

# **Rural Flood Prone Roadway Study**

Prepared by the staff of the  
Fifth Planning District Commission

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## Introduction

About 40 percent of flood related deaths occur to people travelling in motor vehicles. Suddenly changing water depths, water currents and road damage make crossing a flooded roadway very dangerous for both motor vehicles and pedestrians. Two feet of water can float most cars and strong currents can easily push vehicles into deeper water. It only takes a thin layer of water to cause a moving vehicle to hydroplane. Rural areas are particularly vulnerable because roads are lightly traveled and often not closed to traffic as quickly as urban roadways. The lack of alternate routes also tempts drivers into making dangerous crossings. Flooded roadways can also prevent emergency service vehicles from reaching their destinations. This study attempts to identify those roadways in the rural sections of the Fifth Planning District that are prone to flooding.

**A Flood Prone Roadway** is defined as any public road that has a history of being covered by enough water in a manner that the road surface, markings and edges are not visible to the operator of a motor vehicle, cyclists or pedestrians. Such conditions could be caused by stream/river flooding, poor drainage along roadways or normal surface runoff. Water on the roadway could be both standing or moving, and could also leave debris such as gravel, leaves and sticks on the roadway. Duration of the flood event can vary from minutes to days.

Rainfall intensity and duration probably play the greatest role in creating flood/flash conditions. However, soil type, soil moisture content and terrain also influence the runoff absorption rates. For this region, November through March has a higher incident of flood/flash flood events because of rainfall patterns and the vegetation's reduced need for moisture. Frozen ground increases the likelihood of flash flooding as well. Finally, melting snow cover combined with heavy rain increases the likelihood of flash flooding. Snow along roadway can also block drainage ditches and force water into the roadway.

This study is divided by locality with three sections for each jurisdiction:

**1. Flood Prone Roadways** (*VDOT and local sources*): Roadways identified by the Virginia Department of Transportation and/or local officials as having a history of being flooded. These roadways are the focus of this study and the segments are numbered (not always in order) and also indicated on the enclosed map.

**2. NWS Flash Flood/Flood Prone Areas:** Areas identified by the National Weather Service-Blacksburg as having a history of, or potential for flooding. These are provided for information purposes only and may or may not directly impact public roads.

**3. NWS Past Flooding Events:** Rainfall events recorded by the National Weather Service-Blacksburg that created flash flood/flood conditions. These are provided for information purposes only and may or may not directly impact public roads. It is important to point out that these types of events could cause roadways to be flooded.

## **Alleghany County**

### **Flood Prone Roadways** (*VDOT and local sources*)

47. Indian Draft Road (Route 600) at the I-64 bridge.
48. Rt. 600 at Humpback Bridge.
49. Route 634 along the Cowpasture River below Sharon School
50. Route 629 (Douthat Road) just before the Buckhorn Store
51. Route 616 just below Rich Patch Union Church near the intersection of Routes 616 and 621
52. Route 623 about 2 miles from Route 616 at the creek intersection just beyond Bryant Farm

### **NWS Flood/Flash Flood Prone Areas-Alleghany County**

- Jackson River near Selma (Valley Ridge). Flooding here can affect 50 homes, a high school, and a dialysis center.
- Low Moor area is flood prone from the Jackson River, Karnes Creek, and local runoff.
- Rich Patch Road (SR 616). Karnes Creek can flood homes along this road.
- White Rock Gap has a flood prone area along White Rock Creek.
- Smith Creek does not flood very often, but any flooding has a high probability of damaging private property and homes.
- Pounding Mill Creek. Any flooding along this creek has a high probability of damaging homes and private property.
- Simpson Creek. Any flooding along this creek has a high probability of damaging homes and private property.
- Piney Mountain Branch at the intersection with Simpson Creek. Homes and private property can be flooded.
- Roaring Run (near Clearwater Park)-homes subject to flooding under worst conditions
- Dry Run-homes subject to flooding under worst conditions
- Mud Run-homes subject to flooding under worst conditions

- Hays Creek-homes subject to flooding under worst conditions
- Jerry's Run- roadways subject to flooding
- Crows Run- roadways subject to flooding
- Bob Downey Branch (next to Piney Mnt. Branch)-roadways subject to flooding

### **NWS Past Flash Flood/Flooding Events-Alleghany County**

6/26/95 Three inches in 30 minutes caused several road closings in the Rich Patch (Karnes Creek) and Blue Spring Run (Hays Creek, Potts Creek) areas. Several basements of homes were flooded in the Low Moor area.

6/28/95 Two to three inches in less than three hours caused SR 18 to be flooded in the Blue Springs area (Junction of Potts Creek and Blue Springs Run). This caused flooding at a trailer park in the Low Moor area where Karnes Creek and the Jackson River meet.

6/1/97 Three to four inches of rain in less than six hours in southwest Alleghany County caused Potts Creek to overflow its banks in several locations. A mudslide occurred on SR 18. The City of Covington had three inches of rain and numerous runoff problems, including flooded basements. Rain Recorded: three hours-2.6 inches, 12 hours-3.0 inches.

1/8/98 One and a half inches fell in two to three hours, and 2.25 inches in five to six hours caused flooding along Smith Creek and the evacuation of one house in Clifton Forge. It also caused Karnes Creek to flood Rich Patch Road.

### **Botetourt County**

### **Flood Prone Roadways** (*VDOT and local sources*)

1. Route 674. Has a low water bridge near the old mill. When water floods about 12 homes are cut off from road access. Six to ten hours of closure is typical. A possible solution indicated by VDOT would be to replace bridge with box culvert; however, the closeness to the mill would be a problem.
2. Tinker Creek floods SR 674 in the Daleville area .5 miles west of US 220.
3. Catawba Creek floods the intersection of SR 600 and 665 near Haymakertown.
4. Back Creek floods SR 640, and its minor tributaries flood SR 643, 644, 645, and 689 in the Spec, Lithia, and Pico areas.
5. Craig Creek floods SR 615 in several spots from the James River to Roaring Run. Also floods SR 685 on the opposite side of Craig Creek, and SR 683 to US 220.
6. Catawba Creek floods SR 600 two miles west of Fincastle.
7. Crush Run floods SR 681 between SR 679 and 630 just northeast of Fincastle.
8. Little Patterson Creek floods SR 684, which parallels the creek.
9. Lapsley Creek floods SR 726 from the James River, to the intersection with SR 687.
10. Craig Creek floods SR 615 in three locations, just west of Oriskany (10a), near Silent Dell(10b), and at Roaring Run(10c).
11. Little Patterson Creek & Patterson Creek floods SR 819 where they join.
12. An unnamed creek floods SR 610 near I-81 in the extreme northeast portion of the county.
13. A small creek off Purgatory Mountain floods SR 649 four miles northwest of Buchanan.
14. Jennings Creek floods SR 614 from Arcadia to the dead end. Also, minor tributaries of Jennings Creek flood SR 618 and 620.

### **NWS Flood/Flash Flood Prone Areas-Botetourt County**

- Glade Creek near Willow Brook Mobile Home Park. Seldom floods, but a high threat to life and property. Also floods highway 460.
- Small creek along Sanderson Drive by Tinkerview town homes. Medium frequency of flooding. High threat to life and medium threat to property.
- Tinker Creek from just below Daleville, through Cloverdale, to Hollins. Medium frequency of flooding, high threat to life, and a high threat to property.
- Catawba Creek along Haymaker Town Road. Low frequency of flooding, and a low threat to life and property.
- Back Creek along Route 640 from just northeast of Nace, through Lithia, to the intersection of Route 460 and U.S. 11. Medium frequency of flooding, a medium threat to life and property.
- James River from Glen Wilton through Buchanan, to Arcadia. Medium frequency of flooding. High threat to life and medium threat to property.
- Craig Creek along Route 615 to Roaring Run. Medium frequency of flooding, and medium threat to life and property.

### **NWS Past Flooding Events-Botetourt County**

2/4/98            Rainfall occurred at a rate of one inch an hour and 1.5 to 2.0 inches occurred in six hours. A total of 2.5 to 3.0 inches in 12 hours caused minor flooding at Willow Brook Mobile Home Park in Coyner Springs. There was also flooding in the community of Blue Ridge (headwaters of Glade Creek). There was also minor flooding in Cloverdale, however this did not occur from Tinker Creek.

## **City of Clifton Forge**

**Flood Prone Roadways (Clifton Forge Police Department)**

- 53. Upper end of Commercial Street in an area referred to as “Neddleton Addition.” A small 20’ long bridge crossing Smith Creek will flood during extremely heavy rainfall.
- 54. A small bridge located just above the 900 block of Rose Street tends to flood during heavy rainfall. This blocks access to Route 606. Water usually subsides in less than one hour. Dry Creek, which runs under the bridge, is fed by runoff from Fore Mountain and Warm Springs Mountain.
- 55. Rose Street Parking lot is a low lying area bordering Dry Creek. Problems as described in #54 generally occur in this area as well.

**NWS Flood/Flash Flood Prone Areas-Clifton Forge**

NONE AVAILABLE

**NWS Past Flooding Events-Clifton Forge**

NONE AVAILABLE

## **Flood Prone Roadways (VDOT and Covington Police Department)**

15. Dry Run (north Alleghany Avenue [Route 220] - Hillcrest Drive)
16. Downtown Area (Court Street - Riverside Avenue - Maple Avenue - North Lexington Avenue - North Craig Avenue - Royal Avenue - West Chestnut Street)
17. Sunnymeade Area (Lyman Avenue - Dalton Avenue - Conrad Avenue)
18. West Jackson Street Area
19. Parrish Court Avenue (Parrish Street - Phillip Street - Gordon Street)
20. Idlewilde Area (South Carpenter Drive - Marshall Street - Trout Street - Michigan Avenue)
21. Rayon View Area (Wood Street - Gilliam Street - Plum Avenue - Gum Avenue)

### Frequency and Duration of Flooding for Flood Prone Roadways

The areas in question seem to flood approximately every five to ten years as a result from extremely heavy rains or as a result of rains associated with a hurricane and storm. The actual flooding usually lasts for eight hours or less.

### Effects for Flood Prone Roadways

- The effect on the citizens is usually limited to water damage from the rising water (there is usually little damage from moving water) in residences and businesses. There are several streets and areas which are blocked due to the water, these include North Alleghany Avenue, the Royal Avenue Area, Marshall Street, Trout Street, Michigan Avenue, and parts on the Rayon View Area.
- The major effects in the city are residential damage and limited business damage due to the use of property in the areas.
- The effect on City Emergency Operations could be extremely devastating. The road blockages on North Alleghany Avenue, Michigan Avenue, South Carpenter Drive, and in the flooded area prevent emergency vehicles from entering these areas to deliver services.

In the past, the city has stationed fire, police, and rescue vehicles on the south side of the road blockage on South Carpenter Drive because of the distance to the nearest mutual aid department (Boiling Springs Fire and Rescue - 14 miles). Law enforcement vehicles would have to travel in excess 18 miles to reach this area. The areas of the city on Michigan Avenue would be isolated from any city emergency services.

The road blockage on North Alleghany Avenue could possibly isolate citizens in the extreme northern end of the city and citizens in Alleghany County from fire and rescue services provided by Covington Fire Department and Covington Rescue Squad. The Alleghany County Sheriff's office would have to travel in excess of 15 miles to reach areas in the northern end of Alleghany County because of this blockage.

### **NWS Flood/Flash Flood Prone Areas-City of Covington**

The Jackson River and Dunlap Creek feed most of the flooding. There is little flooding in the northern and eastern sections. Flooding along the Jackson River can affect several houses in western and southern Covington. An industrial park and the high school's ball field can be affected in central Covington.

### **NWS Past Flash Flood/Flooding Events-City of Covington**

6/1/97      Three to four inches of rain in less than six hours in southwest Alleghany County caused Potts Creek to overflow its banks in several locations. A mudslide occurred on SR 18. The City of Covington had three inches of rain and a large volume of runoff,

## **Craig County**

### **Flood Prone Roadways**

22. The intersection of Craig Creek and Broad Run along route 311. This is approximately three miles south of New Castle.
23. Portions of Route 611 along Craig Creek.
24. Sinking Creek floods SR 627 one mile southeast of the town of Simmonsville at a low water bridge. A new bridge could be constructed at a higher elevation. It is blocked 3-4 times per year.
25. Craig Creek. A small feeder creek (Turnpike Creek) floods SR 651 about five miles southwest of Abbott.
26. Meadow Creek floods SR 623 about 4 miles southwest of New Castle.
27. Broad Run floods SR 618, which parallels the creek, from about 3/4 miles north of Route 311 to four miles north. It is flooded 5-6 times per year. The road would have to be relocated, but no homes are along this road.
28. Craig Creek floods at the intersection with Route 612.
29. Route 614 has a low water bridge that floods 2-3 times per year. A new bridge at a higher elevation is a possible solution.
30. The intersection of Route 681 and Route 614 is blocked 1-2 times per year for 12-18 hours. Camp Easter Seal access is blocked in these situations. Raising the elevation of the road is a possible solution.
31. Route 647 near the end of state maintenance is flooded 1-2 times per year.

### **NWS Flood/Flash Flood Prone Areas-Craig County**

NONE AVAILABLE

## **NWS Past Flash Flood/Flooding Events**

6/28/95      Two to three inches of rain in less than three hours and caused flooding on Route 311 at Broad Run bridge. (Intersection of Craig Creek and Broad Run.) It also caused the evacuation of Camp Easter Seal along Craig Creek and SR 614.

## Roanoke County

*(Note: to ease confusion, all of Roanoke County is included in this inventory)*

### **Flood Prone Roadways** *(VDOT and local sources)*

32. Route 688 Cotton Hill Road, west of the intersection with Route 613, Merriman Road. Rains in excess of two inches covers roadway for approximately eight hours at a time. Citizens can be stranded at their home due to the erosion of the private entrance pipes in their driveways. Traffic can be blocked by debris that is washed into the road. Stream bank improvements on the parallel creek and driveway culverts are possible solutions indicated by VDOT.
33. Route 607 Bottom Creek Road, approximately 1.5 miles west of intersection Route 711. Rains in excess of two inches cause the roadway to cover for approximately 12-48 hours. Citizens endure a hardship of having to employ alternative routes of travel which may increase their distance up to 10 miles.
34. Route 744 Rocky Road, approximately .10 mi. E of intersection Route 607. Rains in excess of two inches cause the roadway to cover for approximately 36 hours. Citizens endure a hardship of having to travel alternative routes, which may increase their distance up to 6.5 mi. Construction of a bridge instead of roadway cross pipes may be a solution indicated by VDOT.
35. West Fork of Carvin Creek floods SR 623 at Brookside near the intersection with Williamson Road.
36. Deer Branch floods SR 836 (Plymouth Street) near Brookside.
37. Carvin Creek floods Palm Valley Road and Verndale Road in the Sun Valley subdivision.
38. Carvin Creek floods SR 743 near where Carvin Creek joins Tinker Creek (near the Hershberger Road and Plantation Road intersection).
39. Glade Creek floods the intersection of SR 636 and 703 in Bonsack.
40. Upper Carvin Creek (and poor drainage) floods SR 740 (Carvin Creek Road) in several locations from near Bennett Springs, to the reservoir.
41. Back Creek and minor tributaries flood sections of SR 676 (Back Road) between U.S. 220 and SR 615.

42. Tinker Creek floods SR 856 and 601, just off U.S. 11 in the Hollins area.
43. West Fork of Carvin Creek floods Loch Haven Road near Loch Haven Country Club, 2 miles east of U.S. 419.
44. Back Creek floods SR 721 where it parallels the creek, and also SR 666 (Bandy Road) at the Middle Back Creek Bridge near the intersection with SR 667 (Old Virginia Springs Road). SR 666 also experiences drainage flooding near Bandy Cemetery.
45. West River Road and Poor Mountain Road along the Roanoke River in the Glenvar area of Roanoke County can become flooded.
46. Dutch Oven Road near State Route 311 in the Mason Cove area of Roanoke County can become flooded.

### **NWS Flood/Flash Flood Prone Areas-Roanoke County**

- Carvin Creek. Houses along the creek in the Brookside and Sun Valley subdivisions are in the floodplain and have been flooded in the past after very heavy rains.

### **NWS Past Flooding Events-Roanoke Area**

- 6/28/95      Three inches of rain fell in less than an hour and caused Dry Branch, normally a dry creek bed in Salem, to flood. This flooded W. Main Street. Masons Creek flooded which caused the evacuation of Ramey's Trailer Park and Salem Mobile Village. No serious damage was reported.
- 6/1/97      Five inches of rain fell in six hours and caused Upper Carvin Creek to flood. Sections of Carvins Cove Road above Carvins Cove Reservoir near Bennett Springs were washed out. Three inches of rain in three hours caused flooding of Route 419 at Apperson Drive. Two inches of rain in one hour, just three hours after three to four inches of rain (total of five to six inches), caused minor flooding of Peters Creek. Five to six inches of rain in about eight hours caused flash

flooding along Mudlick Creek in Garst Mill Park. Some property damage was reported. Rain Recorded: 3.2 inches in three hours, and 3.6 inches in 12 hours.

6/21/97 Over four inches of rain in less than three hours caused minor street and basement flooding in NE Salem. Minor flooding along Peters Creek in Roanoke County was also reported. Rain Recorded: 2.9 inches in one hour, and 3.2 inches in three hours.

2/4/98 Rain at a rate of one inch in three hours, nearly two inches in six hours, and a total of three inches in nine to 12 hours caused Mudlick Creek to flood Edgewood Street in Roanoke. Glade Creek also flooded Carson Road near Bonsack, and Garden City had several streets and houses flooded. Rain Recorded: 1.5 inches in one hour, 1.8 inches in three hours, 1.9 inches in six hours, and 2.1 inches in 12 hours.

3/20/98 One inch of rain from 10 AM to 1 PM, and then one to two inches from 2 PM to 5 PM caused flash flooding along Murray Run in southwest Roanoke City near Towers Mall. Small stream flooding was reported in southwest Roanoke County as well. Rain Recorded: .90 inch in one hour, 1.2 inches in three hours, 1.3 inches in six hours, and 1.5 inches in 12 hours.

## Conclusions

Mountainous terrain and heavy rains in the Fifth Planning District will always cause roadway flooding. However, there are things that can be done to document incidents and mitigate flood problems. There are three basic conclusions made as a result of this study.

1. There is little written documentation on flooded roadways in the region, and often the knowledge is distributed among the employees of several state and local organizations. A central and structured reporting and inventory system would provide better documentation on problem areas.
  - a. By maintaining an inventory of flood prone roadways, officials will have documentation to help evaluate possible solutions to mitigate the impact of flooded roadways in the future. While some flooding from streams and runoff can be expected, standing water in roadways indicates improper drainage that should be remedied if the problem is re-occurring.
  - b. While the blockage of regular traffic is mostly an inconvenience, emergency service personnel should have easy access to written documentation on flood prone roadways so that they can research alternate routes before emergencies occur. In some heavily affected areas, evacuation plans could be developed for larger flood events.
2. Education on floods, flash floods and vehicle safety should be increased through existing safety programs. At particular problem areas, where there is a high threat to life, warning signs could be considered to indicate the roadway should not be crossed if flooded.
3. New road and bridge construction should follow basic guidelines to reduce the impact of flooding. Within subdivisions, roads should approach homes and businesses in the direction away from the floodplain. Any attempt to put roadways (and structures) out of flood prone areas is beneficial. Bridges should generally be constructed perpendicular to streams with adequate dimensions to accommodate high water flow. New construction should not disrupt

natural drainage patterns. Steep slopes along new roads and bridges are prone to erosion and soil slump; thus, they should be avoided or vegetated appropriately (Morris, 1997)

## **Bibliography**

Morris, Marya. *Subdivision Design in Flood Hazard Areas*. Federal Emergency Management Agency, American Planning Association Planning Advisory Service Report Number 473. American Planning Association, Chicago, 1997.