Making these repairs were twenty-two men and one cart. On the Williamsport Level (above Lock No. 44) there was a break some 30 feet long and extending 3 feet below the bottom of the canal at Cruger's Warehouse. The towpath was torn up badly near Miller's Bend for a distance of over one mile, the trunk was filled with deposits from one to three feet deep, and a waste weir was washed out. On the Two-Mile Level below Four Locks the towpath was damaged greatly and there were several leaks. Forty-three men and eighteen carts under Mr. Masters were at work on these repairs. Damages to the Fourteen-Mile Level above Four Locks included heavy washes along the towpath at Little Pool and two breaks at that point, one of 40 feet in length at its foot and one of smaller extent at its head. On the Hancock Level (above Lock No. 52) the upper portion was filled to a depth of several feet for a considerable distance, much of the towpath surface was swept away, and two breaks were found near the Round Top Cement Mill, one of which was nearly 60 feet long and several feet below the bottom of the trunk. The Four Mile Level from Sir Johns Run to Dam No. 6 suffered greater damage than it had in 1877. Among its significant injuries were the following: the towpath on its upper portion for a distance of one mile was almost entirely washed away; similar damages were inflicted on the level's lower one-quarter mile; the trunk was filled to an average depth of two feet for almost half its length; and the berm bank and the balance of the towpath were damaged in many places. A crew of 62 men and 22 carts under the superintendence of Mr. Sterling was handling the repairs from Little Pool to Sir Johns Run.

The damage at Dam No. 6 was so extensive as to require a total reconstruction of the structure at a cost of \$50,000, although outside estimates had ranged as high as \$119,000. Some 175 feet of the 475-foot structure had been carried away, and the remaining 183 feet on the Virginia side of the river was almost a total wreck. The 117 feet still standing on the Maryland side,

which had been partially rebuilt in 1884, was rotten, its timber above the waterline almost entirely gone, and its stone held in place only by the sheathing. If the dam were rebuilt as recommended, it should be made with sawed white oak and not hewn timber as had been done on the old structure. It should also be filled with broken stone instead of the field stone or the smoothly-worn rock excavated from the river bottom, both of which had been used on the old structure and both of which had been the cause of so much leakage through it.

Part of the chamber walls of Locks Nos. 56 and 57 had yielded, and the lower towpath wing walls and hollow quoins of Lock No. 56 had settled. On the Tunnel Level the embankments were washed badly, and there was a heavy land slide on the berm side. There was also a large slide in the cut below the Tunnel, and the One-Mile Level below Paw Paw Tunnel was heavily washed. Twelve men under Mr. Kelly were effecting repairs in this vicinity. At the head of the Four-Mile Level near Lock No. 61 a waste weir was swept away, and the towpath was carried out to a depth of two to four feet. On the Seven-Mile Bottom above Lock No. 71 one-half mile of the towpath was carried away to a depth of two to four feet. There was a break in the canal banks at Burns Hollow some 40 feet in length and 3 feet in depth. The towpath was damaged, and there was a considerable fill in the prism. A force of 50 men and 20 carts under Messrs. Hottenhouser and Young were at work making these repairs.¹⁴⁵

On May 9 a third flood struck the Potomac Valley, causing further destruction to the canal and retarding the repairs that were in progress. The most significant damage resulting from this freshet occurred at Dam No. 6 where an additional 62 feet were added to the gaping hole in the structure.¹⁴⁶

To meet the costs of the restoration of the canal after the floods of 1886, the company began to sell the remaining repair bonds of 1878 without restraint. On April 22, it ordered the firm of Robert T. Baldwin, or his assignees, Robert A. Garrett and Sons, to exercise the option to purchase \$71,000 of the bonds at 80.¹⁴⁷ This transaction, along with an earlier sale of \$189,000 of the bonds at 86 to the same firm in September 1885, ultimately gave control of the bonds to the Baltimore & Ohio Railroad.¹⁴⁸ John Hambleton and Company bought \$75,000 of the bonds in August 1887 at 78, and the final sale, at the end of the year, was for \$38,000 at 76.¹⁴⁹ By that time a total of \$498,000 of the bonds had been sold.¹⁵⁰

The bonds were particularly desirable, for they carried a preferred mortgage on the physical property of the canal. By the mid-1880s the administration of the canal under its present management was believed by many to be of short duration. In the reorganization that would follow its bankruptcy, the waterway would probably be sold. Hence the bonds were a good investment. Railroad companies, particularly the Baltimore & Ohio and the West Virginia Central, eyed the canal right of way as a possible roadbed, and thus were especially interested for the control of the 1878 bonds could force the sale of the canal in the bankruptcy proceedings. Accordingly, the two railroad companies and their agents began buying up the bonds, but when the West Virginia interests discovered that the Baltimore & Ohio already possessed a majority they suspended their purchases.¹⁵¹

The canal was repaired so that the waterway was again in limited operation by early June, although much of the more substantial masonry work was postponed until the coming winter

¹⁴⁵ Proceedings of the President and Board of Directors, N, 329–332. Also see Fifty-Eighth Annual Report (1886), C & O Co., 15–17, 23–26.

¹⁴⁶ Fifty-Ninth Annual Report (1887), 25.

¹⁴⁷ Proceedings of the President and board of Directors, N, 332–333.

¹⁴⁸ Ibid., N, 317–319, and Washington Evening Star, June 6, 1889.

¹⁴⁹ Proceedings of the President and Board of Directors, N, 338–339, 344, 348–349.

¹⁵⁰ Fifty-Ninth Annual Report (1887), 6.

¹⁵¹ Washington *Evening Star*, June 6, 1889.

months. The most complex repair work was at Dam No. 6. After considering the plans and specifications for the total reconstruction of the dam submitted by Robert M. Martin, the Water Engineer of the City of Baltimore, it was determined that the structure should merely be repaired by company laborers under the supervision of canal engineers. The operations on the dam were completed in the latter part of the summer at a cost of nearly \$45,000.¹⁵²

MAY-JUNE 1889

Between May 30 and June 1, 1889, a titanic flood swept the Potomac, the crest of which was higher than any ever before recorded in the history of the valley. On the upper Potomac in Maryland, there were 50 lives lost and more than \$2,000,000 worth of property was destroyed. The devastation left in the wake of the flood was described graphically in *Appletons' Annual Cyclopedia and Register* (1889):

There was not a mountain or rivulet in the western part of the State which was not transformed into a freshet. Scores of villages, some of them containing important manufactories, were inundated, and thousands of acres of farm lands were laid waste. The loss by ruined bridges, washouts and land slides of the Western Division of the Baltimore & Ohio road reached more than half a million dollars.... The Western Maryland Railroad and its connecting lines, the Baltimore and Harrisburg and the Cumberland Valley roads were extensively damaged by washouts and destruction of bridges over a length of about sixty miles. Hundreds of square miles in the vicinity of Hagerstown and Shippensburg and in the Cumberland valley were submerged and many thousand cattle drowned. The overflow of the Monocacy and its branches at the mountain town of Frederick was the cause of widespread havoc in the city and the surrounding farming region. The water rose thirty feet above its level at the railroad bridge, and most of the city was submerged. The loss in Frederick County was about \$300,000. At Williamsport the railroads were entirely washed away, and the new iron bridge over the Potomac totally destroyed....On the Shenandoah and Potomac near Harpers Ferry hundreds of houses were swept away by the wrath of the waters, which came roaring down through the narrow gorges forty feet in height....Along the South Mountains in Washington and Allegheny counties the havoc was great and the loss of life considerable, and \$100,000 worth of property was swept away at Point of Rocks. All the bridges of Frederick County...were destroyed.¹⁵³

The flood began with a disturbance that was described as a cyclone which entered the valley near Martinsburg, West Virginia, and crossed the river a few miles above Williamsport before crossing back into West Virginia at Falling Waters.¹⁵⁴ It was followed by heavy rains which swelled the Potomac until it poured over its banks. At Cumberland the water rose both in the main river and in Wills Creek until it completely submerged the land between them. At Hancock, it reached a point three feet above previous records set in 1877. At Williamsport, the crest was 44-1/3 feet above the low-water mark, 7½ feet above 1877 levels. The junction of the Potomac and the Conococheague was described as a huge lake, and Aqueduct No. 5 was out of sight. At Harpers Ferry, it rose to the height of 34 feet above the low-water stage and 21 feet above the towpath. At its peak, the water was 2.8 feet above the Baltimore & Ohio rails on the Harpers Ferry Bridge and

¹⁵² Proceedings of the President and Board of Directors, N, 335–336, 338.

¹⁵³ Appletons' Annual Cyclopedia and Register of Important Events of the Year 1889 (New York, 1890), 531–532.

¹⁵⁴ Washington *Evening Star*, June 1, 1889.

6.8 feet higher than the 1877 freshet. Just below Harpers Ferry at Sandy Hook, the water reached a point 8 feet higher than the railroad tracks which were 17 feet above the canal itself.¹⁵⁵

On the lower portion of the canal the river also reached new heights. At Great Falls, the river rose 16 feet above the top surface of the coping on the dam and 4 feet higher than in the 1877 freshet. At Chain Bridge where strong southeasterly winds made the tides unusually high, it was 43.3 feet above tide level. Further down the canal, the river reached 19.5 feet and 13.3 feet at the Potomac Aqueduct and Easby's Wharf in Georgetown respectively. At the latter location, the crest was three feet above the level of the 1877 flood. In the District of Columbia the river remained within 3 feet of its maximum height for a period of 24 hours and within 6 feet of it for about 30 hours.¹⁵⁶

The damage caused by the rampaging river was fully as impressive as the record heights established by the flood. The canal below Harpers Ferry was especially hard-hit. It was reported to be:

One of the peculiarities of the freshet of 1889 was that the stone-work of the walls, &c., is more generally involved than on any previous occasion of the kind. The telephone wires have been swept away ...and every bridge for which the canal company is responsible is down.¹⁵⁷

The flood waters carried away canal boats, teams and cargoes, destroying 176 barges or depositing them crazily along both sides of the valley.¹⁵⁸ The swirling current also damaged mills, warehouses and wharf facilities along the canal and at Georgetown.¹⁵⁹

Within ten days the canal board received extensive reports on the damage done to the waterway by Superintendent Ed Mulvaney and J. P. Biser. The two men noted that Rock Creek Dam had been destroyed. Its wing walls had been washed out, and a hole 125 feet wide had been torn in its center. The 15-foot-high, 5-foot-wide protecting wall from the dam to a point 700 feet up Rock Creek was largely decimated. The mole and the towpath at the basin were washed badly, and the basin itself was filled with some 1,200 cubic yards of deposit. The steam dredge and all the scows on the Georgetown Level were gone. One-half mile above the Georgetown Tidelock, there was a breach in the canal banks 125 feet long and 11 feet below the bottom of the trunk. Opposite to Little Falls Church there was a break 600 feet long and 4 feet below the canal bottom. From the latter westward for 1,000 feet the towpath was deeply washed. At Chain Bridge there was a break 100 feet long and 12 feet deep, and from the bridge to Lock No. 5 the towpath was

¹⁵⁵ Sanderlin, *The Great National Project*, 256; U.S. Congress, House, Committee on Public Lands, *Chesapeake & Ohio Canal Report*, H. Doc. 687, 81st Congress, 2nd Session, 1950, 56; and U.S. Geological Survey, *The Potomac River Basin* (Washington, 1907), 181–182. Numerous newspaper accounts also tell the story of the flood. Among the most important are Cumberland *Evening Times*, May 30, June 1, 1889; Frederick *Examiner*, June 5, 1889; and Hagerstown *Mail*, June 7, 1889.

¹⁵⁶ U.S. Geological Survey, *Potomac River Basin*, 181–182, and Washington *Evening Star*, June 1, 1889. At its maximum height, the mean velocity of the water in the river at the Potomac Aqueduct was 12.4 feet per second. It was estimated that the discharge of the river at Chain Bridge reached a peak of 470,000 second-feet and that the discharge of Rock Creek reached a peak of nearly 25,000 second-feet.

¹⁵⁷ Cumberland Evening Times, June 11, 1889, quoted in Sanderlin, The Great National Project, 257.

¹⁵⁸ Washington *Evening Star*, June 1 and 3, 1889, and *Report of Ed Mulvaney and S. D. Young to Board of Public Works*, Washington County, May 13, 1890, C & O Canal Company Records, Receivership Papers, Washington County (MD) Courthouse. Of the 176 boats, 156 were loaded with coal, 11 with lime and stone and 9 with grain.

¹⁵⁹ Washington *Evening Star*, June 1 and 3, 1889.

washed to a depth of 2½ feet. At Lock No. 5 220 feet of coping was carried away, and the entire backing behind the lock walls was ripped out. The flume was washed out as wide and deep as the canal itself and the gates damaged. The guard bank, the feeder, and the feeder gates were badly injured. The height of Dam No. 1 had been reduced by 18 inches. Near Lock No. 5 the waybill office was swept away and the lockhouse partially damaged.

The towpath between Locks Nos. 5 and 7 was heavily washed, and Locks Nos. 6–8 were nearly destroyed, their lockhouses washed out, and their gates carried away. Cabin John Culvert was damaged, but the majority of the Seven Locks area was unhurt. On the "Log Wall Level" there was a break near the clubhouse 150 feet long and 30 feet deep, and the 60-foot-high retaining wall on the river side had been carried away. Some 300 yards above this break at the mouth of Widewater there was a break 500 feet long, 80 feet wide, and 32 feet deep, and the 60-foot-high retaining wall was gone. To repair this one breach it was estimated that 160,000 cartloads of material would be required for filling. Just above this break were three separate breaches: one 325 feet long, 40 feet wide and 6 feet below the canal bottom; one 180 feet long and 30 feet deep; one 80 feet long and 20 feet deep; and one 310 feet long and 10 feet deep. The Log Wall Bridge was gone, and the 20-foot-wall supporting the towpath was washed away for the distance of 1,000 yards.

At Locks Nos. 15 and 16 the stone lockhouses were swept away, as were the coping, backing, gates and flume of the two locks. The stop lock above Lock No. 16 had been wrecked and its embankment damaged. Locks Nos. 17–19 were considerably injured along with their flumes, and the lockhouse at Lock No. 17 was gone while that at Lock No. 18 was partially standing. Nearly every house between the canal and the river from Chain Bridge to Great Falls had been swept away; the only structure still standing in that area was the Sycamore Island Clubhouse.

The damage to the canal at Great Falls included a break 50 feet long and 3 feet below the bottom. Some 300 yards above this spot, there were two large breaks—one 250 feet long and the other 300 feet long and 8 feet deep. More than 2 feet were washed off the towpath for a distance of 2 miles.

Locks Nos. 23 and 24 were badly washed, and approximately 3,000 perches of stone in Dam No. 2 had been swept away. Opposite to the Seneca Red Stone Quarry just above Seneca Creek there was a break in the towpath and berm 150 feet long and 4 feet below the bottom. In the vicinity of Horse Pen Culvert there were two large deposits of mud and debris in the trunk, one of 5,000 cubic yards and the other of 1,200.

At Edwards Ferry the pivot bridge and the company carpenter shop were gone and a loaded barge was lying across Lock No. 25. Just above the ferry another road bridge was swept away. Near the Haunted House there was a break 20 feet long and 4 feet deep. The east end of Aqueduct No. 2 had a break 40 feet long, and the horse dredge at that location had been carried away. There were heavy bars in the levels between Locks Nos. 24 and 25, 25 and 26, and 27 and 28.

From Point of Rocks to Weverton, the locks and lockhouses were slightly damaged and numerous bars were filling the prism. Lock No. 31 was nearly destroyed and just above it there was a 50-foot-wide break. The towpath from Weverton to Sandy Hook was badly damaged. At Sandy Hook the entire cluster of company buildings—carpenter shop, blacksmith shop, sheds, cart houses, storehouses and dwelling house—were carried away along with a number of lock gates, carts and tools. Lock No. 32 was carried away except for its chamber walls, and its flume was washed out. From the Lock to above the Harpers Ferry Bridge the towpath and heavy river walls were destroyed for the distance of one mile, the river and canal being one body of water for the majority of this length. The Shenandoah River Lock was totally destroyed. The company boarding house, the lockhouse and the storehouse near Lock No. 33 were all carried away. Locks

Nos. 34–36 were all badly injured, and the entire towpath between Locks Nos. 33–36 was washed out. Guard Lock No. 3 was filled with stone and gravel, and the guard banks at Dam No. 3 were badly damaged. Above Lock No. 36 there was a break 125 feet long and 8 feet below the bottom.

The chamber of Lock No. 37 was filled with mud, and a large culvert nearby was entirely gone. In addition there were many washes and bars between Lock No. 36 and the Shepherdstown River Lock. The carpenter shop with its stores of lumber and lock gates at Shepherdstown was swept away. Above Shepherdstown the face and top of Lock No. 39 were damaged, and there was a 50-foot-long break on the level between Locks Nos. 39 and 40.

At Lock No. 40 the gates were gone, the backing was washed out, the chamber was filled with 3 feet of mud, and the recently-built lockhouse was swept away. On the same level the company boarding house and other buildings were gone. There was a break on the feeder level below Dam No. 4 some 60 feet long and 8 feet below the bottom. At Guard Lock No. 4, the gates were gone, the backing was washed out, the chamber was filled with mud, and the new lockhouse was swept away. The stop lock and the nearby lockhouse were entirely gone. In the protection banks between the stop lock and the Dam No. 4 feeder, there were 10 breaks totaling 1,260 feet in length, 37 feet in width, and 11 feet in depth. The gates and lockhouse at Lock No. 42 were destroyed. In the vicinity of Opequon Creek midway between Locks Nos. 42 and 43 there was a break 75 feet long and the towpath was washed 2½ feet for the distance of one mile. All along this level there were heavy deposits of sand in the trunk.

On the level below Lock No. 44 the towpath was damaged and there was considerable filling in the canal. The towpath on nearly all of the Williamsport Level was badly washed, and the towpath bank at the town had a slip on its river side about 100 feet long and 20 feet wide. Almost one-half of the slope had been carried away, and the banks were cracked for several hundred feet above the slip. Much of the town had been under water including the canal basin and Aqueduct No. 5, but the company works generally had survived.

Lock No. 45 received considerable damage, and between Locks Nos. 46 and 47 the towpath was washed from 1 to 4 feet for the distance of one mile. Much material was deposited in the canal trunk on this level. Between Four Locks and Hancock the towpath was washed to depths up to 4 feet for the distance of several miles. Below Aqueduct No. 6 there was a 100-foot-long break. There was a breach 100 feet long and 6 feet below the bottom in the vicinity of Fort Frederick, and below Big Pool there was a similar 100-foot-long break. On the Hancock Level the towpath was badly washed for half its length. Lock No. 53 was damaged badly and its adjacent lockhouse washed away. On the level above the lock the towpath was nearly swept away. The sheathing was torn from the old part of Dam No. 6 for a considerable distance, and about 100 feet of the cribs on the new dam just below it were gone. The gates of Lock No. 55 and Guard Lock No. 6 were injured severely.

At Sideling Hill Creek the towpath was carried away for a mile and deposited in the canal. There was a 60-foot-long break in the towpath near Aqueduct No. 8 and another 50-foot break at Lock No. 56. The towpath on the Little Orleans Level was damaged greatly, and there was a 100-foot break below Aqueduct No. 9. Above Little Orleans the towpath was washed badly, and the trunk was filled for 200 yards by slips from the mountain side and by 4 large trees. When the obstruction was cleared, thousands of cubic yards of additional material would slide down. Below Paw Paw Tunnel virtually 3 miles of the towpath has been washed into the canal. Between the tunnel and Town Creek there were two 100-foot breaks in the towpath. The wooden trunk and culvert at Aqueduct No. 10 were gone.

Above Town Creek there was little significant damage to the waterway except for three breaks and some heavy silt deposits in the prism. Near Kelly's Road Culvert (some 4 miles above Lock No. 71) there was a 60-foot breach, and the canal was filled with mud. On the level above

Lock No. 75 there were two smaller cuts in the banks. There was no significant damage reported at Cumberland.¹⁶⁰

Preliminary reports estimated the damage to the canal at from \$500,000 to \$1,000,000.¹⁶¹ These early estimates were soon reduced officially to \$250,000 or \$300,000 in a special report to the Washington County Court by President Stephen Gambrill on June 13.¹⁶² However, when the canal company admitted that it could not raise the necessary funds for the restoration of the waterway the stage was set for the canal to go into a receivership with the Baltimore & Ohio Railroad emerging as the majority owner of both the 1878 and the 1844 bonds, thereby giving it control of the preferred mortgages on the physical property and the revenues of the canal.

While a final determination was pending in the Washington County Court on the precise nature of the receivership, a contract was let on June 20 to George W. Cissell, Arthur B. Crossley, Robert B. Tenney, W. H. Burr and F. L. Moore to restore the Georgetown Level. Fearful of the ruinous economic consequences to their businesses if their source of water was not quickly restored, these four millers agreed to advance \$16,000 to the company for the repairs, the loan to be repaid out of rents under existing water leases.¹⁶³ Among the terms of the contract were the following:

The said parties of the first part [the Georgetown millers] do covenant and agree with the party of the second part [the C&O Co.], that they will rebuild and put in good condition and repair all that part of the canal ... which lies between Lock No. 4 and Lock No. 5 including the Feeder Lock & Gate, and the Feeder itself ...rebuild the guard bank at said Feeder, to its original height and width, rebuild the tow-path, with good material with banks properly sloped on either side and worked up in the bottom, whenever there is new work on said banks, so that a perfect connection may be formed between said new & old work, having along the center of said bank, whenever made from the bottom of the breaks and washouts to the top of said towpath a core of not less than six feet in width made of good clay; the sides of said towpath next to the water of said Canal to be paved with large flat stones closely laid together whenever the breaks and washes go through the banks of the Canal, and the side next to the river to be well rip rapped with stones wherever the breaks and washes so through the banks of the Canal; and generally to restore said part of said canal to the condition in which it was before the freshets of May & June, 1889, that is to say, with sufficient water to float loaded boats to the coal wharves.

The parties of the first part covenant and agree that whenever it shall be necessary they will rebuild and make watertight, with good cement and stone all culverts along said level.¹⁶⁴

The repairs were effected by August 1, and water was readmitted into the Georgetown Level to provide the mills with their necessary supply of water.¹⁶⁵

Similar work was done locally on the Williamsport and Cumberland Levels while the courts determined the legal framework of the receivership. On March 3, 1890, the Washington

¹⁶⁰ Baltimore *Sun*, June 11, 1889; Washington *Evening Star*, June 1 and 3, 1889; *Proceedings of the president and Board of Directors*, N, 415; and *Report of Mulvaney and Young to Board of Public Works*, May 13, 1890, Receivership Papers.

¹⁶¹ Washington *Evening Star*, June 3 and 4, 1889.

¹⁶² Special Report to the President and Directors, June 13, 1889, in Circuit Court for Washington County, George S. Brown, et. al. vs. Chesapeake & Ohio Canal Company (Equity No. 4191), 9.

¹⁶³ Washington *Evening Star*, June 4, 4 & 8, 1889.

¹⁶⁴ Proceedings of the President and Board of Directors, N, 415–418.

¹⁶⁵ *Ibid.*, N, 418–419.

County Court appointed receivers, and on June 9, these individuals filed optimistic estimates that the total cost of restoration would be \$268,698, including the repairs already effected.¹⁶⁶

Following the legal proceedings, the Baltimore & Ohio Railroad undertook the restoration of the waterway. The actual work of repair, which commenced in the autumn of 1890, took much longer and was more expensive than had been anticipated. At least part of the additional cost of the work was due to the delay in beginning repairs as "it was found that the eighteen months during which the canal was practically abandoned and dried out had added much to the damage caused by the flood of 1889, and had also weakened the canal at points untouched by the flood."¹⁶⁷ Water was not readmitted into the entire length of the canal until August 1891, and traffic did not begin to move on the waterway until September 1. However, repairs continued to be made until the spring of 1893 when the trustees announced that the "canal is now in better condition as a waterway than ever before in its history." The canal had a 6-foot depth throughout its length, and "as a consequence the average loading of the boats was heavier during the last boating season [1893] than ever before." The total cost of the restoration of the canal was \$430,764.43, all of which had to be borrowed from outside sources.¹⁶⁸

ESTIMATES OF COSTS OF REPAIRS OF 1889 FLOOD DAMAGE			
From Cumberland to Dam No. 6	\$10,988.00		
Repair to Dam No. 6	10,850.00		
From Dam No. 6 to Lock No. 44	6,140.00		
From Lock No. 44 to Dam No. 4	2,688.00		
From Dam No. 4 to Lock No. 36	37,116.00		
From Lock No. 36 to Lock No.32	22,503.00		
From Lock No. 32 to Lock No. 20	9,511.00		
From Lock No. 20 to Lock No. 15	8,694.00		
From Lock No. 15 to Lock No. 14	37,057.00		
From Lock No. 14 to D. C. Line	4,638.00		
	\$150,185.00		
20% Contingencies	30,033.00		
Cost of lumber, carpenters work, lock houses, repairing locks, flumes, waste weirs, lock gates and other wooden structures	45,000.00		
Repairs to canal in District of Columbia	15,000.00		
Repairs to Cumberland wharf	1,000.00		
Repairs to telephone line	7,500.00		
Contingencies	20,000.00		
	\$268,698.00		

¹⁶⁶ 2nd Report of Receivers, June 9, 1890, in *Brown et al. vs. Chesapeake & Ohio Canal Company*, 111–133. A copy of the breakdown of the cost of restoring the waterway may be seen on page 45.

 ¹⁶⁷ Report of Trustees, January 30, 1894, in *the State of Maryland vs. John K. Cowen et al., Trustees*, June 17, 1896, *Maryland Reports* (1896), LXXXIII, 552–553.
¹⁶⁸ Ibid.

III: THE FLOODS: 1897–1936

1897, 1902, 1907, 1914

In his *The Great National Project*, Walter S. Sanderlin writes that after 1889 freshets occurred with depressing regularity, the most serious ones in 1897, 1902, 1907 and 1914." Using George Nicolson, the General Manager and Superintendent of the canal from 1891 to 1938, as his source, Sanderlin further elaborates that:

The work of repair and restoration went on unceasingly. As soon as the rough spots from one freshet were smoothed out, another would bring in new bars, cause new breaches and wash the towpath again. None of the floods, however, was so disastrous that the railroad hesitated to repair the damage, and none approached the proportions of the freshets of 1877 and 1889.¹⁶⁹

MARCH 1924

On March 29, 1924, the first major flood in 35 years swept down the Potomac Valley and wrecked the canal. Melting snow and heavy rains caused the Potomac and its tributaries, especially the Shenandoah, to rise and overflow their banks. For the first time in the history of the valley, newspaper editorials placed partial blame for the flood on the heavy timber cutting that had greatly denuded the Allegheny Mountain watershed in western Maryland. A brief cold snap, highlighted by a 10-inch snowfall in the upper valley, momentarily halted the rise of the Potomac on March 30, and even reversed it. The next day the river rose again, but by that time the threat of a major disaster similar to that of 1889 was past, as much of the run-off had occurred. A survey of the damage in the valley revealed that the flood was not nearly so serious as had been feared. The freshet, which centered its destruction primarily in the upper reaches of the valley, was of short duration and caused comparatively slight damage outside the canal.¹⁷⁰

Heavy rains at Cumberland on March 29 swelled the Potomac River and Wills Creek so that the two mounted at a rate of 30 inches an hour to levels approaching the record crest of 1889. The water continued to rise until nearly one-half of the city was under 15 to 20 feet of water by the following day. Just east of the Western Maryland Railroad station the river crumbled away the embankment separating it from the canal and washed away some \$50,000 worth of timber from the Cessna Lumber Company southward toward the canal basin in Shantytown. The wharves at the basin were partially destroyed, and the canal banks greatly washed. When the flood waters began to fall much of the town, along with the canal, were left lying under a deposit of mud up to 2 feet deep. All told, Cumberland, the worst-hit town in the valley, suffered a property loss of some \$3,000,000.¹⁷¹

¹⁶⁹ Sanderlin, The Great National Project, 276.

¹⁷⁰ Frank Moore Colby and Herbert Treadwell Wade, eds., *The New International Year Book* (New York, 1925), 249. Local newspaper accounts also described the general nature and extent of the flood, among the most important of which were the Hagerstown *Daily Mail*, March 29 & 31, 1924, and the Hagerstown *Morning Herald*, April 1 & 3, 1924.

¹⁷¹ *The Washington Post*, March 30 & 31, 1924, Washington *Evening Star*, March 29, 30 & 31, 1924. The Baltimore & Ohio and the Western Maryland Railroads suffered extensive losses to their lines in Cumberland and in the region to the west. All of the railroad bridges across the Potomac between Cumberland and Westernport were swept away. Some 26 miles of track belonging to the Baltimore & Ohio were uprooted while the Western Maryland lost 40 carloads of freight. Many of the mines in the Georges Creek coal region were forced to close.

Tremendous damage also occurred at Hancock where the canal and three-fourths of the town was wholly or partially submerged by the water. All the railroad and canal bridges in the vicinity were destroyed, and the canal banks and masonry were badly washed.¹⁷²

At Williamsport the river reached a point 28 feet above normal, seven feet below the peak of the 1889 flood. Although no major injuries were inflicted on Dams Nos. 4 and 5, the Potomac Edison Company's substations at both points were put out of commission as was the main plant at Williamsport. The water covered the entire length of the canal trunk on the Williamsport Division, obliterating the banks and tearing the masonry.¹⁷³

Despite the high water, the lower valley communities escaped serious damage. However, the canal was not so fortunate as many miles of its banks and its masonry were badly washed, particularly below the Shenandoah and the Monocacy, both of which rose some 20 feet above normal. At Little Falls the crashing waves of the river reached a height of 20 feet, opening a 50-foot-long and 12-foot-deep gap in the canal banks at Dam No. 1 and causing one breach below the dam and another at Guard Lock No. 1. At Washington, the river crested 8 feet above the normal high tide level, but there was no flooding in the city.¹⁷⁴

The flood of 1924 provided the opportunity for the Baltimore & Ohio Railroad to relieve itself of the expense of operating the canal. The receivers made no effort to restore the canal beyond the Georgetown Level. So that the Georgetown millers could quickly have their necessary supply of water restored, a contract was let to the Vang Construction Company on April 1 to repair the 50-foot cut at Dam No. 1, while canal workmen closed the breaches below the dam and at the guard lock.¹⁷⁵

Aside from these repairs, the receivers authorized enough restoration work in the years 1924-26 to protect what was left of the waterway and to enable them to assert that the canal could quickly be put into navigable condition if sufficient business was presented to warrant the effort.¹⁷⁶ The canal was left a wreck, but technically a going concern in which the water rents received from the Georgetown manufacturers paid the expenses of the small operating staff. The court accepted the position of the receivers, and ruled that the canal had not forfeited its rights by non-operation, but that the other aspect of its business, the maintenance of a canal for navigation purposes, was merely suspended temporarily in the absence of remunerative business.

MARCH 1936

A sudden thaw in the wintry temperatures throughout the eastern United States from Maryland to the Canadian border in mid-March 1936 led to the heaviest flood in the recorded history of the Potomac Valley. While the loss of life was comparatively slight, numerous buildings, roads and bridges were destroyed. The Potomac not only flooded its upper reaches to epic proportions, but for the first time in living memory, it went out of its banks along its southern border and caused extensive damage almost down to the Atlantic.¹⁷⁷

The flood surpassed all previous high-water marks in the Potomac Valley. In Georgetown the river crested seven inches higher than it had in 1889 and at Little Falls it was one foot higher. At Seneca the crest was nine inches higher than in 1889. The flood covered the canal at Point of Rocks to a depth of 17 feet for a period of 54 hours, both of which statistics exceeded those of

¹⁷² Washington Evening Star, March 31, 1924.

¹⁷³ *Ibid*.

¹⁷⁴ *The Washington Post*, April 1, 1924; Washington *Evening Star*, March 31 and April 2, 1924; Colby and Wade, *New International Year Book*, 249; and Frederick *Post*, April 1 & 2, 1924.

¹⁷⁵ Washington *Evening Star*, April 2, 1924.

¹⁷⁶ Reports of Trustees for 1924, 1925 and 1926m Receivership Papers.

¹⁷⁷ Frank H. Vizetelly, ed., *The New International Year Book* (New York, 1937), 432.

1889. At Harpers Ferry the water rose to an elevation of 21 feet above the towpath, a similar height to that attained in 1889. The canal at Shepherdstown was inundated for 62 hours, and at its peak the flood reached an elevation of 22 feet above the towpath, a height exceeding the 1889 figure by five feet. In the vicinity of Four Locks, the river rose 10 feet above its 1889 crest. At Hancock the river covered the towpath to a depth of some 7 to 8 feet for a period of 24 hours, while the peak of the flood at Cumberland covered the canal with 3 to 4 feet of water for 12 hours.¹⁷⁸

The heavy flood wrecked havoc on the now-deserted canal and left it in the dilapidated condition in which it was found when the federal government acquired it two years later. A survey of the flood damage follows:

- 1. On the Georgetown Level, the banks washed and the prism was heavily silted.
- 2. Much of Dam No. 1 was destroyed down to its foundation, and the feeder was filled with trees, debris and silt.
- 3. There is no available documentation relative to the damage between Lock No. 5 and Seneca Creek.
- 4. There were two breaks on the Eight Mile Level above Lock No. 24, one of which was just above Aqueduct No. 1 and the other near the Beaver Dam Culvert.
- 5. The abutments of the bridge across the canal at Noland's Ferry were washed into the trunk.
- 6. The company house and all outbuildings at Point of Rocks were swept away.
- 7. The bridge across Lock No. 30 at Brunswick was washed out.
- 8. There was a small washout at Sandy Hook. The blacksmith shop at that place was entirely gone, and the carpenter shop was partially destroyed. The machinery had been saved out of the latter shop.
- 9. The level between Locks, Nos. 32 and 33 was utterly devastated. The guard wall, bank and towpath for 200 to 300 feet below the Harpers Ferry Bridge was badly washed, and there was much torn stonework lying in the trunk.
- 10. At Lock no. 33, the brick lockhouse which had withstood the 1889 flood was destroyed. The lock chamber walls were heavily damaged, the filling around the lock was washed out, and the gates were swept away.
- 11. The towpath between Locks Nos. 33 and 34 was not badly damaged, but the trunk was filled with mud, debris and gravel. At Lock No. 34 the gates were washed out and the brick lockhouse was destroyed. Below the lock the guard bank was heavily washed.
- 12. The level between Locks Nos. 34 and 35 was heavily damaged. A considerable portion of Dam No. 3 was gone. At the feeder there were two breaches in the guard bank, the largest of which was 40 feet long and 25 feet deep. The top of the guard bank was badly washed, and many perches of stone from the wall next to the river and the breaks in the guard bank had been deposited in the feeder. The towpath was left in a ragged condition for several hundred feet below the dam. The section of the canal between Lock No. 34 and Dam No. 3 was filled with rock, mud and debris.
- 13. Little damage was inflicted on the canal from Lock No. 36 to Shepherdstown, except for some injuries to the lock gates. However, all the river bridges at Shepherdstown were washed out, and the bridge over the canal there was carried

¹⁷⁸ House Document 687, 56, 58 and Index to Correspondence, Office of Trustees.

downstream and lodged in the river lock. The upper gates of the river lock were still good, but one of the lower ones had been washed out. The lockhouse at Lock No. 38 was partially destroyed when a heavy drift knocked in its northwest corner.

- 14. Between Shepherdstown and Dam No. 4 all the buildings along the line of the canal were swept away, including the lockhouse at Lock No. 40.
- 15. Dam No. 4 received serious damage during the flood. Earlier on February 27 an ice drift had carried away a section of the dam near the Maryland abutment. The March flood widened the break, and when the water subsided it was found that the gap started at a point about 45 feet from the Maryland abutment and averaged 55 feet in width. The guard bank at the dam was little damaged, but the cross bank at the nearby stop lock was more seriously affected. Both approaches to Guard Lock No. 4 were destroyed. The lockhouse at Lock No. 41, which had withstood the 1889 freshet, was swept away.
- 16. Extensive damage was caused by the flood at Williamsport. The carpenter shop was pushed down across the flume at Lock No. 44, and its floor had dropped out. The nearby corn shed had collapsed. All canal buildings, except for one old company house, were gone. The lockhouse at Lock No. 44 had been under water to within three feet of its eaves, but it was still standing. Just below the town, the house at Lock No. 43 and the Falling Waters Bridge were gone.
- 17. Between Williamsport and Dam No. 5 there were no washouts, and the former company house on this level survived the storm. There was a large quantity of sand in the trunk at Miller's Bend, and the bridge at Dam no. 5 was swept away.
- 18. From Dam No. 5 to Big Pool there was considerable damage to the canal. The mule crossover bridge at Lock No. 46 was knocked into the trunk below. At Lock No. 47 the lockhouse, which had withstood the 1889 freshet, was destroyed.
- 19. At Big Pool there were three large breaks in the embankments: one was 4 feet deep and 10 feet long near the railroad bridge; a second was from 1 to 5 feet deep from the waste way to the foot of the pool; and a third extended for a length of 35 feet and a depth of 10 feet around the stop lock.
- 20. The wooden trunk that had been placed on Aqueduct No. 6 in the 1870s was nearly gone.
- 21. The canal was heavily damaged in the vicinity of Round Top Cement Mill. There was one breach about 30 feet long and 3 to 4 feet below the bottom. Nearly two feet was washed off the towpath for a considerable distance.
- 22. Approximately, one-half of Dam No, 6 was gone, while the sheeting of the remaining half was carried away. The lockhouses at Locks Nos. 53 and 55 were destroyed.
- 23. The mule [s/b pedestrian?] bridge near Aqueduct No. 8 [Sideling Hill] was carried away, as was the berm side of the aqueduct itself.
- 24. From Aqueduct No. 8 to Town Creek, the lockhouses at Locks Nos. 58, 59, 60, 61 and 67, which had survived the 1889 freshet, were gone. The top of the towpath near the railroad bridge above Paw Paw Tunnel was washed off to a depth of two feet for a distance of 100 yards. The trunk on this section was filled with a sand bar three feet deep and 250 feet long. Some of the masonry on Aqueduct No. 10 was torn off and carried away.
- 25. From Town Creek to Lock No. 72, there was considerable damage. The lockhouse at Lock No. 68 was undermined, and the chamber of Lock No. 71 and a

nearby waste weir were clogged with debris. There were two large breaks; one was 30 feet long and 8 feet below the trunk bottom, while the other was 25 feet long and 4 feet deep. The top of the towpath at Spring Gap was badly washed. The approach to the Patterson Creek Bridge was washed away to a depth of six feet for a distance of 25 feet. The pump house just below Lock No. 72 had bulged out toward the canal.

26. Between Lock No. 75 and Cumberland, there were three heavy washes of the towpath in the vicinity of Wiley Ford Bridge, covering a total of 350 feet and varying from two to three feet in depth. There was one small break, some 20 feet wide and 2 feet below the bottom, at the head of Dougherty's Widewater. The lockhouse at Lock No. 75 lost much of its foundation, and a combined culvert-waste weir 1½ miles below Evitts Creek was choked with debris. The old stop lock below the Cumberland Basin was undermined by a 15-foot-wide and 3-foot-deep washout on its towpath side. The concrete slab below Dam No. 8 was partially removed.¹⁷⁹

Some repairs were effected on the canal after the flood waters subsided. The loose stone and rubble dam at Little Falls was restored so that the Georgetown business interests would have their necessary water supply. In addition the banks of the Georgetown Level were renovated, and trees, debris and mud were removed from the Little Falls Feeder. All told, these repairs were completed by early December at a cost of \$25,460.05.¹⁸⁰

In the spring of 1936 the Potomac Edison Company was requested by the canal trustees to let a contract and to supervise the work of repairing Dam No. 4.¹⁸¹ The firm of Sanderson and Porter commenced the work on July 13. Among the repairs that were effected was the use of 595 cubic yards of "High-Early Strength" cement to close the break and the construction of a concrete cap-piece with a curved top over the entire dam. The latter project, which required 730 cubic yards of cement, was built to provide "a stream-lined effect" that would "discharge flood waters faster and back up flood waters less than the old angular ice-guards."¹⁸²

¹⁷⁹ Wine to Nicolson, March 19 and April 10, 1936, Burgan to Nicolson, March 21, 24 & 30, 1936, Shivas to Nicolson, March 22, 1936, Everitts to Nicolson, March 25, 1936, Fisher to Nicolson, March 25, 1936, Sterling to Nicolson, [ca. March 30, 1936], and Anonymous Report to [Nicolson], [ca. April 1, 1936], Ltrs. Recd., Office of Trustees; Nicolson to Horton, December 19, 1936, and Nicolson to Preston, December 4, 1936, Ltrs. Sent, Office of Trustees; and Martin J. Urner, *Report on 1936 Repairs and Improvements at Dam No. 4, December 10, 1936* (Misc. Mss., Office of Trustees).

¹⁸⁰ Nicolson to Preston, December 4, 1936, Ltrs. Sent, Office of Trustees.

¹⁸¹ The cause of the break in the dam was attributed to two theories. One theory was that the break started at the bottom of the dam. This idea was supported by the fact that the greatest amount of leakage had been at the section which failed for years and some subsidence at this point had been apparent. The second theory, which held that the break started at the top of the dam, was supported by three facts: a floating tree had been seen carrying away part of the structure's crest; the February drift ice had removed some of the timber ice guards; and the solid rock ledge under the dam showed no signs of scarring or undermining. Since the masonry had been laid with soft lime mortar and the interior consisted of weaker rubble masonry, it was determined that the second theory was more plausible. Urner, *Report on 1936 Repairs and Improvements at Dam No. 4*, (Misc. Mss., Office of Trustees).

¹⁸² *Ibid*.

IV. CONCLUSION

One of the principal reasons for the collapse of the canal was the recurrence of great floods which repeatedly wrecked the waterway. The forces of nature were continually at work tearing down the physical fabric of the waterway and interfering with its trade. Despite the fact that most of the canal was in the flood plain of the Potomac, approximately 90 percent of it was built above the normal annual high-water level of the river. Yet a heavy rain or a small freshet at any time was likely to wash sand bars into the waterway, cause land or rock slides, undermine culverts, and cause breaches in the embankments. The canal company was never able to cope effectively with these natural occurrences. The most careful and expensive preparations would be undone in several days by a freak storm or by an abnormal rise in the river caused by melting snow, thawing ice, or heavy rain.

The worst of all the destructive forces of nature were the periodic Floods in the Potomac Valley. As the area became deforested and more and more ground was cleared for cultivation and settlement, the run-off became greater and swifter. Simultaneously, the Potomac was filling up as a result of the silt deposits in its bed, and the canal and the railroads were encroaching on the river channel at many points, particularly at the narrow passes of the stream. As a result of these developments, the major floods in the valley occurred more frequently, reached increasingly higher levels, and caused greater destructiveness. This emerging pattern can be seen in the substantial freshets of 1836, 1843, 1846, 1847, 1852, 1857, 1861, 1862, 1865, 1866, 1868, 1870, 1873, 1877, 1886 and 1889.Repairs and improvements to the waterway based on the experience of earlier disasters proved insufficient to withstand the ever higher crests that swept down the river. Particularly was this true at those places along the canal that proved to be most susceptible to the ravages of the river—Dam No. 6, Dam No. 5, Williamsport, Dam No. 4, Shepherdstown, Harpers Ferry, Sandy Hook, Point of Rocks, Edwards Ferry, Dam No. 2, Great Falls, Widewater, Dam No. 1 and Rock Creek Basin. On top of everything else, the floods were completely irregular and unpredictable.

The great floods of 1877, 1886 and 1889 occurred at a most inopportune time. The canal company was hard pressed financially; it was meeting the most severe competition in its history from the railroads; and it faced the necessity of undertaking an extensive program of improvements. The floods struck the waterway a heavy blow on all three points. They reduced company income and increased expenses, rendered its transportation services highly irregular and unreliable, and forced the suspension of the program of improvements. The canal never recovered.

APPENDIX A

DESCRIPTION OF NOVEMBER 1877 FLOOD AT CUMBERLAND

"The effects of the storm of the 22nd, 23rd and 24th of November, 1877, were more severe in Cumberland than ever before known, except perhaps in 1810....The one great point of interest and occasion of alarm, however, was the canal-bank at the foot of Canal Street. About an hour after the great rise in Will's Creek water was noticed trickling through the bank, and at once measures were taken to stop the leak, but little success attended the efforts at first. Finally, after a short consultation, it was decided to use a different method to secure the bank, which proved successful and allaved the growing excitement of the people. The extent of the averted disaster may be imagined when it is known that the surface of the water, which was within a few inches of the top of the bank, was nearly on a level with the pavement in front of the Ocean City Hotel. The west side of Will's Creek was inundated by the waters of the Potomac, which was higher than ever before known. In South Cumberland many houses were inundated with from six inches to three feet of water...The Baltimore and Ohio Railroad sustained great damages, their wires being torn down for miles, trestles washed out and bridges destroyed, which caused a delay of trains for several days. The Cumberland and Pennsylvania also suffered heavy loss. A number of trestles between Ocean and Westernport were washed out, and the tracks badly damaged in some places. The business of the inundated portion of Cumberland was suspended until the waters subsided."¹

¹ Excerpted from Scharf, *History of Western Maryland*, Vol. II, 1390.

APPENDIX B

DESCRIPTION OF NOVEMBER 1877 FLOOD IN WASHINGTON COUNTY

The water in the Potomac during the great flood of 1852, according to a mark at Embrey's warehouse in Williamsport, was three-quarters of an inch higher than the flood of 1877 reached, but this mark is not looked upon as accurate, and according to all other marks the water rose higher in the latter year than in the former. Along the entire line of the river great damage was done; not only fencing, grain, hay, fodder, stock and lumber being swept away, but several houses, and quite a number of stables, hog-pens, chicken-coops and different sorts of outhouses were seen passing down the river at Williamsport and other points. Many visitors from Hagerstown and the surrounding country were in Williamsport on Sunday, viewing the surging river and watching the debris brought down with the flood. At Embrey's and Cushwa's warehouse the damage was but slight, but Mr. S. Culbertson, on the west side of the Conococheague, lost between forty and sixty thousand feet of lumber.

At the junction of the Conococheague and the Potomac there was a vast lake, covering canal, aqueduct and everything except the tops of the trees. Ardinger's mill was in the middle of the Conococheague, and the water was pouring into the windows of the upper story, leaving but a few feet of the stone walls visible between the waters and the eaves of the roof. The stone bridge at this point and the aqueduct on the canal were submerged, but not materially injured. The most serious damage near Williamsport was the injury done to the Cumberland Valley Railroad Bridge. The superstructure of this costly work went about five o'clock on Sunday afternoon. Its danger was appreciated, and six car-loads of coal, railroad and pig iron were sent out from Hagerstown to hold down the capping of the bridge and track. T. J. Nill, the agent there, accompanied the train, and it was run to the Virginia side, which was in greatest danger, and there stationed. But a slight space remained between the surface of the stream and the track on the bridge, so that its destruction by the heavy bodies coming down the stream was inevitable. Three canalboats in turn, which had broken loose from Williamsport, struck the bridge. Two passed under and went down the stream, while the other blocked the stream. Then came an immense float of drift-wood, which cut off a large willow tree as with a knife, and, striking the bridge with a concussion which sounded like a discharge of artillery, and was heard in Williamsport, bore off with it the whole superstructure save only that which spanned the canal, and the canal-boat which was held in suspense was thus released and went down the stream with the moving mass. At this juncture it was Mr. Nill's good fortune to escape in a manner that may be termed miraculous. He was the last upon the bridge, some fifteen or twenty men having just left it, when he saw the impending danger and started in a run for the Maryland side. The first concussion knocked his feet from under him and he fell; but recovering just as the portion of the bridge behind him was swept away, and whilst that upon which he ran was coiling up and moving under his feet, he succeeded in reaching the shore uninjured, and almost at the instant the bridge disappeared. The leading officials of the road, President Kennedy, General Superintendent Lull and General Agent Boyd were all present on the bridge a few minutes before it went down, with fifteen or twenty other persons. A little engine had been trying to haul out the canal-boat that had lodged to the Virginia shore, but without effect. Col. Kennedy and Col. Lull had walked off towards the Maryland side, leaving Gen. Boyd and Mr. Nill. The former started a few minutes before the latter, and was about fifty yards ahead of him when he saw the drift approaching and started in the manner above described.

Only a small portion of the fine "Dam No. 4," the best on the river, having cost almost a half-million dollars, was washed away. This dam was between the Cumberland Valley bridge and the Shepherdstown bridge, one span of which was washed away. This span was one of four, each

one hundred and fifty feet long, and was secured and made fast some distance below. A canalboat loaded with coal, belonging to George McCann, was the first to strike this bridge, and was followed by two others, which were empty, belonging to Lawson Poffenberger and Mr. Boyer.

These were the first boats to strike the Harper's Ferry iron bridge, which was supposed for some time to have been in great danger, but withstood the terrific shocks and pressure brought against it in a wonderful manner, it having been struck by no less than fifteen canal-boats, besides the Powell's Bend bridge, houses, logs and all kind of floating missiles. Mr. Ways, agent of the Baltimore and Ohio Railroad Company, stated that but a single span of the bridge—that over the current—was affected, and that only in the bending of some of the irons.

The damage to the canal was very great, causing the suspension of its operation for the season. The locks at Harper's Ferry and several other locks were washed out and greatly damaged. From Sandy Hook past Harper's Ferry, a distance of four miles, the tow-path was wholly destroyed.

In places the bed of the canal was filled with mud, and all the locks were choked up with accumulations of various kinds. The canal company's buildings were all of them either damaged or washed away, and the total injury to the property of the company amounted to five hundred thousand dollars. The only fatal disaster in Washington County was the drowning of Charles Little, of Hancock, which took place Saturday evening below Dam No. 4, below Williamsport. Mr. Little, who was a boatman, was proceeding up the canal. When the water got deep on the tow-path his driver refused to go any further. Mr. Little got on one of the mules to drive. In a short time the current was too strong, the mules were swept down in the flood, and Mr. Little was drowned. The two mules scrambled to the bank, some distance below, and were saved.

At Powell's Bend, opposite Falling Waters, the dwelling-house of Andrew Pope, a well known farmer of that neighborhood, was taken up, carried away, and deposited upon the land of one of his neighbors. David Straw, of the same vicinity, lost a corn-crib. Mrs. Louisa Davis, another neighbor, lost seventy-five barrels of corn, a buggy, sleigh and other articles. The house of John Snyder, a small building, was carried away, as also was a small house owned by John H. Gattrell, and occupied by a man named Price. Mr. Gattrell's saw-mill was also injured, and was moved four inches. Everything between the canal and the river, from Williamsport to Hancock, that could be carried off by the storm was swept away, and the canal and railroad were greatly damaged. The upper part of Hancock was under water, and along the flats and slopes beyond that town many houses were swept away. All the bridges between Hancock and Indian Spring on the turnpike were carried off or rendered impassable. The Antietam rose to a point higher than was ever before known. Bridges were destroyed all along the line of the creek—among them the one at the Forks, midway between Leitersburg and Waynesboro, Pa., and the one at the Little Antietam, near Hartle's. Among the numerous losses suffered along this stream were the washing away of Mr. Walter's stable, the partial destruction of Fisby M. Stouffer's saw-mill, and the washing away of outhouses, fences, etc. The substantial bridge over the Antietam on the National road was not injured, but the other bridge, built by the county over this stream at Funkstown, was materially damaged. At Rose's paper-mill, an old frame structure sixty feet long, used as a bleach-house, was washed away.

At the Roxbury mill the whole dam was swept away and the stone bridge injured. A portion of the dam at Myer's mill was also destroyed. The Antietam Iron Works, at which every preparation had been made by the Messrs. Ahl for starting work, were damaged to the extent of several thousand dollars, about eight hundred tons of coke having been washed away. The Conococheague, like the Antietam, rose to a higher point than had ever been reached before, but except the damage done at Williamsport no great loss was suffered, the principal injury being the washing away of fences and fodder, and the submerging of the lower stories of buildings.²

² Excerpted from Scharf, *History of Western Maryland*, Vol. II, 1201–1202.