Floods on Tuckasegee River and Deep Creek in Vicinity of Bryson City, North Carolina

Flood Report
TVA/OECD/CD-81/22
September 1981

TENNESSEE VALLEY AUTHORITY

TENNESSEE VALLEY AUTHORITY

Office of Economic and Community Development

FLOODS ON TUCKASEGEE RIVER AND DEEP CREEK IN THE VICINITY OF BRYSON CITY, NORTH CAROLINA

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TVA/OECD/CD - 81/22

Knoxville, Tennessee

September 1981

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FLOODS ON TUCKASEGEE RIVER AND DEEP CREEK IN THE VICINITY OF BRYSON CITY, NORTH CAROLINA

INTRODUCTION

This floodplain information study provides flooding information for the Tuckasegee River and Deep Creek in the vicinity of Bryson City, North Carolina. The study was requested by the town of Bryson City and Swain County to provide information reflecting current flood conditions in order for the communities to better administer their floodplain management programs.

A TVA report "Floods on Tuckasegee River and Deep Creek, Vicinity of Bryson City, North Carolina," which was published in January 1960, contains detailed information on historical, regional, and maximum probable floods.

Since the 1960 TVA report was issued, residential development has taken place in the Deep Creek floodplain; an additional bridge has been constructed across the Tuckasegee River; and Swain County is constructing a new administration building in the right floodplain of the Tuckasegee River with plans for a waterfront beautification project. It is expected that the administration building will provide a focal point for redevelopment and rehabilitation of the area.

STUDY AND SCOPE

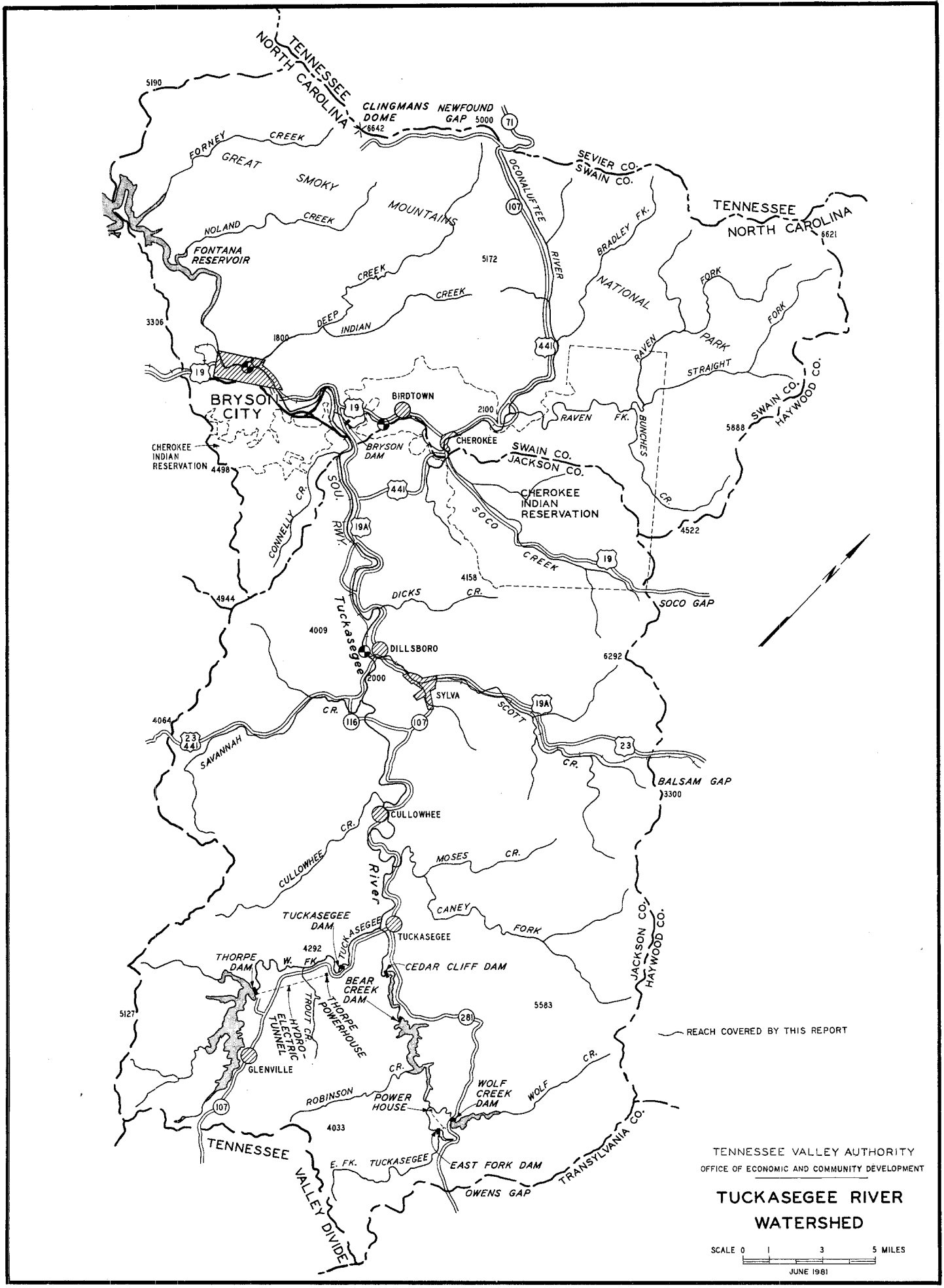
This investigation covers the Tuckasegee River from mile 10.13 to mile 18.31, and Deep Creek from the mouth upstream to mile 1.86 at the Great Smoky Mountains National Park boundary. The watershed map (plate 1) shows the limits of this study.

Bryson City, North Carolina, is located on the Tuckasegee River approximately 13 miles above the mouth of the stream. The river flows diagonally through the corporate limits for 3 miles, bisecting the business section of the town. Deep Creek flows out of the Great Smoky Mountains through a rapidly growing residential area, entering the corporate limits of the town near its mouth. It flows southward to enter Tuckasegee River at mile 13.25.

FLOODPLAIN DESCRIPTION

The floodplain of the Tuckasegee River through Bryson City is well developed, with several industries and a large number of commercial establishments and residences subject to flooding. The Deep Creek floodplain was once largely agricultural but is becoming increasingly residential. Although extensive overflows are relatively rare on Deep Creek, very large floods have occurred in the past. Should these recur, some of this floodplain development would be severely damaged.

PLATE I



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TUCKASEGEE RIVER WATERSHED

SCALE 0 1 3 5 MILES

JUNE 1981

WATERSHED DATA

The Tuckasegee River watershed drains an area of 734 square miles, of which 655 square miles are upstream from Everett Street Bridge in downtown Bryson City. The river heads some 30 miles southeast of Bryson City along the northern slopes of the Tennessee Valley Divide, where elevations range up to 5,000 feet above mean sea level. Elevations are even higher along the eastern and northern boundaries of the watershed, ranging up to 6,400 feet along the eastern side and up to 6,600 feet along the crest of the Great Smoky Mountains. The largest tributary, Oconaluftee River, drains an area of 188 square miles and enters the Tuckasegee River upstream from Bryson City.

Heading on the high ridges of the Great Smoky Mountains at an elevation 5,000 to 6,000 feet above mean sea level, Deep Creek's basin is about 12 miles long and up to 5 miles wide. Ninety-four percent of its 43.9-square-mile drainage basin is in the Great Smoky Mountains National Park.

REVIEW OF HISTORIC FLOODS

Stream gage records have been kept on the Tuckasegee River since November 1897. Other reports, newspaper accounts, and interviews with local citizens yielded information about major floods on the Tuckasegee River back to 1840 when the largest known flood occurred. Based on nearby high water marks, the 1840 flood, known as the "May Fresh," reached elevation 1736.5

at what is now the USGS stream gage near the Everett Street bridge. The largest flood recorded since stream gage records have been kept occurred in late August 1940 and reached elevation 1732.5 at this gage. Recent floods in March 1973 and April 1977 were approximately 2-1/2 feet lower than the late August 1940 flood.

High water profiles for the floods of January 1957 and September 1959, stream gage records from 1966 to 1968, and approximate high water marks for floods in 1902 and 1920 are available for Deep Creek and are documented in the 1960 TVA publication.

More detailed information about Deep Creek and Tuckasegee River flooding may be found in the 1960 TVA publication.

COMPUTED FLOODS

To assist the town of Bryson City and Swain County in administering their floodplain management programs, the 100-year and 500-year floods have been computed. Flood discharges and elevations have been developed for these two floods. The data and plates included in this report have been prepared by the Flood Hazard Analysis Branch, Division of Water Resources, Office of Natural Resources.

HYDROLOGY

Computed flood discharges on the Tuckasegee River are based on the analyses of stream gage records at Bryson City and Dillsboro. Discharges on Deep Creek are based on records from similar watersheds in

the region (reference 2). All stream gage analyses follow standard procedures outlined in reference 3.

ONE HUNDRED-YEAR FLOOD

The 100-year flood is defined as the flood with a 1-in-100 (1-percent) chance of being equaled or exceeded in any given year. While this flood may occur at any time, there is a 26-percent chance of its occurrence in a 30-year period. The 100-year flood on the Tuckasegee River is approximately equal to the August 1940 flood but would be about 4 feet lower than the 1840 flood. On Deep Creek the 100-year flood averages 6 feet higher than the January 1957 flood. The 100-year flood is the minimum standard adopted by the Federal Insurance Administration (FIA) for participation in the National Flood Insurance Program.

FIVE HUNDRED-YEAR FLOOD

The 500-year flood may occur at any time, but it is a rare event with a 1-in-500 (0.2-percent) chance of being equaled or exceeded in any given year. The 500-year flood on the Tuckasegee River would rise 2 to 6 feet above the August 1940 flood and would approximately equal the 1840 flood. The 500-year flood on Deep Creek would average approximately 10 feet higher than the January 1957 flood. The 500-year flood is provided as a guide for planning community and industrial development where risk of flooding must be minimized by providing an increased level of protection.

HYDRAULICS

The hydraulic characteristics of the Tuckasegee River and Deep Creek were analyzed using the U.S. Army Corps of Engineers HEC-2N backwater program (reference 4) to provide estimates of the 100- and 500-year flood elevations at selected cross sections. These cross sections were field surveyed at bridges and other locations to accurately define the flood-plains of the Tuckasegee River and Deep Creek. Locations of selected cross sections used in the hydraulics analyses are shown on the flooded area maps (plates 2-6).

The computed flood elevations at the selected cross sections are joined with straight lines to create a flood profile. The flood profile is a plot of flood elevations versus the stream mile for the 100- and 500-year floods. The elevations are shown in feet above mean sea level and the stream miles are measured from the mouth, upstream (plates 7-10). Tabulations of the 100- and 500-year flood elevations and discharges for the Tuckasegee River and Deep Creek are included in tables 1 and 2.

The computed flood elevations are based on the assumption that bridges and other hydraulic structures remain open and unobstructed. The accumulation of debris under bridges during the time of flooding may raise the flood elevations higher than those shown on the stream profile.

Table 1

TUCKASEGEE RIVER PROFILE TABULATION

Mile	500-Year Flood Discharge (CFS)	500-Year Flood Elevation (Feet)	100-Year Flood Discharge (CFS)	100-Year Flood Elevation (Feet)
10.130	88,885	1714.0[2]	63,870	1711.6[2]
11.000	88,770	1716.9[2]	63,685	1714.3[2]
11.280	88,690	1720.2	63,645	1717.8
11.400	88,655	1722.2	63,630	1719.7
11.750 DS[1]	88,570	1728.7	63,540	1724.7
11.750 US[1]	88,570	1732.3	63,540	1727.7
12.090	88,500	1733.1	63,405	1728.6
12.250	88,470	1733.5	63,340	1729.3
12.510 DS	88,420	1738.1	63,235	1732.3
12.510 US	88,420	1738.9	63,235	1734.2
12.640	88,400	1739.5	63,200	1735.3
12.720 DS	88,395	1739.5	63,200	1735.4
12.720 US	88,395	1740.7	63,200	1737.2
12.900	88,360	1742.3	63,180	1738.7
13.220	85,000	1744.6	59,500	1741.0
13.650	84,960	1749.7	59,460	1745.7
14.000	84,925	1753.1	59,425	1749.2
14.270	84,905	1757.9	59,405	1753.8
14.710 DS	84,500	1763.9	58,900	1760.5
14.710 US	84,500	1771.9	58,900	1766.5
15.310	84,445	1775.9	58,815	1771.0
15.570	84,420	1776.8	58,780	1772.8
15.970	84,385	1779.9	58,725	1776.4
16.560	84,330	1781.5	58,650	1778.9
16.960 DS	84,090	1787.8	58,490	1784.7
16.960 US	84,090	1791.5	58,490	1787.7
17.620 DS	83,595	1797.8	57,895	1793.6
17.620 US	83,595	1798.6	57,895	1794.3
18.310	67,600	1802.0	41,400	1798.4

1. Downstream and upstream at bridges

2. Elevations reflecting combined effect of Tuckasegee River and Fontana Reservoir flooding

Table 2

DEEP CREEK PROFILE TABULATION

Mile	500-Year Flood Discharge (CFS)	500-Year Flood Elevation (Feet)	100-Year Flood Discharge (CFS)	100-Year Flood Elevation (Feet)
0.030 DS[1]	10,795	1744.9[2]	7,795	1741.3[2]
0.030 US[1]	10,795	1744.9[2]	7,795	1741.3[2]
0.040 DS	10,790	1744.9[2]	7,790	1741.3[2]
0.040 US	10,790	1744.9[2]	7,790	1741.3[2]
0.120	10,770	1744.9[2]	7,775	1741.3[2]
0.400	10,700	1745.8	7,720	1744.1
0.670 DS	10,635	1755.5	7,665	1754.7
0.670 US	10,635	1757.6	7,665	1755.7
0.900	10,575	1763.3	7,620	1762.1
1.040	10,540	1769.7	7,590	1768.2
1.350	10,465	1779.7	7,530	1779.2
1.660	10,385	1790.8	7,470	1789.3
1.850 DS	10,340	1798.5	7,430	1796.6
1.850 US	10,340	1799.4	7,430	1797.5
1.970 DS	10,340	1802.8	7,430	1801.0

1. Downstream and upstream at bridges

2. Tuckasegee River mile 13.25 elevations at the mouth of Deep Creek

The flooded area maps show the areas that would be inundated by the 100- and 500-year floods. Using the flood profiles and recent topographic maps, the flood elevations were transferred from the profile to the corresponding locations on the map to establish the expected limits of flooding.

FLOODWAYS

Encroachments on floodplains such as fills or structures reduce the flood-carrying capacity of the floodplain and increase the danger of flooding in other areas. In analyzing floodplain development, the economic gain of the proposed development must be compared to the possibility of increased flood damage both to the development and to neighboring developments. Because eliminating all development from the floodplain is excessively restrictive, the floodway-flood fringe concept was developed. Using this concept, the floodplain is divided into two areas--the floodway and the flood fringe. The floodway (as shown in the appendix) is that portion of the floodplain and stream channel which must remain open and unobstructed to prevent a significant increase in flood elevations. To develop the floodway limits, imaginary "walls" are placed in the floodplain and, through the use of computer modeling, these "walls" are adjusted until an acceptable increase in flood elevation is achieved. For Bryson City the floodway is designed to carry the 100-year flood without causing a 1-foot rise in elevations. For Tuckasegee River and Deep Creek, the correct floodway widths and elevations are shown

in tables 1A and 2A (see appendix). The flood fringe is the outer edges of the floodplain where development may be permitted by local ordinances if it is elevated above the 100-year flood elevation.

FLOODPLAIN MANAGEMENT

Although a detailed investigation containing specific solutions to the flood problem is beyond the scope of this report, technical data presented here may be used in developing an effective floodplain management program. Measures taken to reduce flood damage may be classified into structural and nonstructural solutions. Structural measures may include (1) dams, (2) levees, and (3) channel modifications, while nonstructural measures may include (1) floodplain management regulations, (2) flood insurance, (3) floodproofing, (4) flood warning, and (5) evacuation.

STRUCTURAL MEASURES

Dams

Dams or retention reservoirs may be useful to temporarily impound floodwaters upstream from the area for which protection is needed. Water can be released over a period of several days to be ready to control subsequent floods and to avoid increased downstream flooding. Retention reservoirs are most beneficial when they can be built on only one or two major tributaries above the area being protected in order to control the majority of the drainage area.

Five small power projects, owned and operated by the Aluminum Company of America or its subsidiary, Nantahala Power and Light Company, are located in the headwaters region of the Tuckasegee River. Of these only Thorpe Dam on the West Fork Tuckasegee River with 66,900 acre-feet has any useful storage volume. The drainage above the dam is 36.7 square miles, only 5.6 percent of the total area of 655 square miles above Bryson City. The project has no flood control function, and any effect the reservoir might have on flood heights below would depend on the level of the reservoir just prior to the flood. Because of the small tributary area and the distance from the dam to Bryson City, it is doubtful if water stored in the Thorpe Reservoir would have any important effect on flood crest heights at Bryson City. Dams on Deep Creek or the Oconaluftee River are infeasible because much of the drainage area of these streams is within the national park.

Levees

Levees or walls may be used to protect against flood damage. However, certain problems do arise with their use, such as internal drainage problems and street and utility relocation. Whenever a levee is used, it must be designed to protect against infrequent floods of large magnitude, because failure or overtopping of the levee brings immediate disaster. While the size required and maintenance costs would probably rule out levees for Bryson City, it may be feasible in some cases to use levees to provide localized protection.

Channel Modifications

Channel enlargements to carry floodwaters have been used in some locations as a relief against flood damage. However, due to the necessary dimensions required to pass a large flood and environmental constraints, channel enlargement would probably not be a viable alternative.

NONSTRUCTURAL MEASURES

Floodplain Management Regulations

Floodplain management regulations are useful in providing an orderly development of the floodplain without causing an undue increase in flood heights and in minimizing potential flood damage. The floodplain is divided into a floodway and flood fringe. The floodway should be kept free from development. Development may be permitted by local ordinances in the flood fringe if it is elevated or floodproofed to the 100-year flood elevation.

Minimum floodplain management regulations were adopted by Swain County in January 1980 and Bryson City presently uses a permit system to regulate development in the floodplain.

Flood Insurance

While flood insurance does not reduce flood damage, the insurance can help alleviate financial losses. The town of Bryson City became eligible for the sale of flood insurance under the National Flood

Insurance Program (NFIP) on March 25, 1975, and Swain County on February 3, 1980. Both communities are presently in the emergency phase of the program. Data contained in this report will assist the Federal Emergency Management Agency to convert Bryson City to the regular phase of the NFIP at a later date.

Communities participating in the NFIP must, as a condition of their eligibility, utilize and enforce the best available data as the basis for requiring that:

1. All new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated to or above the 100-year flood level;

2. All new construction and substantial improvements of nonresidential structures have the lowest floor (including basement) elevated or floodproofed to or above the 100-year flood level;

3. The proposed development (meaning any manmade change to improved or unimproved real estate) does not create any adverse effect on the flood carrying capacity of the stream. "Adverse effect" means any increase in flood elevations on adjacent properties.

Enforcement of the 100-year flood elevations at a minimum and the floodway delineations in this study will ensure that Bryson City has met these requirements.

For further information or questions concerning the National Flood Insurance Program, please contact the regional office of the Federal Emergency Management Agency at the following address:

Federal Emergency Management Agency
Region IV
1375 Peachtree Street, NE
Atlanta, Georgia 30309
(404-881-2391)

Floodproofing

Although it is sometimes possible to floodproof existing buildings, it is easier to floodproof new buildings. Floodproofing may include either making buildings impregnable to water or raising floor elevations (either on fill or by other means) to an elevation above the 100-year flood elevation. An example of the latter method of floodproofing is the Swain County Administration Building which uses fill to elevate the floor level above the 100-year flood elevation. FIA requires that new and substantially improved residential buildings have all floors, including basement, elevated above the 100-year flood elevation. Nonresidential buildings may be floodproofed to the 100-year flood elevation. Because the art of floodproofing is complex and requires detailed engineering or architectural skills, the services of a qualified engineer or architect should be obtained when floodproofing is considered.

Flood Warning

Some communities have a flood warning system which enables their citizens to temporarily evacuate the floodplain in time of danger. If given adequate warning time, coupled with an evacuation plan, flood warning can prevent loss of life and possible damage to property. While a flood warning system on the Tuckasegee River could prove feasible, due to the steep terrain, remote location of the headwaters, and very short warning time, a floodwarning system for Deep Creek would probably prove inadequate. Although TVA participates in the development of flood warning systems, the National Oceanic and Atmospheric Administration (NOAA) has primary responsibility for the development and overall coordination of such systems.

Evacuation

Evacuation from the floodplain can be either permanent or temporary. Temporary evacuation occurs when people leave the floodplain in advance of large floods. Areas which experience chronic flood problems should be considered for permanent evacuation. Limited Federal assistance for evacuation may be available depending on fiscal budgets.

SUMMARY

A community's flood problems are usually as diverse as the methods the community uses to solve them. No one measure will solve all of a community's flood problems. A community must look for a combination of measures to fit its individual needs and resources to provide the best solution which will be most effective in reducing flood damage.

DEFINITION OF TERMS

Base Map - A map from which other maps are prepared by adding such features as floodplain and floodway boundaries.

Computed Flood - An estimated future flood based on a hydraulic analysis of the potential storm runoff from an area and flow of water through the floodplain.

Contour - A line on a map which represents points of equal elevation.

Cross Section of a Floodplain - A vertical section of the floodplain surface, normally taken at right angles to the direction of the floodflow.

Effective Stream Mileage - The point along the centerline of the stream channel which has the same flood elevation as a specified location in the floodplain.

Flood - A temporary rise in water levels or an accumulation of water runoff, resulting in inundation of areas not ordinarily covered by water.

1-Percent-Chance (100-Year) Flood - A flood having 1 chance in 100 of being equaled or exceeded in any 1-year period.

0.2-Percent-Chance (500-Year) Flood - A flood having 0.2 chance in 100 (1 chance in 500) of being equaled or exceeded in any 1-year period.

Flood Boundary - The outermost limit the waters of a flood of a certain magnitude will reach.

Flood Elevation or Water Surface Elevation - The height (expressed in relation to mean sea level) reached by floods or channel flows of various magnitudes.

Floodflow Line - A line drawn on a map indicating the general direction of the flow of floodwaters in a floodplain.

Flood Map - A map which shows the horizontal flood limits for one or more floods.

Floodplain - Any land area susceptible to inundation by water from any source including, at a minimum, that area subject to a 1-percent or greater chance of flooding in any given year.

Floodplain Management - A term applied to the full range of public policy and action for ensuring wise use of the floodplains. It includes, but is not limited to, collection and dissemination of flood control information, acquisition of floodplain lands, enactment and administration of floodplain regulations including building codes, and construction of flood-modifying structures.

Floodplain Management Regulations - A general term applied to the full range of codes, ordinances, and other regulations relating to the use of land and construction within designated floodplain limits.

Flood Profile - A graph of flood elevations along a stream.

Flood Stage - The vertical distance to the surface of the floodwater as measured from or compared to some arbitrarily fixed and generally accepted point such as a United States Geological Survey stream gage. Local residents may more commonly use the term "flood depth," which is the vertical distance from the water surface to some point such as the floor, ground, or road.

Floodway - The channel of the stream and those portions of the adjoining floodplain which carry and discharge floodwaters of a particular flood event.

Historical Flood - A flood known to have occurred in a specific area.

Maximum Known Flood - The largest flood known to have occurred on a stream or in an area.

Maximum Probable Flood - A flood comparable to the largest floods known to have occurred in the eastern part of the United States. It is used in planning flood protection works, failure of which might be disastrous, and in establishing critical elevations of major water control structures.

Mean Sea Level - The average height of the sea for all stages of the tide over a 19-year period.

Peak Discharge - The maximum rate of flow normally expressed in cubic feet per second (cfs), occurring during a period of high water.

Reach - Segments of a stream which mark boundaries such as the limits of a study, corporate limits, state or county lines, or other definable features.

Stream Gage - An instrument which makes regular observations of either the water surface elevation (measured from some arbitrary point) or streamflow at a particular site on a stream, canal, lake, or reservoir.

Stream Mileage - Distance measured along the centerline of the stream from some designated point, usually where the stream enters into a larger stream or body of water.

TVA Regional Flood - A flood comparable to the largest floods known to have occurred on streams of similar physical characteristics in the same general geographical region as that of the stream being studied. Ordinarily, the region considered is within a radius of 100 miles or less. Extraordinarily large and rare floods are not included in this determination.

U.S. Coast and Geodetic Survey Levels - The vertical control surveys conducted to establish permanent elevation references.

REFERENCES

1. Tennessee Valley Authority, Floods on the Tuckasegee River and Deep Creek, Vicinity of Bryson City, North Carolina, Division of Water Control Planning Report No. 0-5930, Knoxville, Tennessee, January 1960.

2. U.S. Geological Survey, Magnitude and Frequency of Floods in North Carolina, Water Resources Investigations 76-17, March 1976.

3. U.S. Water Resources Council, Guidelines for Determining Flood Flow Frequency, Bulletin 17A of the Hydrology Committee, Revised June 1977.

4. U.S. Army Corps of Engineers, HEC - 2N Water Surface Profiles Generalized Computer Program, Hydrologic Engineering Center, Davis, California, June 1973.

TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS

TUCKASEGEE RIVER AND DEEP CREEK VICINITY OF BRYSON CITY, N.C.

SCALE 0 1000 2000 FEET

JUNE 1981

PLATE 3

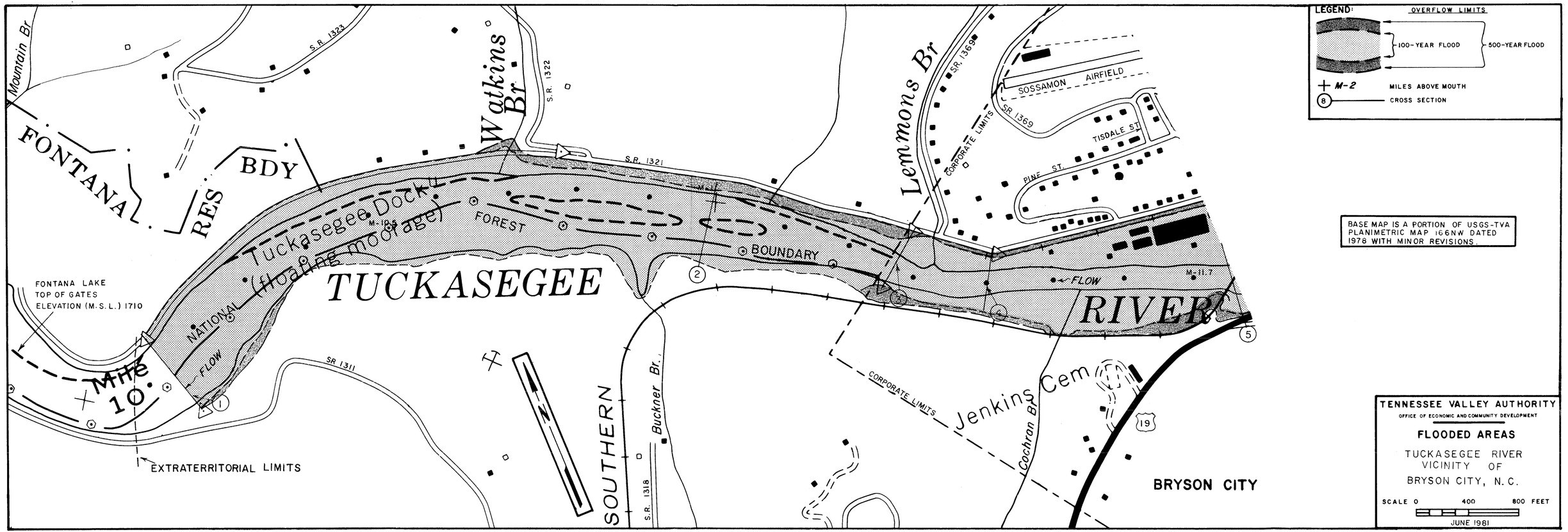
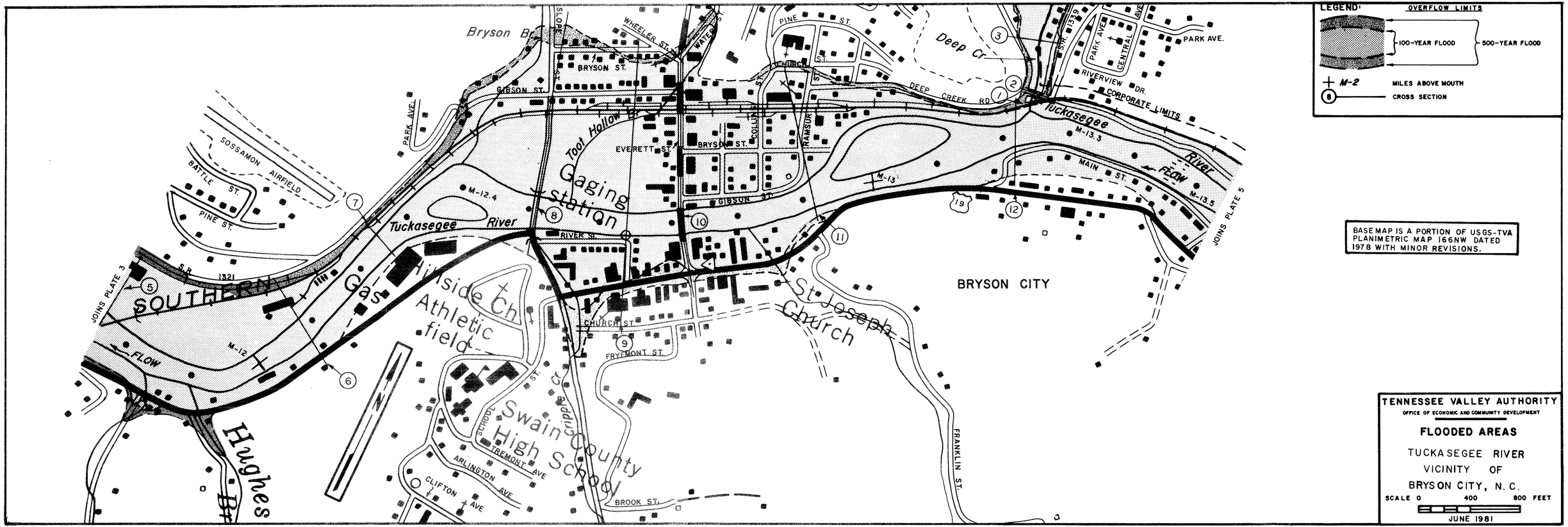
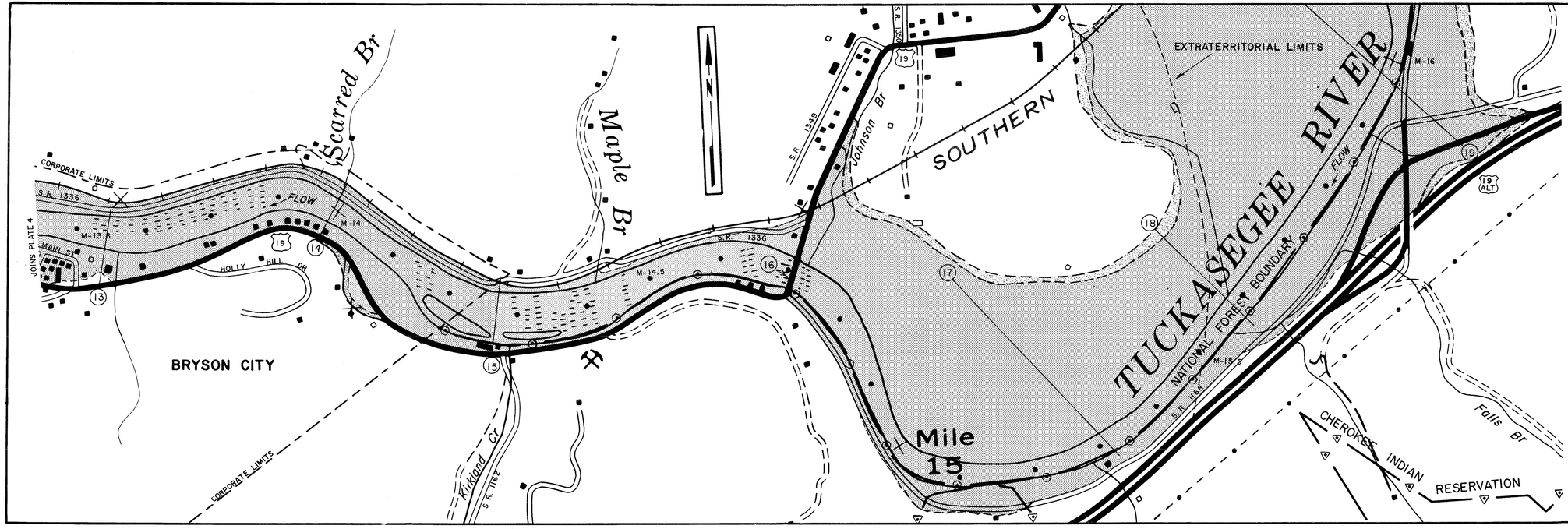

LEGEND:
OVERFLOW LIMITS
100-YEAR FLOOD
500-YEAR FLOOD
M-2 MILES ABOVE MOUTH
8 CROSS SECTION
BASE MAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.
TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
FLOODED AREAS
TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N.C.
SCALE 0 400 800 FEET
JUNE 1981
Mountain Br
S.R. 1323
S.R. 1322
Watkins Br
S.R. 1321
FONTANA RES BDY
Tuckasegee Dock (Hoaling moorage)
FOREST
BOUNDARY
TUCKASEGEE
RIVER
Lemmons Br
S.R. 1369
CORPORATE LIMITS
SOSSAMON AIRFIELD
SR 1369
TISDALE ST
PINE ST
M-11.7
FLOW
FONTANA LAKE
TOP OF GATES
ELEVATION (M.S.L.) 1710
NATIONAL
FLOW
SR 1311
M-10
EXTRATERRITORIAL LIMITS
SOUTHERN
Buckner Br.
S.R. 1318
CORPORATE LIMITS
Jenkins Cem
Cochran Br
19
BRYSON CITY
1
2
3
4
5

PLATE 4


SEE PLATE 6
LEGEND:
OVERFLOW LIMITS
100-YEAR FLOOD
500-YEAR FLOOD
M-2 MILES ABOVE MOUTH
CROSS SECTION
BASEMAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.
JOINS PLATE 3
JOINS PLATE 5
Bryson Br
Deep Cr
Toot Hollow Br
Hughes Br
Tuckasegee River
Gaging Station
Gas
Hillside Ch
Athletic field
St Joseph Church
Swain County High School
BRYSON CITY
SOUTHERN
SOSSAMON AIRFIELD
BRYSON ST.
GIBSON ST.
EVERETT ST.
PINE ST.
CHURCH ST.
RIVER ST.
FRYEMONT ST.
BROOK ST.
DEEP CREEK RD
MAIN ST.
PARK AVE.
CENTRAL AVE
RIVERVIEW DR.
CORPORATE LIMITS
WHEELER ST.
WATER ST.
COLLINS ST.
RAMSEY ST.
FRANKLIN ST.
SCHOOL ST.
TREMONT AVE
ARLINGTON AVE
CLIFTON AVE
BATTLE ST.
S.R. 1321
S.R. 1319
M-12
M-12.4
M-13
M-13.3
M-13.5
FLOW
TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
FLOODED AREAS
TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N.C.
SCALE 0 400 800 FEET
JUNE 1981



LEGEND:

OVERFLOW LIMITS

100-YEAR FLOOD

500-YEAR FLOOD

M-2 MILES ABOVE MOUTH

8 CROSS SECTION

BASE MAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.

TENNESSEE VALLEY AUTHORITY

OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS

TUCKASEGEE RIVER

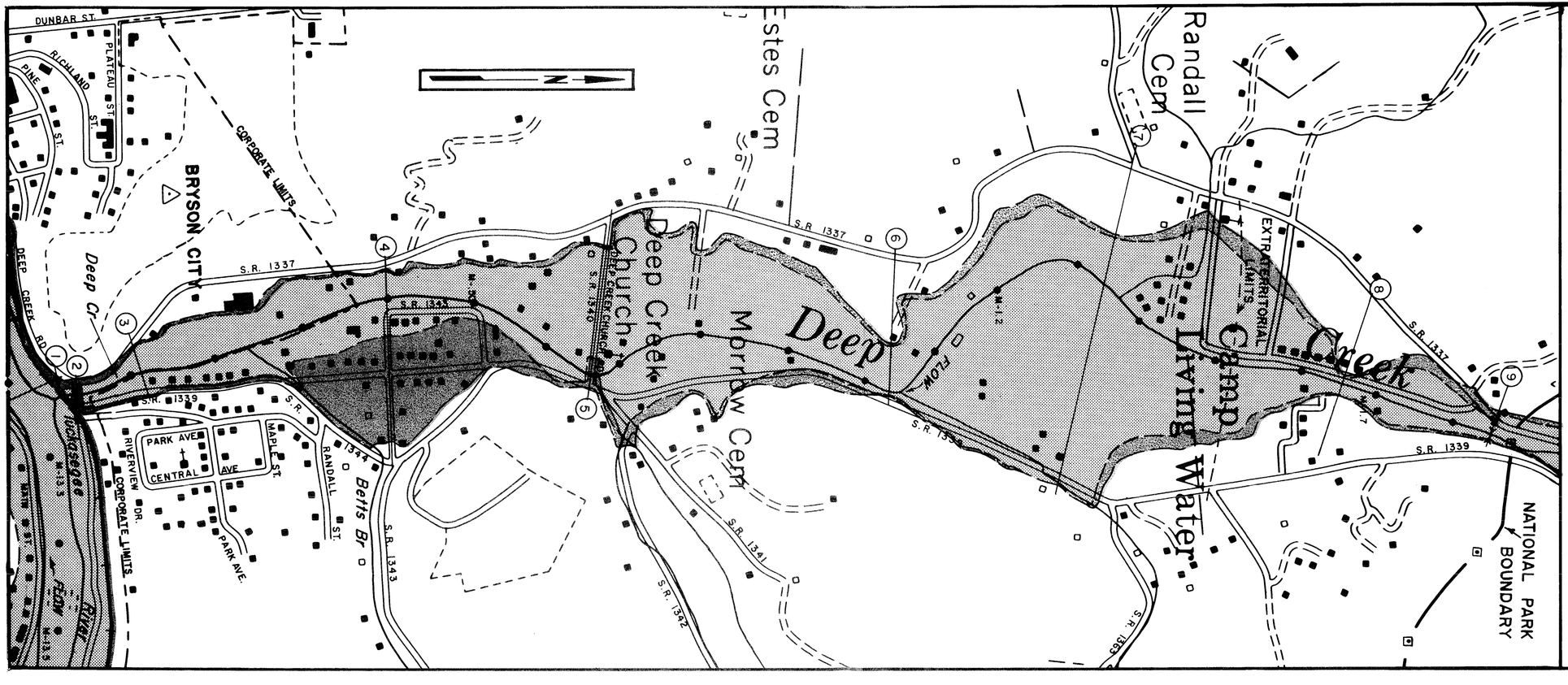
VICINITY OF

BRYSON CITY, N. C.

SCALE 0 400 800 FEET

JUNE 1981

PLATE 6



LEGEND:

OVERFLOW LIMITS

100-YEAR FLOOD

500-YEAR FLOOD

M-2 MILES ABOVE MOUTH

8 CROSS SECTION

BASE MAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.

TENNESSEE VALLEY AUTHORITY

OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS

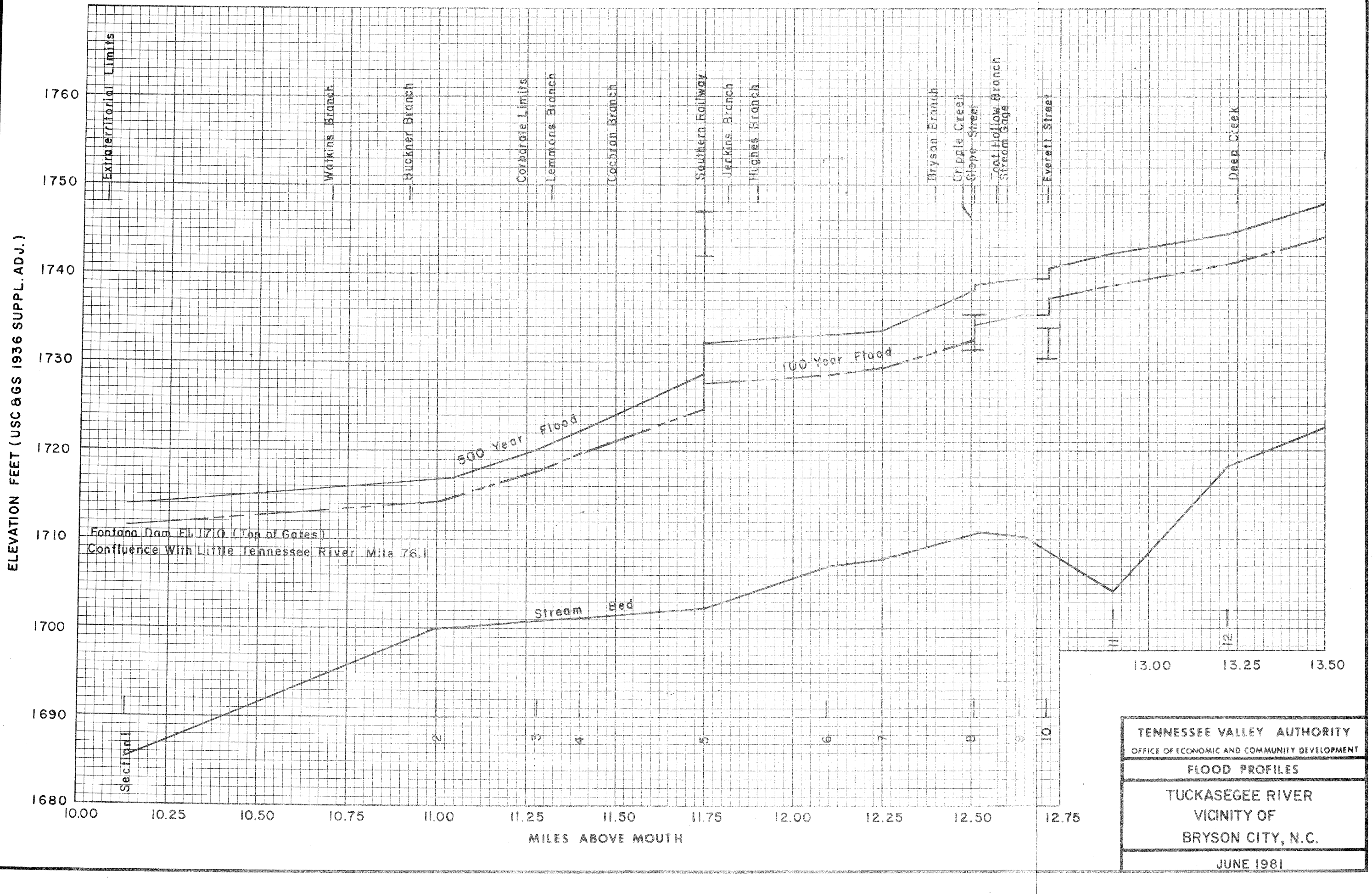
DEEP CREEK

VICINITY OF

BRYSON CITY, N. C.

SCALE 0 400 800 FEET

JUNE 1961

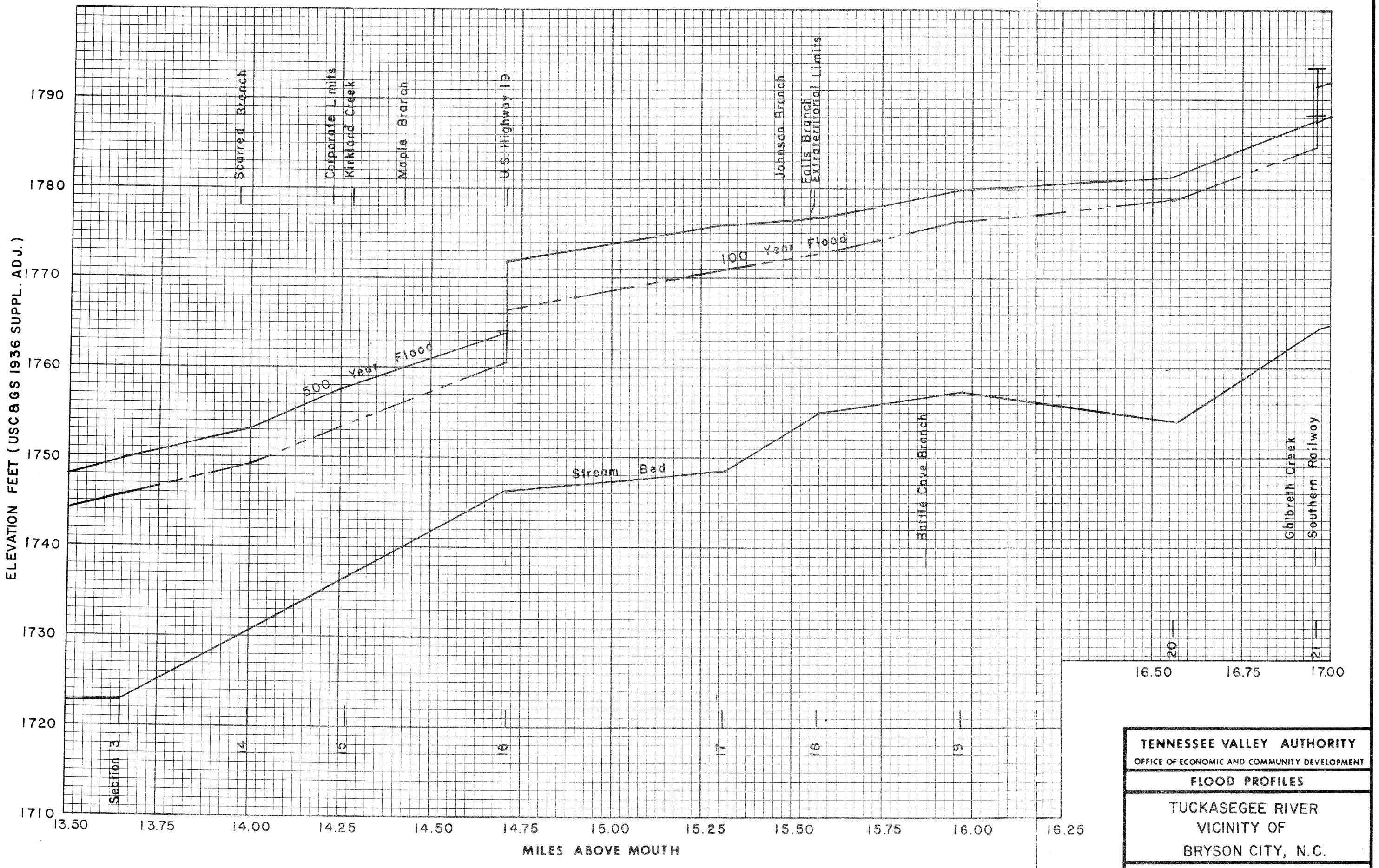


TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOOD PROFILES

TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N.C.

JUNE 1981

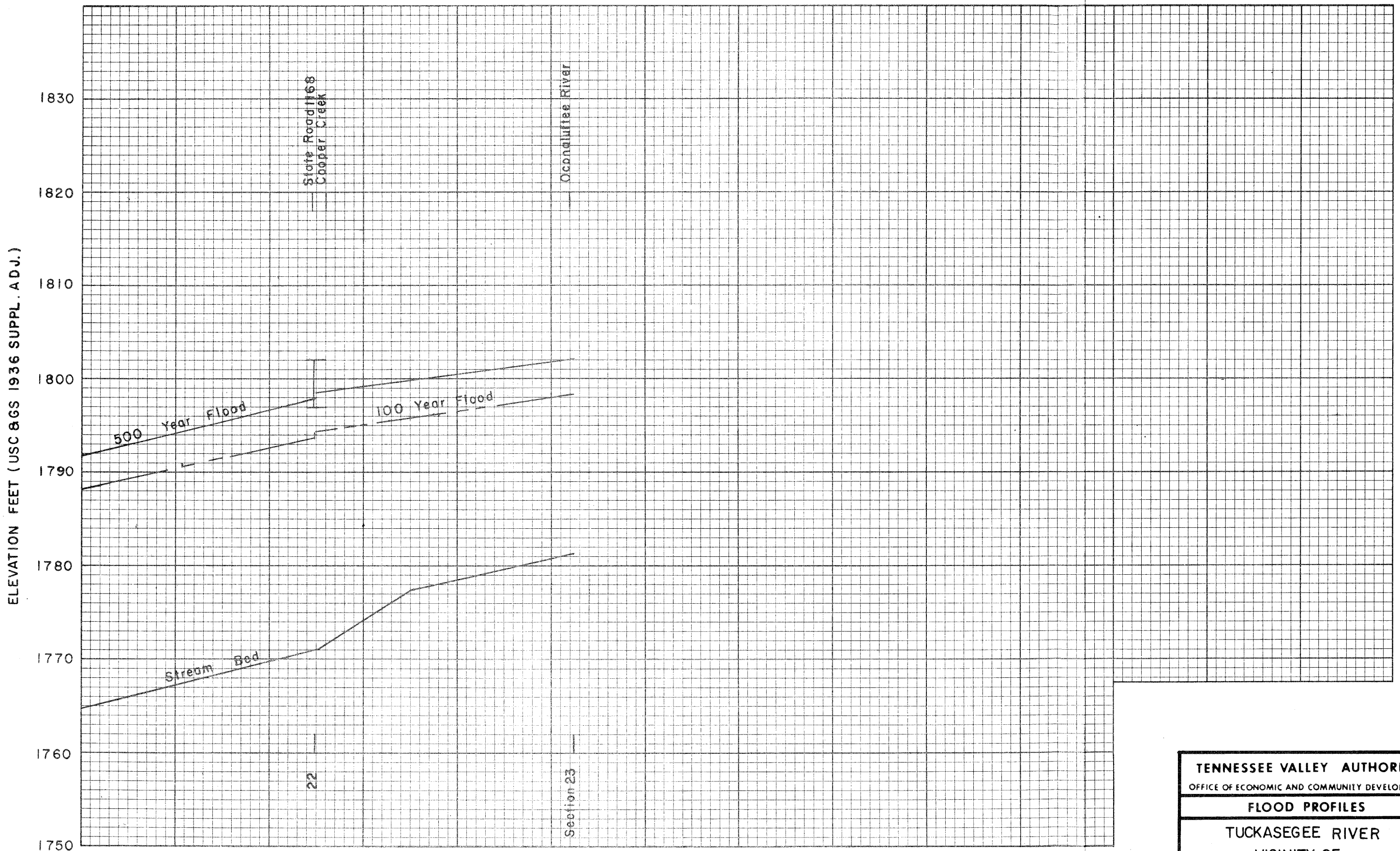


TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

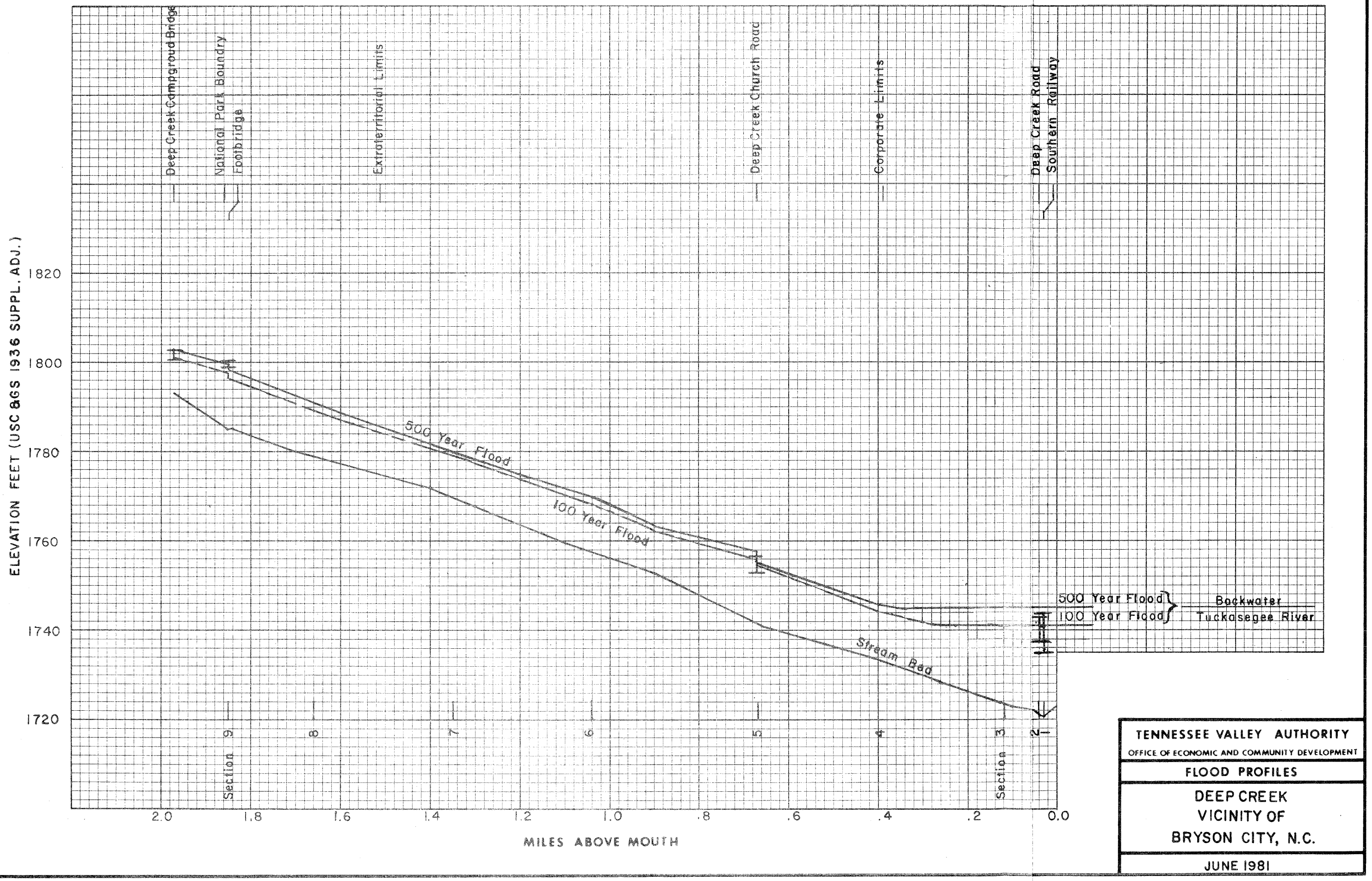
FLOOD PROFILES

TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N.C.

JUNE 1981



TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
FLOOD PROFILES
TUCKASEGEE RIVER VICINITY OF BRYSON CITY, N.C.
JUNE 1981



TENNESSEE VALLEY AUTHORITY

OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOOD PROFILES

DEEP CREEK
VICINITY OF
BRYSON CITY, N.C.

JUNE 1981

APPENDIX

Table 1A

TUCKASEGEE RIVER 100-YEAR FLOODWAY

Mile	Floodway Width (Feet)	Floodway Section Area (Sq. Ft.)	Floodway Mean Velocity (CFS)	Water Surface Elevation[3] With Floodway	Water Surface Elevation[3] Without Floodway	Difference
10.130	590.	5,174	12.3	1700.7	1700.7[2]	0.0
11.000	470.	4,853	13.1	1714.1	1714.1[2]	0.0
11.280	290.	3,847	16.5	1717.9	1717.8	0.1
11.400	300.	4,551	14.0	1720.7	1719.7	1.0
11.750 DS[1]	340.	5,762	11.0	1725.1	1724.7	0.4
11.750 US[1]	340.	6,576	9.7	1727.7	1727.7	0.0
12.090	300.	5,697	11.1	1728.8	1728.6	0.2
12.250	210.	4,241	14.9	1729.6	1729.3	0.3
12.510 DS	360.	4,862	13.0	1732.8	1732.3	0.5
12.510 US	360.	5,284	12.0	1734.2	1734.2	0.0
12.640	230.	4,803	13.2	1735.3	1735.3	0.0
12.720 DS	750.	5,685	11.1	1735.7	1735.4	0.3
12.720 US	750.	6,674	9.5	1738.1	1737.2	0.9
12.900	450.	8,205	7.7	1739.7	1738.7	1.0
13.220	340.	6,049	9.8	1742.0	1741.0	1.0
13.650	350.	6,640	9.0	1746.6	1745.7	0.9
14.000	310.	5,154	11.5	1750.1	1749.2	0.9
14.270	500.	7,755	7.7	1754.7	1753.8	0.9
14.710 DS	330.	3,834	15.4	1760.6	1760.5	0.1
14.710 US	330.	5,777	10.2	1766.5	1766.5	0.0
15.310	850.	8,253	7.1	1771.3	1771.0	0.3
15.570	600.	7,121	8.3	1773.8	1772.8	1.0
15.970	1400.	13,535	4.3	1777.2	1776.4	0.8
16.560	800.	6,632	8.8	1779.7	1778.9	0.8
16.960 DS	370.	4,533	12.9	1784.8	1784.7	0.1
16.960 US	370.	5,662	10.3	1787.8	1787.7	0.1
17.620 DS	600.	6,446	9.0	1793.9	1793.6	0.3
17.620 US	600.	6,576	8.8	1794.3	1794.3	0.0
18.310	600.	6,010	6.9	1799.4	1798.4	1.0

1. Downstream and upstream at bridges

2. Elevation computed without consideration of backwater effects

3. Feet above mean sea level.

Table 2A

DEEP CREEK 100-YEAR FLOODWAY

Mile	Floodway Width (Feet)	Floodway Section Area (Sq. Ft.)	Floodway Mean Velocity (CFS)	Water Surface Elevation[3] With Floodway	Water Surface Elevation[3] Without Floodway	Difference
0.030 DS[1]	110.	1,161	6.7	1736.5	1735.5[2]	1.0
0.030 US[1]	110.	1,195	6.5	1736.8	1735.8[2]	1.0
0.040 DS	100.	848	9.2	1736.8	1735.8[2]	1.0
0.040 US	100.	874	8.9	1737.1	1736.2[2]	0.9
0.120	80.	884	8.8	1738.2	1737.9[2]	0.3
0.400	90.	656	11.8	1744.8	1744.1	0.7
0.670 DS	250.	835	9.2	1755.0	1754.7	0.3
0.670 US	250.	1,234	6.2	1756.6	1755.7	0.9
1.040	170.	1,194	6.4	1768.9	1768.2	0.7
1.350	300.	1,130	6.7	1779.2	1779.2	0.0
1.660	120.	850	8.8	1790.3	1789.3	1.0
1.850 DS	80.	709	10.5	1796.6	1796.6	0.0
1.850 US	80.	841	8.8	1797.6	1797.5	0.1
1.970 DS	140.	763	9.7	1801.3	1801.0	0.3
1.970 US	140.	1,109	6.7	1803.9	1803.6	0.3
2.110	130.	773	9.6	1806.5	1806.3	0.2
2.400	150.	933	8.0	1821.2	1820.2	1.0

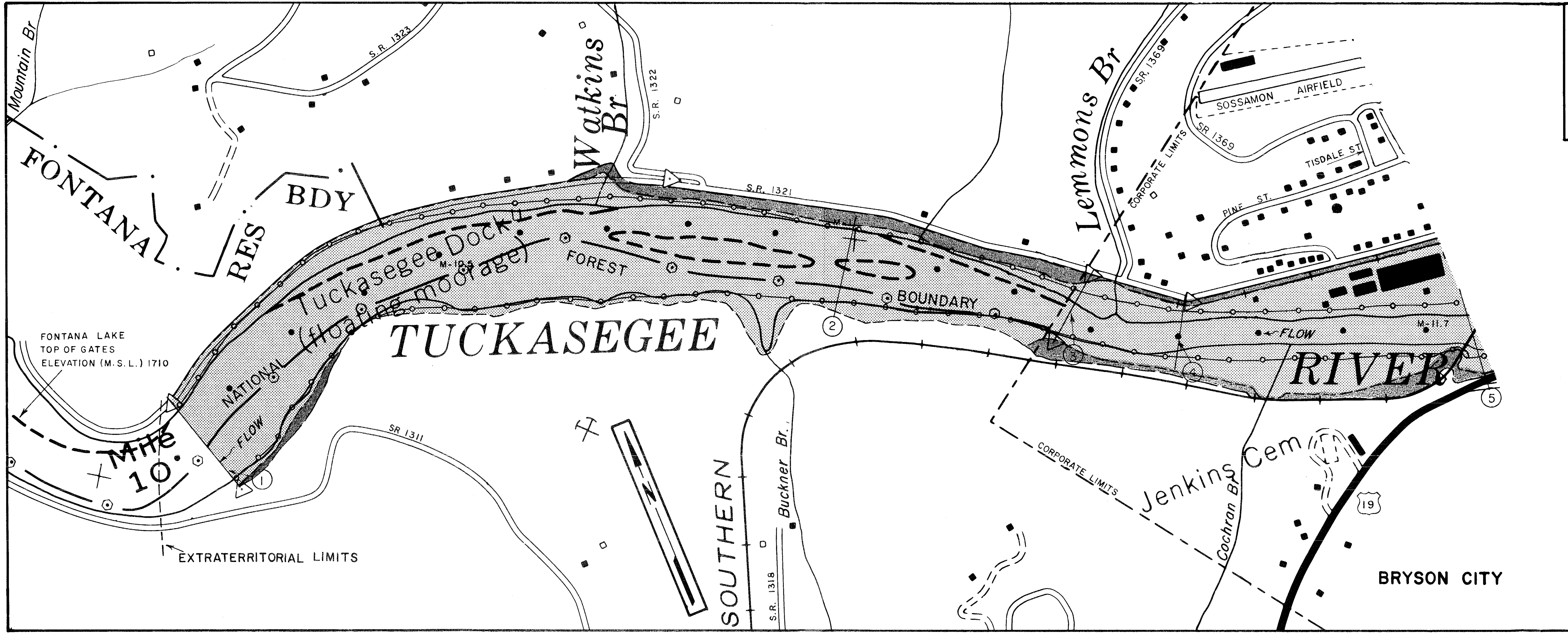
1. Downstream and upstream at bridges

2. Elevation computed without consideration of backwater effects

3. Feet above mean sea level.


SEE INSET
INSET
LEGEND:
OVERFLOW LIMITS
100-YEAR FLOOD
500-YEAR FLOOD
M-2 MILES ABOVE MOUTH
8 CROSS SECTION
FLOODWAY BOUNDARY
CONTOUR INTERVAL 40 FEET
The extent of over flow as shown is based on contours except at cross sections and known flood limits, and may not represent exact flood conditions on the ground
FONTANA LAKE
BOUNDARY
Milksick Cove
NANTAHALA GAME LANDS
Extraterritorial Limits
TUCKASEGEE
RIVER
Tuckasegee Dock
BRYSON CITY
CORPORATE LIMITS
Sossamon Airfield
Lemmons Branch
Watkins Cem
Cochran Branch
Jenkins Br
Hughes Br
Swain County High School
Athletic Field
Golf course
Lackey Hill
Parkview Ch
Deep Creek
Swain Memorial Cem
Toot Hollow
Estes Cem
Victory Ch
Mt Carmel Ch
Reservoir
Substation
Kirkland Creek
Starred Br
Johnson Br
Governors Island Church
Governors Island
NATIONAL
FOREST
SOUTHERN
Mile 15
Thomas Chapel
Worley Br
Cooper Creek
Cooper Cem
Ela
Sutton Cem
McHan Cem
Sherrill Cem
Extraterritorial Limits
Randall Cem
Camp Living Water
BASE MAP IS A PORTION OF USGS-TVA TOPOGRAPHIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.
FOR FLOODWAY NOT SHOWN ON THIS PLATE SEE EXPANDED SCALE MAPS.
TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
FLOODED AREAS
WITH PROPOSED FLOODWAY
TUCKASEGEE RIVER
AND DEEP CREEK
VICINITY OF
BRYSON CITY, N. C.
SCALE 0 1000 2000 FEET
JUNE 1981

PLATE 3A



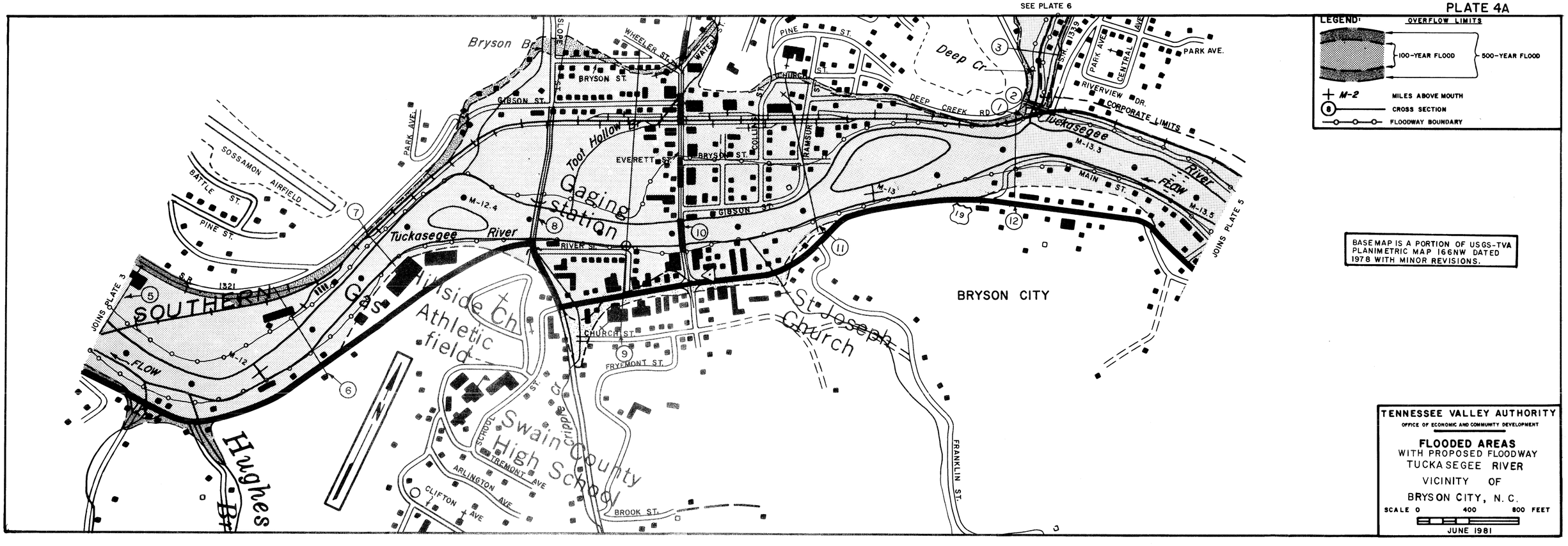
TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS WITH PROPOSED FLOODWAY
TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N.C.

SCALE 0 400 800 FEET

JUNE 1981

PLATE 4A

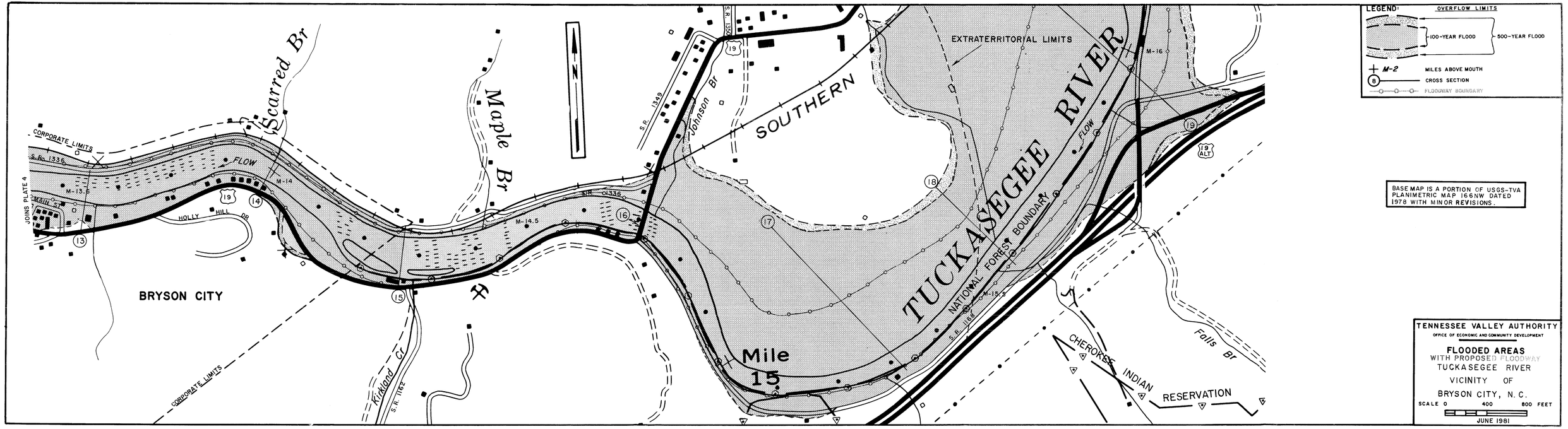


TENNESSEE VALLEY AUTHORITY
OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS
WITH PROPOSED FLOODWAY
TUCKASEGEE RIVER
VICINITY OF
BRYSON CITY, N. C.

SCALE 0 400 800 FEET

JUNE 1981



LEGEND:

OVERFLOW LIMITS

100-YEAR FLOOD

500-YEAR FLOOD

M-2 MILES ABOVE MOUTH

8 CROSS SECTION

FLOODWAY BOUNDARY

BASE MAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.

TENNESSEE VALLEY AUTHORITY

OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS

WITH PROPOSED FLOODWAY

TUCKASEGEE RIVER

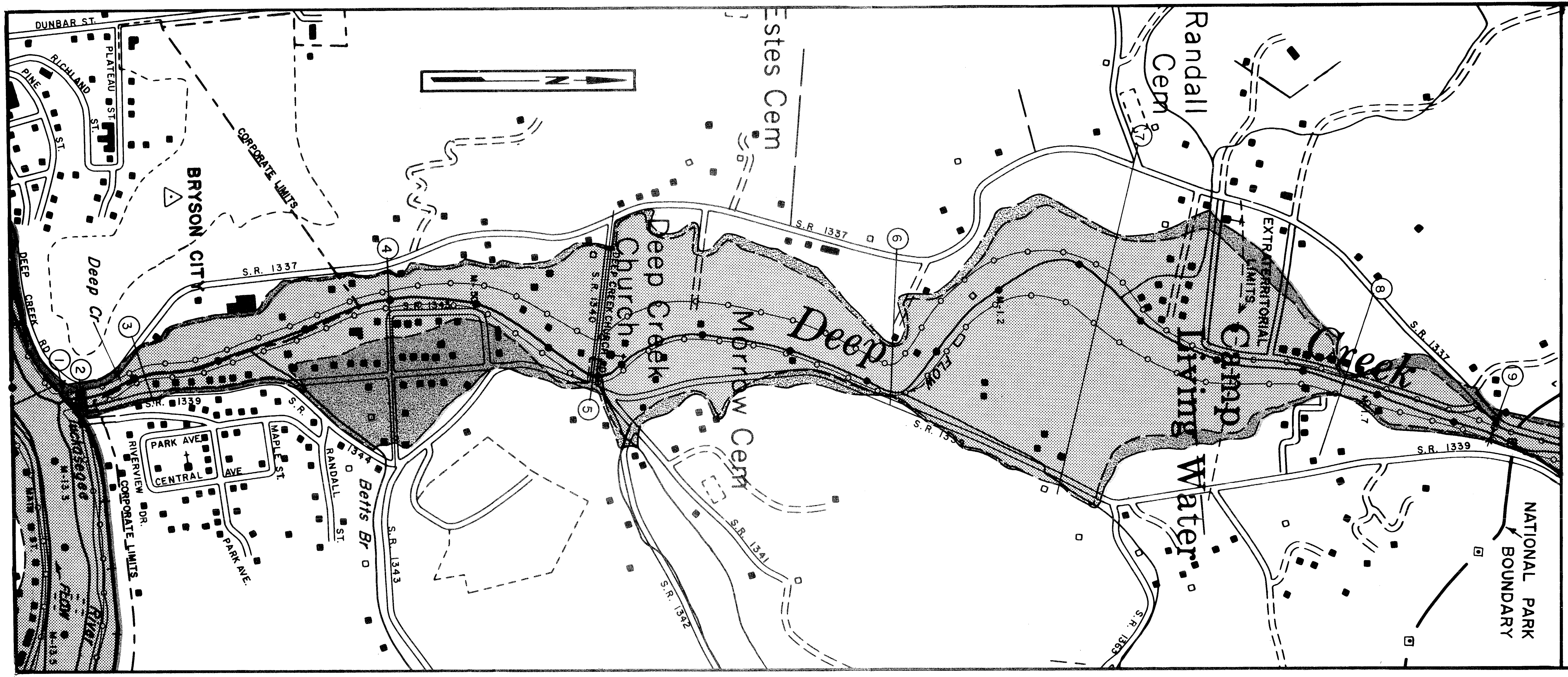
VICINITY OF

BRYSON CITY, N. C.

SCALE 0 400 800 FEET

JUNE 1981

PLATE 6A



LEGEND: OVERFLOW LIMITS

100-YEAR FLOOD — 500-YEAR FLOOD

M-2 — MILES ABOVE MOUTH

(8) — CROSS SECTION

FLOODWAY BOUNDARY

BASE MAP IS A PORTION OF USGS-TVA PLANIMETRIC MAP 166NW DATED 1978 WITH MINOR REVISIONS.

TENNESSEE VALLEY AUTHORITY

OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT

FLOODED AREAS
WITH PROPOSED FLOODWAY
DEEP CREEK
VICINITY OF
BRYSON CITY, N.C.

SCALE 0 400 800 FEET

JUNE 1961