

DS-1977 - November - Field Reports

A-1 - November 6-7, 1977 - Elizabethton Area

A-2 - Flood of November 6, 1977 - Jefferson City Area

UNITED STATES GOVERNMENT

Memorandum

DATA SERVICES BRANCH
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TENNESSEE VALLEY AUTHORITY

Robert A. I

TO : John F. Manthey, Head, Field Investigations, 302 EB, Knoxville

FROM : Stephen W. McLemore, Engineer-in-Charge, Elizabethton

DATE : July 24, 1978

SUBJECT: NOVEMBER 6-7, 1977 FLOOD - ELIZABETHTON AREA

Submitted is the following on subject assignment.

Complete Resume of Flood
 Crest Stage Table, November 6-7, 1978 Flood, Elizabethton Area
 November 6 Highwater Tabulation for:

- Middle Fork Holston River - 1 Sheet
- Staley Creek at Marion, VA - 1 Sheet
- Doe River - 1 Sheet
- Laurel Fork Creek at Hampton, TN - 1 Sheet
- Stony Creek near Elizabethton, TN - 1 Sheet
- Brush Creek at Johnson City, TN - 5 Sheets
- Knob Creek at Johnson City, TN - 3 Sheets
- Sinking Creek at Johnson City, TN - 3 Sheet
- North Toe River - 2 Sheets
- Beaver Creek at Spruce Pine, NC - 1 Sheet
- Grassy Creek near Spruce Pine, NC - 1 Sheet
- South Toe River - 1 Sheet
- Cane River - 2 Sheets
- Nolichucky River - 2 Sheets
- South Indian Creek near Erwin, TN - 2 Sheets
- North Indian Creek near Erwin, TN - 2 Sheets

Field Notes: Book 8534, pp. 15-30
 9533, pp. 1-16

Note: The field notes for Brush Creek, Knob Creek, and Sinking Creek at Johnson City, Tennessee were submitted April 1978 as part of the Johnson City, Tennessee FIA flood data.

The field notes for portions of the Nolichucky River, North Indian Creek, and South Indian Creek were submitted June 7, 1978 as part of the Unicoi County Restudy in the vicinity of Erwin, Tennessee.



John F. Manthey
July 24, 1978

NOVEMBER 6-7, 1977 FLOOD - ELIZABETHTON AREA

Newspaper Clippings - 87 Sheets

1 - 10 page flood edition of Saltville Progress newspaper
1 - 38 page photo booklet "Flood Disaster, Yancy County,
North Carolina, 11-6-77"

Flood photographs - 92 Frames

Appendixes

- A. Saltville, Virginia FDAA Flood Damage Report - 6 Sheets
- B. Marion, Virginia Damage Survey Report Sheets (FDAA) - 22 Sheets
- C. Mountain City, Tennessee FDAA Flood Damage Report - 1 Sheet
- D. Carter County Initial Flood Damage Report - 1 Sheet
- E. Unicoi County Agricultural Damage Assessment Report - 1 Sheet

SWM:BSW

cc: M. D. Cauthen, Jefferson City

NOVEMBER 6-7, 1977 FLOOD - ELIZABETHTON AREA

CATAclysmic
OR
CATAclysmic

The cataclysm flood of November 6-7 in eastern Tennessee, western North Carolina, and southwest Virginia will long be remembered as days of agony to the thousands of people whose lives were uprooted by the raging river torrents.

Virginia

In Virginia, the North, Middle, and South Forks of the Holston River all crested above the recent flood of April 4-5, 1977. In fact, stages along the Middle Fork Holston River near Marion were rated above the 100 year flood. Five counties in Virginia, three of them in the valley, sustained damages estimated at \$22.5 million. All five, Grayson, Lee, Pulaski, Smyth, and Washington were declared disaster areas. Four of these counties, all but Grayson, had been declared disaster areas in April 1977. Lee and Washington counties were just recovering from flash flooding in October 1977. Over 1270 families in Virginia applied for one or more of the recovery programs offered by state, federal, and volunteer agencies. In addition, 17 governmental bodies applied for disaster relief. Road washouts accounted for 185 secondary road closings in the southwestern portion of the state.

North Carolina

Damages in upper western North Carolina were just as severe, if not worse. Yancey County, the hardest hit in the area, suffered damages of over \$11.9 million from the Cane River and South Toe River watersheds which exceeded the 200 year flood on November 6. Although no flood related deaths were reported in the county, 2,000 people were displaced and over 1,200 out of work. Avery and Mitchell Counties also suffered extensive damage from the North Toe watershed which averaged 4.5 feet above the August 1961 flood in Spruce Pine. These three counties, as well as Watauga County in the area, were declared federal disaster areas.

Tennessee

In Tennessee, Johnson, Carter, Washington, Unicoi, and Greene Counties were declared federal disaster areas.

The Doe River crested just under the May 1901 flood. The Nolichucky River crested above the August 1940 flood and under the May 1901 flood.

Storm Rainfall

Prior Precipitation - From October 18-24 and October 29 through November 1, no precipitation was recorded in the Elizabethton area. In fact the only significant rainfall occurring during the last two weeks in October was reported on October 26-27. On October 26 heavy to intense rain fell on the Watauga and Nolichucky watersheds in North Carolina, averaging 1.8 inches and 2.3 inches, respectively. High spots reported that morning included 3.12 inches at Spruce Pine; 3.02 inches at Boone, North Carolina; 2.54 inches at Plumptree. Other area watersheds averaged between 1.1 and 1.8 inches. Area rainfall reported on October 27 averaged 0.1 inch with the highest of 0.38 inch reported at Stone Mountain on the Watauga watershed.

From November 2-4, light to moderate rainfall was again concentrated on the Watauga River watershed averaging 0.6 inch on November 3 and 0.3 inch reported on November 4. The high spot for this period was reported at Boone, North Carolina with precipitation of 1.26 inches.

Storm of November 5 to November 7

Light rain concentrated on the Watauga and Nolichucky watersheds was reported on the morning of November 5 as a low pressure storm system, pulling in moist air from the Gulf, entered eastern Tennessee, western North Carolina and southwest Virginia. The Watauga watershed averaged 0.5 inch for the 24-hour period with a high spot of 1.37 inches at Boone, North Carolina. The Nolichucky watershed averaged 0.4 inches with less than 0.2 inch reported in neighboring watersheds.

Intense rainfall began around 6 p.m. November 5 on the Watauga and Nolichucky watersheds. Heavy to intense precipitation was reported on the South Fork Holston watershed with continuing rainfall during the night. Moderate rainfall was reported on the Upper Clinch, Upper Powell, and Middle Fork Holston watersheds during the period.

By 8 a.m. on November 6, Boone, North Carolina and Spruce Pine had received 7.84 and 6.05 inches respectively. Bakersville reported 4.22 inches. At this point, the Middle Fork Holston watershed averaged 1.1 inches in Marion and Groseclose. Between 8 a.m. and 7 p.m. on November 6, the storm center moved into Virginia dumping an additional 2.15 inches in Marion and 1.75 inches in Groseclose. Tazewell reported 2.20 inches. Light to moderate rainfall continued falling in the area ending during the night. At 8 a.m. on November 7, precipitation had ceased at practically all stations with cloudy skies reported throughout the region.

The highest rainfall amounts for the 3-day storm period at reporting rainfall stations in the Nolichucky River Basin were: Plumptree, 7.55 inches; Spruce Pine, 7.32; Bakersville, 4.82; Erwin, 4.32 inches.

In the Watauga watershed the most intense precipitation for the storm period occurred at Boone, North Carolina with 11.72 inches. Trade reported 6.80 inches; Banner Elk, 5.24; and Mast, 5.09 inches.

Precipitation totals in the Middle Fork Holston watershed were 3.65 inches at Marion and 4.56 inches at Groseclose.

Streamflow

Flows on the area streams were normal at the beginning of the storm period. Generally, the rivers and tributaries in North Carolina and Tennessee begin to rise and crest before those in Virginia.

In the upper Nolichucky River basin, tributaries crested at approximately 5-6 a.m. on November 6. Downstream in Washington County, Tennessee tributary flood crests occurred between 6 a.m. and 7:30 a.m. On the Nolichucky River at Embreeville, the river began a swift rise at 1 a.m. on November 6 with a stage of 4 feet. By 10 a.m. of the same day the river crested 17.5 feet higher (stage of 21.52 feet).

In the upper Watauga basin at Sugar Grove, North Carolina, the Watauga started rising at 5 p.m. on November 5 cresting at 10:15 a.m. on November 6. The Doe River at Elizabethton began a steady increase at 11 p.m. on November 5. By 6 to 7 a.m. on November 6 the Doe had crested in Roan Mountain, Tennessee. The crest at Elizabethton occurred at 11 a.m. The Watauga River at Elizabethton crested one hour later.

Farther north in the South Fork Holston River basin, the river stage at Vestal began rising about 7 a.m. on November 6, cresting at 9:30 p.m. the same day. Upstream on the South Fork at Riverside, Virginia, the crest occurred at 3:30 p.m.

Tributaries on the South Fork Holston River below South Holston Dam crested about 2-3 p.m. on November 6.

The Clinch River began its rise in Cleveland, Virginia about 8 a.m. on November 6, cresting at 7 a.m. on November 7.

The Middle Fork Holston River started rising concurrently with the Clinch River. Flood stage in Marion occurred about 11 a.m. on November 6, one hour after the Nolichucky crested at Embreeville. The Middle Fork crested below Marion in Seven Mile Ford at 5:30 p.m. on the same day. Farther downstream the river crested at 11:30 a.m. on November 7 at Meadowview.

A report on the flood in the area by principal drainage basins follows.

Upper Powell River

The Upper Powell River experienced few problems from the November 6-7 floods with the exception of the community of St. Charles above Pennington Gap. The crests reached at Big Stone Gap, Virginia were well below record stages and were lower than several recent floods.

The Powell River at Big Stone Gap, Virginia crested at a stage of 4.1 feet on November 6. This was 1.9 feet below the October 2, 1977, flood height and 12.4 feet below the record flood of April 5, 1977.

The South Fork Powell River at Big Stone Gap crest stage was also 4.1 feet on November 6. This stage is 5.1 feet below the October 1977 flood and 8.3 feet below the record April 1977 flood.

St. Charles - Straight Creek and Tributaries

The November 1977 flood was the third flood to inundate St. Charles, Lee County in 7 months. The town was still recovering from the flood of October 1-2, 1977, when the November flood swept through town. During the November flood, 10 families were reported evacuated when floodwaters began overflowing some of the town's streets. The St. Charles water and sewer systems, which had not been completely repaired following the October flood, were damaged again by the November highwater. Flood depths in town on November 6 were reported less than 0.5 feet. On October 1, 1977, several downtown businesses experienced two feet of water above the floors.

Upper Clinch River and Tributaries

The streams in the Clinch River basin crested near flood stage on November 6 although no appreciable flood damage was reported.

Tazewell - The 10.2 river stage at the Civil Defense staff gaging station in Tazewell was 0.3 foot below the April 5, 1977 crest. Twenty-five to 30 families were forced to leave their homes for several hours during the afternoon of November 6, but were returned to their homes by nightfall.

Richlands - The river crested 1.95 feet above flood stage on November 6. The crest of 12.95 feet was 3.11 feet below the April 1977 flood and 8.35 feet below the record June 1901 flood at Richlands.

Cleveland - The stage at Cleveland was only 0.02 foot below flood stage, 10.42 feet below the record April 1977 flood, and 4.89 feet below the most recent flood of January 26, 1978

Clinchport - The river crested below the point of blocking traffic on State Route 65 through town.

Holston River Basin

North Fork Holston River

Saltville - The North Fork Holston River at the gage near Saltville crested November 6 at a stage of 13.57 feet. This stage was 1.4 feet below the highest historical floodmark of February 1862 and 0.4 foot above the January 1957 flood, and 0.6 foot above the flood crest of April 5, 1977.

Flooding along the North Fork occurred mainly in the McCreedy area northeast of Saltville where the floodwaters were reported in Highway 91 and in several homes located along the left bank between the river and Highway 91.

Flooding was also reported on the many tributary streams near Saltville. Laurel Creek near Broadford, upstream from McCreedy, was reported out of its banks, but no homes were damaged. Several houses were flooded on McHenry Creek near Plasterca also.

The Federal Disaster Assistance Administration approved approximately \$25,000 for repair of damages caused by flooding during the November highwater in Saltville of which over \$20,000 was appropriated for public utility repair. A breakdown of flooded and destroyed public utilities in Saltville is given in the Appendix A.

Gate City - Near Gate City, Virginia the November crest of 13.91 feet on the North Fork Holston River was 2.8 feet below the January 1957 flood and 5.88 feet below the April 1977 highwater.

Middle Fork Holston River and Tributaries

The November 1977 flood exceeded the 100 year flood on the Middle Fork Holston River in the towns of Marion and Seven Mile Ford. The river also crested above the April 1977 flood along its full length from the headwaters 1.5 miles west of Groseclose to Meadowview, Virginia.

Groseclose - The only point at which the Middle Fork crested below the April flood was at the USGS crest stage gage, Mile 54.72 in Groseclose. The November stage was 4.28 feet, just 0.75 foot below the April 1977 crest. At the gaging station downstream of Groseclose, Mile 52.88, the November highwater was 1.5 feet above the April flood, cresting at a stage of 14.84 feet. This was the highest stage recorded since the beginning of the gage in 1966.

Atkins - In the town of Atkins, the flood affected plants 1 and 2 of Virginia House Furniture Coporation, Mile 49.4 and 48.4, respectively. The flooding began at plant No. 1 about 9 a.m. on November 6 due primarily to overflow from upstream washing across a railroad track and through the plant from the landward side. Soon afterward, the Middle Fork began flowing

in the plant from the riverward side. At the crest of the flood, highwater was 2.8 feet above a sawdust bin on the left bank. In comparison the April 1977 flood crested 1.8 feet deep at the same location. Eleven out of 15 sections of plant No. 1 sustained flooding of 2 to 3 feet deep. Plant No. 2 was inundated 1 to 2 feet deep in the warehouse and several inches deep along all areas of the plant floor. The highwater at plant No. 2 was said to have been about 3 feet higher in November than in April.

Marion - The town of Marion sustained extensive damage from the floodwaters of November 6. At the eastern end of town in the industrial park from Mile 45.08 at the Highway 11 bridge downstream to Mile 43, the November crest stage was 1.5 to 5.0 feet higher than the April 1977 highwater and approximately 5.5 feet higher than the January 1957 flood. This places the November flood in the "100 year flood" category.

At Highway 11 Bridge, Mile 45.08 - The river crested at the bridge clearance. At the Johnston Road bridge, Mile 44.55, the torrent broke over the left bank just upstream of the bridge and inundated the entire left bank road at approximately 11:30 a.m. on November 6. The floodwaters broke through the metal walls of the JEM Corporation on the left bank at Mile 44.50. Approximately 32 inches of free flowing water was reported flowing through the building between 11:30 a.m. and 1 p.m.

The American Furniture Company, Mile 44.02, escaped inundation in the plant; however, the plant sustained \$15,000 damages due to parking lot erosion and lumber lost from a shed streamward of the main building. The Visador plant, Mile 43.8, was flooded 0.6 foot deep throughout the building with estimated damages of \$200,000. A guardhouse at the Brunswick plant, downstream end Mile 43.45, was flooded 4.2 feet deep from overflow that broke across the road between the plant and river upstream of the plant.

The reach of the Middle Fork from the Highway 11 bridge at Mile 42.70 to the North Church Street bridge at Mile 42.02 averaged 4.5 to 5.5 feet higher in November than in April, and 5 to 8 feet higher than the January 1957 crest. The river crested 5.5 feet above the clearance of the Highway 11 bridge. The East Chilhowie bridge floor, Mile 42.52, was extensively damaged along with the right bank approach road. Farther downstream the east end of Franklin Street was inundated 4.2 feet including the Smyth Home Construction Warehouse No. 5 at Mile 42.31 where floodwaters were 3.6 feet above the floor.

Practically every business along the left bank of the river on River Street was flooded. The businesses and depths of flooding follows.

<u>Mile</u>	<u>Name</u>	<u>Depth(ft.)</u>
42.24	Roland Electric	6.3*
42.18	Marion Tool & Die	6.4 above back floor, 4.5 riverward floor
42.03	Builders Supply Woodworking Shop	2.0

*In April 1977 Roland Electric was flooded 1.8 feet above the floor.

Marion - Staley Creek - In the reach of Staley Creek investigated from its mouth to Matson Drive bridge at Mile 0.84, the November crests exceeded the April flood by 0.5 to 3.5 feet. Farther upstream at the USGS crest stage marker, Mile 3.09, the November crest exceeded the "100 year flood" and was 0.7 foot above the April crest of 4.52 feet.

Near the mouth of Staley Creek at the Lee Street bridge, Mile 0.05, backwaters of the Middle Fork Holston River were approximately 4 feet over the floor. Along Main Street, Mile 0.17, Seavers Mortuary had 8.2 feet of water above the basement floor, and at the Main Street entrance water was reported just over the top of the front porch. The Marion Flower Shop next door reported a water depth of 0.5 foot above the floor. Floodwaters at the Matson Drive bridge crested at the clearance approximately 2 feet above the April crest.

According to the Marion town manager, approximately \$250,000 worth of damage was inflicted by the city when the Middle Fork roared through town in what was described as a 3 to 4 foot wall of water.

Detailed damages incurred by the city of Marion to its roads, bridges, drinking water system and wastewater system are given in the damage survey report, Appendix B.

Seven Mile Ford - The November 6 discharge (cfs) on the Middle Fork Holston River at the Seven Mile Ford USGS stream gage exceeded the 100 year flood discharge of 12,000 cfs by 2500 cfs. The November discharge was also greater than the 7680 crest discharge in January 1957 and the 11,000 cfs discharge of April 5, 1977. The river channel and control of the stream gage at Seven Mile Ford was altered in connection with highway construction in 1962. The present condition is such that the November 1977 flood stage is not comparable with gage height records prior to October 17, 1952. The November stage exceeded the April 1977 stage by 1.79 feet, and in the community of Seven Mile Ford several low-lying homes experienced flood waters 3.5 feet deep.

Chilhowie - The November flood crests in Chilhowie, Virginia from Mile 27.08 to Mile 28.28 averaged 1.5 to 2.0 feet above the April 1977 flood. The river was reported to have started its rise about 8:30 a.m. on November 6. After reaching flood stage, the Middle Fork split

over the right bank at approximate Mile 28.4. The right prong inundated the school yard continuing its destructive path down the landward side of the elevated railroad bed which normally separates the business district from the floodwaters. As a consequence, the streamward (south) side of Main Street downtown was submerged slightly more than one foot deep. Vance Hardware was inundated on Main Street 0.7 foot as the river crested. On the streamward side of the railroad track the left prong of the river almost destroyed 40 houses located between the tracks and the river making it necessary to evacuate about 125 persons. The two prongs joined downstream near the State Route 107 bridge which was blocked by the floodwaters at Mile 27.46.

Near the State Route 107 bridge the flood crested 3.6 feet above the floor of Berry Iron and Metal Company located on the right bank at Mile 27.48. The April 1977 crest at this point was 2.1 feet deep. Downstream across the highway at Mile 27.45, Berry Builders and Supply Company contained 2 feet of water in the company offices and showroom.

At Mile 27.08 the sewage treatment plant office was inundated 0.7 foot. The April 1977 flood crest was about 1.1 foot below the floor. Also the November floodwaters crested about 2 feet over the wastewater plant lagoon at Mile 27.0

Other business establishments flooded include the following:

<u>Mile</u>	<u>Name</u>	<u>Depth(ft.)</u>
28.55	Rainbow Autel	2.0 (approx.)
28.0	United Telephone	4.0 (approx.)
27.6	First Baptist Church	2.6

The Rainbow Autel is located north of Highway 11 on the right bank of Carlock Creek just upstream of the mouth. Floodwaters here are caused by the creek overflow combined with Middle Fork overflow. Seven mobile homes behind the motel were reported in 6 feet of water. The motel owner reported his loss as about \$50,000 to the restaurant and motel.

The town of Chilhowie spent over \$40,000 just in repair work to sewers, streets and the waste treatment plant. Flood related expenses to the phone company which had 2,000 customers out of service November 6 were not reported.

Near Meadowview - The November 1977 flood set a new high for the 45-year record near Meadowview, Virginia exceeding the previous maximum stage of April 5, 1977 by 0.85 foot.

South Fork Holston River and Tributaries above South Holston Dam

Teas, Virginia - The South Fork Holston River at Teas crested on November 6 with a stage of 16.38 feet. This stage was 1.9 feet above the April 5, 1977 flood.

Thomas Bridge - At least 5 sections of State Route 660 were destroyed by the floodwaters including a gaping 10 foot deep crevice filled with water just north of the community. All but 4 of the approximate 20 homes were evacuated during the flood.

Riverside - The November 1977 flood set a new highwater record at the Riverside gage near Chilhowie, cresting at 10.2 feet; 1.2 feet above the June 1923 flood and 1.3 feet above the April 1977 flood.

Vestal - The South Fork Holston River crest stage at the near Vestal, Virginia gage was 14.78 feet. This stage falls below the April 1977 stage by 2.33 feet and also below the more recent October 2, 1977 flood by 0.84 foot.

Damascus, Virginia - Beaverdam and Laurel Creeks - Beaverdam Creek at Mile 0.64 in Damascus, Virginia crested at stage 4.27 feet, which was 4.18 feet below the record flood stage recorded on October 2, 1977 but 0.27 feet above flood stage. American Cyanide Company located on the left bank, Mile 0.53 to Mile 0.70, escaped flooding in November as well as the town hall building and Damascus Elementary School which were inundated during the October 1977 flood.

Most of the damage in the November flood was contributed to the Laurel Creek floodwaters which reportedly crested one foot above the October 1977 flood. Since the two major floods on Laurel Creek were within 5 weeks apart and nearly equal in magnitude, an accurate relationship of the flood crests could not be determined.

On Laurel Creek the October flood was 1.3 feet below the 1901 flood below Beaverdam Creek and from one to three feet below the 1901 flood above Beaverdam Creek. Therefore, according to residents interviewed, the November flood on Laurel Creek above the mouth of Beaverdam Creek was probably within 2 feet of the 1901 flood.

The residents of Damascus were still recovering from the October flood when the flood on Laurel Creek repeated itself in November. Separate damage estimates for the two floods were not available. A detailed account of the October flood given in the Elizabethton flood report closely parallels the November flood on Laurel Creek.

South Fork Holston River and Tributaries below South Holston Dam

Bristol - Beaver Creek - Again the two small dams, located on Beaver and Clear Creeks above Bristol, aided in flood control during the

November storm. Beaver Creek reservoir reached a stage of 22.10 feet at 11:30 p.m. on November 6, cresting 3.51 feet below the stage of the October 1977 flood. The reservoir on Clear Creek crested with a stage of 30.80 at 11:30 p.m. on the same night.

At the Beaver Creek USGS stream gage, Mile 20.6, the floodwaters crested 2.3 feet below flood stage. Only minor flooding was reported in several low-lying areas of town with no major problems encountered.

Bristol - Susong Branch - The only problem reported on Susong Branch, a tributary of Little Creek, was minor flooding on the left bank, Mile 0.45 at the Bristol Herald Courier newspaper office.

Bristol - Sinking Creek - During the November flood and storm, as well as past floods in April and October 1977, considerable problems have been encountered at the Middlebrook Dam built in 1970-1971 on Sinking Creek in east Bristol, Tennessee by a private association. Personnel investigated the dam at 5 p.m. on November 8 after having reports of leaking. Portions of the dam which had been washed out in April and again in October were being rebuilt when the November storm occurred. Investigation revealed that the reservoir was approximately 3.5 feet below full pool elevation which is approximately 193 acre-feet of water. A twenty foot wide wall of water was spilling over the dam approximately 4 inches deep at a point 50 feet from the left bank. A considerable amount of earth on the downstream face of the dam was gradually being washed out at the spill. A concrete spillway was in the process of being built but had not progressed enough to allow water to spill. A 4 foot wide, 200 foot long concrete footer had been placed at the toe of the dam after the previous floods to help stabilize the toe. The 24-inch by pass valve upstream appeared to be discharging at full capacity. Very little water was discharging through the top of the reservoir overflow pipe.

Several concerned citizens living along Sinking Creek below the dam were also inspecting the dam for fear of another failure. No reports of a subsequent dam failure were received in the office. Documentation of the April 5, 1977 failure is contained in the June 7 memo from McLemore to Cauthen titled "Middlebrook Dam Failure in Bristol, Tennessee on April 5, 1977."

Kingsport - Reedy Creek - Reedy Creek at Orebank crested at a stage of 8.21 feet which was 2.14 feet below the record crest occurring October 2, 1977, and 0.02 foot below the March 16, 1973 flood. Only minor flood damage was reported by the Kingsport Public Safety Office.

Watauga River and Tributaries

Sugar Grove, North Carolina - Above Watauga Dam near Sugar Grove, the Watauga River reached a stage of 16.77 feet which was 8 feet above flood stage, 5.64 feet above the April 1977 crest, and 0.37 foot above the crest of December 7, 1950.

Elizabethton - With the Watauga Dam shut off on November 6 and 7 to limit flows downstream, the Watauga River at Elizabethton crested 0.4 foot below flood stage on November 6. which was 0.9 foot above the April 1977 crest but over 10 feet below the record flood of May 1901.

Mountain City - Goose Creek, Furnace Creek, Roan Creek - The November 1977 flood on Goose Creek was approximately 1.5 feet below the October 1977 flood stages. In the upper reach of the creek at the Brown Place Road subdivision, Mile 1.20, the homes along the left bank that were flooded in the October flood escaped serious flood damage in November. Near the mouth at Mile 0.02, the flood crested below the floor of the Johnson County Tire Company. In October the building was inundated to a depth of 16 inches above the floor.

Most of the damage in the November flood was a result of Furnace Creek which reportedly crested about one foot above the October 1977 flood. The bank was extensively scoured from Mile 0.83 to Mile 1.96 as it had been in October particularly at Mile 0.83 and Mile 1.4. Residents of a subdivision located at Mile 0.97 to 1.15 sustained yard and carport flooding below the floors of the homes. The flood characteristics of the November flood were almost identical to that of the October 2, 1977 flood described in the Elizabethton flood report dated February 22, 1978.

Farther downstream, Roan Creek near Neva, Mile 10.4, crested at stage of 9.20 feet which was 1.6 feet below the October 1977 stage and 1.28 feet above the March 12, 1963 flood stage. The October stage ranks as the highest stage recorded.

Public utilities and road systems in Mountain City sustained extensive damage in the November flood. Total financial assistance requested by the town was over \$53,000 as tabulated in the FDAA Assistance Application Form in Appendix C.

The Neva, Roan Creek and Coe Creek sections near Mountain City were damaged as extensively as they were in October. Johnson County Chairman W.D. Hill reported that 4 or 5 bridges erected as temporary structures after the October flooding were completely washed out. Some of the bridges damaged again in November had been previously repaired at a cost of \$125,000. Approximately 41 bridges were washed out by the November highwater.

Doe River and Tributaries

Burbank - Arthur Crain who has lived on the right bank of the Doe River at Brubank, Mile 26.6, for 49 years stated that the November 6 flood was approximately one foot below the June 20, 1972 highwater; the highest flood he had ever seen on the Doe River in the Burbank section.

Below Burbank the Doe River inundated State Route 143 in several locations and cut out a new channel above the State Route 143 bridge at Mile 24.72.

Roan Mountain - The November 6 flood on the Doe River at Roan Mountain reached a flood height approximately one foot above the 1901 flood and 3 feet above the June 20, 1972 flood just upstream of the Hampton Creek road bridge, Mile 21.30. This high stage was partially caused by the blocking of the bridge with debris from upstream and floodwaters from Hampton Creek which enters the Doe at Mile 21.4. The Doe River crested the left bank near the mouth of Hampton Creek upstream of Cloudland Elementary School. The principal stated that the one foot of water in the school was a result of both Hampton Creek and Doe River. Estimated damage at the school was given as \$5,000 due to ruined supplies and carpet damage.

Floodwaters in the main part of town were 0.3 to 0.5 foot above the highwater recorded in June 1972. The water broke out of its banks in the early morning hours of November 6 and rushed down the streets into the downtown area. The highwater entered 6 commercial establishments and 3 churches as it crested about 7 a.m.

Commercial and public buildings flooded in Roan Mountain are as follows.

<u>Name</u>	<u>Depth Flooded</u>	<u>Damages</u>
Holiness Church	4.2 ^a	\$1600
Roan Mountain Feed Store	2.5 ^b	
Roan Mountain Service Station	1.0	
Dr. Raulston (DDS)	0.3	
Post Office	0.5	
Mountain Electric Coop.	0.5	
Seventh Day Adventist Church	0.5	
Heaton Hardware	0.2	
First Baptist Church	0.5	

- (a) Storage area
 (b) Above basement floor

The Roan Mountain Holiness Church, Cloudland Elementary School, and Roan Mountain Feed Store suffered the most damage in the flood. Most

of the damage at the feed store was caused by lost seed and fertilizer which had been stacked on the floor. The basement of the Holiness Church served as a kitchen and recreation area. The damage to buildings was confined mostly to clean-up problems.

The Roan Mountain Service Station suffered damage as sheets of asphalt were washed up by the raging Doe and deposited in nearby yards. Other roads in town were covered with mud and debris after the floodwaters receded.

Downstream at the old U.S. Highway 19E bridge, Mile 19.37, water backed up to about floor elevation on the upstream end and was 4.9 feet above the June 1972 crest at this point. The November crest below the bridge was 0.8 foot below the June highwater. At the old Doe River gage at Hopson School, Mile 14.65, the November flood crested 4.6 feet above the June 1972 crest.

Fifteen bridges were reported washed out between Roan Mountain and Hampton.

Hampton - Doe River and Laurel Fork Creek - In the vicinity of Hampton flooding along the Doe occurred west of the new Highway 19E embankment in the Rittertown section on the left river bank. Floodwaters crested at the clearance of the old Highway 19E bridge, Mile 7.42. The November crest at the bridge was 4.1 feet above the June 1972 crest and approximately 2.5 feet below the May 1901 flood.

Immediately upstream of the U.S. Highway 19E northbound lane, Mile 8.09, heading up of the river produced a stage equal to the May 1901 crest. Further upstream though, the November 1977 stage was 1.4 feet below the 1901 crest at the Hampton High School field house, Mile 8.10, which sustained floodwaters 3.4 feet over the floor. The Doe River broke over the right bank at the downstream end of the vocational building, but none of the buildings were flooded. The school's sewage treatment plant was overtopped by the flood.

On Laurel Fork Creek in Hampton, the November 1977 crest was 1.2 feet above the February 1966 stage near the Highway 321 bridge at Mile 1.35. The two floods were equal in magnitude at Mile 0.79. Below Mile 0.23 the November crest was about 0.5 foot above the 1966 flood.

The highest flood in recent years on Laurel Fork Creek occurred in March 1963 and averaged 2 feet above the February 1966 stage.

In the upper reaches of Laurel Fork Creek at approximate Mile 1.0, left bank overflow inundated 12 to 15 houses one to two feet deep. Downstream from Mile 0.33 to Mile 0.23, overflow across the left bank was about a foot deep and spread to the edge of Highway 321. Several

trailers were damaged in this area. In addition, the foundation under a trailer sales office washed out causing the back of the building to plunge into the raging creek. Downstream at the post office, floodwaters crested 1.9 feet below the floor at the rear entrance. Overflow in front of the building seeped in the front door causing minor mud damage. Mud damage was also reported in the cable company and laundry mat. As the floodwaters crested, approximately 50 families were evacuated from the Hampton area.

Valley Forge - In the Valley Forge area of the Doe River, the November crest was 1.6 to 2.4 feet above the March 1963 flood in the reach from Mile 3.95 to 4.90. In comparison with the May 1901 flood, the November 1977 crest was 2 to 5 feet lower.

Forty to fifty persons were evacuated in the McCathern Springs and Crowe Bottom areas of Valley Forge. Water ran rampant several feet deep in the McCathern Spring area as shown in the accompanying photographs. The Long Hollow bridge at Mile 4.23 was closed to traffic because of a damaged pier. The McCloud Lumber Company, Mile 3.99, was inundated 1.7 feet above the ground floor with estimated damage of \$30,000. At Crowe Bottom, 5 or 6 houses were flooded approximately one foot deep near Mile 3.7. Residents complained of septic tank back-up in the homes and practically every basement was flooded.

Elizabethton - At the USGS stream gage, Mile 0.97, the Doe River crested at stage 9.35 feet which was 1.15 feet under the May 21, 1901 flood crest. The November stage ranks as the second highest stage on record at the gage.

Above Elizabethton at Mile 1.5, the Carter County school garage was inundated several feet deep as shown by the accompanying photographs. Two cars, 2 buses and 2 pickup trucks were reported damaged at the garage and silt damage to motors and spare parts in the building was extensive.

In Elizabethton the right bank wall was crested in several places near the stream gage, but flooding was limited to streets and several lawns and basements. No major damage was reported. The Doe also came out of its banks at the county school system administration building on the right bank, Mile 0.5, inflicting minor damage.

The Elizabethton Utility District incurred heavy losses from the Doe highwater when a 14 inch water main was broken upstream of Elizabethton; the main source of water for Elizabethton customers. The force of the floodwaters was so great that 3 sections of the pipe were washed away even though it was buried under 4,000 bags of cement.

The Carter County Civil Defense Office issued over \$65,000 to residents of the county for flood damage assistance. Other flood statistics for Carter County are given by the Civil Defense report in Appendix D.

Buffalo Creek - Buffalo Creek which enters the Watauga River west of Elizabethton crested with a peak stage of 7.45 feet on November 6 at 7:50 a.m. at the stream gage near Milligan College. This stage was 3 feet below the record 1965 flood on Buffalo Creek and 0.05 foot below the April 5, 1977 flood crest. The creek flooded low-lying pastures along the banks but no appreciable damage was reported.

Johnson City - Brush Creek, Knob Creek - The November 1977 flood on Brush Creek was near the elevations of August 1938 and July 1962 from Mile 1.80 to Mile 5.60 below the covered channel section in the downtown area. Upstream of the covered channel section, the November flood crested 1 to 3.5 feet below the 1938 and 1962 floods.

The Oakland Avenue bridge at Mile 4.86 was inundated about 0.6 foot above the floor. Just upstream near Mile 5.0, the back entrance road to Mor-Flo Industries plant off Lester Harris Road was also flooded. Several houses were reported surrounded by water south of East Fairview Avenue at Mile 5.1.

Upstream of the downtown covered channel section, Brush Creek overflow ran across West Watauga Avenue, Mile 6.64, and Sevier Street, Mile 6.45. Floodwaters crested from 1 to 3 feet above the top of bank from Mile 7.5 to Mile 8.7.

Flooding occurred in the "Y" section of Johnson City, Brush Creek Mile 7.7 to 8.2, where a number of houses reported minor flood damage. The highwater extended from the right bank to West Walnut Street in places. Embreeville road was also blocked. Only minor damage was reported along the other sections of the creek.

On Knob Creek, Mile 2.86, A&W Imports reported water in the showroom. No other damages were reported.

North Toe River Watershed

North Toe River and Tributaries

Plumtree, North Carolina - No homes along the North Toe River at Plumtree were flooded. However, the river crossed Highway 19E on the right bank, approximate Mile 55.2, inundating the Plumtree Presbyterian Church yard up to the bottom steps of the church.

The Avery County Sheriff's Department reported that no bridges were washed away in the county and that there was no water shortage reported since most of the residents received their water from springs.

Spruce Pine - North Toe River - Upstream from Spruce Pine at the USGS Altapass gaging station, Mile 35.97, the November 6, 1977 crest stage of 14.1 feet was 4 feet above bankfull stage. In comparison with past floods, the November crest was 0.6 foot below the March 12-13, 1963 stage and 2.1 feet below the August 1961 stage. Maximum stages recorded at the gage were 22.1 feet in July 1916 and 19.5 feet in August 1940.

On the North Toe River above the mouth of Beaver Creek in Spruce Pine, the November 1977 crest averaged 4.2 feet above the August 1961 flood and 6.7 feet below the July 1916 flood. Below Beaver Creek the 1977 crest was 5.2 feet above the 1961 flood and 8.5 feet below the 1916 flood.

Private road bridges and public utility installations near the river sustained the most flood damage along the North Toe River in Spruce Pine. A low water, wooden bridge, at Mile 34.22 was washed away as the North Toe River inundated it approximately 12 feet deep. This bridge provided access to houses which are encircled by the North Toe River in the upper part of an "S" bend of the river in this reach.

A suspension type footbridge at Mile 32.89 was destroyed. This bridge provided access from the Feldspar Corporation on the right bank to their water supply dam on Grassy Creek, which enters the North Toe River from the left bank at Mile 32.82.

The Feldspar Corporation pump station, Mile 32.87, was damaged by floodwaters cresting 9 feet above the floor. Across the river the North Toe lacked only several feet before flooding an equipment shed.

At the mouth of Beaver Creek, Mile 31.89, the floodwaters completely covered a pumping station owned by the city causing extensive damage. In town at the railroad depot, Mile 31.59, the floodwaters crested below the height of the railroad tracks, approximately 5 feet below the depot floor. Water did enter some low-lying sheds between the tracks and river.

Across the river just downstream of the Harris Elementary School athletic field, several trailers close to the river were inundated and nearly washed away. At the Gouge Exxon distribution plant downstream of U.S. Highway 19E bridge, water crested 0.6 foot below the floor and damaged the storage tank pump bearings. Right bank overflow at Mile 31.24 caused mud damage at the city equipment shed.

Downstream of Spruce Pine at the sewage treatment plant, Mile 30.3, floodwaters were within an inch of the chlorination chamber but did not damage the facilities except for an entrance gate which required replacing.

Spruce Pine - Beaver Creek - The November 6, 1977 flood on Beaver Creek was approximately equal to the flood of August 1961. Bridges and sewer lines crossing the creek were extensively damaged as well as several houses. The following bridge floors were known to have been destroyed in the November 1977 flood: Gulf Street, Mile 0.06; Ward Street, Mile 0.42; Private road, Mile 1.16.

Upstream of U.S. Highway 19E, a house at Mile 1.29 on the left bank was flooded. Extensive lawn and bank damage was reported near Mile 1.16 as the floodwaters left the bank leaving rocks and debris in its path.

Upstream of the Cabin Road bridge, 3 sections of sewer pipe were destroyed by the creek. Downstream of Highway 19E, the basement of a house on the right bank at Mile 0.77 was flooded to a depth of 5.4 feet.

The floodwaters did not enter the lumber building located on the right bank at Mile 0.14, but several stacks of lumber were washed downstream by the river as it flowed through the yard. This lumber backed up in front of the Gulf Street bridge and was a factor in its destruction. Backwater from the North Toe River was reported at the Gulf Street bridge.

Spruce Pine - Grassy Creek - At the Carter Ridge road, the November 1977 flood was about 2 feet below the August 1961 highwater. Farther upstream, the two floods were equal in magnitude. No appreciable damage was seen on the creek.

Bakersville, North Carolina - Cane Creek - Cane Creek is a tributary to the North Toe River at Mile 14.0. The town of Bakersville is located along Cane Creek from approximately Mile 3.6 to Mile 4.8. White Oak Creek, a tributary of Cane Creek at Mile 4.2, enters the town from the southeast.

Flooding during November 6 was a result of overflow from the two creeks which reportedly crested between 6 and 7 a.m. One resident stated it was the highest he had seen the creek rise since the 1901 flood. During the flood crest, Highway 226 was blocked in the downtown area and several business establishments were inundated.

Commercial and public buildings flooded in Bakersville are as follows.

<u>Name</u>	<u>Depth (ft.)</u>	<u>Damages</u>
Henline-Hughes Funeral Home	1.5 ^a	
Youngs Exxon Station	1.0 ^a	
Mitchell County Health Center	2.2 ^a	
Buchanon-Young Chrysler-Plymouth	1.3 ^b	\$35,000-40,000
Day Care Center	2.3 ^a outside 0.5 inside	

(a) Above main office floor

(b) Above floor at main entrance door - outside measurement

Damage to the Chrysler-Plymouth dealership was extensive as 2 automobiles were lost in the flood and 21 damaged.

The town of Bakersville suffered damages from destroyed water lines and street damage. In addition, a mill dam below town washed out causing a drop in the reservoir. Bakersville received \$49,900 of Federal Assistance money for cleanup and repair.

South Toe River and Tributaries

The South Toe River, Yancy County, is a tributary of the North Toe River at Mile 21.5. Development along the river is limited to the community of Newdale which extends along the banks from Mile 6 to Mile 7.1. The area below Newdale is mainly undeveloped as the river winds its way through the mountain gorges. Above Newdale, development consists of scattered farmhouses and fields combined with mountain recreation areas near the headwaters and small communities.

At the USGS stream gaging station near Celo, the river crested at a stage of 17.41 feet which was 4.88 feet above the instrument shelf. This stage ranks as the highest stage on record and was 7.54 feet above the previous record stage set June 20, 1972. The recurrence interval of the November 1977 flood was above 200 years at the site. Just downstream of the gage, the Celo bridge was completely inundated and heavily damaged.

The November flood crest at the Blue Rock road bridge, Mile 14.12, was 8.3 feet above the 1972 flood and crested just below the bridge floor.

At the U.S. Highway 19E bridge above Newdale, Mile 7.13, the South Toe River crested approximately 0.5 foot below the clearance.

This stage was 6.5 feet above the 1972 highwater. The stage of 17.73 feet at the Newdale stream gage, Mile 6.88, set a new record above the August 13, 1940 stage of 17.40. The recurrence interval of the November 1977 flood was 100 years. The November 1977 stage was also 4.94 feet above the June 1972 crest. An undetermined number of low-lying houses and trailers were flooded.

Micaville - Ayles Creek and Little Crabtree Creek - The two tributaries of the South Toe River which flow through the community of Micaville caused extensive damage to the town. Ayles Creek and Little Crabtree Creek tossed vehicles and mobile homes down the creeks. In addition, miles of railroad tracks of the Yancy Railroad were ripped and twisted off their foundations.

Nolichucky River Watershed

Cane River and Tributaries

The Cane River and North Toe River combine to form the Nolichucky River at Mile 110.8 in Yancy County, North Carolina. Flood damages in Yancy County were mainly attributed to the Cane River, which practically flows through the center of the county, and its many tributary streams. The enormous flood damages in the county will total over \$11.9 million when the final tabulation is complete.

The flood of November 1977 averaged 8 feet above the most recently documented flood of June 20, 1972 on the Cane River from the mouth to Mile 22. The following text will describe some of the most noteworthy flood occurrences.

At Mile 1.4 the USGS stream gage established in 1934 was overturned by the raging Cane and washed downstream on its side. The crest stage determined by high water marks was about 22.3 feet at the gage on the morning of November 6, and ranks as the highest stage in the known history at the site. The highest stage previously recorded was 17.8 feet on August 13, 1940. The flood of June 20, 1972 crested at 13.94 feet. The recurrence interval of the November 1977 flood at the gage site was over 200 years for the November 1977 flood.

The Highway 19W-23 bridge crossing the Cane River near Sioux, North Carolina, Mile 3.52, was completely inundated by up to 3 feet of floodwaters. On the right bank a grocery store-service station was torn from its foundation and had to be completely razed. Trees, mud and debris were left piled on the highway bridge.

At Ramseytown, Mile 5.15, a steel bridge crumbled under the force of the water and was carried downstream. Several buildings were also lifted from their foundations.

Two bridges were destroyed in the Bent Creek area, Mile 6.52 and 6.94. In addition, one car was washed downstream.

Lewisburg - Both approaches to the Highway 19W-23 bridge were washed out. A grocery store-service station was flooded 4.0 feet above the floor by Cane River and Bald Mountain Creek floodwaters at Mile 9.92.

Elk Shoal - The cornerstone and foundation were the only remaining evidence of the Elk Shoal Church located on the left bank, Mile 16.2. The bridge at Mile 16.25 was also destroyed.

Riverside - Mile 21.61 - Highway 19E from Burnsville to Asheville was impassable for 3 days when the Cane River cut a 10 foot gap between the left end of the bridge and the west bank.

Burnsville - The major water mains from a watershed on Bowlens Creek, which carried water to a reservoir on a hilltop above town, ruptured at noon on November 7 due to flood force. Before the line burst, the Burnsville reservoir level had been down to 500,000 gallons which town officials estimated would last 24 hours. After the break, the town residents were without water. A footbridge below the Cane River dam was destroyed at Mile 22.8.

Miles of Highway 197 were destroyed in the reach of the Cane River from the mouth of Bowlens Creek, approximate Mile 24.3, upstream to Pensacola. In addition, a steel truss bridge was washed, intact, from its abutment, coming to rest several hundred feet downstream.

Pensacola - Cane River and Cattail Creek - The community of Pensacola was heavily damaged from the Cane River and Cattail Creek floodwaters. Cattail Creek enters the Cane River and Pensacola area south of the community, dividing into several forks before entering the river. The Wilson Grocery Store was inundated 1.5 feet above the floor. In addition to water damage in the store, a gasoline pump in front of the store was torn from its foundation. Extensive scour damage to streets and lawns in the entire community also resulted.

In the upper reaches of Cattail Creek, the road along the creek was cut 10 feet deep in places. The residents of the area were without electricity at 3 a.m. on November 6 when the creek crested destroying houses and bridges in its path.

Murchison - The Highway 197 bridge at Murchison, Mile 33.6, was inundated approximately 1.5 feet above the floor. Floodwaters from the Cane River and Haney Creek, which enters Cane River from the left bank upstream of the bridge, cut away the west bridge approach. The bridge was further damaged by settlement of the center pier.

On a county-wide basis, between 500 and 600 families were completely isolated by floodwaters in Yancy County in the Ramseytown, Bee Log, Pensacola, Cattail Creek and other areas. Helicopter crews delivered over 32,000 pounds of food to over 1400 persons. Power and telephone service was out in much of the county. Forty to fifty mobile homes damaged, barns containing tobacco crops, 17 to 18 bridges and numerous roads were only part of the estimated destruction from the floods.

Nolichucky River - North Carolina

Poplar - At the Poplar USGS stream gaging station, Mile 106.8, the November 6 crest of about 21.2 feet ranks as the highest stage on record, with over a 200-year recurrence interval. This stage was 1.5 feet above the previously maximum recorded stage of August 13, 1940. Also, the November stage was about 0.2 foot higher than the floods of July 1916 and May 1901.

Nolichucky River and Tributaries - Tennessee

Erwin - Nolichucky - Upstream from Erwin at the Clinchfield Railroad bridge, Mile 98.00, the November crest was 3.3 feet above the August 1940 flood and 0.2 foot under the May 1901 crest. At Mile 97.37, old U.S. Highway 19W-23, the 1977 flood crest dropped to 4.4 feet below the 1940 flood and 7.1 feet below the flood of 1901. Similarly, the 1977 flood was below the 1901 and 1940 floods at the U.S. Highway 19W-23 bridge, Mile 95.90, by 7.2 feet and 2.0 feet respectively.

The Nolichucky River channel below U.S. Highway 19W-23 has been recently altered from Mile 95.7 to 94.0 due to construction of the 19W-23 Erwin by-pass highway. In the reach of the channel change, the streambed is now 2 to 9.5 feet lower, averaging about 7 feet below the previous channel bed. The Nolichucky River flows west of and adjacent to the by-pass highway after crossing under a by-pass bridge at Mile 95.65. The November flood crested approximately 7 feet below the clearance at this bridge. From below the bridge to the mouth of Martin Creek at Mile 94.78, the November flood crested approximately 4 feet below the 1940 flood.

Below North Indian Creek at Mile 94.1 to Mile 93.0, the 1977 river stages averaged 3.5 feet above the 1940 highwater.

The Nolichucky River spilled over both banks downstream of the Chestota bridge at Mile 97.37. The left bank field from Mile 97 to Mile 96 was completely inundated. Damage in this area included destruction of a radio station transmitting tower which was toppled by the raging waters and flooding of the Riverview Baptist Church located on the left bank just upstream of the U.S. Highway 19W-23 bridge at Mile 95.90. The river lapped against the south embankment of Highway 19W-23 and the east embankment of the by-pass highway.

The left bank overflow entered the channel at the Riverview Baptist Church. One resident living in a subdivision north of Highway 19W-23 along the left bank of the Nolichucky, Mile 95.90 to 95.65, stated that the overflow south of the highway crossed over the intersection of Highway 19W-23 and the by-pass road for about 10 minutes. No homes were flooded in the subdivision though.

Nolichucky River - Embreeville - At the USGS Embreeville gage, Mile 89.00, the Nolichucky River crested at stage 21.52 feet. In comparison with past floods, this stage was 2.5 feet below the May 1901 flood and 2.95 feet above the August 13, 1940 stage.

Over 80 families were evacuated from the Embreeville community on the morning of November 6 as the river crested over the left bank more than 1000 feet from the normal channel.

Nolichucky River below Embreeville - The following tabulation compares the November 6, 1977 flood on the Nolichucky River with the August 13, 1940 highwater below Embreeville downstream to the Glaze bridge at Mile 70.03.

<u>Mile</u>	<u>Bridge</u>	<u>11-6-77 Highwater (ft.)</u>	
		<u>Below 1940</u>	<u>Above 1940</u>
85.89	Lamar		1.3
81.64	Jackson	4.3	
77.12	Bailey		1.4
74.00	Snapp	0.2	
70.03	Glaze	0.4	

Several families were stranded in the Enon Church located on State Route 107, approximately 1000 feet from the left bank of the Nolichucky River at Mile 80.8 in the southern part of Washington County. The church was surrounded by approximately 3 feet of water. Other damage in the county was caused by flooded farmland and isolated houses along the river.

Erwin - South Indian Creek - Comparison of the November 1977 flood with the documented March 1965 flood on South Indian Creek above Erwin was made from the mouth to Mile 4.2. The 1977 flood crest at the mouth exceeded the 1965 crest by 4.2 feet. Upstream, the 1977 flood was equal to the 1965 flood and approximately 3.5 feet higher than the 1965 stages along several scattered areas of the creek.

Widespread damage was reported in the southern portion of Unicoi County along the headwaters of South Indian Creek. Mud slides and road washouts were a common occurrence. Flooding was reported along Highway 19W-23 which parallels Spivey Creek east toward North Carolina. The community of Coffee Ridge on Coffee Ridge Creek sustained road damages. Near Ernestville, South Indian Creek Mile 6.1, a portion of U.S. Highway 19W was cut away by the swift flowing floodwaters and

several automobiles were tossed into the creek. Flood damage was also reported in the Temple Hill section of South Indian Creek, Mile 4.1.

Near the mouth of South Indian Creek in the sandy bottom section, 2 house trailers were washed away, 6 trailers moved from their foundations and flooded, and 4 other trailers damaged. In addition, over 5 houses were flooded to depths of one foot or less when the creek crested approximately at 5 a.m. on November 6.

On a county-wide basis, 75 percent of the bridges in Unicoi County were reported destroyed. Over 50 families were driven from their homes by the floodwaters and another 100 families in the county were reported isolated. The Clinchfield Railroad suffered 40 track washouts south of Erwin. Northwest of Erwin, Highway 81 between Erwin and Embreeville in the Devils Looking Glass area of the county was inundated until the afternoon of November 6.

The Unicoi County Civil Defense quoted the following tabulation of flood damage in the county.

35 homes damaged	\$240,000
12 trailers damaged	30,000
4 trailers destroyed	40,000
Road damage	894,000
Agricultural and farmland	500,000
39 public and private bridges destroyed	

Total estimated cost of flood damage will be over 2.7 million.

Jonesboro - Unnamed Tributary to Little Limestone Creek

Primarily, the water that caused damages to businesses in the downtown area of Jonesboro on November 6 came from an unnamed tributary which flows through the middle of town in a covered channel. The November crest on the tributary was 0.3 to 0.8 foot below the most recently documented flood of August 17, 1977. Damage in the downtown area was confined to several businesses along Main Street which experienced mud damage. The Old Sweet Shop was flooded 1.0 foot above the inside floor and 2.3 feet above the rear outside door entrance. Highwater at Whites Auto Parts seeped in the back entrance less than 0.1 foot deep.

The town experienced problems from clogged storm sewers and mud along Main Street. A detailed description of the flood problem in Jonesboro is given in the August 17, 1977 Jonesboro flood report.

Jonesboro suffered the most extensive damage at the water intake station located on the Nolichucky River. The force of the river washed part of the structure downstream and inundated the intake pumps and motors. Several pieces of equipment had to be dug out of the sand deposited by the receding river and all motors required rewinding. In addition, the road to the intake station was completely destroyed.

The wastewater treatment plant which is located on Little Limestone Creek approximately one-half mile below Jonesboro was not damaged due to sandbagging efforts before the crest.

Damage estimates for clean up and repair were quoted as \$375 for downtown area (most of the work was donated by volunteers) and over \$2000 for repair of access road to the water intake. No estimate was given on repair of intake.

NORTH TOE RIVER

SPRUCE PINE, NC

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
30.3		Sewage treatment plant located on left bank. Highwater was one inch below top of chlorination chamber.
30.39	2499.8	Good trash
31.02	2505.6	Good trash at highwater mark 59-18
31.24	2508.4	Good mud at concrete pumping station on right bank
31.32	2509.2	At highwater mark 59-17 - trash
31.32	2510.9	Highwater was 0.6 foot below floor of Gouge Exxon Distribution plant on left bank pointed out by employee.
31.4	2510.2	Highwater was pointed out to be 1.5 feet below floor of Spruce Pine Lumber Co. building No. 3.
31.43	2511.2	Fair trash 100 feet downstream U.S Hwy 19E bridge
31.59	2513.2	Good trash 100 feet upstream railroad depot
31.78	2515.7	Fair trash at highwater mark 59-14 and pedestrian bridge
31.89	2515.6	At mouth of Beaver Creek on city pump station pointed out by employee
32.82	2522.2	Cut line mouth Grassy Creek
32.87	2526.9	Excellent mud line on shed at Mica Compa upstream of mouth of Grassy Creek .
32.88		New low water bridge - Clearance - 2509.
32.89		Floor - 2510.2 Footbridge destroyed
34.20	2543.6	Trash

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
34.22		New low water bridge - clearance-2531.2 Floor-2532.3
35.97	2557.0	Altapass gage height - 14.1 feet

Field Notes: Book 8534, pp. 25, 27-30

BEAVER CREEK

SPRUCE PINE, NC

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
0.02	2515.6	North Toe River backwater, Mile 31.89 at city pump station
0.06	2515.8	North Toe River backwater at Gulf Street bridge which was washed out
0.07	2514.7	Poor silt in lumber
0.23	2522.1	Trash in lumber yard
0.42		Ward Street bridge washed out
0.54	2551.6	Trash 50 feet downstream private road bridge
0.55		Road bridge washed out
0.57	2551.8	Good trash
0.66		Bridge removed before flood
0.77	2565.6	Excellent mud line in basement of Young house 5.35 feet above concrete floor
0.96	2579.8	Trash at Blevins & Son Warehouse and tan
1.04	2585.7	Trash 150 feet downstream Cabin Road bridge
1.08	2589.0	Trash
1.15	2594.3	Trash 50 feet downstream private road bridge
1.16		Bridge washed out
1.18	2596.9	Good seed
1.28	2604.7	Trash 50 feet downstream Hanging Rock Ro
1.30	2606.5	Trash

Field Notes: Book 8534, pp. 23-25

GRASSY CREEK

NEAR SPRUCE PINE, NC

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
0.00	2522.2	Cut line North Toe River, Mile 32.82
0.96	2565.6	Trash 50 feet downstream Carter Ridge Rd
0.98	2566.7	Trash
2.00	2598.0	At Richard Dobbin house
2.10	2599.7	Excellent mud line in woodworking shop

Field Notes: Book 8534, pp. 26-27

SOUTH TOE RIVER

NORTH CAROLINA

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Reference Point</u>	<u>Elevation</u>	<u>Remarks</u>
6.88		2461.71	USGS gage at Newdale - 17.73 feet
7.09	ST-19	93.9	Trash 200 feet downstream Hwy 19 bridge
7.14	ST-19	95.5	Trash
14.10	ST-26	100.6	Good seed 100 feet downstream Blue Ro Road bridge
14.13	ST-26	102.4	Pointed out by resident
20.1		2675.41	USGS gage near Celo - 17.41 feet

Field Notes: Book 9533, p. 16

Reference mark descriptions were established for the June 20, 1972 flood described in Book 1439, pp. 9-16. Reference marks not tied to elevation were assumed elevation 100.0 feet.

CANE RIVER

NORTH CAROLINA

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Reference Point</u>	<u>Elevation</u>	<u>Remarks</u>
0.27	C-2	97.0*	
0.28	C-2	101.9*	Clearance new concrete bridge - 99.7 Floor -101.7 Top semisolid rail -104.1
1.40		2067.5	USGS Sioux, NC gage - 22.3 feet gage destroyed
3.52	C-7	2113.1	Pointed out by resident
3.52	C-7	2112.2	Trash wood and steel girder bridge Clearance - 2107.4 Floor - 2110.1 Top Rail - 2112.7
5.15	C-11	100.8*	Bridge destroyed
6.52	C-13		Swinging bridge destroyed
6.94	C-14		Bridge destroyed
6.94	C-15		Bridge destroyed
9.92	C-20	108.8*	Highwater 4.0 feet above floor grocery store and Texaco station in Lewisburg - concrete bridge built in 1971 Clearance - 100.0 Floor - 104.7 Top Rail - 106.7
11.02	C-23	2328.4	Trash
11.25	C-25	109.8*	Poor trash
11.27	C-26	108.1*	Trash Concrete bridge built in 1971 Mile 11.25 Floor - 105.2 Clearance - 100.0 Top Rail - 107.3
12.24	C-28	111.1*	Mud line in basement of house 2.5 fe above concrete floor

<u>Mile</u>	<u>Reference Point</u>	<u>Elevation</u>	<u>Remarks</u>
13.34	C-31	92.6	Pointed out by resident
13.40			Concrete bridge Clearance - 98.7 Floor - 103.1 Top Rail - 104.3
13.42+	C-31	95.8	Trash
15.49	C-36	2445.4	100 feet downstream Elk Shoal Creek
16.25	C-37	106.8*	Bridge destroyed Elk Shoal Church destroyed Mile 16.2
18.28	C-41	102.4*	Poor trash Bridge Clearance - 100.0 Floor - 102.4 Top Rail - 105.3
21.61	C-48	105.3*	Bridge, Highway 19E Clearance - 100.0 Floor - 103.1 Top Rail - 105.6 Left bridge approach washed out.
21.69	C-48	102.0*	Pointed out by resident
22.15	C-51	104.3*	Good trash
22.15	C-51	105.3*	Resident pointed out highwater and stated it was the highest he had seen since 1939.
22.8	C-53		Bridge destroyed(footbridge)
33.6	C-55	101.7*	State Route 197 bridge at Murchison Clearance - 97.6 Floor - 100.2 Top Rail - 102.9

Field Notes: Book 9533, pp. 12-15

*Reference mark descriptions were established for the June 20, 1972 flood described in Book 1439, pp. 2-8. Reference marks not tied to elevation were assumed elevation of 100.0 feet.

NOLICHUCKY RIVER

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
70.00	1360.8	Glaze Bridge - Mile 70.03
70.06	1361.0	
74.00-	1391.3	Snapp Bridge - Mile 74.00
74.04	1395.0	
76.0	1414.5	
76.7	1417.3	
77.07	1421.6	Bailey Bridge - Mile 77.12
77.13	1422.0	
78.5	1436.0	
81.62	1455.4	Jackson Bridge - Mile 81.64
81.69	1455.9	
85.87	1498.8	New Hwy 81 bridge - Mile 85.89
85.91	1499.3	
88.85	1537.8	
88.87	1537.9	New Hwy 81 bridge - Mile 88.88
89.00	1540.87	Embreeville Stage - 21.52 at 1000 on 11-6-77
92.80	1589.1	
93.87	1616.0	
94.17	1630.8	
94.82	1631.7	
95.15	1633.0	
95.40	1637.3	
95.63	1641.6	

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
95.65	1642.3	New Hwy 23 by-pass bridge Mile 95.65
95.67	1643.0	
95.72	1645.4	
95.89	1646.6	Excellent trash U.S. Hwy 19W & 23 Mile 95.90
95.90+	1648.1	
95.93	1654.8	Overflow from left bank
95.93	1648.9	Good seed
96.20	1658.3	Pointed out by resident
97.37-	1674.7	
97.37+	1675.7	Old U.S Hwy 19W & 23 - Mile 97.37
97.98	1695.5	
98.01	1696.9	Clinchfield Railroad, Mile 98.00

Field Notes: Book 8534, pp. 15-17
 3344, pp. 1-23
 9533, pp. 1-4, 9-11

SOUTH INDIAN CREEK

NEAR ERWIN, TN

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
0.00	1642.9	
0.14	1643.7	
0.24	1644.3	Downstream bridge
0.26	1647.8	Upstream bridge
0.34+	1648.8	
0.42	1651.2	
0.59	1655.8	
0.77	1658.8	
0.87	1664.4	
0.97	1668.8	
0.98	1668.1	
1.14	1671.5	
1.25	1677.1	
1.34	1679.2	
1.45	1682.6	
1.65	1684.1	
1.78	1687.1	
1.85	1691.0	
1.95	1692.2	
2.05	1695.1	
2.11	1694.3	
2.22	1703.6	
2.25	1704.0	
2.40	1708.1	
2.50	1710.4	

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
2.68	1716.2	
2.88	1722.7	
3.00	1727.6	Downstream bridge
3.13	1733.6	
3.18	1733.9	Upstream bridge
3.24	1735.8	
3.32	1745.3	
3.48	1747.5	
3.64	1755.2	
3.72-	1756.9	Downstream bridge
3.74	1757.2	Upstream bridge
3.82	1759.9	
4.02	1766.0	
4.16-	1773.3	Downstream bridge - right channel
4.16+	1775.6	Upstream bridge - right channel
4.24	1776.7	
4.29	1780.7	
4.31	1782.0	
4.44	1783.2	
4.70	1795.1	Right channel
4.70	1797.4	Left channel
4.95	1803.9	Right channel
5.09	1808.2	Downstream bridge
5.11	1810.2	Upstream bridge
5.14	1809.9	
5.22	1814.0	

Field Notes: Book 3342, pp. 16-30
 3343, pp. 1-29
 9533, p. 4

NORTH INDIAN CREEK

NEAR ERWIN, TN

NOVEMBER 6, 1977 HIGHWATER

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
0.17	1624.4	
0.32	1623.9	at bridge
0.38	1618.6	Upstream bridge
0.72	1620.2	
0.92	1638.6	
1.08	1646.6	Downstream bridge
1.13	1649.6	Upstream bridge
1.16-	1650.6	
1.28	1650.9	
1.63	1653.6	
1.73	1655.2	
1.97	1661.5	
2.09	1669.4	Downstream bridge
2.24	1676.6	
2.26	1679.7	
2.31	1701.5	
2.37	1711.5	
2.49	1713.6	
2.60	1716.2	
2.69	1720.7	
2.81	1723.5	
2.85	1725.6	Downstream bridge
2.87	1727.8	

<u>Mile</u>	<u>Elevation</u>	<u>Remarks</u>
2.93	1729.0	Upstream bridge
3.07	1735.3	
3.19	1738.7	
3.20	1740.2	
3.29	1743.4	Downstream bridge
3.32	1744.2	Upstream bridge
3.43	1748.7	
3.58	1755.5	
3.66	1759.1	
3.67	1761.2	Pointed out by resident
3.69	1762.7	
6.71	1915.4	Downstream railroad bridge
6.73	1916.6	Upstream railroad bridge
6.74	1917.70	Downstream Hwy 23
6.76	1918.6	Upstream Hwy 23

Field Notes: Book 3341, pp. 1-30
 3342, pp. 1-15
 3344, p.22
 9533, pp. 4-5

UNITED STATES GOVERNMENT

Memorandum

DATA SERVICES BRANCH

Rec'd. MAR 10 1978

File No. DS-1977

TENNESSEE VALLEY AUTHORITY *Nov.*
Report A-

TO : Melton D. Cauthen, Supervisor, Eastern Region Section, Jefferson City

FROM : James D. Satterfield, Area Engineer, Jefferson City

DATE : January 31, 1978

SUBJECT: FLOOD OF NOVEMBER 6, 1977 - JEFFERSON CITY AREA

Submitted is the following on subject assignment:

Complete Resume of Flood - 9 Sheets

Highwater Tabulations: Nolichucky River - 2 Sheets

Hominy, Moore, Pole Creeks - 4 Sheets

French Broad River at Asheville - 1 Sheet

French Broad River at Marshall - 1 Sheet

Spring Creek at Hot Springs - 1 Sheet

Swannanoa River - 2 Sheets

Mud, Bat Fork, Devils Fork, King Creeks
in Hendersonville, NC - 1 Sheet

FDAA-542-DR-North Carolina Federal Agency Cost Estimate - 2 Sheets

Flooding Over Western North Carolina on November 5-6, 1977,
Disaster Survey NWS - Earnest A. Rodney - 20 Sheets

"Flood 77" - Supplement to Asheville Citizen-Times of 11-29-77
2 Copies

Photographs - 48 Sheets

6 Copies of Photographs (previously submitted to Division Office)

Newspaper Clippings - 106 Sheets

JDS:BSW



FLOOD OF NOVEMBER 6, 1977 - JEFFERSON CITY AREA

Moderate to heavy precipitation occurred over the Jefferson City and Asheville Area during the period November 5, 6 and 7. This precipitation occurred in connection with a weather system which caused the National Weather Service to issue a flash flood watch for the mountainous areas of East Tennessee and Western North Carolina. Heavy rains fell on the Upper French Broad, Pigeon and Nolichucky watersheds.

Rain

Storm totals ranged from one to 10 inches with the heaviest precipitation reported over the western Carolina mountains on the morning of November 6. Twenty-four hour and storm totals from selected stations are as follows:

<u>No.</u>	<u>Station</u>	<u>24-Hour Amounts</u> <u>November 6</u>	<u>Storm Total</u> <u>November 5-7</u>
281C	Mills River	7.1	7.5
733	Clingmans Peak	6.6	10.9
279B	Hendersonville	6.50	7.3
268	Beetree Dam	5.10	6.7
271A	North Fork	4.50	7.0
254	Mount Pisgah		4.81

The storm total at station No. 254 is not especially high. However, antecedent precipitation of 1.22 and 1.02 inches on November 3 and 4 respectively, influenced the record flood on Hominy Creek.

The most intense precipitation occurred on the late evening of November 5 and early morning of November 6. Precipitation from selected stations are as follows:

<u>No.</u>	<u>Station</u>	<u>Hourly Totals - November 5-6</u>			
		<u>1 hr.</u>	<u>3 hr.</u>	<u>6 hr.</u>	<u>12 hr.</u>
281C	Mills River	2.70	5.40	6.26	6.45
268	Beetree Dam	2.25	3.40	4.55	5.00
733	Clingmans Peak				6.6

This precipitation caused high flows on all streams in the Upper French Broad and Pigeon watersheds and record flow on some. Hominy Creek near Candler experienced a crest which exceeded a 200-year reoccurrence cycle. Flows on Beetree Creek near Swannanoa and Ivy River near Marshall exceeded 100-year floods.

Record flows also occurred on streams in the headwaters of the Nolichucky River Basin. On the lower Nolichucky, the flood in general was above that of March 1935 and August 1940 and 2 to 6 feet below the record flood of May 1901.

Nolichucky Dam was not in existence during the flood of May 1901, and from the dam (Mile 45.9) upstream to Mile 59 (approx.) the crest of November 6 exceeded the flood of May 1901.

Damages caused by the heavy precipitation and the resulting floods is estimated in the millions of dollars.

French Broad River Basin

At Rosman the precipitation and resulting flow was of little consequence. The crest on the French Broad River was 6.10 feet, approximately 2 feet below flood stage.

Downstream at Brevard, the flood was of little significance also. The crest on the Davidson River at Brevard was 5.62 feet, representing a flood that re-occurs in less than two years.

At the USGS streamgage at Blantyre, Mile 183.7, the flood reached a stage of 18.44 feet. The maximum of record for this station is 27.1 feet occurring in July 1916. A near record stage of 25.50 was reached in October 1964.

At the town of Mills River, where the highest recorded intensity of precipitation occurred (station No. 281C), only minor damages occurred from local drainage problems. The crest stage at the Mills River gage was 10.77 feet as compared with the maximum of record of 13.62 feet which occurred in August 1940.

In the same general area as Mills River at Hendersonville, station No. 279B, reported a 24-hour precipitation amount of 6.50 inches on the morning of November 6.

This precipitation caused high flows on Mud Creek and its major tributaries Bat Fork, Devils Fork and King Creeks. Flood crests on the tributaries were 2 to 3 feet above the flood of August 1940 and approximately 2 feet below that of July 1916. On Mud Creek

the crest of November 1977 was 2 to 3 feet above that of August 1940, one to 3 feet above that of October 1959, and one foot above flood history marks of July 1916 on the upstream side of Hendersonville to two feet below at the downstream side.

Two shopping centers on Mud Creek near the intersection of Highways 25 and 176 (Mile 9.1) were affected by the flood as well as the Winkler Airport and a mobile home park near Mile 2.5 on Bat Fork Creek.

Water flooded the Public Catalog Showroom to a depth of 3 feet with damages estimated at \$250,000 by the manager. In the same area, Sky City and Family Dollar Store were flooded to a depth of 6 inches. The Northwestern Bank building was flooded to the same depth. Bob Winkler estimated damages to buildings, planes and runway at the airport to be in excess of \$100,000.

The Hendersonville Times-News of November 7 estimated damages in excess of \$1,000,000 for Henderson County included 10 bridges destroyed, 25 major roads inundated or left impassable by the flood and also stated that all three of the area radio stations were off the air for various periods of time. This same publication described the activities of rescue squads, volunteer fire departments, etc. of Henderson County in evacuation and rescue work during the flood.

On the French Broad River at the Bent Creek gage Mile 157.7, a crest stage of 12.09 feet was recorded; a flood crest of 15.80 occurred at the location in October 1964 and the maximum of record of 27.3 feet was reached in July 1916.

Hominy Creek and Tributaries

A record flood occurred on Hominy Creek, a stream which rises in the Pisgah National Forest and flows into the French Broad River at Mile 151.5, from the left bank near Asheville. At the USGS streamgage near Candler, a crest stage of 24.17 feet was established from high-water marks since the flood destroyed the gaging station. This flood was approximately 6 feet above the previous maximum of record of 18.0 feet which occurred in August 1940. High flows also occurred on Pole and Moore Creeks, smaller tributaries of Hominy Creek, in the Enka-Candler area of Buncombe County.

Heavy damage was caused by the flood on Hominy Creek and its tributaries including 3 drownings. On Hominy Creek east of Candler, a woman and two small children were drowned when their mobile home was floated from its foundation and later broke apart at the Southern Railroad Bridge. Her husband and an older son managed to escape the flood.

Flooding of commercial buildings and residences occurred in Candler near the confluence of Hominy and South Hominy Creeks. Further downstream at the mouth of Pole Creek, Mile 10.25, the Western North Carolina Pallet Company suffered heavy damage from Hominy Creek as well as Pole Creek. The Southern Railroad was overtopped at Mile 0.2 on Pole Creek; portions of the fill were washed out, rails and ties were washed from the roadbed.

On Pole Creek above the Southern Railroad, Mile 0.2 to 0.4, at New Candler, industrial and commercial establishments along U.S. Highways 19 and 23 were flooded to depths up to 10 feet and buildings damaged by the force of the current. Additional flooding also occurred along Highways 19 and 23 near Mile 9.5 from local drainage problems and backwaters from Hominy Creek.

On the right bank of Hominy Creek near Mile 8.3, the American Enka plant was flooded to a depth of approximately 5 feet when plant personnel were unable to install flood gates in time.

Immediately below the Enka plant on the left bank at the mouth of Moore Creek, additional flooding of commercial and residential buildings occurred.

Swannanoa River

The Swannanoa River flowing into the French Broad at Asheville near Mile 149.0 from the right bank experienced a crest stage of 15.12 feet on November 6 at 2 p.m. This stage was approximately 4 feet below the maximum of record of 19.0 feet occurring August 13, 1940. The recent flood of March 1973 reached a stage of 13.30 feet at this location. The reoccurrence cycle of the flood of November 6, 1977, has been established as 15 years by the U.S. Geological Survey. A highwater profile was developed for the Swannanoa River upstream to Black Mountain.

The flood of November 6 is almost identical to that of August 30, 1940, and 2 to 4 feet below that of August 13, 1940, from the mouth to the Azalea Bridge (Mile 7.0). From Mile 7.0 upstream to Mile 12.2, the flood of August 30, 1940, was not marked. In this reach the flood of November 6 is 4 to 5 feet below the profile of August 13, 1940.

Beetree Creek enters the Swannanoa River from the left bank at Mile 13.5 from the right bank. On this stream at the USGS gage to above Beetree Reservoir, a stage of 6.04 was reached as compared to the maximum of record of 6.20 on August 13, 1940.

From Mile 14.0 through Swannanoa to the North Fork Swannanoa River, Mile 17.2, the highwater profile of November 1977 continued to be equivalent to the flood of August 30, 1940, and approached that of August 13, 1940.

Upstream from U.S. Highway 70 (Mile 17.6) through Black Mountain (Mile 22), the flood of November 6, 1977, exceeded that of August 13, 1940, and June 16, 1949. Through much of this reach the construction of Interstate 40 has affected the flood plain and channel work has affected the flow characteristics of the watershed. Low-lying roads and farm land were inundated with only minor damage occurring.

Road damage and minor flooding were reported in the upper watershed of the Swannanoa River and major flooding occurred along the lower 5 miles of the river from the Asheville recreation park downstream to the mouth.

French Broad River and Tributaries Downstream from the Swannanoa River

The French Broad River at Asheville crested at 10:45 a.m. on November 6, 1977, reaching a stage of 12.33 feet. Comparable stages of 12.15 and 12.75 feet were reached on August 30, 1940, and October 5, 1964, respectively. The maximum of record for the station of 23.1 feet occurred in July 1916. The flood of May 1973 reached a stage of 11.63 feet.

The highwater profile for the flood of November 6, 1977, along the French Broad River through Asheville is almost identical to that for the flood of August 30, 1940, and approximately 6 feet below that of July 1916.

Minor flooding from small tributaries and local drainage problems were common throughout the city of Asheville during this period. Major flooding was reported along the French Broad River.

Damages from the flood of November 6, 1977, should exceed those of the flood of May 1973 in which a detailed damage estimate was obtained. The crest of November 7, 1977, was 0.5 and 1.8 feet higher on the French Broad and Swannanoa, respectively, than those of May 1973.

Asheville newspaper accounts indicated a minimum of 30 bridges destroyed in Buncombe County and additional information on roads that were inundated, washed out or affected by slides. The same papers detailed action of rescue squads, fire departments, National Guard, and other organizations in assisting those affected by the floods.

On Ivy River, a tributary of the French Broad right bank, Mile 127.7 near Marshall, the crest stage of 15.47 exceeded a 100-year flood and also the previous maximum of record of 14.52 feet which occurred on March 26, 1965.

At the USGS streamgage on the French Broad above Marshall (Mile 126.7), the gage height of 13.64 exceeded the previously recorded stage of 11.54 that occurred March 26, 1965. Floods of August 30, 1940, and July 16, 1916, reached crests of 16.6 and 22.0 feet, respectively.

At Marshall almost all the business district was affected by the flood on the French Broad River with buildings flooded up to depths of 3 to 4 feet. The school cafeteria on Blennerhassett Island was flooded to a depth of two feet and water reached the main floor level of the high school. The crest at Marshall occurred at approximately 4 to 6 a.m. on the morning of November 6, 1977, and several hours before the crest at Asheville. The intense rainfall in the area caused high run-off rate from Ivy River, Sandymush Creek and other smaller tributaries which produced the fast crest, approximately 4 feet below that of August 30, 1940.

At Hot Springs, North Carolina the crest on the French Broad River reached a stage of 17.5' feet as compared to the maximum of record of 22.0 feet occurring July 16, 1916. The flood of August 30, 1940, reached a stage of 16.1 feet at Hot Springs. This crest on the French Broad River caused minor damage and flooding of low-lying roads.

Spring Creek, which flows through Hot Springs and empties into the French Broad at Mile 108.5, experienced a record or near record flood. The business district was inundated and buildings severely damaged by high velocities and debris. High water marks were several feet above those for the flood of June 1949. Flood history from local residents indicated flooding of the business district by backwater from the French Broad River during the flood of July 1916 without the destructive force of a headwater flood. The crest on Spring Creek was in the early morning of November 6.

At Del Rio, Mile 90.5 to 91.0, on the left bank of the French Broad River, a furniture plant was flooded. Damage to the plant was estimated at \$250,000. In the same area, one residence and several mobile homes were damaged by the flood. The crest at Del Rio was at approximately 11 a.m. November 6.

At Newport, the French Broad River crested at a stage of 18.3 feet, approximately 1.0 foot below the flood of August 30, 1940 (19.25 feet) and 5.7 feet below the maximum of record of March 1967. Recent floods of March 1973 and April 1977 experienced crests of 17.6 feet at this location.

Pigeon River Watershed

The flood was of little consequence in the Pigeon River watershed. Crest stages on West Fork above Lake Logan, East Fork near Canton, Pigeon River near Canton, and Pigeon River at Hepco approached bankfull and were 2 to 4 feet below recent crests of May 1976 and May 1973.

Minor flooding occurred along tributary streams causing damages to secondary roads and to agricultural lands.

Nolichucky River Watershed

Record flows occurred over the upper watershed of the Nolichucky River. Crest stages on the South Toe River near Celo, Cane River near Sioux and the Nolichucky River at Poplar exceed a 200-year reoccurrence interval. These streams will be covered in the flood report by the Engineer of the Elizabethton Office.

On the lower Nolichucky, the flood in general was above that of March 1935 and August 1940 and 2 to 6 feet below the record flood of May 1901 with one exception.

Nolichucky Dam was not in existence during the flood of May 1901, and from the dam at Mile 45.9 upstream to near Mile 59, the crest of November 6, 1977, exceeded that of 1901.

The crest elevation at Nolichucky Dam of 1256.8 feet was reached at approximately 10 p.m. on November 6. Floods of August 13, 1940, and March 1963 reached elevations of 1255.5 and 1255.3, respectively at this location.

Near Mile 59, the profile of the flood of November 6, 1977, falls below that of May 1901 and at Mile 61.7 the crest of November 6 was 7 feet below the highwater profile of May 1901.

At the former USGS gage site below the dam, a stage of 30.4 feet was obtained from highwater marks. Floods of March 1963 and March 1973 reached gage heights of 21.30 and 18.15 feet, respectively. The maximum of record of 38.0 feet occurred in May 1901.

A crest stage of 24.9 feet was obtained from highwater marks at the former USGS gage site near Morristown. A stage of 22.85 feet was reached during the flood of March 1973, while that of March 1963 reached a crest of 23.05 feet. The profile of the flood of May 1901 indicates an approximate gage height of 26 feet at this location.

Major overflow with minor flooding of buildings occurred along both banks of the Nolichucky River downstream to the mouth.

This flooding was documented by photographs at Enon Church on the left bank near Mile 81, Baileys Bridge Mile 77, and David Crockett State Park near Glaze Bridge-Big Limestone Creek, Mile 70-71.

Damages in the reach of the river where the 1901 flood crest was exceeded included the Greeneville Water Pumping station on the right bank near Mile 57. The station was flooded to a depth of 20 feet, 5 feet over the operating floor. Greeneville storage reservoirs contained a 3 to 4 day supply when the pump station was flooded on November 6.

All Greene County residents were requested to curtail water use. Car washes and laundries were asked to close and schools were closed on Monday, November 7. One pump was returned to service on November 9 and service was near normal by Friday, November 11.

Flooding also occurred on Camp Creek near Mile 56 on the left bank. Two homes were flooded to depths of up to 3 feet; 2 barns and other outbuildings were also flooded as the flood levels were 10 to 12 feet above the 1901 elevations as a result of silting of the river channel. Two bridges, Jones Bridge near Mile 54 and Bird Bridge at Mile 50, were destroyed by the flood. Cost of replacing these structures is estimated at 1.5 million dollars. Flooding also occurred at a mobile home park immediately upstream from Nolichucky Dam on the right bank.

Below Nolichucky Dam, low-lying roads and bridge approaches were flooded; some were damaged by the flood and others were closed until they could be inspected for damages after the flood receded.

Agricultural damages by flows of this magnitude included scouring of farmland and streambanks, deposition of silt and debris, destruction of fences, drowning of livestock and flooding of low-lying residences and outbuildings.

Damages

No attempt has been made by TVA to itemize the damages for this flood. The following estimates were used when application was made for disaster relief for the following counties.

North Carolina

Buncombe County

Public property-Utilities, Hwys, etc.	\$ 5,973,000
Private property-non-Agricultural	16,650,500
Private property-Agricultural	1,641,000

Henderson County

Public property-Utilities, Hwys, etc.	166,000
Private property-non-Agricultural	1,683,150
Private property-Agricultural	1,015,675

Madison County

Public property-Utilities, Hwys, etc.	486,000
Private property-non-Agricultural	1,039,000
Private property-Agricultural	1,790,000

Haywood County

Public property-Utilities, Hwys, etc.	\$100,000
Private property-non-Agricultural	188,000
Private property-Agricultural	100,000

These estimates were obtained from Bill Thompson, Deputy Director of the North Carolina Division of Civil Preparedness at Raleigh. Based on these estimates, Buncombe, Henderson and Madison Counties were declared disaster areas. The application for Haywood County was denied.

TennesseeGreene County

Individual assistance	350,000
Roads and bridges	1,500,000
Public buildings	50,000
Public utilities	136,000

Cocke County

Individual assistance	59,000
Roads and bridges	282,000

Greene and Cocke Counties were among those counties in Tennessee which applied for and were granted disaster assistance. The others were Johnson, Unicoi, Carter, and Washington Counties.

The damage estimates were obtained from Mike Phillips in the State Civil Defense Office at Nashville.

NOLICHUCKY RIVERHIGHWATER MARKS

	<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
	3.20	1003.2	Book 9555, p. 30
	14.54	1040.7	Book 9555, p. 30
	27.98	1098.7	Book 9555, p. 30
Allen Bridge	42.15	1183.9	Book 2596, p. 9
	42.19	1184.1	Book 2596, p. 9
Nolichucky Tailwater	45.64	1203.9	Book 9555, p. 30
Nolichucky Headwater	45.95	1256.78	Book 9555, p. 30
	45.98	1256.9	Book 2596, P. 10
Richland Creek	- 49.4 ±	1258.8	Book 2596, p. 10
	50.2	1265.9*)	Book 2596, p. 9
	50.3	1266.1*)	Book 2596, p. 9
Bird Bridge	50.3+	1266.5*)	Book 2596, p. 9
	50.35	1267.0*)	Book 2596, p. 9
	54.12-	1275.5*	Book 2596, p. 7
Jones Bridge	54.12+	1276.0*	Book 2596, p. 7
	55.3	1283.5	Right Bank Book 2596, p. 6
	55.4	1284.6	Left Bank Book 2596, p. 6
	55.7	1284.8	Left Bank Book 2596, p. 5
	55.7	1284.3	Right Bank Book 2596, p. 5
Camp Creek	55.9	1285.2**	Book 2596, p. 2

*Supersedes elevation previously submitted

**Highwater on Camp Creek backs up beyond Mile 1.0±
still elevation 1285.2

HIGHWATER MARKS

	<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
	56.15±	1285.3	Book 2596, p. 2
	57.14	1289.3	Book 2596, p. 12
	57.58	1291.7	Book 2596, p. 13
	61.7±	1311.9	Book 2596, p. 4
Earnest Bridge	66.73	1343.1	Book 9555, p. 30

HIGHWATER

HOMINY CREEK

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
0.85+	2001.4	Book 2592, p. 12
1.75-	2011.8	p. 12
1.75+	2012.0	p. 12
3.18-	2024.1	p. 10
3.18+	2024.5	p. 10
3.30	2025.5	p. 10
4.39	2040.6	p. 10
5.17	2044.3	p. 11
5.35	2046.3	p. 11
6.86	2054.1	p. 10
7.83-	2061.1	p. 8
7.83+	2061.4	p. 8
8.01	2063.5	p. 7
8.54	2069.2	p. 8
8.60	2069.6	p. 8
8.90	2073.6	p. 11
9.10	2077.7	p. 11
9.20	2078.7	p. 11
9.30	2079.5	p. 11
10.14	2090.0	p. 10
10.25	2092.1	p. 6
10.62-	2092.4	p. 9

HOMINY CREEK cont'd

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
10.62+	2092.5	Book 2592, p. 9
11.36	2101.9	p. 9
11.38	2102.3	p. 9
11.44	2102.9	p. 9
11.47	2103.5	p. 9

HIGHWATER

MOORE CREEK

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
0.05	2063.5	Book 2592, p. 7
0.15	2063.5	Book 2592, p. 7
0.31	2067.9	Book 2592, p. 7
0.54	2074.8	Book 2592, p. 7
0.78	2085.5	Book 2592, p. 7
1.17	2109.7	Book 2592, p. 7
1.20	2121.5	Book 2592, p. 7
1.56	2185.8	Book 2592, p. 7
1.80	2202.2	Book 2592, p. 7

HIGHWATER

POLE CREEK

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
0.0	2092.1	Book 2592, p. 6
0.19	2092.3	Book 2592, p. 6
0.23-	2092.1	Book 2592, p. 3
0.23+	2096.3	Book 2592, p. 3
0.29	2096.8	Book 2592, p. 3
0.35	2096.8	Book 2592, p. 3
0.36+	2097.1	Book 2592, p. 1
0.67-	2097.0	Book 2592, p. 1
0.67+	2099.5	Book 2592, p. 1
0.85-	2099.2	Book 2592, p. 2
0.85+	2102.3	Book 2592, p. 2
0.89	2102.0	Book 2592, p. 2
0.92	2102.8	Book 2592, p. 2

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : John F. Manthey, Head, Field Investigations, 312 EB, Knoxville

FROM : James D. Satterfield, Area Engineer, Jefferson City

DATE : January 10, 1978

SUBJECT: FLOOD OF NOVEMBER 6, 1977 - HIGHWATER MARKS

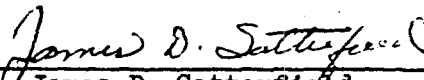
Submitted is the following on the above subject:

French Broad River at Asheville Highwater Tabulation - 1 Sheet
French Broad River at Marshall - 1 Sheet
Spring Creek at Hot Springs - 1 Sheet
Swannanoa River - 2 Sheets
Mud Creek, Bat Fork Creek, Devils Fork Creek, King Creek in
Hendersonville, North Carolina - 1 Sheet

Field Notes: Book 2592, pp. 1-3, 6-22

Note: Book 2592, pp. 4-5 contain cross-section
on Pole Creek at Southern Railroad previously
submitted.

Book 2592, pp. 1-3, 6-22 contain data for
previously submitted Hominy, Moore, and
Pole Creeks.


James D. Satterfield

JDS:BSW

cc: M. D. Cauthen, Jefferson City



HIGHWATER

FRENCH BROAD RIVER AT ASHEVILLE

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
145.75	1962.5	Book 2592, p. 14
146.52	1967.6	Book 2592, p. 14
146.98	1971.5	Book 2592, p. 14
147.32	1974.0	Book 2592, p. 14
147.34	1974.4	Book 2592, p. 13
147.66	1975.3	Book 2592, p. 13
148.13	1977.6	Book 2592, p. 13
148.96	1981.0	Book 2592, p. 13
148.99	1981.5	Book 2592, p. 13
149.95	1984.2	Book 2592, p. 13

HIGHWATER

MARSHALL, NORTH CAROLINA

FLOOD OF NOVEMBER 6, 1977

FRENCH BROAD RIVER

<u>Mile</u>	<u>Reference</u>	<u>Rod</u>	<u>Elevation</u>
125.36	Depot Floor - 1647.1	-0.5	1646.6
125.21	Bldg. No. 27 Floor - 1641.4	+1.5	1642.9
125.08	Bldg. No. 68 Floor - 1640.9	+1.8	1642.7
125.04	Cafeteria Floor - 1640.4	+2.0	1642.4
125.0	High School Floor - 1642.5	±0	1642.5
124.94	Bldg. No. 54 Floor - 1637.6	+2.5	1640.1

HIGHWATER

SPRING CREEK

HOT SPRINGS, NORTH CAROLINA

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Reference</u>	<u>Rod</u>	<u>Elevation</u>
0.24-	Clearance 1325.8	-4.1	1321.7
0.24+	Clearance 1325.8	-2.3	1323.5
0.38	Clearance 1326.2	+5.3	1331.5
0.61	Pump floor 1342.9	-4.0	1338.9
1.19	Clearance 1376.8	-13.8	1363.0

HIGHWATER

SWANNANOA RIVER

FLOOD OF NOVEMBER 6, 1977

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
0.0	1981.5	Book 2592, p. 15
1.58	1991.70	p. 15
2.66	2002.3	p. 15
3.14	2005.8	p. 15
3.53	2010.3	p. 15
4.35	2021.4	p. 15
5.1	2027.4	p. 16
6.0	2042.4	p. 16
6.50	2047.1	p. 16
6.96	2051.0	p. 16
7.58-	2057.6	p. 16
7.58+	2057.7	p. 16
8.0	2062.3	p. 17
9.0±	2071.3	p. 17
12.21-	2120.5	p. 17
12.21+	2121.1	p. 17
13.92	2154.5	p. 17
14.80	2170.3	p. 18
15.43	2183.6	p. 17
17.58-	2240.8	p. 18

SWANMANOA RIVER cont'd

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
17.58+	2244.0	Book 2592, p. 18
19.05	2281.0	p. 18
20.01	2304.9	p. 18
20.89	2339.6	p. 18
21.33	2353.7	p. 19
22.78	2400.3 - 2457.6	p. 19 Book 2591, p. 6
22.93	2469.0	p. 19
23.07	2484.9	p. 19
23.19	2499.1	p. 19
23.33	2513.2	p. 19
23.35	2515.0	p. 19

HIGHWATER

HENDERSONVILLE, NORTH CAROLINA

FLOOD OF NOVEMBER 6, 1977

MUD CREEK

<u>Mile</u>	<u>Elevation</u>	<u>Reference</u>
6.23	2078.7	Book 2592, p. 20
6.85	2080.6	p. 20
7.76	2083.0	p. 20
8.53	2086.9	p. 20
8.79	2087.3	p. 20
9.20	2090.0	p. 20
9.86	2093.1	p. 21

BAT FORK CREEK

0.91	2082.5	Book 2592, p. 21
2.24	2084.7	p. 21
2.71	2087.6	p. 21
3.78	2093.4	p. 21

DEVILS FORK CREEK

0.06	2081.1	Book 2592, p. 22
0.41	2084.0	p. 22
0.50	2084.2	p. 22
2.18	2098.3	p. 22

KING CREEK

0.38	2088.3	Book 2592, p. 22
1.01	2089.4	p. 22