City Council
Kevin Mumpower, Mayor
Kevin Wingard, Vice Mayor
Anthony Farnum, Council Member
Bill Hartley, Council Member
Neal Osborne, Council Member

BRISTOL, VIRGINIA CITY COUNCIL
300 Lee Street, Bristol, Virginia 24201
March 12, 2019

6:00pm
Call to Order
Moment of Silence
Pledge of Allegiance

A. Mayor's Minute and Council Comments

B. City Manager's Comments

C. Matters to be Presented by Members of the Public- Non-Agenda Items.

REGULAR AGENDA

1. Consider a Public Hearing on the Sale of City-Owned Property at 321 Lee Street.
    a. Open Hearing
    b. Staff Comment
    c. Public Comment
    d. Close Hearing

2. Consider Approval of Offer Received on 321 Lee Street.
    a. Staff Report
    b. Public Comments
    c. Council Motion and Second
    d. Council Discussion
    e. Roll Call

3. Consider Resolution Adopting the Five Year Update of the Mount Rogers Hazard Mitigation Plan.
    a. Staff Report
    b. Public Comments
    c. Reading of Resolution
    d. Council Motion and Second
    e. Council Discussion
    f. Roll Call

4. Consider Granting Approval for City Manager to Enter into Contract with Bristol Baseball, Inc.
    a. Staff Report
    b. Public Comments
    c. Council Motion and Second
    d. Council Discussion
    e. Roll Call

5. Presentation of Outside Agency (Non-Mandated) Budget Requests for FY 19-20.
    Believe in Bristol
    Birthplace of Country Music Museum
    Discover Bristol

6. Presentation of Bristol Virginia Public Schools Budget Request for FY 19-20.

CONSENT AGENDA

6.1 Consider Approval of Street Closure Request for the Bristol Wing War – May 25, 2019

6.2 Consider Purchase Requisitions

Public Works – Fleet; Fuel Tank Replacement	$110,000.00
Sheriff's Department; Inmate Housing January 2019	$ 41,000.00

D. Adjournment

BRISTOL, VIRGINIA CITY COUNCIL
AGENDA ITEM SUMMARY
Item #1 and Item #2

Meeting Date: __3/12/19_____
Department: ___City Attorney_____
Staff Contact: ___**Randall Eads**_____

AGENDA ITEM WORDING:

Consider public hearing on offers received for city-owned property at 321 Lee Street

ITEM BACKGROUND:

The City has received offers an unsolicited offer of $9,000 for the property located at 321 Lee Street.

PREVIOUS RELEVANT ACTION:

Council received a list of city owned properties to be listed for sale at the February 27, 2018 meeting and passed a resolution on the procedures to be used when an offer is received on April 10.

Public hearing was advertised on 2/26/19 and 3/5/19.

STAFF RECOMMENDATIONS:

Accept the offer as presented for the sale of city-owned property.

DOCUMENTATION: Included __X__ Not Required_____

MOTION: ___I move to accept the offers as presented.

Order Confirmation

Order# 0000902837

Client
CITY OF BRISTOL VA
Phone: 2766457329
Account: 2158563
Address: 300 LEE ST CITY HALL
BRISTOL VA 24201

Payor
CITY OF BRISTOL VA
Phone: 2766457329
Account: 2158563
Address: 300 LEE ST CITY HALL
BRISTOL VA 24201

Ad Content Proof
Note: Ad size does not reflect actual ad

The following matter is scheduled for public hearing at the Tuesday, March 12th meeting of the Bristol, Virginia City Council at 6pm in City Council Chambers, 300 Lee Street: (i) the sale of city-owned property at 321 Lee Street. Additional information may be obtained by contacting the City Manager's Office at 300 Lee Street, Bristol, Virginia, 276-645-7300.

Sales Rep	Accnt Rep	Ordered By	Fax:
hjonestri	lmorrell	Nicole Storm	**EMail:** donq@bristolva.org

Total Amount	**$214.60**
Payment Amount	**$0.00**
Amount Due	**$214.60**
Tax Amount:	0.00
Payment Meth:	Invoice - Statement

Status **Materials**

Tear Sheets	Proofs	Affidavits	Blind Box
0	0	1	

PO Number:

Ad Number	Ad Type	Ad Size	Color
0000902837-01	CLS Legal Liner	1 X 21 li	$0.00

Production Method
AdBooker (liner)

Product and Zone	Placement	Position	# Inserts
TRI Bristol Herald Courier	C-Legal Ads	Legal Notices	2

Run Schedule Invoice Text: The following matter is scheduled for public hearing at the

Run Dates 2/26/2019, 3/ 5/2019

Product and Zone	Placement	Position	# Inserts
TRI heraldcourier.com	C-Legal Ads	Legal Notices	3

Run Schedule Invoice Text: The following matter is scheduled for public hearing at the

Run Dates 2/26/2019, 2/27/2019, 2/28/2019

TagLine: THEFOLLOWINGMATTERISSCHEDULEDFORPUBLICHEARINGATTHETUESDAYMARCH12THMEETINGOF THEBRISTOLVIRGINIACITYCOUNCILAT6PMINCITYCOUNCILCHAMBERS

REALTOR®

VIRGINIA REALTORS®
RESIDENTIAL CONTRACT OF PURCHASE

EQUAL HOUSING OPPORTUNITY

(This is a legally binding contract. If you do not understand any part of it, please seek competent advice before signing.)

This CONTRACT OF PURCHASE made as of Feb 18, 2019, between Randall C. Eads City of Bristol, VA (the "Seller," whether one or more), whose address is 300 Lee St Bristol VA 24201, and Danny Browning (the "Purchaser", whether one or more), whose address is _____, provides: The Listing Company (who represents Seller) is N/A and the Selling Company (who ☒ does OR ☐ does not represent Purchaser) is Prestige Homes of the Tri Cities.

1. **REAL PROPERTY**: Purchaser agrees to buy and Seller agrees to sell the land and all improvements thereon located in the County or City of Bristol, Virginia and described as (legal description): 45 x 100 x 45 x 100 32

and more commonly known as: 321 Lee St

together with all fixtures located thereon (if present as of the date of this Contract), including, without limitation, blinds, ceiling fans, curtain rods and brackets, audio-video or media mount and mounting hardware, built-in dishwasher, door knockers, garage door openers and controls, gas fireplace logs and inserts, installed floor and wall coverings, installed mirrors, light fixtures, mailbox and post, built-in range, shades, shrubs, exterior plants and trees, shutters, smoke and heat detectors, storm windows and storm doors, switch and receptacle covers, television antenna(e), window screens, and screen doors (together with the items of personal property described in paragraph 2, the "Property").

2. **PERSONAL PROPERTY**: The following items of personal property are included in this sale:

3. **PURCHASE PRICE**: The Purchase Price of the Property is: Nine thousand Dollars ($9000.00), which shall be paid to Seller at settlement in cash or by cashier's or certified check or wired funds subject to the prorations described herein and from the following sources:

☐ (a) **THIRD PARTY FIRST TRUST:** This sale is contingent on Purchaser's ☐ obtaining OR ☐ assuming: ☐ a conventional; ☐ FHA; ☐ VA; ☐ VHDA OR ☐ other (describe) (_____) loan secured by a first deed of trust lien on the Property in the principal amount of $_____, or _____% of the Purchase Price bearing interest at a fixed rate not exceeding _____% per year, or at an adjustable rate with an initial rate not exceeding _____% per year and a maximum rate during the term of the loan not exceeding _____% per year, or at the market rate of interest at the time of settlement, amortized over a term of _____ years, and requiring not more than a total of _____ loan discount points, excluding a loan origination fee, or an assumption fee not exceeding $_____. (If this contract provides for the assumption of a loan: (i) the parties acknowledge that the balance set forth above is approximate and that the principal amount to be assumed will be the outstanding principal balance on the date of settlement, and (ii) Purchaser shall assume all obligations of Seller under such loan.)

☐ (b) **THIRD PARTY SECOND TRUST:** This sale is also contingent on Purchaser's obtaining a loan secured by a second deed of trust lien on the Property in the principal amount of $_____, or _____% of the Purchase Price bearing interest at a rate not exceeding _____% per year, amortized as follows _____, and requiring not more than a total of _____ loan discount points, excluding the origination fee.

☐ (c) **SELLER FINANCING:** Seller agrees that $_____ or ____% of the Purchase Price shall be evidenced by a note made by Purchaser payable to Seller bearing interest at a rate of _____% per year amortized as follows _____

_____.

The note shall be secured by a deferred purchase money ☐ first, ☐ second, OR ☐ (specify priority) _____ deed of trust lien on the Property. The deed of trust and note shall provide, among other things, that: (i) the note shall be due and payable in full if the Property, or any interest therein, is transferred, sold, or conveyed; (ii) Purchaser shall have the right to prepay the note at any time in whole or in part ☐ with a premium penalty of _____% of the amount prepaid, or ☐ without premium or penalty; (iii) a lot release schedule shall be provided, if applicable; (iv) a late payment charge not exceeding five percent of the payment may be assessed by Seller for any payment more that seven (7) calendar days late; (v) the note and deed of trust shall otherwise be in form satisfactory to Seller; (vi) other terms:_____

_____

_____

_____

_____.

Such financing shall be contingent upon review and approval of Seller of a current credit report on each Purchaser and a current personal financial state of each Purchaser, which documents must be provided to Seller within _____ business days following execution of this Contract by both parties. The deed of trust shall be recorded at Purchaser's expense at settlement. Purchaser may not assign this Contract in whole or in part, without the prior written consent of Seller, which Seller shall be under no obligation whatsoever to give.

☒ (d) **BALANCE OF PURCHASE PRICE:** Purchaser will provide the balance of the Purchase Price from Purchaser's funds in cash or by cashier's or certified check or wired funds at settlement.

(e) **OTHER FINANCING TERMS:** _____

_____

_____

_____

_____

4. **DEPOSIT:** Purchaser shall make a deposit of $ 0 to be held by N/A (the "Escrow Agent") in the form of: ☐ check ☐ cash ☐ other _____ (the "Deposit"). Purchaser **[select one]:** ☐ has paid the Deposit to the Escrow Agent OR ☐ will pay the Deposit to the Escrow Agent within _____ days (the "Extended Deposit Date") after the date this Contract is fully executed by the parties. If Purchaser fails to pay the Deposit as set forth herein, then Purchaser shall be in breach of this Contract. At Seller's option and in lieu of all other remedies set forth in this Contract, Seller may terminate this Contract by written notice to Purchaser and neither party shall have any further obligation hereunder.

If the Escrow Agent is a Virginia Real Estate Board ("VREB") licensee, the parties direct the Escrow Agent to place the Deposit in an escrow account by the end of the fifth business banking day following the latter of: (i) the date this Contract is fully executed by the parties, or (ii) receipt during the Extended Deposit period. If the Escrow Agent is not a VREB licensee, the parties direct the Escrow Agent to place the Deposit in an escrow account in conformance with applicable Federal or Virginia law and regulations. The Deposit may be held in an interest bearing account and the parties waive any claim to interest resulting from such Deposit. The Deposit shall not be released by the Escrow Agent until (i) credited toward the purchase price at settlement; (ii) Seller and Purchaser agree in writing as to its disposition; (iii) a court of competent jurisdiction orders a disbursement of the funds; or (iv) disbursed in such manner as authorized by the terms of this Contract or by Virginia law or regulations. Seller and Purchaser agree that Escrow Agent shall have no liability to any party for disbursing the Deposit in accordance with this paragraph, except in the event of Escrow Agent's negligence or willful misconduct.

If the Property is foreclosed upon while this Contract is pending, the terms of Section 54.1-2108.1 of the Code of Virginia shall apply to the disbursement of the Deposit. Foreclosure shall be considered a termination of this Contract by Seller and, absent any default by Purchaser, the Deposit shall be disbursed to Purchaser.

5. **FINANCING:**

(a) This Contract and Purchaser's obligation hereunder are contingent upon Purchaser obtaining and delivering to Seller a written commitment or commitments, as the case may be (the "Commitment") for the third-party financing or loan assumption required in paragraph 3. Purchaser agrees to make written application for such financing or assumption (including the payment of any required application, credit, or appraisal fees) within five (5) business days of the date of acceptance of this Contract and to diligently pursue obtaining the Commitment. Purchaser hereby grants permission for Purchaser's lender and Selling Company to furnish Seller and Listing Company information about the status of Purchaser's loan approval process, including specific items required by Purchaser's lender or actions Purchaser must perform to obtain loan approval. Purchaser agrees, upon written request by Seller, to provide written consent satisfactory to Purchaser's lender to permit Purchaser's lender to provide such information to Seller and Listing Company.

(b) If Purchaser does not obtain the Commitment and so notifies Seller or Listing Company in writing before 5:00 p.m. local time on _____, 20_____ (if no date is filled in, the date shall be the same date set forth in paragraph 9), then this Contract shall terminate upon giving such notice and the Deposit shall be refunded to Purchaser. If Purchaser does not obtain the Commitment and notice thereof is not received by the deadline, or such later deadline as the parties may agree upon in writing, then Purchaser's financing contingency set out in subparagraph 5(a) above shall nonetheless continue unless Seller gives Purchaser written notice of intent to terminate this Contract. If Seller gives Purchaser such notice, this Contract shall terminate as of 5:00 p.m. local time on the third day following Seller's delivery of such notice to Purchaser unless before that time Purchaser has delivered to Seller a Commitment in compliance with the provisions of subparagraph 5(a) above, or a removal of Purchaser's financing contingency and evidence of the availability of funds necessary to settle without such financing. As used in this paragraph 5, the term Commitment shall mean a written acknowledgment from the Purchaser's lender or lenders that (i) selling, settling on or leasing another property is not required for underwriting approval, unless Purchaser's obligations under this Contract are contingent on such sale, settlement or lease; (ii) Purchaser has made application for the financing and paid all fees associated therewith; and (iii) as of the date of the Commitment, Purchaser's credit, income and assets, and debt have been verified by lender's underwriter as adequate or as meeting underwriting requirements without further action by Purchaser as of that date. If Purchaser provides Seller evidence that it has obtained the Commitment and the lender issuing such Commitment notifies Purchaser, after the date set forth in this paragraph 5(b), that it will not provide the financing, Purchaser shall notify Seller in writing of such fact within three (3) days of Purchaser's receipt of such notice from the lender.

(c) If the balance of the Purchase Price in excess of the Deposit is to be paid in cash without third party or Seller financing, Purchaser shall give the Seller written verification from Purchaser's bank or other sources within fifteen (15) days after the date this Contract is fully ratified that Purchaser has or can have the balance of the Purchase Price in cash not later than the settlement date. If Purchaser fails to give such verification within such time, Seller may terminate this Contract by giving Purchaser written notice thereof within ten (10) days after the date by which verification was to be given.

(d) Purchaser represents to Seller that neither Purchaser's obligations under this Contract nor Purchaser's financing is dependent or contingent on the sale or settlement or lease of other real property, unless specified in a written contingency. Purchaser acknowledges that Seller is relying on this representation.

(e) The occurrence of any of the following shall constitute a default by Purchaser under this Contract, which Purchaser may cure only by providing evidence reasonably satisfactory to Seller, within three (3) days of written notice by Seller of such default, of Purchaser's ability to settle timely:

(i) Purchaser fails to make timely application for any financing provided for hereunder, or to diligently pursue obtaining such financing;
(ii) Purchaser fails to lock in the interest rate(s) provided for hereunder and the rate(s) increase so that Purchaser no longer qualifies for the financing;
(iii) Purchaser fails to comply with the lender's reasonable requirements in a timely manner;
(iv) Purchaser fails to notify the lender, Seller, or Listing Company promptly of any material adverse change in Purchaser's financial situation that affects Purchaser's ability to obtain the financing;
(v) Purchaser does not have the down payment, closing costs or fees, or other funds required to settle as provided in this Contract;
(vi) Purchaser does or fails to do any act following ratification of this Contract that prevents Purchaser from obtaining the financing; or
(vii) Purchaser makes any deliberate misrepresentation, material omission, or other inaccurate submission or statement that results in Purchaser's inability to secure the financing.

(f) Purchaser ☐ does OR ☒ does not intend to occupy the Property as a primary residence.

(g) Nothing in this Contract shall prohibit Purchaser from pursuing alternative financing from the financing specified in paragraph 3 unless it delays settlement or increases expense to Seller without Seller's written agreement. Purchaser's failure to obtain the alternative financing shall be at Purchaser's risk, and shall not relieve Purchaser of the consequences set forth in this paragraph 5 should Purchaser fail to pursue, as required in this paragraph 5, the financing set forth in paragraph 3.

6. VA/FHA LOAN:

(a) It is expressly agreed that notwithstanding any other provision of this Contract, the Purchaser shall not be obligated to complete the purchase of the Property or to incur any penalty by forfeiture of earnest money Deposits or otherwise unless the Purchaser has been given in accordance with HUD/FHA or VA requirements a written statement by the Federal Housing Commissioner, Department of Veterans Affairs, or a Direct Endorsement lender setting forth the appraised value of the Property (excluding closing costs) as not less than the Purchase Price. The Purchaser shall have the privilege and option of proceeding with consummation of this Contract without regard to the amount of the appraised valuation by giving Seller written notice thereof within three (3) days after receipt of notification of the appraised value. THE APPRAISED VALUATION IS ARRIVED AT TO DETERMINE THE MAXIMUM MORTGAGE THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT/DEPARTMENT OF VETERANS AFFAIRS WILL INSURE. HUD/DEPARTMENT OF VETERAN AFFAIRS

DOES NOT WARRANT THE VALUE OR THE CONDITION OF THE PROPERTY. THE PURCHASER SHOULD SATISFY HIMSELF/HERSELF THAT THE PRICE AND CONDITION OF THE PROPERTY ARE ACCEPTABLE.

(b) If Purchaser is obtaining VA financing and elects to complete the purchase at a purchase price in excess of the appraised value as established by the Department of Veterans Affairs (the "Department"), Purchaser will disclose the source of such funds to the Department and pay the excess amount from such source. Such funds will not be borrowed funds unless approved by the Department.

(c) If Purchaser is obtaining FHA financing, the parties acknowledge that the loan amount may be approximate because financed acquisition costs cannot be determined until settlement.

7. **LOAN FEES:** Except as otherwise agreed upon in this Contract, Purchaser shall pay all points, loan origination fees, charges, and other costs imposed by a lender or otherwise incurred in connection with obtaining the loan or loans. The amount of any contributions Seller agrees to make under this Contract toward Purchaser's loan fees shall include miscellaneous and tax service fees charged by a lender for financing described in this Contract and which by regulation or law Purchaser is not permitted to pay.

8. **TITLE INSURANCE.** Purchaser may, at Purchaser's expense, purchase owner's title insurance. Depending on the particular circumstances of the transaction, such insurance could include affirmative coverage against possible mechanics' and materialmen's liens for labor and materials performed prior to Settlement and which, though not recorded at the time of recordation of Purchaser's deed, could be subsequently recorded and would adversely affect Purchaser's title to the Property. The coverage afforded by such title insurance would be governed by the terms and conditions thereof, and the premium for obtaining such title insurance coverage will be determined by its coverage. Purchaser may purchase title insurance at either "standard" or "enhanced" coverage and rates. For purposes of owner's policy premium rate disclosure by Purchaser's lender(s), if any, Purchaser and Seller require that enhanced rates be quoted by Purchaser's lender(s). Purchaser understands that nothing herein obligates Purchaser to obtain any owner's title insurance coverage at any time, including at Settlement, and that the availability of enhanced coverage is subject to underwriting criteria of the title insurer.

9. **SETTLEMENT; POSSESSION:** Settlement shall be made at Mumpower Title on or about March 20, 20 19. Possession of the Property shall be given at settlement, unless otherwise agreed in writing by the parties. At settlement, Seller will deliver the deed described in paragraph 15, an affidavit acceptable to Purchaser and Purchaser's title insurance company as to parties in possession and mechanic's liens, applicable non-foreign status and state residency certificates and applicable IRS 1099 certificates.

10. **EXPENSES; PRORATIONS; ROLLBACK TAXES:**
(a) Each party shall bear its own expenses in connection with this Contract, except as specifically provided otherwise herein. Seller agrees to pay the expense of preparing the deed and the recordation tax applicable to grantors; all expenses incurred by Purchaser in connection with the purchase, including without limitation title examination, insurance premiums, survey costs, recording costs and the fees of Purchaser's attorney, shall be borne by Purchaser. All taxes, assessments, interest, rent escrow deposits, and other ownership fees, if any, shall be prorated as of the date of settlement. In addition to the Purchase Price, Purchaser agrees to pay Seller for all fuel, oil and/or propane remaining in the tank(s) (if applicable) at the prevailing market price as of the date of settlement.

(b) Rollback taxes shall be paid as follows: To be paid by responsible party.

11. **BROKERAGE FEE; SETTLEMENT STATEMENTS:** Seller and Purchaser authorize and direct the settlement agent to disburse to Listing Company and/or Selling Company from the settlement proceeds their respective portions of the brokerage fee payable as a result of this sale and closing under the Contract. Each of Listing Company and/or Selling Company shall deliver to the settlement agent, prior to settlement, a signed written statement setting forth the fee to which such company is entitled and stating how such fee and any additional sales incentives are to be disbursed. Seller and Purchaser authorize and direct the settlement agent to provide to each of Seller, Purchaser, Listing Company and Selling Company a copy of the closing disclosure for the transaction.

12. **BROKER INDEMNIFICATION:** Seller and Purchaser agree to hold harmless Listing Company, Selling Company, the officers, directors and employees, or any real estate broker or salesperson employed by or affiliated with the Listing Company or Selling Company for any delay, or expense caused by such delay, in settlement due to regulatory or legal requirements.

13. **RISK OF LOSS:** All risk of loss or damage to the Property by fire, windstorm, casualty, or other cause is assumed by Seller until settlement. In the event of substantial loss or damage to the Property before settlement, Purchaser shall have the option of either (i) terminating this Contract and recovering the Deposit, or (ii) affirming this Contract, in which event Seller shall assign to Purchaser all of Seller's rights under any policy or policies of insurance applicable to the Property.

14. **WOOD INFESTATION INSPECTION AND REPORT:** Prior to settlement, Seller shall provide Purchaser a report, dated not more than 30 days prior to date of settlement, from a wood infestation control company certified and licensed by the

Commonwealth of Virginia and properly insured, concerning the presence of or damage from termites or other wood-destroying insects in the primary dwelling, in any other dwelling(s) on the Property as to which a certificate of occupancy has been issued and is in effect, and in the following additional structures _____

_____

(the "Applicable Structures"). If the inspection reveals active infestation in any of the Applicable Structures, Seller shall have such infestation treated by a company licensed by the Commonwealth of Virginia and properly insured. If the inspection reveals damage to any Applicable Structure, Seller shall have the damage repaired by a contractor licensed in the Commonwealth of Virginia; provided, however, that if the estimated aggregate cost of such treatment or repairs or both exceeds $1,000, and Purchaser and Seller cannot agree on how the amount exceeding $1,000, will be paid, Purchaser shall have the right either (i) to accept repairs or treatment not exceeding $1,000, in which event Seller shall have such repairs or treatment performed at Seller's expense, (ii) to receive a credit at settlement in the amount of $1,000, or (iii) to terminate this Contract and receive a refund of the Deposit.

15. **TITLE:** At settlement Seller shall convey the Property to Purchaser by general warranty deed containing English covenants of title (except that conveyance from a personal representative of an estate or from a trustee or institutional lender shall be by special warranty deed), free of all encumbrances, tenancies, and liens (for taxes and otherwise), but subject to such restrictive covenants and utility easements of record which do not materially and adversely affect the use of the Property for residential purposes or render the title unmarketable. If the Property does not abut a public road, title to the Property must include a recorded easement providing adequate access thereto. In the event this sale is subject to a financing contingency under paragraph 3(a) or 3(b), the access to a public road must be acceptable to each lender. If the examination reveals a title defect of a character that can be remedied by legal action or otherwise within a reasonable time, then Seller, at Seller's expense and subject to the Remediation Limit set forth in paragraph 18, shall promptly take such action as is necessary to cure such defect. If the defect is not cured within 60 days after Seller receives notice of the defect, then Purchaser shall have the right to (i) terminate this Contract, in which event the Deposit shall be returned to Purchaser, and Purchaser and Seller shall have no further obligations hereunder, or (ii) waive the defect and proceed to settlement with no adjustment to the Purchase Price. If Seller has agreed to cure such defect, the parties agree that the settlement date prescribed in paragraph 9 shall be extended as necessary to enable Seller to cure such title defect, but not for more than 60 days unless agreed by the parties.

16. **EQUIPMENT CONDITION AND INSPECTION:**

(a) Purchaser agrees to accept the Property at settlement, and Seller agrees to deliver the Property to Purchaser at settlement, in its present physical condition, ordinary wear and tear excepted, but with such repairs and improvements as the parties otherwise agree.

(b) If Purchaser's obligations under this Contract are contingent on a professional home inspection of the Property, then Purchaser shall be entitled to receive the Property at settlement in such condition as determined by such inspection and any negotiation and agreements relating to it. Purchaser and Purchaser's agents, inspectors, and engineers shall have the right to conduct a preoccupancy or presettlement inspection to verify that the condition of the Property conforms to this Contract and that no material damage or changes necessitating repairs have occurred to the Property after the date of this Contract or after any prior inspection of the Property provided for herein. Purchaser shall not be entitled to require Seller to correct defects discovered at a preoccupancy or presettlement inspection but existing as of the time of a prior inspection of the Property if those defects were not reported to Seller in connection with such prior inspection and Seller has not agreed to remedy such defects.

(c) If Purchaser's obligations under this Contract are not contingent on a professional home inspection of the Property, then Seller warrants that all appliances, heating and cooling equipment, plumbing and electric systems will be in working condition at the time of settlement or of Purchaser's occupancy, whichever occurs first. Purchaser and Purchaser's agents, inspectors, and engineers shall have the right to conduct a preoccupancy or presettlement inspection to verify that the condition of the Property conforms to this Contract and that no material damage or changes necessitating repairs have occurred to the Property after the date of this Contract. Seller's obligations in this regard are limited by the Remediation Limit set forth in paragraph 18 of this Contract.

(d) Seller will provide Purchaser, Purchaser's professional inspectors and engineers, Selling Company, and representatives of Purchaser's lenders reasonable access to the Property to conduct inspections as appropriate and in compliance with this Contract. Seller will have all utilities in service at the time of all inspections to be conducted pursuant to this Contract, including those provided for in any separate provision or addendum dealing with inspections of the Property.

(e) Seller agrees to deliver the Property in broom-clean condition and to exercise reasonable and ordinary care in the maintenance and upkeep of the Property between the date this Contract is executed by Seller and the time of settlement or Purchaser's occupancy, whichever occurs first. If Seller fails to deliver the Property in the condition required by this paragraph 16, or if the presettlement or preoccupancy inspection reveals material damage or changes necessitating repairs occurring after any prior inspection of the Property, and Seller refuses to make the appropriate repairs, Purchaser shall have the right to terminate this Contract and receive a refund of the Deposit, or to waive the defects and proceed to settlement with no adjustment to the Purchase Price.

17. **WELL AND SEPTIC:**
(a) If the Property is served by an on-site well or other natural water source, Seller agrees to provide Purchaser with a certificate dated not more than 30 days prior to settlement from the appropriate governmental authority, or from an acceptable private company, indicating that the water is free from contamination by coliform bacteria. If this Contract is contingent on Purchaser's obtaining FHA or VA financing, the certificate shall also state that the water is free from levels of lead unacceptable to FHA or VA.

(b) If the Property is served by a sewage disposal system, Seller agrees to provide Purchaser with a certificate dated not more than 30 days prior to settlement from the appropriate governmental authority, or from an acceptable private company, indicating that there is no evidence of malfunction of or needed maintenance to the sewage disposal system.

(c) If contamination of the water or septic system malfunction or needed maintenance is found, then Seller, at Seller's expense and subject to the Remediation Limit set forth in paragraph 18, shall effect the appropriate remedies or repairs. If Seller fails to do so as soon as practicable, Purchaser shall have the right to (i) terminate this Contract, in which event the Deposit shall be returned to Purchaser, and Purchaser and Seller shall have no further obligations hereunder, or (ii) waive the defect and proceed to settlement with no adjustments to the Purchase Price.

18. **SELLER'S AND PURCHASER'S OPTION:** In the event that the total cost of fulfilling Seller's obligations set forth in paragraphs 15, 16 (c), and 17 above exceed $_____ — © — _____ in the aggregate (the "Remediation Limit"), Seller shall have the option (i) to fulfill Seller's obligations fully at Seller's expense, or (ii) to pay or credit the Remediation Limit to Purchaser and refuse to pay any excess over that amount. If Seller elects option (ii), Purchaser shall have the right to either accept the Property in its present condition (in which case the Seller shall pay or credit the Remediation Limit to Purchaser at settlement), or to terminate this Contract and receive a refund of the Deposit. If no amount is entered in the space in this paragraph, the parties agree that the amount shall be $1,000. The Remediation Limit is independent of any obligations agreed to by Seller in connection with an inspection of the Property pursuant to a separate addendum to this Contract, or provision other than contained in paragraphs 15, 16 (c) and 17, dealing with the right of Purchaser to conduct an inspection of the Property.

19. **HOME PURCHASER'S INSPECTION:** Purchaser may have a professional home inspection performed at Purchaser's expense by one or more qualified/licensed inspectors. Purchaser (Please check and initial): ☒ **WAIVES (purchaser's initial):** JDB OR ☐ **DESIRES (purchaser's initial):** _____ a professional home inspection. If Purchaser desires an inspection contingency, see attached home inspection addendum or separate provision of this Contract.

20. **NOTICE TO PURCHASER REGARDING SETTLEMENT AGENT AND SETTLEMENT SERVICES: Choice of Settlement Agent: Chapter 27.3 (§ 55-525.16 et seq.) of Title 55 of the Code of Virginia provides that the purchaser or borrower has the right to select the settlement agent to handle the closing of this transaction. The settlement agent's role in closing this transaction involves the coordination of numerous administrative and clerical functions relating to the collection of documents and the collection and disbursement of funds required to carry out the terms of the contract between the parties. If part of the purchase price is financed, the lender for the purchaser will instruct the settlement agent as to the signing and recording of loan documents and the disbursement of loan proceeds. No settlement agent can provide legal advice to any party to the transaction except a settlement agent who is engaged in the private practice of law in Virginia and who has been retained or engaged by a party to the transaction for the purpose of providing legal services to that party. Variation by agreement: The provisions of Chapter 27.3 (§ 55-525.16 et seq.) of Title 55 of the Code of Virginia may not be varied by agreement, and rights conferred by this chapter may not be waived. The seller may not require the use of a particular settlement agent as a condition of the sale of the property. Escrow, closing, and settlement service guidelines: The Virginia State Bar issues guidelines to help settlement agents avoid and prevent the unauthorized practice of law in connection with furnishing escrow, settlement or closing services. As a party to a real estate transaction, the purchaser or borrower is entitled to receive a copy of these guidelines from his settlement agent, upon request, in accordance with the provisions of Chapter 27.3 (§ 55-525.16 et seq.) of Title 55 of the Code of Virginia.**

To facilitate the settlement agent's preparation of various closing documents, including any HUD-1 or Closing Disclosure, Purchaser hereby authorizes the settlement agent to send such Closing Disclosure to Purchaser by electronic means and agrees to provide the settlement agent Purchaser's electronic mail address for that purpose only.

21. **MECHANICS LIEN NOTICE:**
(a) Virginia law (§43-1 et seq.) permits persons who have performed labor or furnished material for the construction, removal, repair or improvement of any building or structure to file a lien against the Property. This lien may be filed at any time after the work is commenced or the material is furnished, but not later than the earlier of (i) 90 days from the last day of the month in which the lienor last performed work or furnished materials or (ii) 90 days from the time the construction, removal or improvement is terminated. **AN EFFECTIVE LIEN FOR WORK PERFORMED PRIOR TO THE DATE OF SETTLEMENT MAY BE FILED AFTER SETTLEMENT. LEGAL COUNSEL SHOULD BE CONSULTED.**

(b) Seller shall deliver to Purchaser at settlement an affidavit, on a form acceptable to Purchaser's lender, if applicable, signed by Seller that no labor or materials have been furnished to the Property within the statutory period for the filing of mechanics' or materialmens' liens against the Property. If labor or materials have been furnished during the statutory period, Seller shall deliver to Purchaser an affidavit signed by Seller and the person(s) furnishing the labor or materials that the costs thereof have been paid.

22. **CONDOMINIUM DISCLOSURE:** The Seller represents that the Property **[select one]:** ☐ is OR ☒ is not a condominium resale, which is subject to the Virginia Condominium Act (§55-79.39 et seq. of the Code of Virginia) (the "Condominium Act"). If the Property is a condominium resale, the Condominium Act requires the Seller to obtain from the unit owners' association a resale certificate and provide it to the Purchaser or Purchaser's authorized agent. The information contained in the resale certificate shall be current as of the specified date on the resale certificate. The Purchaser may cancel this Contract (a) within three days after the date of this Contract, if on or before the date that the Purchaser signs this Contract, the Purchaser receives the resale certificate or is notified that the resale certificate will not be available; (b) within three days after receiving the resale certificate if the resale certificate or notice that the resale certificate will not be available is hand delivered, delivered by electronic means, or delivered by a commercial overnight delivery service or the United States Postal Service and a receipt obtained; or (c) within six days after the postmark date if the resale certificate or notice that the resale certificate will not be available is sent to the Purchaser by United States mail. The Purchaser may also cancel this Contract at any time prior to settlement if the Purchaser has not been notified that the resale certificate will not be available and the resale certificate is not delivered to the Purchaser. Notice of cancellation shall be provided to the Seller (owner) or his agent by one of the following methods: (i) hand delivery; (ii) United States mail, postage prepaid, provided the sender retains sufficient proof of mailing, which may be either a United States postal certificate of mailing or a certificate of service prepared by the sender confirming such mailing; (iii) electronic means provided the sender retains sufficient proof of the electronic delivery, which may be an electronic receipt of delivery, a confirmation that the notice was sent by facsimile, or a certificate of service prepared by the sender confirming the electronic delivery; or (iv) overnight delivery using a commercial service or the United States Postal Service. In the event of a dispute, the sender shall have the burden to demonstrate delivery of the notice of cancellation. Such cancellation shall be without penalty, and the Seller shall cause any deposit to be returned promptly to the Purchaser, but not later than thirty days from the date of cancellation. Seller shall provide written instructions to the Association for the delivery of the resale certificate to Purchaser or Purchaser's authorized agent who is _____ for the purposes of this paragraph. The right to receive the resale certificate and to cancel this Contract terminates at settlement. If the Purchaser has received the resale certificate, the Purchaser has a right, at Purchaser's sole expense, to request from the unit owners' association a resale certificate update or financial update. A request for an updated resale certificate does not extend the cancellation periods set forth above.

23. **PROPERTY OWNERS' ASSOCIATION DISCLOSURE**: The Seller represents that the Property **[select one]:** ☐ is OR ☒ is not located within a development which is subject to the Virginia Property Owners' Association Act (§§ 55-508 et. seq. of the Code of Virginia) (the "Act"). If the Property is within such a development, the Act requires the Seller to obtain from the property owners' association an association disclosure packet and provide it to the Purchaser, or Purchaser's authorized agent. The information contained in the association disclosure packet shall be current as of the specified date on the disclosure packet. The Purchaser may cancel this Contract (a) within three days after the date of this Contract, if on or before the date that the Purchaser signs this Contract, the Purchaser receives the association disclosure packet or is notified that the association disclosure packet is not available; (b) within three days after receiving the association disclosure packet, if the association disclosure packet or notice that the association disclosure packet will not be available is hand delivered, delivered by electronic means, or delivered by a commercial overnight delivery service or the United States Postal Service and a receipt obtained; or (c) within six days after the postmark date if the association disclosure packet or notice that the association disclosure packet will not be available is sent to the Purchaser by United States mail. The Purchaser may also cancel this Contract at any time prior to settlement if the Purchaser has not been notified that the association disclosure packet will not be available and the association disclosure packet is not delivered to the Purchaser. Notice of cancellation shall be provided to the Seller (owner) or his agent by one of the following methods: (i) hand delivery; (ii) United States mail, postage prepaid, provided the sender retains sufficient proof of mailing, which may be either a United States postal certificate of mailing or a certificate of service prepared by the sender confirming such mailing; (iii) electronic means provided the sender retains sufficient proof of the electronic delivery, which may be an electronic receipt of delivery, a confirmation that the notice was sent by facsimile, or a certificate of service prepared by the sender confirming the electronic delivery; or (iv) overnight delivery using a commercial service or the United States Postal Service. In the event of a dispute, the sender shall have the burden to demonstrate delivery of the notice of cancellation. Such cancellation shall be without penalty, and the Seller shall cause any deposit to be returned promptly to the Purchaser, but not later than thirty days from the date of cancellation. Seller shall provide written instructions to the Association for delivery of the disclosure packet to Purchaser or Purchaser's authorized agent who is _____ for the purposes of this paragraph. The right to receive the association disclosure packet and to cancel this Contract terminates at settlement. If the Purchaser has received the association disclosure packet, the Purchaser has a right, at Purchaser's sole expense, to request an update of such disclosure packet from the property owners' association. A request for an updated disclosure packet does not extend the cancellation periods set forth above.

24. **LEAD-BASED PAINT INSPECTION:** This paragraph applies only if the Property was built prior to 1978 and is not exempt from the provisions of the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. § 4852d) (the "Lead Paint Act") and regulations promulgated pursuant thereto. (Check as applicable):

(a) Attached to this Contract is a fully executed "Disclosure of Information and Acknowledgment Lead-Based Paint and/or Lead-Based Paint Hazards," which is made a part of this Contract by the provisions of the Lead Paint Act.

(b) The Lead Paint Act grants Purchaser the right, for a period of ten (10) days after the date this Contract is fully ratified, to conduct a risk assessment or inspection for the presence of lead-based paint and/or lead based paint hazards. Unless Purchaser and Seller have otherwise agreed, Purchaser's obligations under this Contract are not contingent on the results of such assessment or inspection. **(Check as applicable):**

☐ (i) Purchaser reserves the right to conduct a risk assessment or inspection for lead-based paint and/or lead-based paint hazards; **OR**

☒ (ii) Purchaser waives the right to conduct a risk assessment or inspection for lead-based paint and/or lead-based paint hazards.

25. **NOTICE TO PURCHASER(S):** Purchaser should exercise whatever due diligence Purchaser deems necessary with respect to information on sexual offenders registered under Chapter 23 (§19.2-387 et seq.) of Title 19.2 of the Virginia Code. Such information may be obtained by contacting your local police department or the Department of State Police, Central Records Exchange at (804) 674-2000 or www.vsp.state.va.us/.

26. **NOTICE OF DISCLOSURE PURSUANT TO VIRGINIA RESIDENTIAL PROPERTY DISCLOSURE ACT:**
Disclosure ☐ is **OR** ☒ is not attached. (Attachment does not become part of this Contract.)

27. **DEFAULT:** If Seller or Purchaser defaults under this Contract, the defaulting party, in addition to all other remedies available at law or in equity, shall be liable for the brokerage fee referenced in paragraph 11 hereof as if this Contract had been performed and for any damages and all expenses incurred by non-defaulting party, Listing Company, and Selling Company in connection with this transaction and the enforcement of this Contract, including, without limitation attorneys' fees and costs, if any. Payment of a real estate broker's fee as the result of a transaction relating to the property which occurs subsequent to a default under this Contract shall not relieve the defaulting party of liability for the fee of Listing Company in this transaction and for any damages and expenses incurred by the non-defaulting party, Listing Company, and Selling Company in connection with this transaction. In any action brought by Seller, Purchaser, Listing Company, or Selling Company under this Contract or growing out of the transactions contemplated herein, including, without limitation, a suit to secure the release of any earnest money deposit that the other principal to the transaction has refused to authorize, the prevailing party in such action shall be entitled to receive from the non-prevailing party or parties, jointly and severally, in addition to any other damages or awards, reasonable attorneys' fees and costs expended or incurred in prosecuting or defending such action. Seller and Purchaser acknowledge and agree that Listing Company and Selling Company are intended third-party beneficiaries of this Contract as to any commissions due them as a result of the transactions contemplated by this Contract.

28. **MISCELLANEOUS:** This Contract may be signed in one or more counterparts, each of which shall be deemed to be an original and all of which together shall constitute one and the same document. Documents delivered by facsimile machine shall be considered as originals. Unless otherwise specified herein, "days" mean calendar days. For the purpose of computing time periods, the first day shall be the day following the Date of Ratification or delivery of the notice that triggers the time period. Deadlines run until 11:59 p.m. on the date of the deadline. This Contract represents the entire agreement between Seller and Purchaser and may not be modified or changed except by written instrument executed by the parties. This Contract shall be construed, interpreted and applied according to the laws of the state in which the Property is located and shall be binding upon and shall inure to the benefit of the heirs, personal representatives, successors, and assigns of the parties. To the extent any handwritten or typewritten terms herein conflict with or are inconsistent with the printed term hereof, the handwritten and typewritten terms shall control. Whenever the context shall so require, the masculine shall include the feminine and singular shall include the plural. Unless otherwise provided herein, the provisions of this Contract affecting title shall be deemed merged into the deed delivered at settlement and shall not survive settlement.

29. **NON-BINDING MEDIATION:** In an effort to avoid the expense and delay of litigation, the parties agree to submit any disputes or claims arising out of this Contract, including those involving the Listing Company or the Selling Company, to mediation prior to instituting litigation. Such mediation will be ***non-binding,*** that is, no party will be obligated to enter into any settlement arising out of mediation unless that settlement is satisfactory to that party. Any settlement the parties enter into will be binding, but if the parties are not able to reach agreement on a settlement, they may resort to arbitration or litigation as if the mediation had never taken place. The mediation will be performed by a mutually agreeable mediator or mediation service in the area. This agreement to mediate does not apply to foreclosure, unlawful detainer (eviction), mechanics lien, probate, or license law actions. Judicial actions to provide provisional remedies (such as injunctions and filings to enable public notice of pending disputes) are not violations of the obligation to mediate and do not waive the right to mediate.

30. **BROKERS: LICENSEE STATUS:**
(a) Listing Company and Selling Company may from time to time engage in general insurance, title insurance, mortgage loan, real estate settlement, home warranty, and other real estate-related businesses and services, from which they may receive compensation during the course of this transaction, in addition to real estate brokerage fees. The parties acknowledge that Listing Company and Selling Company are retained for their real estate brokerage expertise, and neither has been retained as an attorney, tax advisor, appraiser, title advisor, home inspector, engineer, surveyor, or other professional service provider.

(b) Disclosure of Real Estate Board/Commission licensee status, if any is required in this transaction: _____

31. **OTHER TERMS:** (Use this space for additional terms not covered elsewhere in this Contract.)
Seller will pay a 3% commission to Prestige Homes of the Tri Cities heat closing.

32. **ACCEPTANCE:** This Contract, when signed by Purchaser, shall constitute an offer to enter into a bilateral contract, and the offer shall remain in effect unless earlier withdrawn, until 5 p.m. (local time in Virginia), on March 14, 20 19 (date). If not accepted by such time, this offer shall be null and void.

33. **ELECTRONIC SIGNATURES. _____ /_____ If this paragraph is initialed by both parties, then in accordance with the Uniform Electronic Transactions Act (UETA) and the Electronic Signatures in Global and National Commerce Act, or E-Sign, regarding electronic signatures and transactions, the parties do hereby expressly authorize and agree to the use of electronic signatures as an additional method of signing and/or initialing this Agreement and any addenda or amendments. The parties hereby agree that either party may sign electronically by utilizing an electronic signature service.**

WITNESS the following duly authorized signatures:

PURCHASER:

2-18-19 / Thomas D Browning
DATE PURCHASER

_____/_____
DATE PURCHASER

_____/_____
DATE PURCHASER

_____/_____
DATE PURCHASER

SELLER:

_____/_____
DATE SELLER

_____/_____
DATE SELLER

_____/_____
DATE SELLER

_____/_____
DATE SELLER

Receipt of deposit per paragraph 4 above is hereby acknowledged.

_____/_____

For information purposes only:

Selling Company's Name and Address

_____
_____
_____
Office Phone: _____ Fax: _____
MLS Broker Code: _____ Office ID No._____
Firm license No.:_____
Agent Name: _____
Agent MLS ID No.: _____
Agent license No.:_____
Agent E-mail address: _____

Listing Company's Name and Address:

_____
_____
_____
Office Phone: _____ Fax: _____
MLS Broker Code: _____ Office ID No._____
Firm license No.:_____
Agent Name: _____
Agent MLS ID No.: _____
Agent license No.:_____
Agent E-mail address: _____

This Contract has been ratified by Purchaser and Seller as of _____, 20____ ("Date of Ratification").

Acknowledgement that Contract is ratified as of the date above.

Selling Firm _____
(signature)

Listing Firm _____
(signature)

REALTOR®

VIRGINIA REALTORS®
DISCLOSURE OF INFORMATION AND ACKNOWLEDGMENT
LEAD-BASED PAINT AND/OR LEAD-BASED PAINT HAZARDS
(Purchase)

EQUAL HOUSING OPPORTUNITY

This disclosure applies to the property(ies) in the City or County of Bristol and is described as follows:
321 Lee St

Lead Warning Statement:

Every purchaser of any interest in residential real property on which a residential dwelling was built prior to 1978 is notified that such property may present exposure to lead from lead-based paint that may place young children at risk of developing lead poisoning. Lead poisoning in young children may produce permanent neurological damage, including learning disabilities, reduced intelligence quotient, behavioral problems, and impaired memory. Lead poisoning also poses a particular risk to pregnant women. The seller of any interest in residential real property is required to provide the buyer with any information on lead-based paint hazards from risk assessments or inspections in the seller's possession and notify the buyer of any known lead-based paint hazards. A risk assessment or inspection for possible lead-based paint hazards is recommended prior to purchase.

Sellers' Disclosures (each Seller initial in each space and check the appropriate box after each space)

_____ (a) Presence of lead-based paint hazards (check one below):

☐ Seller has no knowledge of lead-based paint and/or lead-based paint hazards in the housing.

☐ Known lead-based paint and/or lead-based paint hazards are present in the housing: (Explain):_____

_____ (b) Records and reports available to the seller (check one below):

☐ Seller has no reports or records pertaining to lead-based paint and/or lead-based hazards in the housing.

☐ Seller has provided the purchaser with all available records and reports pertaining to lead-based paint and/or lead-based hazards in the housing (list documents):_____

Purchasers' Acknowledgments (each purchaser initial in each space and check the appropriate box after space (e))

_____ (c) Purchaser has received copies of all available information listed above.

_____ (d) Purchaser has received the pamphlet "*Protect Your Family From Lead in Your Home.*"

_____ (e) Purchaser has (check one below):

☐ Received a 10-day opportunity (or mutually agreed-upon period) to conduct a risk assessment or inspection for the presence of lead-based paint and/or lead-based paint hazards; or

☐ Waived the opportunity to conduct a risk assessment or inspection for the presence of lead-based and/or lead-based paint hazards.

Agents' Acknowledgments (each agent involved in this transaction receiving compensation from the seller must initial in the appropriate space)

_____ (f) Seller's agent (listing agent) has informed the seller of the seller's obligations under 42 U.S.C. 4852d and Agent is aware of his/her responsibility to ensure compliance.

_____ (g) Purchaser's agent (if agent will receive any compensation from seller or seller's agent) has been assured the seller is aware of the seller's obligations under 42 U.S.C. 4852d, or the Agent has informed the seller of the seller's obligations under 42 U.S.C. 4852d, and Agent is aware of his/her responsibility to ensure compliance.

Certification of Accuracy
The following parties have reviewed the information above and certify that, to the best of their knowledge, the information provided by the signatory is true and accurate.

_____/_____	_____/_____
Date Seller	Date Purchaser
_____/_____	_____/_____
Date Seller	Date Purchaser
_____/_____	_____/_____
Date Agent	Date Agent

For informational purposes only:
Firm:_____ Firm:_____

REALTOR®

EQUAL HOUSING OPPORTUNITY

VIRGINIA ASSOCIATION OF REALTORS®
DISCLOSURE OF BROKERAGE RELATIONSHIP IN A RESIDENTIAL REAL ESTATE TRANSACTION FOR UNREPRESENTED PARTY(IES)

Property Address (if applicable): 321 Lee St
Bristol VA 24201

The undersigned unrepresented party(ies) do hereby acknowledge disclosure that the licensee Daniel Shew (Broker or Salesperson) associated with Prestige Homes of the Tri Cities Inc (Brokerage Firm) represents only the following party in a residential real estate transaction:

☐ Seller(s) **OR** ☐ Landlord(s)

☒ Buyer(s) **OR** ☐ Tenant(s)

SIGNATURE OF UNREPRESENTED PARTY

_____
Print Name

_____ / _____
Date Signature

SIGNATURE OF UNREPRESENTED PARTY

_____
Print Name

_____ / _____
Date Signature

BRISTOL, VIRGINIA CITY COUNCIL
AGENDA ITEM SUMMARY

Meeting Date: 3/12/19
Department: Fire Dept
Staff Contact: Mike Armstrong

AGENDA ITEM WORDING:

Consider Resolution Adopting the Five Year Update of the Mount Rogers Hazard Mitigation Plan.

ITEM BACKGROUND:

The Mount Rogers Planning District Commission updates the regional hazard mitigation plan every five years. This plan must be adopted at the local level in order to be eligible for federal disaster relief funds as well as pre-disaster hazard mitigation grant funds.

PREVIOUS RELEVANT ACTION:

STAFF RECOMMENDATIONS:

Staff recommends adoption of the plan so the City may apply for hazard mitigation grants.

DOCUMENTATION: Included _X___ Not Required_____

MOTION: _Move to approve the resolution adopting the Mt. Rogers Hazard Mitigation Plan.

City of Bristol, Virginia

300 Lee Street, Bristol, Virginia 24201 (276) 645-7333
FAX: (276) 821-6278
Website: www.bristolva.org

RESOLUTION PRE-DISASTER HAZARD MITIGATION PLAN

WHEREAS, the Federal Emergency Management Agency, the Commonwealth of Virginia's Department of Emergency Management, and the Mount Rogers Planning District Commission agree that a regional Pre-Disaster Hazard Mitigation Plan shall be developed for the Mount Rogers Planning District; and

WHEREAS, the Mount Rogers Planning District Commission has completed the necessary tasks required by the agreement between the Virginia's Department of Emergency Management and the Mount Rogers Planning District Commission; and

WHEREAS, the Pre-Disaster Hazard Mitigation Plan contains risk assessments and potential losses of each of the identified hazards, a mitigation strategy to reduce or eliminate the risk of damage from future incidents, and a process to update the plan every five (5) years, thereby making the City of Bristol, Virginia, a jurisdiction of the Mount Rogers Planning District, eligible for federal disaster relief and hazard mitigation grant assistance.

NOW THEREFORE, BE IT RESOLVED, that the City of Bristol, Virginia adopts the Pre-Disaster Hazard Mitigation Plan.

Adopted_____
Date

_____ _____
Mayor Clerk

Mount Rogers PLANNING DISTRICT'S

Pre-Disaster Hazard Mitigation Plan

MOUNT ROGERS
SOUTHWEST VIRGINIA

Prepared by the Mount Rogers Planning District Commission for the Counties of Bland, Carroll, Grayson, Smyth, Washington, and Wythe, the Cities of Bristol and Galax, and the Towns of Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville.

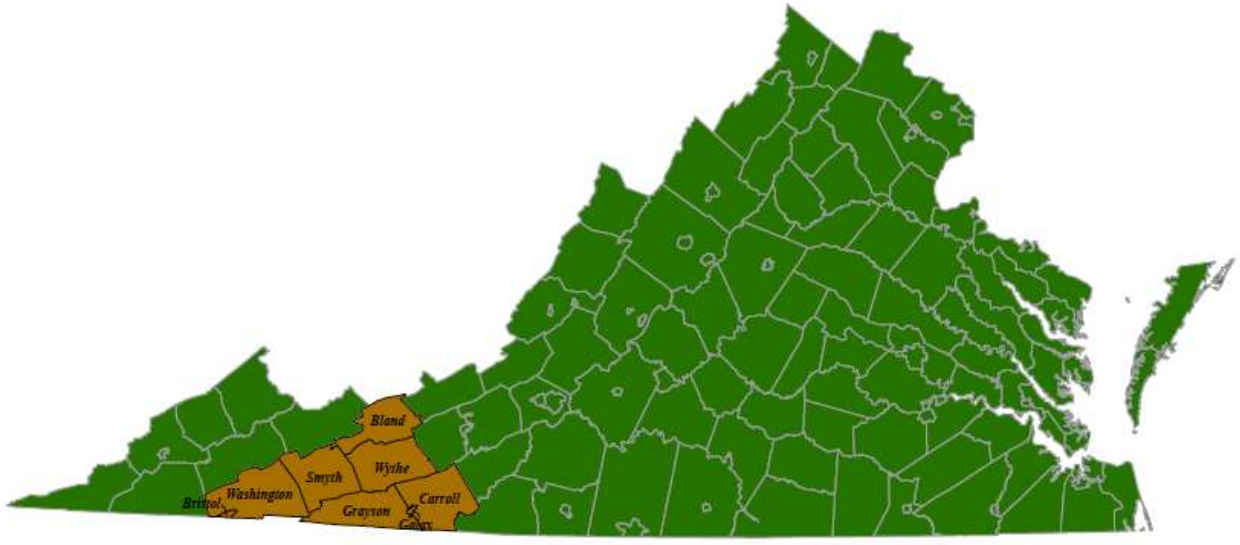
Funding through the Virginia Department of Emergency Management and the Federal Emergency Management Agency.

SW VA *A different side of Virginia*

TABLE OF CONTENTS

INTRODUCTION

The Mount Rogers Hazard Mitigation Plan 2017 update is a revision to the region's original plan, adopted and approved by FEMA in December 2005. In this updated plan, new data and analysis has improved the hazard identification and risk assessment used to determine mitigation strategies. All sections of this plan have been updated to include the newest information and data available. In the past five years, the participating local governments (Bland, Carroll, Grayson, Smyth, Washington, and Wythe Counties, the Cities of Bristol and Galax, and the Towns of Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville), have participated in a yearly overview and update of the strategies and goals set forth in the original plan.



The Pre-Disaster Hazard Mitigation Update is meant to describe natural hazards and their impacts to people and property; recommend mitigations to reduce or eliminate those hazards; and outline the strategy for maintaining and updating the Plan.

This Plan addresses natural hazards of importance to the Mount Rogers Planning District region of southwest Virginia. This is a rural, mountainous region covering 2,777 square miles that stands within both the Ridge & Valley and Blue Ridge geologic provinces. This plan will focus primarily on natural hazards: dam safety, drought, earthquakes, flooding, karst & sinkholes, landslides, severe winter storms/ice, thunderstorms/lightning, tornadoes/hurricanes, wildfires and windstorms.

HAZARD MITIGATION PLANNING

The purpose of this plan is to meet the requirements set forth in the Disaster Mitigation Act 2000 (DMA 2000). The DMA 2000 requires state and local government to identify hazards, assess their risks and community vulnerability, and to describe actions to mitigate those risks and vulnerabilities. The plan is meant to be a framework for decreasing needs for post disaster funds for recovery and reconstruction through pre-disaster actions.

Adoption of the Hazard Mitigation Plan and approval from FEMA is required for localities to remain eligible to apply for the five Hazard Mitigation Assistance (HMA) Programs. They include the four annual grant programs; Pre-Disaster Mitigation Program (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL) and the post-disaster Hazard Mitigation Grant Program (HMGP). Three of these programs (FMA, RFC, and SRL) are directly linked to the National Flood Insurance Program (NFIP). HMGP and PDM can also be used to fund tornado safe rooms, wildfire mitigation, etc. Adoption of this plan is also required to receive a declaration of a federal major disaster or emergency from FEMA.

There are four basic phases of emergency management: mitigation, preparedness, response, and recovery. Preparedness and mitigation measures occur prior to a disaster event. Preparedness refers to plans and strategies for efficiently handling disasters as they occur. Response and recovery occur during and after a disaster event, respectively, to return the community to normal operations as quickly as possible. Mitigation includes the long-term strategies determined to reduce risk to life and property from a disaster event.

The benefits of planning to mitigate for natural hazards include a systematic approach for identifying hazards, their risks, and strategies for minimizing those risks. In planning prior to a disaster, the high emotions and rushed environment are absent allowing a diverse group of stakeholders to collaborate to develop strategies from which the community derives the most benefits. The opportunities offered by approaching mitigation planning proactively allow local communities to shape not only post-disaster recovery, but also achieve additional community objectives, such as recreation and housing and economic development.

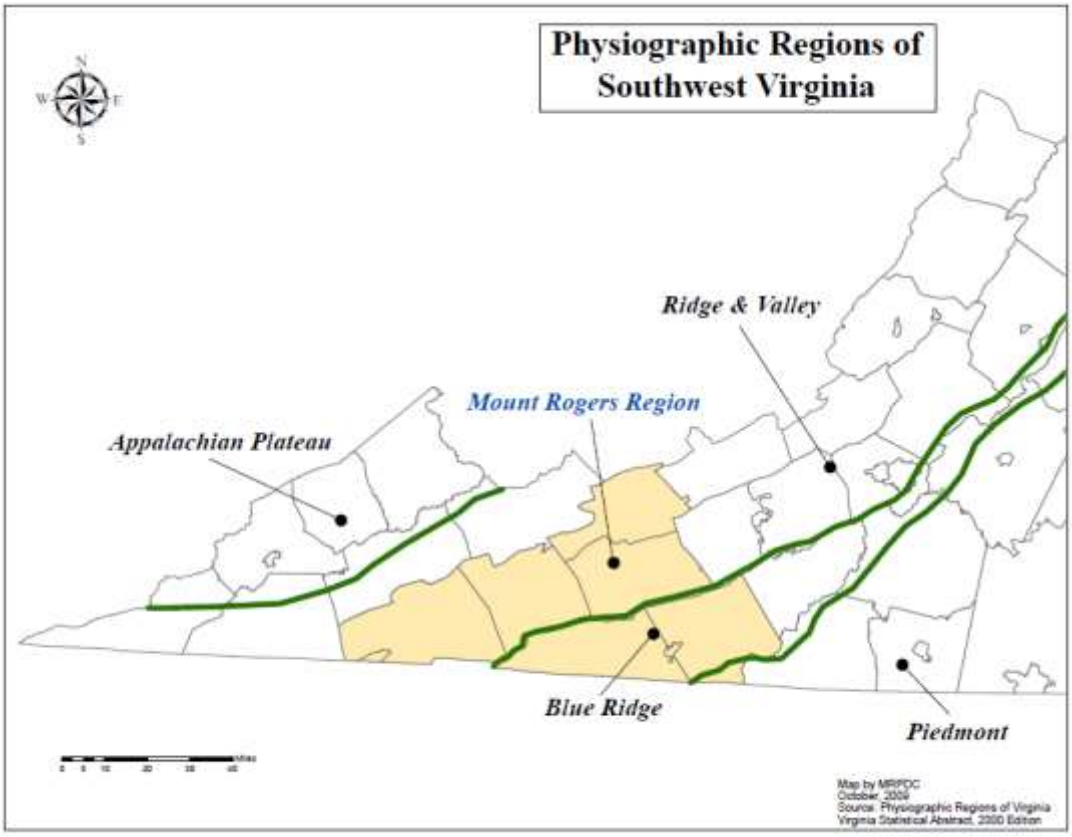
Implementation of mitigation strategies is the final step of these planning efforts. Mitigation strategies can take many forms, most commonly directed towards flooding, hurricanes, and

earthquakes, three historically catastrophic events. The true community benefits of mitigation planning are not realized until the construction or installation of these projects is completed.

Community Profile

Natural Features

The region covers 2,777 square miles and stands within both the Ridge & Valley and the Blue Ridge geologic provinces of Virginia. An image (Physiographic Regions of Southwest Virginia) is shown below.

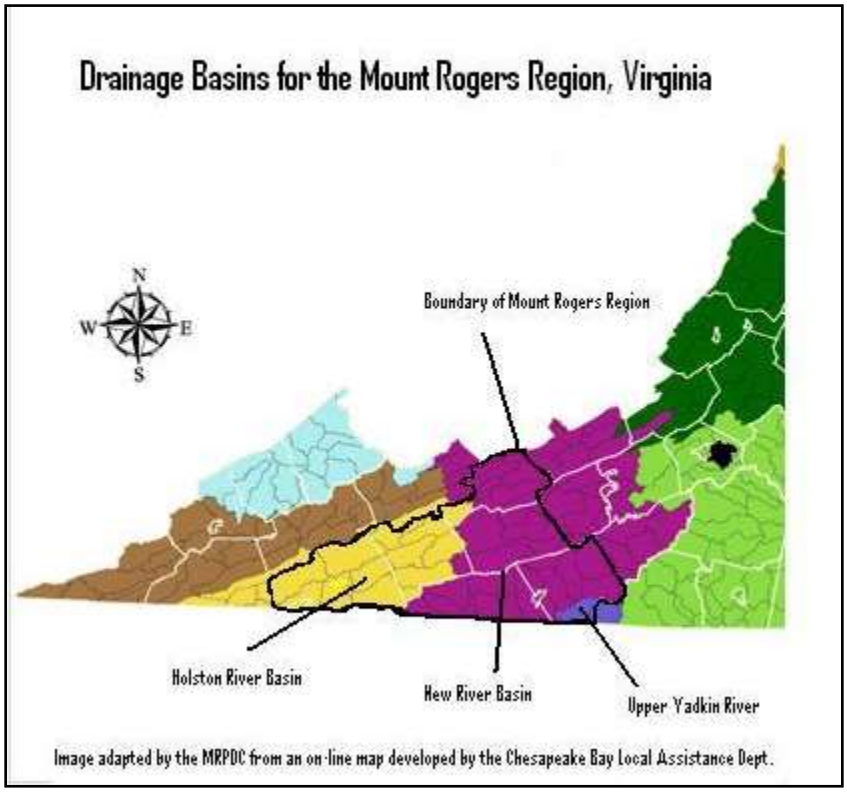


In the Ridge & Valley section, the land is characterized by valleys with low to moderate slopes underlain by carbonate rocks; this area starts in Bristol and runs in a northeasterly direction through Washington, Smyth and Wythe counties in a track toward Roanoke. Elevations generally range between 1,200 and 2,300 feet. The Blue Ridge portion generally includes Grayson and Carroll counties. The land appears as a broad upland plateau with moderate slopes. The elevations are higher, generally ranging from 2,400 to 3,000 feet, and sometimes

much higher. Mount Rogers itself, located near the junction of Grayson, Smyth and Washington counties, stands at more than 5,729 feet.

Natural Resources

The principal watersheds that drain the region include the Holston River system (including the North, South and Middle Forks), the New River, and a small portion of the Upper Yadkin River drainage as shown on the map below.



The Holston River Basin flows in a southwesterly direction to join with the Tennessee River system. The New River flows in a northerly direction into West Virginia, while the Upper Yadkin flows south into North Carolina. Much of the Mount Rogers region contains state and national forest, including the Mount Rogers National Recreation Area. The mountainous terrain generally precludes intensive development other than in the limited valley regions of the district.

Mineral resources of the region include limestone, sandstone, granite, gravel, sand, shale, iron oxide, quartzite and salt. All are actively mined, according to the state Department of Mines, Minerals and Energy. Historically important minerals in the region included coal, iron, lead, zinc,

salt, gold, and gypsum. The richer mineral resources of the west have long since replaced much of the local mining activity in the Mount Rogers region.

Temperatures and Climate

The local region stands within a temperate climate zone influenced by the mountainous nature of southwest Virginia. Temperatures range from average lows of 15° F-25° F (in January) to average highs of 80° F-90° F (in July). The differing elevations and lay of the land account for the range of differences in local weather. The MRPDC ranges in elevation from 5,729 feet at its highest point on Mount Rogers in western Grayson County, to 1,110 feet along Lovills Creek on the Carroll Surry County line. Local annual precipitation also is highly variable. It ranges from 62" annually in the highest mountains (Mount Rogers and surrounding area in the Blue Ridge) to 46" annually in other parts of the district. Weather patterns and climate are influenced by the Appalachian and Blue Ridge mountain ranges, the direction of airflow and the effects of the major river valleys. Weather systems typically move from west to east. Cloud systems may pass up and over the mountains. As clouds rise, their moisture content condenses and falls as rain or snow; that often results in heavy precipitation on the western slopes of the mountains and little or no precipitation on the eastern (or rain shadowed) slopes of the mountains. Weather systems and storms also may follow the river valleys, running parallel to the mountain ranges.

Political Boundaries

The Mount Rogers region, as designated by the Virginia General Assembly, includes six counties Bland, Carroll, Grayson, Smyth, Washington, and Wythe, two cities Bristol and Galax, twelve towns Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville.

Key transportation systems within the region include the interstate highways (I-81 and I-77), U.S. Route 58 and U.S. Route 11, several local airports, some limited public transit service, and service from local taxicabs and Greyhound Bus Lines. The Norfolk Southern Railway is an important private hauler of freight. Passenger rail service presently is lacking in the region.

The region is variable in nature. It ranges from the very rural character of Bland County, with a population of 6,511 (a decrease of 4.6% since the last plan update) to the rapidly urbanizing character of the largest county, Washington, with a growing population of 53,789 (a decrease of 2.0% since the last plan update). Grayson and Carroll counties are known as places for

second home development, especially in areas with views of the New River. The two mid-size counties, Smyth and Wythe, with populations of roughly 30,000 each, serve as centers of commerce and manufacturing. The three largest towns, each with populations greater than 5,000, are Abingdon, Marion and Wytheville.

Population

As of 2017 the region-wide population numbered 188,498, according to the Weldon Cooper Center for Public Service at the University of Virginia. The population of the Mount Rogers Region was 193,595 as of the 2010 Census, up approximately 2.4% from the 2000 level of 188,984. Currently the region wide population has decreased 2.6% since the last census in 2010. The decline is distributed unevenly within the region. Only one locality saw a slight increase in population. This occurred in Grayson County. Bland County, Carroll County, Smyth County, Washington County, Wythe County, and the Cities of Bristol and Galax saw a slight decrease in population in the past five years since the last update of the Hazard Mitigation Plan.

Locality	2017	2012	% Population Change
Bland	6,511	6,824	-4.6%
Carroll County	29,212	30,042	-2.8%
Grayson County	15,669	15,533	0.9%
Smyth County	30,686	32,208	-4.7%
Washington County	53,789	54,876	-2.0%
Wythe County	28,723	29,235	-1.8%
City of Bristol	17,160	17,835	-3.8%
City of Galax	6,748	7,042	-4.2%
Mount Rogers Planning District	188,498	193,595	-2.6%

Source: Weldon Cooper Center for Public Service, 2012 and 2017 Population Estimates

Median family income for the region as of 2016 came to $39,655[1], which lags behind the statewide level of $66,149[1], as reported by the U.S. Census Bureau. This number reflects a 3% decrease in median household income for the Mount Rogers region over the past ten years. Incomes in the Mount Rogers region have traditionally lagged behind statewide averages, along with the region's rate of new job creation. At the same time, unemployment generally runs higher than the statewide average, reflecting disparities between the high job growth rates in northern Virginia compared against job growth rates in southwest Virginia.

[1] U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Ethnically, the Mount Rogers region is dominated by whites (95.4%)[2]. Of a total population of 193,595 in the region the largest significant minority populations are African American totaling 2.2% and Hispanics totaling 2.1%.

Economy

Manufacturing stands as one of the key employment sectors for the Mount Rogers region, though foreign competition is undermining the sector. From 2000 through 2011, the region lost 10,000 manufacturing jobs, with the total going from 24,274, to 14,106 a decrease of 41%. By end of the third quarter of 2017, the number of manufacturing jobs had stabilized at 13,477[2], a decrease of only 4.5% over the 6-year period. The sector includes production of refrigeration and heating equipment, clothing, truck trailers and motor vehicle parts, glass products, furniture, wood products, hardware, sporting and athletic goods, and mining equipment.

The next largest employment sector falls in the government category, with 13,405[2] jobs in third quarter 2017, 8,944 in local government, 3,963 in state government, and 498 in federal government. The next highest employment by category is retail trade (10,103) and health care and social assistance (8,495).

Agriculture and forestry offer relatively few jobs but remain an important industry to the Mount Rogers region. Chief products include livestock, poultry, with a growing sector raising produce. Christmas trees, raised in the higher elevations, also are important to the region.

Planning Process

Planning Team

Since 2017 the Mount Rogers Planning District staff has been working with its localities to update the Pre-Disaster Hazard Mitigation Plan that was approved by FEMA in 2012. Between the years of 2005-2012 each year VDEM provided us with a spreadsheet outlining the recommended mitigations for each locality. The staff at Mount Rogers facilitated a yearly update of the mitigation strategies. VDEM did not provide/require this after the last plan update in 2012. This process is scheduled to start again after the 2018 adoption of the plan on a biennial basis. The hazard mitigation steering committee was composed of county

[2] Virginia Employment Commission Community Profile, 2018

administrators, town managers, emergency management personnel, local and state personnel, regional governmental employees, members of the business and public utility community, and any interested stakeholders from the public. The steering committee oversaw the plan update process as well as coordinated with local fire, rescue, and police personnel.

Planning Process

The Mount Rogers Planning District Commission initiated the plan update process in the spring of 2017. A regional kick-off meeting was held at the offices of the Mount Rogers Planning District Commission in Marion, Virginia on May 25th, 2017. At this meeting, the MRPDC and the stakeholders from the various localities reviewed the process for updating the plan, as well as outlining how the old plan would be improved upon.

The Mount Rogers staff met with the steering committee members weekly or monthly in small groups or on a one on one basis throughout the rest of the year. All members were also contacted through telephone conversations or emails. A second meeting at the Mount Rogers PDC was called on November 30th, 2017. After that meeting with representatives from VDEM and FEMA some new input was requested to be added into the plan update. Another round of meetings with each locality was conducted in December of 2017 and January of 2018, in addition with meeting with other members of the community outside of local government. Please see the table below for a listing of meetings and conversations with stakeholders.

Meetings/Conversations with Stakeholders	
Month	Stakeholder (Day of Month)
May 2017	Kickoff Meeting (25), All localities (31)
June 2017	Town of Chilhowie (1), Smyth County (2), Town of Abingdon (7), Bland County (21)
July 2017	Bland County (5), Town of Damascus (20), Bland County (24)
August 2017	Town of Damascus (10), City of Galax (24), All localities (29), Town of Marion (30)
September 2017	Grayson County (1), Town of Chilhowie (1), Town of Marion (1), Smyth County (1), Washington County (11), Smyth County (18)
October 2017	Wythe County (24), Town of Wytheville (24), Bland County (24)
November 2017	VDEM (1, 2), FEMA (2), All localities (8), FEMA (16), Washington County (27), Town of Chilhowie (27), Grayson County (28), Meeting at MRPDC (30)
December 2017	Town of Saltville (1), FEMA (4), Washington County (6), All localities (6), FEMA (11), NOAA (14, 15)
January 2018	VDEM (3), Appalachian Power (4), DCR (9, 10), City of Bristol (23), Town of Glade Spring (24)
February 2018	Emory & Henry College (7)
March 2018	VDEM (8), All localities (28), Town of Abingdon (30)

April 2018	Wythe County (2), Town of Wytheville (2), Town of Rural Retreat (2), Washington County (3), Grayson County (12)
August 2018	All localities (6)

Sign-In Sheet

Hazard Mitigation Kick-Off Meeting **May 25, 2017**

Print Name	Locality	Title	Email
BRIAN MARTIN	GLADE SPRING FRIES, TROUTDALE	TOWN MGR	BMARTIN@MRPDC.ORG
Brian Reed	RR	"	breed
Jenna Dunn	Bland County	Adm/Emer Svc Coord	jdunn@blandcounty.org
Everett Lineberry	Carroll Co.	EM Coordinator	elineberry@carrollcountyva.org
Retta Jackson	Hillsville	Town Manager	hillsville@townofhillsville.com
Jason Busick	Wythe Co	EM Coordinator	jbbusick@wytheco.org
Tim Estes, Sr	WASH. Co.	EM Coordinator	timestes@washcova.com
Mike Ayers	Galax	Rdr Coordinator	mayers@galaxva.com
Gavin M. Blevins	Pamplin	Town Manager	gblevins@mrpdc.org
Aaron T. Smith	Chilhowie	Lieutenant PD	chilhowie.smith@chilhowie.org
Brandon Moore	Bristol, VA	Lieutenant	brandon.moore@bristolva.org
Mike Armstrong	Bristol, VA	Fire Chief - EM	mike.armstrong@bristolva.org
Aaron Sizemore	MRPDC	Director	asizemore@MRPDC.org
Rocky Warren	MRPDC	Planner	RWARREN@mrpdc.org
Scott McCoy	MRPDC	Intern	smccoy14@etsu.edu
Jimmy Mays	Grayson Co.	EM Coordinator	jmays@graysoncova.gov
James Dillon	MRPDC	GIS Dir	jdillon@mrpdc.org

Sign-In Sheet

Hazard Mitigation Meeting **November 30, 2017**

Print Name	Locality	Title	Email
[illegible]	Smyth County	EM Coordinator	CHarrington@SmythCountyva.gov
TYLER YENCILL	ABINGDON	TOWN ENGINEER	tyencill@abingdon-va.gov
DAVE HAYNES	CHILHOWIE	FIRE CHIEF	cdhaynes2201@gmail.com
Jason Basick	Wythe County	EM Coordinator ES Director	jbbusick@wytheco.org
Justin Haga	VDEM	DRRO	justin.haga@vdem.virginia.gov
Sara Harrington	VDEM	Pvt. Hazards Planner	Sara.harrington@vdem.virginia.gov
John Clark	Chilhowie	Town Manager	chilhowie.townmgr@chilhowie.org
Aaron Sizemore	MRPDC	Executive Dir	asizemore@MRPDC.org
Rocky WARREN	MRPDC	PLANNER	RWARREN@mrpdc.org
Mari Radford	FEMA	Comp. Planning	mari.radford@fema.dhs.gov

The committee members first reviewed the existing data that was included in the last Hazard Mitigation Plan update. Throughout the 2017 Hazard Mitigation Plan Update process the materials from each section of the original plan as well as any new changes were looked over. For the most part in the past five years there were few changes the committee felt needed to be added to the updated plan due to the fact that little has changed in our region in the past five years. Focus and discussion was placed on each hazard identified to be a potential threat to the district. The committee brought in their own knowledge of any disasters that had happened in their districts within the past five years since the plan's original adoption. The committee took these ideas back to their localities and met with their local representatives in the emergency services field and gathered any additional information they could find concerning how natural disasters are dealt with, as well as any areas where the localities had vulnerabilities or difficulties in responding to disasters. All meetings were open to the public.

Following any reviews of the data gathered, the group then brainstormed mitigation objectives and strategies to include in the plan update. The final component of the committee meetings

was a capabilities and vulnerability assessment. Each member of the committee was encouraged to discuss with any person or group, or with an agency or the public that may have valuable input to add to the plan update. This cast a wider net enabling the steering committee members to consult with many people outside of local government.

Plan Participation

Below are two tables, the first outlining the localities and agencies that had input in developing the Hazard Mitigation Plan update. Some participated on the steering committee that met at the Mount Rogers PDC offices. Others participated by personal visits, phone calls, or through email. The second outlines the localities that participated in the plan update as well as the original drafting of the Hazard Mitigation Plan.

Planning Committee Member	Representing	Title/Department
Tyler Vencill	Abingdon	Civil Engineer Public Works
Jenna Dunn	Bland County	911 Emergency Services Coordinator
Mike Armstrong Brandon Moore	Bristol	Fire Chief Lieutenant
Everett Lineberry	Carroll County	Emergency Services Coordinator
John Clark Dave Haynes	Chilhowie	Town Manager Fire Chief
Gavin Blevins	Damascus	Town Manager, Planner
Scott McCoy	Fries	Town Manager
Mike Ayers	Galax	R&R Director Fire Department
Aaron Sizemore	Glade Spring	Town Manager
Jimmy Moss	Grayson County	Emergency Services Coordinator
Retta Jackson	Hillsville	Town Manager
Jimmy Moss	Independence	Emergency Services Coordinator
Bill Rush	Marion	Town Manager
Jason Childers	Rural Retreat	Town Manager
Brian Martin	Saltville	Town Manager, Planner
Charles Harrington	Smyth County	Housing Authority
Brian Martin	Troutdale	Town Manager, Planner
Tim Estes	Washington County	Emergency Management Coordinator
Jason Busick	Wythe County	Emergency Management Coordinator
Al Newberry	Wytheville	Director of Public Safety
Sara Harrington	VDEM	All Hazards Planner
Justin Haga	VDEM	DRRO
Brian Reed	MRPDC	Planner

James Dillon	MRPDC	GIS Director
Rocky Warren	MRPDC	Planner
Phil Hysell	NOAA	Warning Coordination Meteorologist
Donny Necessary	VDOT	Bristol District Planner
Tony Miller	APCO	Distribution Systems Supervisor
Steve Gibson	LENWISCO PDC	GIS Analyst
Tom Roberts	DCR	Regional Dam Safety Engineer
Angela Beavers	Cumberland Plateau PDC	GIS Internet Technology
Patrick Wilson	NOAA	Meteorologist Intern

Locality Participation 2005, 2011, & 2017

Locality	2005 Participation	2011 Participation	2017 Participation
Abingdon	X	X	X
Bland County	X	X	X
Bristol	X	X	X
Carroll County	X	X	X
Chilhowie	X	X	X
Damascus	X	X	X
Fries	X	X	X
Galax	X	X	X
Glade Spring	X	X	X
Grayson County	X	X	X
Hillsville	X	X	X
Independence	X	X	X
Marion	X	X	X
Rural Retreat	X	X	X
Saltville	X	X	X
Smyth County	X	X	X
Troutdale	X	X	X
Washington County	X	X	X
Wythe County	X	X	X
Wytheville	X	X	X

Plan Update

For the five-year update for the Mount Rogers Hazard Mitigation Plan, the planning team and steering committee reviewed and updated each chapter of the plan. Each of the Hazard Identification and Risk Assessment (HIRA) sections were revised based on current information and the updated analysis conducted by the Mount Rogers Staff. The committee discussed both historical information focused on each hazard as well as brainstorming new mitigation objectives and strategies. These new strategies are included in each hazard section and in the

mitigation strategy chapter. The Community Summaries chapter was updated through discussions with each community's representative to the steering committee. Information was also gathered by the staff from emergency management personnel as well as interest individuals in the public. Through these discussions, new information was added where necessary and specific mitigation projects identified by the localities were included. The planning team reviewed numerous local documents to include in various sections of the updated plan, including but not limited to local comprehensive plans, emergency operations plans, and capital improvement plans. In some cases, the 2005 original Hazard Mitigation plan was included in discussions and updates of these plans. For example, in the 2011 update process for the Town of Marion comprehensive plan, the Mount Rogers Hazard Mitigation Plan was referred to specifically in reference to the developed floodplain along the Middle Fork of the Holston River. The 2017 Plan was referenced in the updates of the comprehensive plans of Town of Saltville, Grayson, County, and the Town of Chilhowie. The information gathered from these sources was included as data in the HIRA chapter, as well as providing some of the basis of the capabilities assessment section.

Public Involvement

Public input was solicited throughout the planning process. All committee members were asked to go to their localities and solicit input from their citizens. All meeting at the Mount Rogers PDC were open to the public as well. A project website was created so the public could review the original Hazard Mitigation plan and provide input toward sections of the plan update they were interested in. The website allowed the public to view the plan and share input if they could not attend the called meetings. The plan was also advertised on social media to make it easier for the public to be involved. Also at least one public meeting will be held during the adoption process to give anyone an opportunity to comment on the entire plan before its official adoption by each locality.

Other Involvement

Mount Rogers also discussed update ideas with our neighboring regional government offices Cumberland Plateau, and the LENWISCO Planning District Commissions. Emory and Henry College, Appalachian Power, the Department of Conservation and Recreation, the National Weather Service, and the Virginia Department of Transportation, and the Mount Rogers Health District were also invited to give their input into the plan update. In our meetings with our local officials we stressed to not limit data gathering and input to local governments, fire and rescue.

We asked them to talk to anyone in their community as well as local business owners and land owners to make the fact-finding process as thorough as possible.

HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Introduction

The Mount Rogers Region is susceptible to a wide range of natural hazards. Fortunately, the inland and mountainous setting of the Mount Rogers region protects it from most coastal phenomena such as hurricanes and tropical storms. This also shelters us from the brunt of most tornados. However, the parts of the region suffered severe damage in the spring of 2011 from an F3 tornado. We also suffered minor damage from an F1 tornado in fall of 2017. The mountains, steep slopes, forests, and other geographic factors subject the region to many kinds of other natural hazards. These include:

- Dam Safety
- Karst & Sinkholes
- Tornadoes/Hurricanes
- Drought
- Landslides
- Wildfires
- Earthquakes
- Severe Winter Storms/Ice
- Flooding
- Windstorms
- Thunderstorms/Lightning
- Hazardous Material Spills (HAZMAT)

This section discusses each of the natural hazards possible in the region, including history, risk assessment and vulnerability, and past or existing mitigation. The hazard risk assessment and vulnerability looks specifically at two criteria: locations where the hazard is most likely to have negative impacts and the probability and severity of the hazard should it occur. When information is available, the specific impacts of a hazard is discussed, sometimes based on the

usual impact in the region. These sections haven been completely revised since the 2005 plan to include additional, more helpful information.

Risk Assessment and Vulnerability

Risk assessment seeks to define the probability of events and the likely consequences of events. In the past five years, the Mount Rogers Planning District has experienced a population declines, which will also decrease our risk of potential disaster. Also, as our population declines the probability of loss of life and injuries will decrease.

The risk assessment and vulnerability presented herein is a result of an extensive analysis of historic event data, scholarly research and field work.

Mitigation

Many times, mitigation seeks to prevent the impacts of hazards on life and property. The primary goal of mitigation is to learn to live within the natural environment. This plan reviews past mitigation efforts in the Mount Rogers Region and identifies both strategies and specific projects that could further mitigate these impacts.

Mitigation options fall generally into six categories: prevention, property protection, natural resource protection, emergency services, structural projects and public information. Prevention projects are those activities that keep hazard areas from getting worse through effective regulatory planning efforts, such as comprehensive planning, building code update and enforcement, burying utility lines and water source planning. Property protection activities are usually undertaken on individual properties or parcels with coordination of the property owner, such as elevation, relocation and acquisition of frequently flooded or damaged structures, eliminating fuel sources surrounding the property, installing rain catchment systems and purchasing additional insurance. Natural resource protection activities seek to preserve or restore natural areas or natural functions of floodplain and watershed areas. They are often implemented by parks, recreation, or conservation agencies or organizations. Emergency services measures are taken during a hazard event to minimize its impact. These measures can include response planning, regional coordination and collaboration and critical facilities protection. Structural projects include activities associated with building new or additional infrastructure or features to minimize impacts from a hazard. The final category of public information is possibly the most important, empowering residents to take action to protect

themselves and their property in the event of a hazard event. This category can include additional information available to the public, such as maps, brochures, and workshops.

Overview of Assessments

The following section describes each of these hazards, their history, severity and impact, and likelihood of causing damage. Describing the hazards separately is problematic because natural hazards often combine. Flooding often follows severe winter storms. Thunderstorms contain lightning, high winds, and, rarely, tornadoes. Heavy rain can cause flooding and landslides. These descriptions, however, will provide detailed information and a basis for further analysis.

Dam Safety

Description

Dams exist to serve various functions within the Mount Rogers region. These include farm use, recreation, hydroelectric power generation, flood and stormwater control, navigation, water supply, fish or wildlife ponds, debris control, and tailings (from mining operations). In some cases, a single dam structure can serve multiple functions, such as generating hydroelectric power and providing recreational opportunities to boaters and fishermen.

State and federal governments regulate dam construction, maintenance and repair. On the state level, the Virginia Dam Safety Act of 1982 serves as the guiding legislation. With certain exceptions, dams that must abide by this statute fall under one of two categories:

- Dams 25 feet tall or higher, with a maximum storage capacity of 15 acre-feet or more.
- Dams 6 feet tall or higher, with a maximum storage capacity of 50 acre-feet or more.

Dams not regulated by the state include those with an agricultural exemption (95 statewide), a federal license (114 statewide), a mining exemption (20 statewide), or a size exemption (879 in the state). Spillways are channels designed to keep water from overflowing the top of the dam and to prevent erosion at the bottom, or toe, of the dam. State law regulates spillway construction based on the dam's hazard classification and site classification. The federal government maintains an inventory of dams through the National Dam Inspection Act of 1972 and, more recently, the Water Resources Development Act of 1996. Maintained by the U.S. Army Corps of Engineers, the inventory has been available on-line since January 1999. It is called the National Inventory of Dams, and its database covers roughly 77,000 dams, including

several in the Mount Rogers region. A map showing the location of all dams in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

Dam Hazard Classification

The state and federal governments have adopted slightly different methods of classifying dam hazard potential. For the federal national inventory, dams are grouped into one of three categories, based on two criteria: the potential for loss of human life and the potential to cause economic, environmental and lifeline losses, in the event of a dam failure.

Virginia's dam classification system varies in that it classifies the state-regulated dams into one of four categories. 1.) Loss of human life probable with excessive economic impact, 2.) loss of human life possible with appreciable economic impact, 3.) no loss of human life expected with minimal economic impact, and 4.) no loss of human life expected with no economic impact.

Under the state system, dam operation and maintenance plans, as well as inventory reports, must be completed every six years. Re-inspection reports, performed by professional engineers, must be made at 2-year intervals for Class I dams and 3-year intervals for Class II dams. In addition, dam owners must inspect their own dams and submit annual reports in years when professional inspections are not required.

Dam Hazard History

In the Mount Rogers region there has been some history of dam failures over the years, although obtaining a complete record has proven difficult for the purposes of this Hazard Mitigation report. Regulatory agencies at the state and federal governments are reluctant to release full information on dams, inspection histories, and known hazards. Hazard classifications, in and of themselves, serve as a bureaucratic indicator of potential hazard in the event of dam failure, but the classification does not reflect the present physical condition or status of any given dam.

In Bland County, a failure in the Crab Orchard Creek Dam at about noon on January 29, 1957 flooded the community of Bland as a result of three days and nights of continuous rains. The water went through a crack that opened when a slate hillside on one side gave way. While no one was hurt, the flooding destroyed or severely damaged many homes and also swept away outbuildings, cars, fences, machinery, livestock, and household equipment. The flooding also

damaged several downtown businesses. One house floated a mile downstream and came to rest against a bridge and other wreckage. One home was tilted on edge and carried 200 yards downstream to come to rest against a concrete bridge in the community. Estimated damages came to $500,000. The local unit of the American Red Cross provided $30,363 in emergency aid, with nearly $22,395 going for structural repairs. This photo shows the tilted home (see far right of image) that was swept 200 yards downstream during the Crab Orchard dam failure and flood of 1957.

Some now believe that Interstate 77, which passes between the dam and the community, will protect Bland from a similar occurrence in the event the dam should fail again. However, the state's hazard rating on the dam was upgraded in 2004 from significant hazard (Class II) to high-hazard status (Class I). The dam owner hired an engineer as part of an effort to show why the Crab Orchard Creek Dam does not deserve a Class I rating. Another locally known dam failure occurred on Christmas Eve in 1924, when the muck dam at Saltville broke and flooded the community of Palmertown, killing 19 people and dislodging several homes from their foundations. According to at least one news account at the time, the dam failure occurred due to human intervention; police accused a 27-year-old man named Roy Patrick of using dynamite to blow up the dam.

Risk Assessment and Vulnerability

For the purposes of hazard mitigation, this report takes note of dams classified with a potential for high or significant hazard in the event of failure, as defined under the National Inventory of Dams. Those dams classified with a low hazard potential were not considered.

High-hazard and significant-hazard dams (14 total) in the Mount Rogers region primarily consist of earthen structures built for recreational use. Four of the dams are used to generate hydroelectric power, although three of those also offer recreational uses. Several of the dams combine recreational uses with flood or stormwater control. Clear Creek Dam in Washington County, near the City of Bristol, serves multiple uses. These include flood and stormwater control, recreation, water supply, and other uses.

Of the 14 previously mentioned dams, six come under federal regulations. These include the Byllesby Dam and Buck Dam on the New River in Carroll County, Hale Lake Dam in Grayson County, and Beaver Creek Dam, Clear Creek Dam and Edmondson Dam (which has been breached), all located in Washington County. These dams mainly serve to provide hydroelectric power or flood control.

Due to recent changes in state dam safety regulations, two more of the region's dams – Laurel Creek Dam and Fields Dam, both in Grayson County – will be required to prepare Emergency Action Plans. EAPs, contained in county emergency operations plans to govern emergency response for natural and man-made disasters, define roles by dam owners and emergency services personnel for monitoring of dams' physical condition and notification of downstream communities in the event of flooding or potential dam failure. For more details on all the region's dams classified as High Hazard and Significant Hazard, please see the table found at the end of this section.

There is no way to predict the likelihood of a dam failure, since failures relate to the structure, condition, age, maintenance, and natural forces (and storm events) that can affect the integrity of the dam. A well-maintained dam classified as a High Hazard structure may in fact pose little risk to downstream community.

Dam regulation first began in this country due to failures of poorly built dams in the early part of the 20th century. More regulations came following a series of dam failures in the 1970s. Legally, dam owners hold the responsibility for the safety, upkeep, and maintenance of dam structures. Of the 75,000 dams listed by the National Inventory of Dams, 95% fall to the regulation of state governments

The possibility of failure generally increases with age, with many dams designed for an effective life of 50 years. Six of the 14 high-hazard and significant-hazard dams in the Mount

Rogers region are at least 50 years old. Dams with known structural problems can be given conditional operating permits, which point to the need to make improvements. There are 30 such dams in Virginia, with none located in the Mount Rogers region.

Property Exposure Data for Downstream Communities

Legally dam owners must properly monitor and maintain their dams, while state and federal regulators act as overseers and enforcers. But the Association of State Dam Safety Officials and others point out that the effectiveness of regulation vary among states and dam owners often lack the financial resources necessary to undertake costly repairs.

Events that can lead to dam failures include the following: overtopping, structural failure, loss of stability in the dam's foundation, cracking in the dam structure from natural settling, poor upkeep, and piping (resulting from improper filtration in the dam structure, allowing seepage and passing of soil particles to gradually create sinkholes in the dam). The vulnerability of structures and homes at risk of dam failure has not changed since the drafting of the original Hazard Mitigation Plan, and no dam failures have occurred in that time.

High-Hazard and Significant-Hazard Dams
Mount Rogers Region, Virginia

Dam and Location	Nearest Downstream Community	Dam Height and Max. Capacity*	Drainage Area (Sq. Miles)	Year Done	Hazard Potential**	Emergency Action Plan in Place***	Owner Type	Main Use	Structures at Risk	Notes
Crab Orchard Creek Dam (Bland County)	Bland	51 ft high 550 acre-ft	4.98	1953	High (recent upgrade)	Yes	Private	Recreation	19 occupied homes, 18 businesses	Based on 1995 Emergency Operations Plan for Bland County. The state now regulates this as a Class I dam.
Byllesby Dam (New River, Carroll County)	Ivanhoe Austinville	63 ft. high 2034 acre-ft	1,310	1912	High	Federal Regs	Public Utility (AEP)	Hydroelectric	N/A	Data not available. This is a federally regulated hydroelectric dam.
Buck Dam (New River, Carroll County)	Ivanhoe Austinville	45 ft. high 708 acre-ft	1,320	1912	High	Federal Regs	Public Utility (AEP)	Hydroelectric	N/A	Data not available. This is a federally regulated hydroelectric dam.
Stewarts Ck-Lovills Ck Dam #9 (Carroll County)	Mt. Airy, NC	88 ft. high 7415 acre-ft	20.92	1990	High	Yes	Local Govt (Carroll County)	Recreation	N/A	
Hidden Valley Estates Dam (Grayson County)	Not given	29.4 ft. high 77 acre-ft	0.2	1989	Significant	Yes	Private	Recreation	N/A	
Laurel Creek Dam (Laurel Creek, Grayson County)	Fox Creek	24 ft. high 60 acre-ft	0	1974	Significant	Not Yet (formerly size exempt)	Private	Recreation	N/A	Downstream risks have not yet been assessed due to prior size exemption for this dam. The state will require an EAP under new rules adopted in 2002.

Dam and Location	Nearest Downstream Community	Dam Height and Max. Capacity*	Drainage Area (Sq. Miles)	Year Done	Hazard Potential**	Emergency Action Plan in Place***	Owner Type	Main Use	Structures at Risk	Notes
Fields Dam (New River, Grayson County)	Fries	14 ft. high 2000 acre-ft	0	1930	Significant	Not Yet (formerly size exempt)	Private	Hydroelectric	N/A	Downstream risks have not yet been assessed due to prior size exemption for this dam. The state will require an EAP under new rules adopted in 2002.
Hale Lake Dam (Wolf Pen Branch, Grayson County)	Comers Rock	30 ft. high 53 acre-ft	0	1965	Significant	Federal Regs	Federal (U.S. Forest Service)	Fish & wildlife	N/A	Data not available. This is a federally regulated fish & wildlife dam.
Hungry Mother Dam (Smyth County)	Marion	45 ft. high 2500 acre-ft	12.9	1934	High	Yes	State (DCR)	Recreation	Campground A few houses	
Beaver Creek Dam (Washington County)	Bristol	85 ft. high 5020 acre-ft	13.7	1965	High	Federal Regs	Federal (TVA)	Flood control	N/A	Data not available. This is a federally regulated flood control dam owned by TVA.
Clear Creek Dam (Washington County)	Bristol	51 ft. high 2825 acre-ft	5.75	1965	High	Federal Regs	Federal (TVA)	Flood control	N/A	Data not available. This is a federally regulated flood control dam owned by TVA.
Edmondson Dam (Middle Fork Holston River, Washington County)	Mock Mill	47 ft. high 2620 acre-ft	0	1921	Significant	Federal Regs	AEPSCO	Hydroelectric	N/A	Data not available. This is a federally regulated hydroelectric dam.

Dam and Location	Nearest Downstream Community	Dam Height and Max. Capacity*	Drainage Area (Sq. Miles)	Year Done	Hazard Potential**	Emergency Action Plan in Place***	Owner Type	Main Use	Structures at Risk	Notes
Hidden Valley Lake Dam (Brumley Creek, Washington County)	Duncanville	40 ft. high 1975 acre-ft	1.67	1964	Significant	Yes	State (VDGIF)	Recreation	N/A	
Rural Retreat Dam (S. Fork Reed Creek, Wythe County)	State Rt. 749	41 ft. high 2266 acre-ft	3.34	1967	High	Yes	State (VDGIF)	Recreation	N/A	

Sources: National Inventory of Dams maintained by the U.S. Army Corps of Engineers; consultations with local emergency services coordinators; consultations with Virginia state dam safety officials.

Mount Rogers PDC

High-risk and Significant Hazard Dams

List of All Known Dams in Mount Rogers Region

County	Name Dam
Bland County	Hunting Camp Dam
Bland County	Crab Orchard Creek Dam
Bland County	Bland County Farm Dam
Carroll County	Russell Dam
Carroll County	Byllesby Dam
Carroll County	Buck Dam
Carroll County	Olde Mill Golf Club Dam
Carroll County	Patch Inc. Dam
Carroll County	West Dam
Carroll County	Stewarts Creek - Lovills Creek Dam #9
Carroll County	Ernest Golding Dam
Carroll County	Carol Cox Dam
Carroll County	Richard Webb Dam
Carroll County	Lakeside POA Dam
Carroll County	Grassy Creek Farm LLC Dam
Carroll County	Caviness Dam
Carroll County	Vannoy Family Farms LLC Dan
Carroll County	Bruce Bryant Dam
Grayson County	Parker Dam
Grayson County	Hale Dam
Grayson County	Fries Mill Dam
Grayson County	Fields Dam
Grayson County	Hidden Valley Estates Dam
Grayson County	Laurel Creek Dam
Grayson County	Roberts Dam
Grayson County	JoAnn Arey Dam
Grayson County	Cassell Dam
Grayson County	Bolt Dam
Grayson County	Chicago Heritage Farms LLC Dam
Grayson County	Bottomley Evergreen & Farms Inc. Dam
Grayson County	John Hart Dam
Grayson County	Henry Jones Dam
Grayson County	Highlander Dam
Grayson County	Shateley Dam
Smyth County	Glade Mtn Washer Site 3 Dam
Smyth County	Umberger No. 1 Dam
Smyth County	Brushy Mtn No 2 Dam
Smyth County	Glade Mtn Washer Site No. 1 Dam

County	Name Dam
Smyth County	Billings Dam
Smyth County	Johnson Dam
Smyth County	Waddle Dam
Smyth County	Hungry Mother Dam
Smyth County	Smyth County Dam #1
Smyth County	Smyth County Dam #2
Smyth County	Smyth County Dam #3
Washington County	Clear Creek Dam
Washington County	Straight Branch Dam
Washington County	Hidden Valley Lake Dam
Washington County	Beaver Creek Dam
Washington County	Thomas Nichols Dam
Washington County	Kenneth Nicewonder Dam
Washington County	Olde Farm Dam
Washington County	Glenrochie Dam
Washington County	Texas Brine Dam
Wythe County	No. 1 Tailings Pond Dam
Wythe County	Impoundment 173 Dam
Wythe County	Rural Retreat Dam
Wythe County	Butt Dam #1
Wythe County	Harold Leedy Dam
Wythe County	Harold Leedy Horseshoe Pond
Wythe County	Reed Creek Dam
Wythe County	Paul Riefenberg Dam
Wythe County	Talley Farms Dam
Wythe County	ALC Acquisition Dam
Wythe County	Crowder Dam
Wythe County	Wythe County Dam #1
Wythe County	Harold Leedy Dam #1
Wythe County	Harold Leedy Dam #2
Wythe County	Kenneth Tibbs Dam
Wythe County	Butt Dam #2
Wythe County	Sharon Ball Dam
Wythe County	Windy Acres Dam

Drought

Description

In simple terms, drought can be defined as "a condition of moisture deficit sufficient to have an adverse effect on vegetation, animals, and man over a sizeable area." Drought can also be defined in terms of its effects and divided into categories, as suggested by FEMA:

- Meteorological drought: Defined solely on the degree of dryness, expressed as departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Hydrologic drought: Related to the effects of precipitation shortfalls on streamflows and reservoir, lake, and groundwater levels.
- Agricultural drought: Defined mainly in terms of soil moisture deficiencies relative to water demands of plant life, usually crops.
- Socioeconomic drought: This occurs when the demand for water exceeds the supply as a result of a weather-related supply shortfall.

Drought occurs as part of the regular climatic regime in virtually all climates, and can occur throughout the entire Mount Rogers Region. Its causes are complex, and not readily predictable, especially in variable climates. Compared to storm events such as hurricanes and floods, drought has a slow onset and can last for months, years or even decades. Estimated dollar losses caused by drought can far exceed those of major storm events.

Some measures of drought, also known as drought indices, include:

- Percent of Normal: Calculated by dividing actual precipitation by normal precipitation (usually defined as the 30-year average) and multiplying by 100%. Effective for a single region or a single season. A disadvantage is the average precipitation is often not the same as the median precipitation.
- Standardized Precipitation Index: Index based on the probability of precipitation for any time scale. This is used by the National Drought Mitigation Center. It can provide early warning of drought, can assess drought severity and is less complex than some indices.
- Palmer Drought Severity Index: This is a measure of soil moisture and was the first comprehensive drought index created in the country, in 1965. It works best in areas of

even topography but is less suitable for mountainous areas or places with frequent climatic extremes. Palmer values may lag emerging droughts by several months.

- Crop Moisture Index: A derivative of the Palmer Index. It reflects moisture supply across major crop-producing regions. It is not intended to assess long-term droughts.
- Deciles: This approach groups monthly precipitation events into deciles so that, by definition, "much lower than normal" weather cannot occur more than 20% of the time. This provides an accurate statistical measurement of precipitation, but its accuracy relies on a long climatic data record.

History

The U.S. Geological Survey has noted four major droughts statewide since the early 1900s. These occurred in 1930-1932 (one of the most severe droughts on record for the state), 1938-1942, 1962-1971 and 1980-1982 (the least severe). Other sources suggest the record is somewhat different for the Mount Rogers region. The table below gives a brief review of the some of the major droughts that have affected southwest Virginia.

Droughts in Southwest Virginia

Date	Location	Details	Impact
September 2007	Carroll, Grayson, Smyth, and Wythe Counties	Primary disaster for Carroll, Grayson, Smyth, and Wythe Counties	$8.0 million in crop damage
2-12-03	Carroll, Grayson, Smyth, large parts of SW VA	USDA disaster declaration due to severe drought for 46 counties. Primary disaster for Carroll, Grayson, Smyth Counties. Contiguous declaration for Galax and Washington County.	Low-interest emergency loans for farmers.
July and August 2002	Statewide	State emergency drought declaration for July and August. USDA disaster declarations for Bland, Carroll, Grayson, Smyth, Wythe Counties.	Significant crop damage. Reduced streamflow and groundwater levels.
9-1-99 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SWVA	Dry conditions began in July 1998, subsided for several months, then returned in June 1999 and through early Sept. Drought largely ended due to heavy rain from remnants of Hurricane Dennis on Sept. 4-5, 1999.	$8.25 million in crop damage. Very low water levels in creeks, streams and rivers.

Date	Location	Details	Impact
July to October 1998 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SW VA	Dryness began in July, subsided in August, resumed in September. Low water levels in creeks, streams, rivers, lakes and some shallow wells.	Water levels low. $7.7 million crop damage.
9-1-95 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SW VA.	A drought that started earlier in the summer peaked in many sections of the state during the first two weeks of Sept. State of emergency declared. Widespread rainfall on Sept. 17 helped to alleviate the dryness.	Crops damaged. Many lakes and rivers with well-below normal water levels.
1988	Mount Rogers region	Drought based on the Palmer Drought Severity Index, with the region in severe drought up to nearly 50% of the time. One of the worst droughts on record for the nation (1988-1989).	
1954-1956	Mount Rogers region	Drought based on the Palmer Drought Severity Index. Region in severe drought up to nearly 40% of the time.	
1928-1934	Mount Rogers region	Drought based on the Palmer Drought Severity Index. Region in severe drought up to nearly 20% of the time.	

For the Mount Rogers region, the worst period came in 1988, with the region in severe drought 40%-49.99% of the time. Over the long-term severe drought conditions in the Mount Rogers region occurred only up to 10% of the time.

Risk Assessment and Vulnerability

In recent years, major agricultural droughts have occurred five times from 1995 through 2003. The historical record is not as well developed for the years prior to 1995, though major droughts are known to have occurred in 1928-1934, 1954-1956 and in 1988.

For the 100-year period from 1895 to 1995, the region has been estimated to experience drought less than 10% of the time. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to drought has not changed.

History shows drought conditions reaching disaster proportions can affect the entire Mount Rogers region. For some parts of the region, especially in Carroll County, well development is difficult and often produces a dry hole.

The impacts appear to have the greatest impact for the farming community. In these cases, the U.S. Department of Agriculture makes damage assessments and provides financial aid to qualifying farmers through the local farm service agencies.

Water issues also are a concern for the general public, local governments, business and industry. Several engineering studies from the mid- to late-1990s, as well as a 1996 health department survey, identified issues regarding water quantity, water quality and reliability of supply. In the unincorporated areas, most parts of the region depend upon groundwater supplies. The reported problems include low quantity, poor quality (due to mineral or bacterial content), turbidity, petroleum contamination and dry holes. Limited quantities restrict fire-fighting capabilities. Inadequate or limited water supplies also restrict future growth potential for business and industry. The table on the following page describes in more detail water related problems in the Mount Rogers District.

Water Problems Reported to the Mount Rogers Health District	
Bland County	Complaints
Little Creek area	Bacteria in recently drilled wells.
Hollybrook	Mineral quality/iron bacteria. Cisterns used for some supplies.
Seddon	Appearance of dry wells. Cisterns used for some supplies. Mineral quality.
Waddletown	
Laurel Creek/Dry Fork	Poor quality with some wells and springs. Cisterns used for some supplies.
Ceres	Poor quality in some springs and wells.
	Poor quality in springs and iron bacteria in wells.
Bastian/Hicksville Crandon/Mechanicsburg	Mineral quality/iron bacteria concerns.
Carroll County	Complaints
Paul's Creek (Cana area) Dugspur (Rt. 753) Star (Rt. 1105) Woodlawn Piper's Gap Fancy Gap (Rt. 683) Chestnut Yard Rt. 645 (below Laurel Fork) Short Creek (Rt. 640/I-77)	Iron, turbidity, low-yield wells.
Grayson County	Complaints
Old Town – Fries Hill	High iron levels.
Flatwood Community	Many wells are drilled deep. Many dry holes found.
Helton/Cabin Creek Area	Well construction difficult due to rock formations.
Fairview Community	
Nuckols Curve Area	
Other Comments:	Many springs used as private water supplies, especially in western areas of the county. Many springs have bacteria contamination.
Smyth County	Complaints
Walker Mountain area	High iron/sulphur content.
Washington County	Complaints
Mendota (Rt. 802 area)	High iron/sulphur content in private water supplies.
Rt. 91 (S.F. Holston to Rhea Valley)	Low-yield wells and bacteria contamination.
Wythe County	Complaints
Poplar Camp, Crockett, Gateway Trailer Park (Grahams Forge), Rosenbaum Chapel area	Petroleum contamination.
Sand Mountain area	Dry holes and low-yield wells.
Stony Fork area	High iron/sulphur levels.

Earthquakes

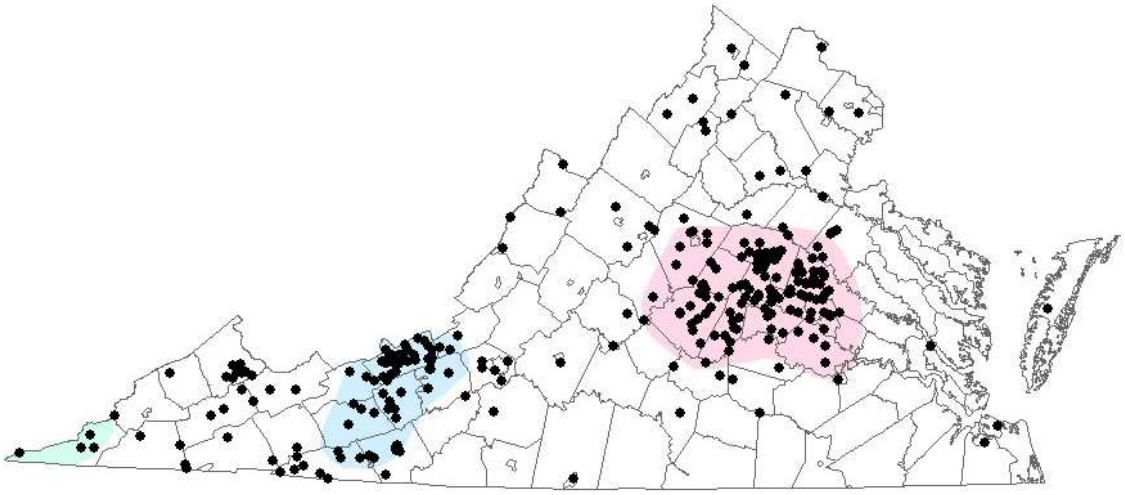
Description

An earthquake can be defined as a sudden motion or trembling caused by an abrupt release of accumulated strain on the tectonic plates that comprise the earth's crust. The theory of plate tectonics has been described since 1967 and is based on the idea the earth's crust is composed of several major plates that move slowly and continuously, at times bumping and grinding against each other and at other times creating separations.

The tectonic plates are thought to bump, slide, catch or hold as they move together. An earthquake happens when faults located near plate boundaries slip when the stress against the rock formations becomes too great. This sudden movement results in surface faulting, ground failure and tsunamis.

Surface faults are thought to occur in various forms, including strike-slip faults, normal faults (with strong vertical movement), and reverse (thrust) faults (mainly horizontal movement). Ground failure is expressed through liquefaction, when coarse soils lose their strength and act like fluids flowing over the landscape. Ground failure created by liquefaction includes lateral spreads, flow failures (the most catastrophic form), and loss of bearing strength (causing buildings to settle and tip). Tsunamis are phenomena associated with the west coast and are not considered further in this report.

Earthquakes are described in various fashions, including by intensity and magnitude. Intensity is defined as a measure of earthquake effects at a particular place on humans, structures or the land. Magnitude is a measure of the strength of an earthquake or the strain energy released by it (originally defined by Charles Richter in 1935).



This map shows the locations of known earthquake epicenters in Virginia. The Eastern Tennessee Seismic Zone is shown in green, the Giles County seismic zone is shown in blue and the Central Virginia seismic zone is shown in pink.

History

Sources such as the Virginia Department of Mines, Minerals and Energy describe the statewide risk of earthquakes as moderate, in keeping with most other states in the eastern seaboard of the United States.

Earthquake activity in Virginia has generally been, with a few exceptions, low-magnitude but persistent. The first documented earthquake in Virginia took place in 1774 near Petersburg, and many others have occurred since then, including an estimated magnitude 5.5 (VII) event in 1897 centered near Pearisburg in Giles County. A Roanoke attorney who was in Pearisburg said that for nearly fifty miles from that place he "saw hardly a sound chimney standing." In his opinion, "If the buildings throughout Giles had been largely of brick, the damage would have been very great, and serious loss of life would have occurred." The largest recorded earthquake in Virginia occurred in Louisa County on August 23, 2011 and had a magnitude of 5.8 (VII). It was felt all along the eastern seaboard by millions of people, causing light to moderate damage in central Virginia, Washington, D.C. and into southern Maryland. Since 1977, more than 195 quakes have been detected as originating beneath Virginia. Of these, at least twenty-nine were large enough to be felt at the Earth's surface. This averages out to about six earthquakes per year, of which one is felt.

Much of Virginia's earthquake activity has been in the southwest and eastern parts of the state. Counties and cities that have experienced earthquakes of intensity VI and higher include Smyth, Washington and Wythe in the local region. Local earthquake history is described by Stover and Coffman and also by the U.S. Geological Survey, through its Earthquake Hazards Program. The table below describes in more detail major recorded earthquakes in the Mount Rogers Region.

Modified Mercalli Scale

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Earthquakes in The Mount Rogers Region by Date/Location, Intensity, and Description

Date/Location	Intensity	Description
March 9, 1828 Southwest VA	V (MM)	Felt over 218,000 sq. miles, from Pennsylvania to South Carolina and the Atlantic coastal plain to Ohio. Doors and windows rattled.
April 29, 1852 Wytheville	VI (MM)	Severe earthquake shook down a chimney near Wytheville and shook down tops of chimneys at Buckingham Courthouse. Homes shook in Staunton. A brick fell from a chimney in Davie County, N.C.
Aug. 31, 1861 Southwest VA	VI (MM)	Epicenter in extreme southwest Virginia or western North Carolina. Bricks fell from chimneys at Wilkesboro, NC. Felt from Washington, D.C. to the Midwest and south to Columbus, GA.
Sept. 1, 1886 South Carolina	V (MM)	Epicenter in Charleston, S.C., with estimated intensity of X. Caused minor structural damages in various parts of Virginia (fallen plaster and chimneys, cracked walls, broken windows).
May 3, 1897 Giles County	VII (MM)	Greatest severity at Radford, where some chimneys were destroyed and plaster fell from walls. Felt in most of southwest Virginia and in a region of 89,500 sq. miles.
May 31, 1897 Giles County	VIII (MM)	Largest known earthquake originating in Virginia in history. Felt over 280,000 sq. miles. Largest effects felt from Lynchburg to Bluefield, W. Va. and from Giles County south to Bristol, Tenn. Many downed chimneys, changes in flow springs and appearance of some earth fissures.
Feb. 5, 1898 Wytheville or Pulaski	VI (MM)	Earthquake felt over 34,000 sq. miles. Bricks fell from chimneys and furniture shifted in a few houses. Effect felt throughout southwest Virginia and south to Raleigh, N.C.

April 23, 1959 Giles County	VI (MM)	Several chimneys were damaged, plaster cracked and pictures fell from walls in Eggleston and Pembroke. Felt over 2,900 sq. miles in Southwest Virginia.
Nov. 11, 1975 Giles County	VI (MM)	Windows were broken in Blacksburg and plaster cracked at Poplar Hill (south of Pearisburg, Giles County). Also felt in Pulaski County.
Sept. 13, 1976 Carroll County	VI (MM)	One of the most persistent areas of activity in recent years, with five small earthquakes felt near Hillsville. Effects felt in the Carolinas and West Virginia.
Aug. 23, 2011 Mineral, VA	VIII (MM)	The earthquake was felt in some of the eastern parts of the Mount Rogers Region, but no damage was reported.

One notable earthquake occurred in May 1897 and was based in Giles County. It was the largest Virginia-based earthquake in recorded history. Chimneys were shaken down throughout southwest Virginia, including in Wytheville and as far west as Knoxville, Tenn. Effects of the earthquake were felt from Georgia to Pennsylvania and from the Atlantic Coast to Indiana and Kentucky. The effects were strong at Pearisburg, where brick walls cracked and some earth fissures appeared. The magnitude of this quake has been estimated at VII and VIII on the Modified Mercalli intensity scale. This event, felt over 11 states, is described as the third largest earthquake in the eastern part of the country in the past 200 years.

Risk Assessment and Vulnerability

For the Mount Rogers region, the likelihood of earthquakes appears to be moderate, based on measurements related to maximum ground acceleration and as described by FEMA. This data is incorporated into probabilistic ground motion maps published in the 2015 edition of the National Earthquake Hazards Reduction Program's *NEHRP Recommended Provisions*.

The southwest Virginia region faces a moderate chance of experiencing earthquakes. While recent history shows some part of the region experiences earthquakes roughly once every 18 years, the resulting damage has been relatively minor.

The entire Mount Rogers region is subject to the effects of an earthquake, as shown by the historical record from larger events such as the Giles quake from May 1897.

The Mount Rogers region in total covers 2,786 square miles, with over 68,000 households and a population of 188,498. The region includes 71,000 buildings with an estimated structural replacement value of $7.3 billion. An estimated 98% of the buildings and 78% of the building value is in residential housing.

While earthquakes can create widespread destruction and death, the damages experienced in southwest Virginia are more moderate, based on the historical record. It should be noted that earthquake analysis is tricky, given that the historical record covers a period of less than 175 years. A much better record for earthquakes would cover hundreds, even thousands, of years. The risk assessment in this report is based upon this limited range of data. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to earthquakes have not changed.

For the Mount Rogers region, the worst of the earthquakes experienced historically appear to correspond to an intensity of VI on the Modified Mercalli Scale. For purposes of analysis, we assumed an intensity of 6.3 and applied the HAZUS 99-SR2 computer model to reflect the characteristics of the Giles earthquake of May 1897.

At the 6.3 level magnitude, HAZUS predicted moderate damage to 3,902 buildings and slight damage to 7,423 buildings. Only 65 buildings would be completely destroyed. Other estimates by HAZUS were as follows:

- $6.8 million damage to bridges, railways and airports.
- Minor injuries to 47 people, with 9 hospitalized and 1 dead.
- Economic losses of $118 million (or 1% of the total replacement value of the region's buildings).
- $3 million in damages to communication facilities.
- Significant loss of function in several schools, especially in Bland, Carroll and Wythe counties.

Flooding

Description

Flooding is regarded as the most damaging natural hazard in Virginia. Average annual flood damages statewide amount to $100 million. Nationwide, between 1983 and 1997, Virginia ranked 14th with flood damages of $1,507 million.

In the Mount Rogers region, flood damages can cost millions of dollars. In November 1977, flood damages to business and industry in Smyth County was estimated at up to $8.6 million. In the previous flood of April 1977, damages were estimated at $7.8 million for 16 jurisdictions.

Flood-Related Definitions

Base Flood: Flood with a 1% chance of being equaled or exceeded in any given year. The Base Flood is the standard used by the National Flood Insurance Program.

Base Flood Elevation: The elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year.

Floodplains: Lowlands, adjacent to rivers, lakes and oceans, subject to recurring floods.

Floodway: The stream channel and that part of the adjacent floodplain that must remain open to permit passage of the Base Flood without raising the water surface elevation by more than one foot. Flooding is the most intense and poses the greatest risk in the floodway area.

More recently, in March 2002, Smyth County alone sustained an estimated $2 million in flood damages, compared to $100,000 in Wythe County and $360,000 in Washington County. Preliminary estimates from the November 2003 flooding came to $485,000 for Bland County, $251,000 for Carroll County and $878,000 for Smyth County.

Flood hazards in the local region include *riverine flooding* and the *flash floods* that result from sudden, violent storms that produce large amounts of rainfall in short amounts of time. *Riverine flooding* involves overflows from rivers and streams. The form of flooding is often more gradual in nature and may allow more time for advance warning. *Flash flooding* – such as occurred in November 2003, resulting in federal disaster declarations for several localities may occur with little warning and yet cause significant damage.

History

The Mount Rogers region of Virginia has a long history of flooding. The floods typically result from heavy rains or from melting following a severe winter storm. Heavy rains during thunderstorms can cause flash flooding in localized areas. The data in the chart below only

relates to major flood events through spring of 2018 and does not reflect the full range of flood events that have affected the region over the years.

Major Flooding Events in Mount Rogers Planning District		
Date	Affected Localities	Description
5-24-17	Carroll County	This flood caused $75,000 in damage
5-24-17	Grayson County	This flood caused $150,000 in damage
4-23-17	Smyth County	This flood caused $75,000 in damage
6-27-16	Bland County	This flash flood caused $75,000 in damage
4-19-15	Wythe County	This flood caused $50,000 in damage
6-29-14	Smyth County	This flash flood caused $250,000 in damage
6-9-11	Bland County	This flood cause $250,000 in damage
5-13-11	Grayson County	This flash flood caused $85,000 in damage
2-28-11	Bristol	Severe storms and flooding caused $40,000 in damage
3-4-08	Smyth County	Severe storms and flooding caused $500,000 in damage
6-12-04	Washington County	This flood caused $250,000 in damage
11-18-03	Bland, Smyth, Galax; 12 counties and two cities in SW VA and NE TN	Heavy rains of 1.88" to more than 5" caused heavy flooding Nov. 18-19. Federal disaster declaration for Bland, Smyth, Galax in local region. $12 million damage across entire 12-county region.
2-15-03	Southwest Virginia (Wythe County declared a disaster)	State of emergency declared on 2-17-03 due to snow & ice in northwest VA and more than 4" of rain in southwest VA that caused flooding and mudslides. Federal disaster declared 4-28-03.
2-14-03	Washington, Bristol	Flooding from 4-day rainfall of 2-6" across southwest VA. See state of emergency declaration above.
4-17-02	Smyth, Washington, Wythe	Severe storms and flooding
3-17-02	All counties in Mount Rogers Planning District	State of emergency declared on 3-18-02 due to heavy rainfall and flash flooding.
8-20-01	Washington	Severe storms and flooding
8-9-01	Smyth	Severe storms and flooding
7-26-01	Smyth, Washington	State of emergency declared on 7-29-01 and $4.4 million in state and federal aid. This was part of the same weather pattern causing flooding on 7-8-01.
2-2-96	Bland, Grayson, Washington, Wythe	Flooding (resulting from Blizzard of 1996)

Major Flooding Events in Mount Rogers Planning District		
Date	Affected Localities	Description
5-17-94	Galax	Severe ice storms and flooding
3-28-94	Bristol	Severe ice storms and flooding
3-10-94	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe ice storms and flooding
5-19-92	Carroll	Severe storms and flooding
5-29-84	Washington	Severe storms and flooding
5-07-84	Town of Damascus	Flooding on Beaverdam Creek. Town declared a federal disaster area for damage to sewer system, Virginia Creeper Trail and private homes.
11-17-77	Carroll	Severe storms and flooding
11-12-77	Grayson, Smyth, Washington	Severe storms and flooding
10-02-77	Bristol	This 20-year flood caused $3 million in damage in 1977 dollars.
4-21-77	Carroll	Severe storms and flooding
4-7-77	Bland, Grayson, Smyth, Washington, Wythe	Severe storms and flooding
9-8-72	Smyth, Galax	Tropical Storm Agnes (flooding)
March 1867	Bristol	Flood of record for Beaver Creek in Bristol, TN and Bristol, VA. This was a 250-year flood.

For Bristol the flood of record occurred in March 1867. This 250-year flood on Beaver Creek and its tributaries caused $1 million worth of damages (in 1867 dollars). More recently, in October 1977, a 20-year flood caused $3 million worth of damages (in 1977 dollars) on the Bristol, Virginia side alone. The worst and most costly of flood damages on an annual basis occurs along the main stem of Beaver Creek.

For the Mount Rogers region as a whole, the worst flooding within the past 50 years occurred in April and November of 1977. The floods of 1977 later led to engineering reports that encouraged people to move out of the floodplain.

Engineering Studies

Town of Chilhowie

An engineering study in 1978 on flooding in Smyth County eventually led to a special project in Chilhowie that relocated 67 families and created the Chilhowie Recreation Park.

The Middle Fork Holston River Flood Control Improvements Study, completed in March 1978, studied flooding issues in Smyth County, with special focus on the Town of Chilhowie/Seven Mile Ford community and the Town of Marion/Atkins community.

Initial recommendations from that 1978 study carried a total implementation cost of $18 million. Later the study was reduced to three sub-projects, but the price tag still proved very high. The recommendations included channelizing parts of the Middle Fork Holston River, with rip rap or concrete reinforcement, flood-proofing for selected businesses and industries, rebuilding several bridges to accommodate the widened river channel, relocations out of the floodplain, and installing some levees and pump stations. Of all the proposals discussed in the 1978 study, channelizing the river was deemed as a top priority with the potential for making the greatest impact on future flood levels.

The recommendations also included removing obstructions from the Middle Fork (including the breached dam at the old Marion Ice Plant), development of six flood storage reservoirs along six tributaries, and implementation of floodplain ordinances to limit future development in the floodplain area.

Although the 1977 floods had serious impacts for several industries located in the Middle Fork Holston floodplain, the industries declined to implement the recommendations due to the high cost. The local communities felt equally intimidated by the proposed mitigation costs, and there was little hope of major help from among a range of federal agencies to provide the 100% grant funding needed to carry out any of the proposed projects. The Planning District Commission finally decided to try to get the most for the funds available by demolishing the most flood-prone structures in Chilhowie and relocating families out of the floodplain.

The project that eventually emerged was a $2.8 million multi-part proposal to relocate families out of the Middle Fork Holston floodplain in Chilhowie, build replacement housing in a new subdivision created for the relocation, and to provide water treatment improvements for the town of Chilhowie. The project area included 72 homes, three churches, three businesses and one lodge. To succeed at all, the effort had to overcome numerous complications created by the funding agencies, the attitudes of local residents, and the feelings of the town council, which observers felt cared more about the water treatment project than the flood mitigation project.

In the end, 67 families moved out of the floodplain. Of those, 53 families had help from the Tennessee Valley Authority and 14 had help through the Department of Housing and Urban Development. Due to the time it took to form the Chilhowie Redevelopment and Housing Authority (created in July 1979) and the new subdivision, most families relocated elsewhere. Only six families opted to relocate to the subdivision as planned. The town had the abandoned property demolished and built a community recreation park in the floodplain area (between Holston Street and Railroad Avenue). The project took seven years to complete.

Town of Damascus

Building on flood study work begun by the Tennessee Valley Authority in the late 1950s, the Town of Damascus also undertook projects to relocate 34 homes (88 residents) and three businesses out of the floodplain following the 1977 flooding. Historically a flood-prone community due to development along Beaverdam and Laurel Creeks, along with obstructions in the creeks, Damascus suffered three major floods in 1977 (in April, October, and November). Twice in 1977 the community qualified as a federal disaster area. The 1977 flood events 1977 led to a comprehensive flood mitigation study completed in 1979. An initial cost estimate of more than $3.2 million would have built a levee emergency access route, relocated flood-prone homes out of the floodplain, flood-proofed some homes and businesses, removed two abandoned dams from Laurel Creek, installed storm drainage collection systems, and required more control of floodplain development by the town. In 1981, a follow-up flood mitigation program proposed by the town was estimated at $4.3 million.

Image 1: 2003 Flooding in Damascus

Successful efforts by Damascus to mitigate its flooding problems over the years have included the following:

- A $559,000 grant from the HUD in 1981 to install storm sewers along Mock, Surber, and Haney Hollows (finished in 1983).
- State and federal disaster assistance following another major flood in May 1984 helped make repairs to nearly $86,000 worth of damage to the community.

Image 2: Flooding in Marion, VA
View of flooding at Baughman Street Bridge in Marion. The bridge itself becomes a barrier during times of high water

- Grant funding in 1984 ($700,000 from the state CDBG program and $190,000 from the Tennessee Valley Authority) to relocate 34 families (88 people) and three local businesses out of the floodplain (1985 through 1988).
- The town also converted the old Damascus Elementary School for housing under a project funded by the state CDBG program.

Recent Flood Events

The more recent flood events from 2001-2011 were less drastic in extent and damages compared to the floods of 1977. Nonetheless the floods disrupted the lives of those who had to endure them, including the first major flood in several decades for the City of Galax.

The events of 2001 occurred in late July and early August. Heavy rainstorms caused flooding that forced more than 100 Smyth County residents from their homes, according to news accounts. Smyth and Washington counties became federal disaster areas. In all the flooding affected nine counties in southwest Virginia and led to at least $4.4 million in state and federal aid.

The next round of disaster-level flooding occurred March 17-20, 2002. Three to six inches of rain fell in a 36-hour period and led to federal disaster declarations for Smyth, Washington and Wythe counties.

The event affected numerous homes and businesses, with residential evacuations along the North Fork Holston River in Smyth County near the Town of Saltville and in remote parts of eastern Washington County near the Smyth County line. The floods also created overflows for water and sewer plants in the Towns of Saltville, Chilhowie, and Rural Retreat and in Washington County. Additionally, floods ruined some businesses and temporarily stranded some communities, such as Downtown Chilhowie. FEMA disaster aid came to more than $500,000 in the local region as of June 2002, with an estimated $2.5 million total in damages.

For the entire southwest Virginia region, state and federal disaster assistance had reached $8 million.

The 2002 flooding led Chilhowie to undergo a preliminary $100,000 study by the U.S. Army Corps of Engineers on causes of the flooding and potential solutions, including river dredging and use of levees. In March 2004, the Chilhowie Town Manager recommended buy-outs of the 15 properties that flood most often and the decision was made to buy out six homeowners located on River Bottom Circle along the North Fork Holston River.

The flood disasters continued into 2003, with a federal declaration resulting from two back-to-back snowstorms February 15-28, affecting all localities in the Mount Rogers Planning District. In total, the storm cost $37 million in snow removal costs and $71 million in damages to homes, businesses, public facilities, roads and other property. In the local region, Bland and Wythe counties sought federal aid for flood damages to public and private property.

On November 18-19, 2003, heavy rains caused severe flooding across 10 counties in northeast Tennessee and southwest Virginia. In Bland County damages were estimated at $485,000, with $878,000 in damage in Smyth County and $251,000 in damage in Carroll County. This included major damage or destruction of numerous homes, flooded roadways, damage to public and private property, some evacuations and temporary closure of area schools.

The City of Galax suffered its first major flooding since 1940; initial reports to FEMA included damage to 10 businesses and 70 homes in an area that included the city's main business district along Chestnut Creek. Some sinkholes appeared, and there was flooding in several nearby residential communities. Total damages amounted to $100,000, with about half consumed by the cost of cleanup by the city, according to city officials. Because Galax does not participate in the National Flood Insurance Program, the designated floodplain area was not eligible for federal disaster assistance. The city so far has resisted suggestions it consider re-joining the flood insurance program. Damaged properties located out of the designated floodplain were eligible for disaster assistance. City officials have said many flooding problems are caused by undersized and deteriorated stormwater drainage systems.

In the past five years only one flood event in the Town of Fries was recorded. In May of 2011 a flash flood caused minor flooding at the elementary school, damaged approximately 20

vehicles, and caused some minor damage at an RV park. This flood also caused a manure spill that caused some localized water contamination. The town residents were asked by officials at the water treatment plant to conserve water. The town had enough water in reserve until the spill was cleaned.

National Flood Insurance Program

Most communities with flooding issues in the local region participate in the National Flood Insurance program (NFIP). Participation in NFIP allows homeowners and commercial businesses to obtain flood damage protection. For single-family homes, the insurance provides up to $250,000 for structural damages and up to $100,000 for contents damages. Commercial businesses can be covered for up to $500,000 in structural damages and up to $500,000 in contents damages.

Flood insurance helps cover flood damages during minor and major flood events. Insurance coverage through NFIP also covers a larger amount for losses than typically would be available during a federal disaster. Emergency aid that is available following declaration of a federal disaster most often comes in the form of a low-interest loan. FEMA promotes participation in NFIP for all qualifying communities.

Community Participation in NFIP
Mount Rogers Region, Virginia

Jurisdiction	NFIP Status			
	Y	N	N/A	CRS Class
Bland County	X			N/A
Carroll County	X			N/A
Grayson County	X			N/A
Smyth County	X			N/A
Washington County	X			N/A
Wythe County	X			N/A
City of Bristol	X			N/A
City of Galax		X		N/A
Town of Abingdon	X			N/A
Town of Chilhowie	X			N/A
Town of Damascus	X			N/A
Town of Fries	X			N/A
Town of Glade Spring	X			N/A
Town of Hillsville	X			N/A
Town of Independence	X			N/A
Town of Marion	X			N/A
Town of Rural Retreat	X			N/A
Town of Saltville	X			N/A
Town of Troutdale		X		N/A
Town of Wytheville	X			N/A

As shown in table above, most of the localities participate in floodplain management and make NFIP coverage available to property owners. The City of Galax, with Chestnut Creek flowing through the city's downtown industrial district, participated in NFIP for a few years before dropping out. As a result of the November 2003 flood disaster, the city met with state and federal flood program officials. The city has opted to remain a non-participant. Galax recently submitted a request to the US Army Corps of Engineers to look at possible projects upstream of Chestnut Creek through the Flood Damage Reduction Program (Section 205 of the 1948 Flood Control Act). The end result would be a project that would reduce the 100-year flood plain to the Chestnut Creek channel. The Town of Troutdale due to its small size and the fact that relatively little water runs through the town does not find it feasible to participate in the NFIP.

The FEMA floodplain maps available for communities participating in the National Flood Insurance Program (NFIP) depict 100-year floodplains for flood-prone areas. That means, in any given year, the floodplain area faces a 1% chance of having a flood.

One major drawback for the floodplain maps in effect for the Mount Rogers region, as well as for many communities nationwide, is the age and relative inaccuracy of the maps. Although a fine effort has been made by FEMA to update the existing maps digitally, there are still existing accuracy issues, however, FEMA is in the process of rectifying these errors. We expect new data for much of the Mount Rogers Region in the next two years.

In addition, most local floodplains have not been subject to hydrological studies to determine the Base Flood Elevations; the floodplain extent in such cases has been estimated based on the local topography.

Risk Assessment and Vulnerability

The Mount Rogers region has experienced 18 presidential disaster declarations or state-level emergencies related to flooding over 30 years. That does not account for the more minor flooding that may occur from time-to-time due to a brief but severe rainstorm or thunderstorm causing small stream flooding in localized areas.

As shown in the table below, Smyth County has received a relatively large share of payments under the National Flood Insurance Program, due to the frequency and severity of flooding in that county.

NFIP Claims Data as of October 31, 2018

Community Name	Losses	Total Payments	Average Payments
Bland County	19	177,105	9,321.32
Carroll County	19	136,910	7,205.79
Grayson County	6	14,563	2,427.17
Smyth County	89	841,130	9,450.90
Town of Chilhowie	40	222,697	5,567.43
Town of Marion	32	192,960	6,030.00
Town of Saltville	1	1,271	1,271.00
Washington County	44	499,023	11,341.40
Town of Abingdon	11	158,112	14,373.80
Town of Damascus	10	6,311	631.10
Town of Glade Spring	1	4,347	4,347.00

Wythe County	15	66,077	4,405.13
Town of Wytheville	1	35,472	35,472.00
City of Bristol	19	71,753	3,776.47
City of Galax	2	3,227.00	1,613.50

The NFIP defines Repetitive Loss Properties as those with 2 or more claims of at least $1,000 over a 10-year rolling period. There are 21 such properties in the Mount Rogers Region. The breakdown by locality follows in the table below:

Repetitive Loss Properties for Mount Rogers Planning District, as of 2018	
Locality	Number of Properties
Town of Abingdon	2
Bland County	6
City of Bristol	2
Town of Chilhowie	3
Town of Hillsville	1
Town of Marion	1
Town of Saltville	3
Washington County	1
Wythe County	1
Town of Wytheville	1

The Hazard Mitigation Assistance program defines Repetitive Loss as having incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and, at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Flooding causes damages ranging from blocked roadways and flooded basements to severe damage and destruction of homes and businesses. People sometimes die when they attempt to cross flood-swollen creeks that under normal circumstances appear fairly harmless. Severe flooding can take out bridges and sections of roadway. Flooding can also force people out of their homes into emergency shelters as a way to save lives and prevent people in flood-prone areas from becoming stranded. Fortunately, despite the constant threat of flooding for much of the Mount Rogers region, few people have died. Many more have sustained property damage, and some have been relocated out of the floodplain through government-sponsored programs.

A map showing the 100-year floodplain for all localities in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

The localities in the Mount Rogers Region do not allow construction inside the floodplain unless the structure is elevated above the 100-year floodplain elevation. For this reason, the vulnerability of structures inside the floodplain have either not changed or become less vulnerable since the original writing of the 2005 Hazard Mitigation Plan.

At-risk Structures in the 100-year Flood Plain				
Locality	Number of Structures	% of Total Structures	Total $ Value of Structures*	Estimated Potential Damage (25% of Total Structure $ Value)
Bland County	237	6.25%	$11,376,000	$2,844,000
Carroll County	31	0.16%	$1,488,000	$372,000
Grayson County	48	0.44%	$2,304,000	$576,000
Smyth County	425	2.44%	$20,400,000	$5,100,000
Washington County	216	0.76%	$10,368,000	$2,592,000
Wythe County	226	1.42%	$10,848,000	$2,712,000
City of Bristol	146	1.77%	$7,008,000	$1,752,000
City of Galax	53	1.54%	$2,544,000	$636,000
** Average value of structure in flood plain is $48,000*				

Hazardous Material Spills

Description

Hazardous materials can be found in many forms and quantities that can potentially cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and FEMA-identified fixed HAZMAT sites determined to be of greatest significance as appropriate for the purposes of this plan.

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents, and 266 are due to other causes. In essence, HAZMAT incidents consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile

containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife as well.

HAZMAT incidents can also occur as a result of, or in tandem with, natural hazard events, such as floods, hurricanes, tornadoes, and earthquakes, which in addition to causing incidents can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that caused widespread toxological concern.

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude:

1) any release which results in exposure to poisons solely within the workplace with respect to claims which such persons may assert against the employer of such persons;
2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine;
3) release of source, byproduct, or special nuclear material from a nuclear incident; and
4) the normal application of fertilizer.

Risk Assessment and Vulnerability

The majority of Hazardous events in the Mount Rogers Region are due to fuel/oil releases from motor vehicle crashes. Typically range from a few ounces up to over one hundred gallons of diesel and oil from overturned tractor trailers.

The easiest way to mitigate against these events is early notification and have the appropriate agency (typically the fire department) to perform Hazardous Materials Operations level job functions such as, damming, diking, plugging, placing absorbent pads and/or booms down. Of course, this is for the small fuel spills. If the region has a larger event, then a large-scale HAZMAT team response would be necessary.

Karst and Sinkholes

Description

Sinkholes are bowl-shaped, funnel-shaped, or vertical-sided depressions in the land surface that form over underground voids. These depressions, which can range in size from a few feet to several hundred feet in diameter, usually result from the natural collapse of the roofs of caves eroded in soluble bedrock, but they can also result from man-made activity such as mining, groundwater pumping, or the failure of sewer and storm water drains. Subsidence of the ground is usually gradual, but on occasions it can be sudden and dramatic.

In regions of carbonate bedrock such as limestone or dolomite, slightly acidic rainwater percolating though organic soil dissolves the carbonate minerals as it comes into contact with the bedrock. Over time, this persistent process can create extensive systems of underground fissures and caves. The surface of such a region is often pocked with depressions. This type of topography is called karst terrain. In well-developed karst terrain, chains of sinkholes form what are known as solution valleys and streams frequently disappear underground.

Sinkhole collapse, either slow or dramatic, regularly causes considerable damage to buildings, highways, rails, bridges, pipelines, storm drains, and sewers. In addition, sinkholes provide a pathway for surface water to directly enter groundwater aquifers. The increasing potential for pollution is particularly high due to the minimal filtering of surface water.

A poor understanding of Karst terrain has led to land-use practices that pose significant economic and environmental impacts to households and communities. Sinkhole formation is closely related to local hydrological conditions, and human-induced changes to the local hydrology commonly accelerate the process. Diverting surface water, pumping groundwater, and constructing reservoirs all contribute to sinkhole collapse. An extreme example occurred in Florida on February 25, 1998,when, during the flushing of a newly drilled irrigation well, hundreds of sinkholes up to a hundred and fifty feet across formed over a twenty-acre area within a few hours. Runaway urbanization and development dramatically increases water usage, alters drainage pathways, and overloads the ground surface. According to the Federal Emergency Management Agency, the number of human-induced sinkholes has doubled since 1930, while insurance claims for related damages has increased 1,200 % from 1987 to 1991, costing nearly $100 million. Subsidence is not covered by standard homeowners insurance.

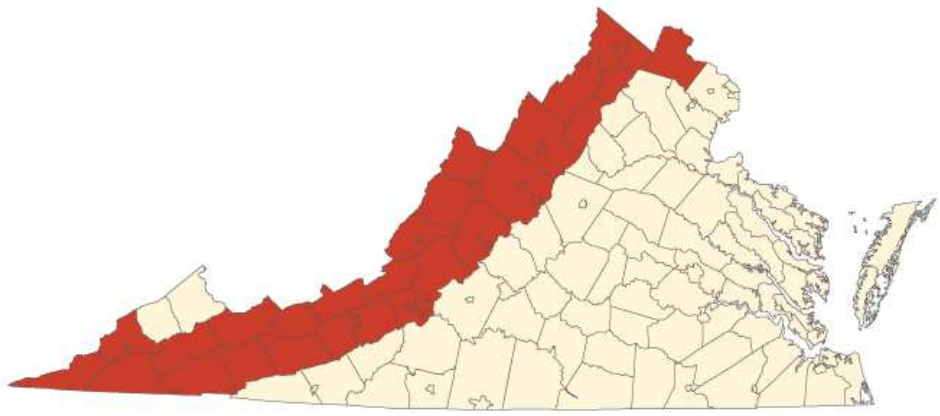
In Virginia, the principal area affected by sinkholes is the Valley and Ridge province, an extensive karst terrain underlain by limestone and dolomite, but the narrow marble belts in the Piedmont and some shelly beds in the Coastal Plain are also pocked with sinkholes. Dramatic collapses that swallow homes or persons have happened in Virginia, but are rare. The most notable incidents occurred in the City of Staunton: on August 11, 1910, parts of several homes and the firehouse were lost in a series of sinkholes on Baldwin Street and Central Avenue, and on October 28, 2001, a 45-feet deep chasm opened up on Lewis Street. In April of 2000, thirty-two sinkholes were reported in the upper Shenandoah Valley after seven inches of rain fell after a long dry spell.

Sinkholes regularly cause problems for transportation infrastructure in the Commonwealth. During the past thirty years, VDOT has recorded approximately 500 sinkholes that have damaged roads throughout the state. In March 2001, a nine-mile stretch of Interstate 81 in Augusta County was closed after the sudden appearance of three sinkholes, the largest measuring 20 feet long, 11 feet wide and 22 feet deep. On October 5, 2004, the right southbound lane of I-81 just north of the Exit 118C ramp in Montgomery County collapsed. Due to the potential for damage to infrastructure and danger to the travelling public, VDOT maintains an emergency contract for sinkhole repair. In general, sinkhole occurrence is unpredictable and the size of a sinkhole cannot be estimated from the surface collapse, so repair costs range from the tens of thousands to the hundreds of thousands of dollars per sinkhole. Research into sinkhole distribution and early prediction is ongoing; however, a true method of early prediction remains elusive.

Groundwater contamination is a common problem in populated areas overlying karst terrain. Karst aquifer contaminants in Virginia have included petroleum products, herbicides, solvents, fertilizers, sheep and cattle dip, sewage, dead livestock, and household garbage. In the late 1800s, a Shenandoah County community was subjected to a cholera outbreak due to the pollution of the local karst aquifer. A significant concern is the vulnerability of karst aquifers to contamination along the I-81 corridor, where hazardous materials are regularly transported and accidents can occur. For some chemicals that do not readily mix with water, contamination can be widespread and remain in the groundwater for many years. Most of Virginia's karst region follows Interstate 81, and twenty-seven of Virginia's counties lie in this zone, where hundreds of thousands of people get their drinking water from wells and springs.

State law prohibits the dumping of waste into sinkholes, and some Virginia counties have implemented ordinances about sinkhole dumping and outfalls. Meanwhile, the Virginia Health Department discourages the use of karst springs as public water supplies and requires periodic testing of those karst springs that are used. The Virginia Department of Conservation and Recreation's Natural Heritage Karst Program is responsible for groundwater and habitat protection in karst areas, supported by EPA Section 319 Clean Water Act Program. The USGS, working with various state agencies, has developed a National Karst Map.

Areas over underground mine workings are also susceptible to subsidence. Mine collapses have resulted in losses of homes, roadways, utilities and other infrastructure. Subsidence is often exacerbated by the extensive pumping of groundwater associated with underground mining. Abandoned coal mines occur in Buchanan, Dickenson, Lee, Scott, Russell, Tazewell, Wise, Montgomery, and Pulaski counties in southwest Virginia; and Henrico, Chesterfield and Goochland counties in the Richmond coal basin. Other abandoned underground mines occur throughout the state. Information of past mining activity can be obtained from the Virginia Division of Mineral Mining and Division of Mined Land Reclamation.



Virginia counties containing significant karst terrain. Modified from Virginia Natural Heritage Karst Program.

Source: Department of Mines, Minerals, and Energy

History

In the local region, sinkholes suddenly appear from time to time on Interstate 81, which passes through the karst region of Virginia. One recent incident occurred in October 2003, when a sinkhole appeared on I-81 about one mile past the junction with I-77 in Wythe County. Both the Virginia Department of Transportation and Duke Energy said the sinkhole appeared in connection with drilling under the highway in connection with installation of a 24-inch natural

gas pipeline. The incident blocked a northbound lane of I-81 for a few days before VDOT completed the needed repairs and the reopened the lane to regular use.

Subsidence also has been a problem for Saltville due to mining for salt and gypsum. Salt mining first began in 1782 and continued until 1972 with the shutdown of Olin Industries, once a major employer in Saltville. Commercial production of salt resumed in 2000 with completion of an evaporator plant by Virginia Gas Company, which was removing brine from the underground caverns to make room for natural gas storage.

Gypsum mining began in 1815 and continued under the U.S. Gypsum Company, starting in the early 1900s. U.S. Gypsum, which has since moved to production of artificial gypsum, closed its Saltville area facilities in 2000.

In 1960 a major collapse occurred in a section of the high-pressure brine field located just southwest of Saltville. The collapse involved four wells spaced closely together and considered shallow, ranging from 450 to 800 feet deep, according to expert testimony. Over time the bottom cavities of the wells appeared to have merged together. The underground collapse moved upwards through the relatively thin rock "roof" layers (themselves 200-316 feet thick) to the surface. This resulted in a crater 400 feet wide and 250 feet deep.

More recently, a section of State Rt. 91 collapsed into a 50-foot wide sinkhole in front of the offices of U.S. Gypsum. In the past gypsum mining had occurred under the collapse site and may have been a contributing factor. Blame was also placed on a leaking water line that had apparently dissolved the underlying limestone, thereby weakening the underground support structure and leading to the collapse. It should be noted these incidents have resulted from human-induced activities, while the focus of this study has been on hazards created by nature.

In the Wythe County community of Ivanhoe an underlying sinkhole eventually caused the floor of the local post office to fall through. A new post office has since been established for Ivanhoe. Karst terrain also is a factor in the Town of Chilhowie, which is investigating why the town water system loses 16 million gallons a month; some is thought to leak into the underlying terrain. Construction workers for Duke Energy Gas Transmission also encountered karst terrain during the recent installation of the Patriot Extension natural gas pipeline near New River Trail State Park (near Foster Falls in Wythe County).

Risk Assessment and Vulnerability

There is no known way to predict when sinkholes might open up or when subsidence might occur. There is only limited data available on karst terrain, its extent, and its importance from an ecological standpoint and as a natural hazard.

The ecological importance of this landform is only beginning to be understood through the efforts of various state and federal agencies and by groups such as the Karst Waters Institute, Cave Conservancy of the Virginias, The Nature Conservancy, and others.

As noted in the section on landslides, detailed basic geology maps are still under development in the state and local region. It is not possible to make any risk assessment other than in a generalized fashion. This task may become possible in the future under a new program on karst and subsidence hazards proposed for the National Cooperative Geologic Mapping Program. The NCGMP is a digitized mapping effort by the U.S. Geological Survey in coordination with the Association of American State Geologists. The Geologic Mapping Act of 1992 mandated creation of a national geologic database.

The Karst and Subsidence Hazards program has been planned to develop better understanding of groundwater contamination, sinkhole formation, new techniques for karst analysis through remote sensing and geophysics, regional karst issues in the Appalachians, and understanding of karst issues on a national scale through development of a new National Atlas karst map.

Karst terrain is a special concern for Bland, Wythe, Smyth and Washington counties as a feature of the Valley and Ridge geological province. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to karst and sinkholes have not changed.

Karst as a natural hazard can be a costly matter for the community. There are the long-term costs associated with environmental pollution and contamination of the groundwater supply. There also are costs associated with damage created by subsidence, such as the collapse of State Rt. 91 into a sinkhole near Saltville in 1977. In 2004 VDOT was nearing completion on relocating 0.5 miles of Rt. 91 at an estimated cost of $2 million.

Due to the lack of mapping of significant karst terrain, incidents involving the sudden appearance of sinkholes and leakage often come as a surprise to local governments. No historical events have occurred since 2005.

Landslides

Description

Landslides can be defined as the downward and outward movement of soils and slope-forming materials reacting under the force of gravity. These movements can be triggered by floods, earthquakes, volcanic eruptions and excessive rain. The three important natural factors include topography, geology and precipitation. Human-caused factors include cut-and-fill highway construction, mining and construction of buildings and railroads.

Types of landslides include slides, flows, falls and topples (which occur rapidly), and lateral spreads (which occur much more slowly).

The Appalachian Highlands, along with other mountainous regions of the United States, are known to be highly susceptible to landslides. These come in the form of earth flows, debris flows and debris avalanches, mainly in areas of weathered bedrock and colluvium. Debris avalanches can occur during period of continual steady rainfall followed by a sudden heavy downpour. Areas prone to landslides include the plateau of the western Appalachian Highlands (especially in Tennessee and Kentucky) and southeast of the Appalachian Plateau, in the flanks of the Appalachian Ridge and the Blue Ridge (which includes the Mount Rogers region). For the most part these movements are comprised of slowly moving debris slides.

On a generalized scale, hazard-prone areas have been mapped by the U.S. Geological Survey. However, this information needs to be evaluated at ground level to more clearly identify the landslide-prone areas of the Mount Rogers region. A map showing landslide incidence and susceptibility in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Information is limited regarding landslides and debris flows for the Mount Rogers region. While generalized statewide geology maps have been published, detailed maps for the local region are still in development. These will become the basic geology maps that in the future can be used in landslide risk assessment. Geologists with the Virginia Department of Mines, Minerals and Energy were in the process in 2003 of creating basic geology maps in Washington County and were planning to move into Smyth County and other parts of the Interstate 81 corridor. In the past most geologic mapping related to resources of economic value, such as coal.

The record is scant concerning landslide incidents in the Mount Rogers region. A staff review of a comprehensive, nationwide database giving locations of debris flows, debris avalanches, and mud flows revealed no information pertaining to the local region.

Small-scale landslides are known to occur on steep slopes and can sometimes block roadways. The Virginia Department of Transportation makes emergency repairs as needed. On occasion, a major landslide can block a roadway. Heavy rains and the annual freeze-thaw cycle can trigger these landslides.

More recently in March of 2011 a rockslide occurred in Carroll County. The event happened on Interstate 77 at mile marker 3.8 in the left northbound lane. A boulder roughly the size of a car fell onto the highway. A man struck the boulder with his car killing him instantly. VDOT officials surveyed the cliff above and determined that no other rocks were in danger of falling.

Risk Assessment and Vulnerability

The Mount Rogers region is mountainous in nature, and its steep slopes make parts of the region susceptible to landslides. The hazard-prone areas have been generally mapped by the U.S. Geological Survey, as shown below.

The USGS divides landslide risk into six categories. These six categories were grouped into three, broader categories to be used for the risk analysis and ranking; geographic extent is based off of these groupings. These categories include:

High Risk

1. High susceptibility to landsliding and moderate incidence.
2. High susceptibility to landsliding and low incidence.
3. High landslide incidence (more than 15% of the area is involved in landsliding).

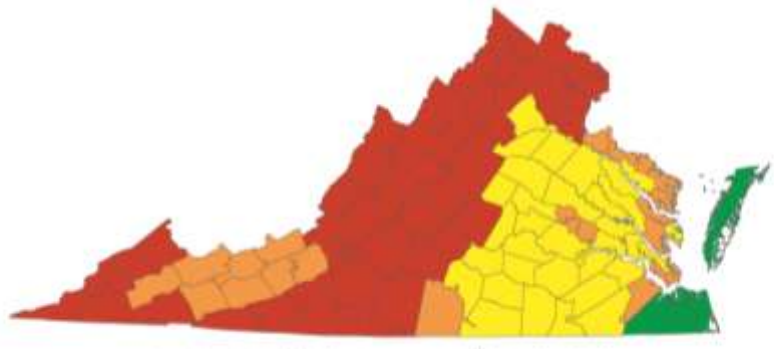
Moderate Risk

4. Moderate susceptibility to landsliding and low incidence.
5. Moderate landslide incidence (1.5 - 15% of the area is involved in landsliding).

Low Risk

6. Low landslide incidence (less than 1.5 % of the area is involved in landsliding).

The six categories were grouped into High (categories 1-3), Medium (categories 4 –5), and Low (category 6) to assess the risk to state faculties, critical facilities and jurisdictions.



Counties in Virginia that are susceptible to landslides.
Red = high potential; orange = moderate potential; yellow = moderate to low potential; green = low potential.

Source: Department of Mines, Minerals, and Energy

Certain types of rocks and geologic conditions, when they occur on slopes, make an area prone to landsliding. These types include fine-grained clastic rocks (those consisting mainly of silt and clay-sized particles), highly sheared rocks and loose slope accumulations of fine-grained surface debris, which give way during times of intense or sustained rainfall. Steep slopes also can add to the likelihood of landslides. Debris flows, for instance, are known to occur mainly on slopes steeper than 25°.

There is no accepted method for determining the likelihood of a landslide in the Mount Rogers region. Given the relative lack of historical data on catastrophic landslides affecting the region, our best guess is a major landslide incident appears to be unlikely.

Landslides are not well understood in the Mount Rogers region. Most geologic studies have been focused on mineral resources (especially coal) of economic importance. Basic geologic mapping is only beginning to get underway in the region. More information will be needed before any detailed risk assessment can be made for localities in the Mount Rogers region.

Please see the image above (Generalized Landslide Image of Southwest Virginia) for a visual depiction of potential landslide risk areas in the local region.

Generally speaking, the areas posing the greatest landslide risk include the pink and red regions. The pink regions include parts of Washington, Smyth and Grayson counties and a corner of Carroll County. The red regions include much of Carroll County and the border area between Washington, Smyth and Grayson counties.

Landslides can damage or destroy roads, railroads, pipelines, utilities and infrastructure, forests, fisheries, parks and farms. Damages can include economic losses to local, state and

federal agencies – because of the impacts to public infrastructure – and to the private sector for impacts to land and buildings. When located near communities, sudden landslides also can cause death. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to Landslides have not changed.

Severe Winter Storms and Ice

Description

Blizzards represent the worst of the winter season, combining heavy snowfall, high winds, extreme cold and ice storms. Severe winter storms can be characterized by heavy snowfall but lacking the severity usually associated with blizzards. They often begin as mid-latitude depressions or cyclonic weather systems and sometimes follow the jet stream.

For the Mount Rogers region storm systems travel in from the Midwest and Tennessee Valley, from the Gulf Coast region and sometimes as a result of a major coastal storm that passes inland. On the northern side, extreme cold weather and Arctic cold fronts move in from Canada and are known to sweep into the Mid-Atlantic region. The severity of these storms may result from high snowfall accumulations that lead to major snowdrifts and blizzard conditions or that later melt and cause flooding. Wetter storms may have only limited amounts of snow but are severe due to accumulations of ice. A light covering of ice can easily create numerous traffic accidents. Both ice and heavy snow can tear down tree limbs, trees, power lines and telephone lines, creating major disruptions that sometimes cannot be cleared up for weeks. A map showing the heaviest average snow accumulations in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

The historical record for snowstorms and blizzards in the Mount Rogers regions gives numerous examples of how bad these storms can get. major winter events in the region resulted in seven federal disaster declarations and at least four state emergency declarations. The chart below contains inconsistencies in monetary values and locations of damage due to poor recordkeeping within localities.

Major Winter Storms, Cold and Ice
Mount Rogers Region, Virginia 1993-2017

Date	Localities	Description
01-17-13	Bland, Carroll, Grayson, Smyth, Wythe, Galax	The region was hit by a winter storm that brought heavy snow fall ranging from 12 inches in Rocky Gap (Bland County) to 6.0 inches in Ceres (Bland County). This winter storm brought the interstate to a standstill with accidents and heavy snow fall.
4-28-03	Wythe County	Severe winter storm, near record snowfall, heavy rain, flooding, and mudslide. 39 jurisdictions had disaster declarations. Wythe qualified in April for public assistance as result of the March storm.
3-30-03	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Winter storm with heavy snow that began during the predawn hours of the 30th and continued through the early afternoon. Snow accumulated 6-12", brought down numerous tree limbs and power lines, resulting in more than 50,000 power outages.
2-15-03	Bland, Grayson, Wythe	State emergency declaration due to severe winter storm, impassable roads and flooding. SW Virginia got more than 4" of rain. Evacuations from homes in Bland and Wythe counties.
12-11-02	Carroll, Galax	State emergency declaration due to icy conditions creating massive power outages. Accretions of ¼" of ice. An icy winter storm followed on Dec. 13.
12-04-02	Bland, Carroll, Grayson, Smyth, Washington, Wythe, Galax.	Winter storm affected a wide area of SW Virginia. Snowfall amounted to 5-10" and ice of 1" or more in Carroll and Floyd counties. Numerous traffic accidents.
5-22-02	Bland, Carroll, Wythe, Bristol, Galax	Freeze damage affected Christmas tree growers.
2-28-00	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe winter storm. 107 jurisdictions had disaster declarations for winter storm from Jan. 25-30, 2000.
1-25-00	Bland, Carroll, Grayson, Wythe, Galax	State emergency declaration due to winter storm with high winds that dumped up to 18" of snow across much of the state, with drifting and blizzard conditions. Local storm occurred on Jan. 29. Snow mixed with sleet amounting to 4-8" inches, 11" in higher elevations.
3-15-99	Bland, Carroll, Smyth, Wythe, Galax	Winter storm developed with rain and sleet changed to a wet snow early in the morning. Snow amounts of 4-8", with up to 10" in the higher elevations. The snow downed power lines and small trees, resulting in power outages.

Date	Localities	Description
3-03-99	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Winter storm resulted from rain changing to sleet and then snow, with accumulations of 6-12". Numerous motor vehicle accidents. Motorists stranded for 5-6 hours on I-77.
12-23-98	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Ice storm created ice accretions of ½" and sometimes as much as 1". Ice downed tree limbs and power lines and created numerous power outages. Many traffic accidents and some injuries due to ice-covered roads and bridges.
1-28-98	Bland, Carroll, Grayson, Smyth, Wythe, Galax	State emergency declaration for severe winter storm with heavy snowfall in the western part of the state causing riverine flooding. Snowfall of 15-32" closed schools, businesses & church services & stranded people in vehicles & homes. Numerous traffic accidents. A charter bus overturned on I-81 near Marion, injuring 20 people. I-81 was closed for several hours during the height of the storm. Power lines, tree limbs and trees were knocked down.
12-29-97	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Heavy winter snowstorm produced accumulations of 5-10", with 4-7" in Bland County. Bad road conditions resulted in numerous traffic accidents.
3-28-96	Bland, Carroll, Wythe, Galax (Bath County hardest hit)	Ice storm with freezing rain all day created significant ice cover above 1900 feet. Ice downed tree limbs, power lines, telephone lines. Numerous power outages and some traffic accidents.
2-02-96	Bland, Carroll, Grayson, Smyth, Washington, Wythe, Bristol, Galax	State emergency declaration for a winter storm with heavy snow, followed by extreme cold Feb. 3rd -6th. Burkes Garden in Bland County recorded 22° below zero. Most locations had morning lows on the 5th of zero to 12° below zero. Emergency declaration based on an Arctic air mass moving across state Feb. 1-4, with potential to cause widespread power outages.
1-06-96	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Blizzard of 1996. State emergency declaration for a predicted winter storm with blizzard conditions and snowfall of 12-24" expected. Statewide disaster declaration. Occurred Jan. 6-13.
Winter of 1995-96	VDEM "Virginia Winters" account	Unusually heavy snowfall for the winter. Burkes Garden had 97", while Bland had 62". Some schools lost up to 15 days due to snow.
3-28-94	Bristol	Severe ice storms, flooding
3-10-94	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe ice storms, flooding. May be related to the state emergency declaration of March 2, 1994.

Date	Localities	Description
3-12-93 to 3-13-93	Bland, Carroll, Grayson, Smyth, Wythe, Galax (affected a region from Florida to New England)	Blizzard of 1993. 43 jurisdictions received disaster declarations statewide. Extreme cold and heavy snowfall, along with high winds, sleet and freezing rain left many motorists stranded. $5 million property damage. It was the biggest storm in a decade in Virginia. SW VA got 24-42" of snow. Interstate highways were closed and emergency shelters were opened to house up to 4,000 motorists.
12-18 2009	Grayson, Carroll, Smyth, Washington.	Grayson County received federal assistance. A total of $600,000 of damage was reported

Source: Virginia Department of Emergency Management and National Climatic Data Center.
Note: Items with dates appearing in boldface and shading resulted in presidential disaster declarations.

Major storms such as the Blizzard of 1993 closed down interstate highways, stranded motorists in their vehicles and trapped people in their homes. The event also brought high winds, sleet and freezing rain, adding to the disruptions created by the snowfall. In southwest Virginia, snowfall ranged from 24 to 42 inches in what was the largest snowstorm in a decade for the state. The Blizzard of 1996 (January 6-13) began in the southeastern states and moved into the northeastern states to cover the entire eastern seaboard. Snowfall amounted to one to four feet, with the greatest impacts for Virginia and West Virginia. On a statewide level, Virginia had 48 inches of snow, followed by West Virginia with 43 inches of snow. Much of the same region experienced two more snowstorms that dumped up to 12 inches more within the next 10 days. The National Climatic Data Center listed the storm of December 2009 as the only winter storm since the writing of the original plan that caused major monetary damage.

Below is the Northeast Snowfall Impact Scale (NESIS) that characterizes and ranks high impact winter storms.

Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Locality	Avg. Annual Total Snowfall
Abingdon	16.3"
Bland	25.5"
Burkes Garden	46.3"
Byllesby	11.4"
Chilhowie	19.2"
Damascus	22.0"
Galax Radio	19.1"
Hillsville	18.9"
Independence	20.2"
Mendota	15.6"
Saltville	13.4"
Troutdale	20.2"
Wytheville	19.9"

Snowstorms pose a threat not only because of dangerous driving conditions and downed power lines, but also due to the melting that can lead to flooding. During the 2002-2003 winter season, severe winter storms later created flooding problems in Bland, Grayson and Wythe counties, with Wythe declared eligible for federal disaster assistance.

Due to variable topography and other factors, average annual snowfall amounts vary greatly throughout the Mount Rogers region, based on available weather records shown in the accompanying table shown at left. The data covers time periods as long as 81 years.

Risk Assessment and Vulnerability

Winter storms are a regular part of the weather regime for the Mount Rogers region. The severity of the season varies from year-to-year and can be highly variable among the localities for any given storm event. The variability can be due to differences in elevation, differences in temperature and the track of given storm systems.

In recent years there have been at least seven federal disaster declarations and four state emergency declarations due to severe winter storms over a 10-year period, as shown in the table on Major Winter Storms, Cold and Ice. Based on this brief time period, it is likely localities in the Mount Rogers region will experience at least one major snow and/or ice storm per year with the potential to become a federal disaster. The winter season typically runs from November to April of each year.

The average winter season in the Mount Rogers region can create annual snowfall amounts ranging from 8 to 46 inches. The average snow season in Roanoke produces 23 inches per year. The average winter season in the Mount Rogers region can create annual snowfall amounts ranging from 8 to 46 inches. The average snow season in Roanoke produces 23 inches per year (over 49 years) and in the Bristol-Johnson City-Kingsport, Tenn. area produces 15.6 inches per year (over 59 years).

Any major winter storm or blizzard is likely to affect the entire Mount Rogers region, with the most direct impacts affecting highways and power lines. Most snow-related deaths result from traffic accidents, overexertion, and exposure. Sometimes also there is damage to buildings from collapsed roofs and other structural damage. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to winter storms have not changed. There is no way that we know of to calculate the likely costs of a major winter snow or ice storm. The available data, through the National Climatic Data Center, reports damages by storm event, but this is not broken down by locality.

Severe winter storms and ice can cause death and injury on the highways and trap people in their motor vehicles or in their homes due to impassable roads. Snowstorms also regularly result in the closing of schools; in some years, the local schools have been closed as much as 15 days due to winter conditions. Forecasts of impending snowstorms also regularly result in early school closings to reduce risk from bus and traffic accidents. Likewise, winter conditions can result in temporary disruptions of business activity, with workers advised to remain home until driving conditions improve.

The Virginia Department of Transportation deals directly with the effects of snowstorms. On average in the past five years, VDOT has spent $83 million annually on snow removal. As a general rule, the first priority is to plow interstate highways, major primary roads and secondary roads. Plowing in subdivision and residential areas are the second priority during winter storms. VDOT seeks to get ahead of snow conditions on the roadways through pre-treatments with liquid chloride and close monitoring of storm conditions and incoming storms.

For American Electric Power the main concern is icing, which can tear down overhead power lines. AEP is sometimes hampered in its efforts to restore power during major snowstorms due to the poor condition of the roads. The state's system of highway maintenance, carried out by several private contractors, at times creates uneven results during snow clearing.

Thunderstorms and Lightning

Description

Thunderstorms arise from atmospheric turbulence caused by unstable warm air rising rapidly into the atmosphere, enough moisture to form clouds and rain and an upward lift of air currents caused by colliding warm and cold weather fronts, sea breezes or mountains. Thunderstorms are always accompanied by lightning, but they may also be associated with heavy rains, hail and violent thunderstorm winds.

Thunderstorms occur most often during the spring and summer months and can occur throughout the entire Mount Rogers Region. Nationwide the average storm is 15 miles wide and generally last less than 30 minutes at any given location. Some storm systems have been known to travel more than 600 miles. A map showing the favored high wind areas in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Storm events reported to the National Climatic Data Center reflect the kind of activity and damages resulting from high winds and thunderstorm winds. Describing the data can be problematic, since storms often travel over wide regions. The reported damages represent those for the entire storm event and are not usually limited to a given locality. The data given in the table below offers a guide to thunderstorm history in the Mount Rogers region.

Storm Event History for Thunderstorm Winds, as of April 2018

Location	Time Period	No. Of Years	No. Of Events	Avg. Per Year	Reported Damages
Bland County	May 1989-April 2018	28	38	1.4	$334,000
Carroll County	June 1960-April 2018	57	81	1.4	$1,430,000
Grayson County	May 1962-April 2018	55	62	1.1	$672,000
Smyth County	April 1972-April 2018	45	62	1.4	$828,000
Washington County	June 1995-April 2018	22	119	6	$1,570,000
Wythe County	July 1962-April 2018	55	55	1	$705,000
City of Bristol	July 1980-April 2018	37	46	1.3	$252,000
City of Galax	Jan. 1998-April 2018	19	14	0.7	$29,000

Another event, on July 4, 1997, captured in the NCDC data involved a supercell thunderstorm and associated severe thunderstorms affecting a region stretching from Tazewell to Pittsylvania counties. Thunderstorm winds estimated at 60-80 mph and hail the size of golf

balls damaged at least 29 homes, 16 mobile homes, five outbuildings, four businesses and a church in a two-mile path near Wytheville. There was also widespread damage to vehicles, roofs, sidings, satellite dishes, trees and a large sign knocked down by the winds. Wytheville Community College sustained 100 broken windows. Hail drifts amounted to six to eight inches deep in several locations. The event caused an estimated $300,000 in property damage.

A supercell thunderstorm, while rare, is the often the most violent known form of thunderstorm and is associated with tornadoes, damaging straight-line winds and large hail. These events are defined as long-lived thunderstorms with a persistent rotating updraft. They often contain a mesocylone, or storm-scale regions of rotation typically two to six miles in diameter that may produce tornadoes.

Lightning

Thunderstorms are always accompanied by lightning, which can cause fires, injury and death. Florida is known for having the greatest number of thunderstorms and the highest density lightning strikes in the contiguous United States.

Lightning becomes a problem when the discharge of a lightning bolt connects with an object or surface on the ground. Lightning will be considered together with thunderstorms in judging the importance of this hazard for the Mount Rogers region.

Risk Assessment and vulnerability

Southwest Virginia experiences 60-80 thunderstorms on average per year. Most of these occur during the summer months, extending from May through September, with July the peak month for thunderstorms statewide, according to the state climatology office. This is moderate compared to other parts of the country with more than 130 thunderstorms annually. During the peak of the thunderstorm season in the local region, storms may roll through at the rate of three or four per week, which is relatively frequent.

People and property throughout the Mount Rogers region are subject to damages and injuries created by lightning and thunderstorms. But any individual storm is likely to affect only a very limited area. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to thunderstorms and lightning has not changed.

Virginia experiences a moderate number of thunderstorms and lightning strikes compared to other parts of the country, according to research cited by FEMA. Thunderstorms in the Mount

Rogers region typically last 70-80 minutes in any given location, which falls in the mid-range for storm duration nationwide. In some areas thunderstorms last 130 minutes or more, based on findings by the National Weather Service for the years 1949-1977.

These storms can cause serious structural damage to buildings, start forest fires and wildfires, blow down trees and power lines, and cause death. On rare occasions, events such as the supercell thunderstorm from July 1997 can cause widespread damage, as previously discussed on the history section.

Nationally, Virginia falls in the mid-range for lightning fatalities, based on the cited research through the National Oceanic and Atmospheric Administration. States such as Florida, North Carolina, New York and Tennessee rank far ahead of Virginia. The lightning that accompanies thunderstorms in the Mount Rogers region averages 4-6 strikes per square kilometer, which is relatively low.

It is not possible based on available data to quantify the impacts of thunderstorms and lightning for localities in the Mount Rogers region. Available data from the National Climatic Data Center, which tracks incidents of thunderstorms and thunderstorm wind damage, is reported on a regionalized basis often covering numerous localities as a storm system moves through. Data resources will have to improve in the future to be able to make these calculations on the local level.

Tornadoes and Hurricanes

Description

A tornado appears as a rapidly spinning vortex or funnel of air extending to the ground from an overhead storm system (usually a thunderstorm). Tornadoes come in many sizes, ranging from several yards to more than a mile wide. The severest tornadoes can achieve wind speeds of more than 300 mph, though most are 100 mph or less. The weakest tornadoes may last only about a minute, while the stronger ones may continue for 30 minutes at a time and travel miles before dissipating. Virginia is said to have an average of seven reported tornadoes per year (1950 through 2006), though the actual number of tornadoes may be higher.

Statistically the peak month for tornadoes in Virginia is July, though the tornado season goes from spring through fall. Tornadoes spring from an estimated 1% of all thunderstorms; of the group that produces tornadoes, only about 2% are considered violent with winds over 200 mph

(categories F3, F4 and F5 on the Fujita scale). Tornadoes also can be associated with hurricanes, though hurricanes are not a significant factor in southwest Virginia.

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

As seen in table shown above, tornadoes are measured on the Enhanced Fujita Scale, with categories ranging from F0 to F5. The categories are defined according to wind speed and the types and severity of damage caused. Parts of southwest Virginia show some tendency toward tornadoes in an area that extends from Tennessee into Bristol and Washington County due to the lay of the land and its influence on storm systems. Maps showing tropical cyclone tracts and tornado hazard frequency in the Mount Rogers Region are located in the section titled Appendix I at the end of the document.

History

Between 1950 and 2005, Virginia experienced six tornadoes per year or 1.6 tornadoes annually per 10,000 square miles. Two storms per year on average were rated as strong or violent (F2-F5), with 0.5 such storms per 10,000 square miles per year.

Tornado History: Mount Rogers Region1950 through 2017

Locality	Date	Time	Dead	Hurt	F Scale
Bland Co.	-	-	-	-	-
Carroll Co.	Aug. 1, 1965	0230	0	5	F1
	Aug. 21, 1977	1700	0	0	F2
	July 4, 1979	1620	0	0	F1
	May, 6 2009	2126	0	0	F0
Grayson Co.	July 10, 1959	1500	0	0	F1
	May, 6 2009	2125	0	0	F0
	October 23, 2017	1747	0	0	F1

Locality	Date	Time	Dead	Hurt	F Scale
Smyth Co.	April 4, 1974	0405	0	3	F3
	Jan. 25, 1975	2335	0	2	F2
	June 5, 1975	1815	0	0	F0
	July 13, 1975	1900	0	0	F1
	April 28, 2011	0200	0	1	F2
	April 28,2011	0015	0	0	F2
Washington Co.	April 30, 1953	1845	0	0	F0
	June 10, 1953	1500	0	0	F1
	June 3, 1962	1600	0	0	F2
	April 4, 1974	0400	1	1	F3
	Jan. 25, 1975	2330	0	0	F2
	April 30, 1990	1725	0	0	F0
	April 28, 2011	0100	4	50	F3
Wythe Co.	-	-	-	-	-
City of Bristol	April 4, 1974	0300	0	0	F0
City of Galax	-	-	-	-	-
Totals:	20 events		5	61	

For the Mount Rogers region there have been 20 reported tornadoes from 1950 through April 2011, with 5 people killed and 61 people injured. The highest intensity ever recorded for these storms was F3. See the table above for more details.

On the Fujita scale, an F3 category tornado is considered severe, with winds up to 206 mph. This fits with the FEMA Wind Zone III designation for the region. By definition, Zone III communities are known to experience winds of 160-200 mph.

The tornadoes of April 4, 1974 were part of what is known as the "Super Outbreak," when severe thunderstorms at the leading edge of a cold front moved into southwest Virginia. Eight tornadoes struck statewide, killing one person and hurting 15. The destruction affected more than 200 homes and barns and more than 40 mobile homes and trailers. The storm event in total spawned 148 tornadoes killed 315 people and injured 5,484. "Super Outbreak" created the most tornadoes ever recorded in a 24-hour period and the worst tornado outbreak since Feb. 19, 1884. This was true until the tornado outbreak of April 25-28 of 2011. This outbreak produced at least 336 tornados in 21 states from Texas to New York and even created isolated tornadoes in Canada. The storms caused $10 billion worth of damage and tragically resulted in

346 deaths. In the Mount Rogers Planning District, the storms resulted in 4 fatalities and caused $38.5 million in damages.

One of the tornadoes, rated at F0 to F1, struck near Bristol, demolishing several mobile homes and hurting four people. A stronger F3 tornado hit the Saltville area, traveling up the valley of the North Fork Holston River from Washington County, then following Tumbling Creek into Poor Valley and traveling up the Poor Valley to Cardwell Town. The storms resulted in one dead, one injured and destruction of two houses, two mobile homes, a church and three barns. There was also damage to 42 homes, two mobile homes and the roof of a high school. Wind damage was reported in Bland and Wythe counties.

Hurricanes

Generally speaking, the Mount Rogers region does not have hurricanes and is not considered hurricane-susceptible like communities all along the east coast. Hurricanes become a factor on those rare occasions when the storm systems take an inland route as they pass over the Mid-Atlantic region. Two of the most significant hurricanes in recent decades affecting the Mount Rogers region were *Hurricane Agnes* (June 1972) and *Hurricane Hugo* (September 1989).

Hurricane Agnes, originating off the coast of the Yucatan Peninsula in Mexico, became a tropical storm on June 16, 1972 and then a hurricane in June 19, 1972. It crossed the Florida panhandle on June 19 and passed through Georgia, South Carolina and North Carolina before returning to the Atlantic Ocean to regain strength. The storm made landfall a second time on June 22, 1972 in southeastern New York and moved west across the southern tier of New York and into north-central Pennsylvania, where the $3.1 billion hurricane made its greatest impact.

Though the local record is scanty for this storm, 106 jurisdictions in Virginia qualified for a presidential disaster declaration due to widespread flooding. Those included Smyth County and the City of Galax. Most notable for damage caused by flooding, Agnes dropped an average of 6-10 inches of rain over the Mid-Atlantic region from June 20-25, 1972. The storm in Virginia created an estimated $126 million in damages and resulted in 13 deaths.

Hurricane Hugo began as a cluster of thunderstorms moving west off the coast of Africa. As the storm system passed over the Atlantic Ocean, it gained strength to become a tropical depression and then a hurricane, on Sept. 13, 1989. Once classified as a Category 5 storm

(highest intensity hurricane) on the Saffir-Simpson Scale, Hugo did great damage in the Caribbean and Puerto Rico. By Sept. 19 the storm had weakened and moved back over the Atlantic, where Hugo regained strength and became a Category 4 hurricane with winds up to 135 mph when it made landfall near Charleston, S.C. on Sept. 22, 1989. By the time Hugo passed west of Charlotte, N.C., it had weakened to a tropical storm with peak winds of 87 mph. The storm continued tracking north over southwest Virginia and West Virginia; the Appalachian Mountains helped weaken the storm further as it continued into western New York and passed out of the country. In the end, six Virginians died as a result of Hugo. As the storm passed over the Appalachians, orographic effects were thought to cause locally heavy rainfalls of more than six inches over western North Carolina and southwest Virginia, causing small stream flooding. Orographic effects are defined as those caused by the presence of mountains; most commonly, this occurs when air rises over the mountains and then cools, creating condensation and rainfall. In total Hugo was estimated as a $9 billion storm in damages and economic losses, with $7 billion of that total occurring on the mainland, particularly in the Carolinas.

Risk Assessment and Vulnerability

The Mount Rogers region appears to face a low risk of tornadoes and hurricanes. FEMA classifies the region under Wind Zone III, meaning winds can reach speeds ranging from 160 mph to 200 mph. The region also, based on historical information, experiences less than one tornado per 1,000 square miles. Tornadoes are rare for the Mount Rogers region.

FEMA High Wind Matrix
Tornado and Hurricane Risk

		Wind Zone			
		I	II	III	IV
No. of Tornadoes per 1,000 sq. miles	< 1	Low Risk	Low Risk ✹	Low Risk✹	Moderate Risk
	1-5	Low Risk	Moderate Risk✹	High Risk	High Risk
	6-10	Low Risk	Moderate Risk✹	High Risk	High Risk
	11-15	High Risk	High Risk	High Risk	High Risk
	> 15	High Risk	High Risk	High Risk	High Risk

Saffir-Simpson Scale

Category	Winds	Effects
One	74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal road flooding and minor pier damage
Two	96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL may be flooded inland 8 miles or more.
Four	131-155 mph	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

A tool to judge damage potential from tornadoes and hurricanes can be found in a FEMA publication called *Taking Shelter from the Storm: Building a Safe Room Inside Your House*. The tool appears in the table above.

The matrix and the wind zone assignments are based on 40 years of tornado history and more than 100 years of hurricane history in the United States, as well as research by the Wind Engineering Research Center at Texas Tech University. This serves as the basis for a low risk rating for the Mount Rogers region.

Tornadoes, though rare for the Mount Rogers region, have been known to achieve an F3 intensity rating, based on the Fujita scale. These most severe known tornado incidents have occurred in Smyth and Washington counties. An F3 intensity tornado contains sufficient power to tear roofs and walls from well-built homes, uproot most trees, and lift objects such as

automobiles off the ground and send them flying through the air. These storms can generate wind speeds of 158-206 mph.

As for hurricanes, the Mount Rogers region stands far inland and is not part of the coastal zone region where hurricanes cause most of their damage. Generally speaking, the local region experiences the outer effects of hurricanes; this can include high winds and heavy rainfall. Since heavy rainfall mainly results in flooding, hurricane impacts in this plan are covered in the section on flooding. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to tornadoes and hurricanes has not changed.

Wildfires

Description

Wildfires occur as a regular part of the natural environment and are fueled by trees, brush and grasses. The three primary factors that influence these fires are topography, fuel and weather. Nationwide, the most frequent and worst of the wildfires occur in the western states, due to the dry climate and the prevalence of conifer and brush fuel types.

Wildfires also occur as a result of human actions, with increasing numbers of people choosing to live in wooded and wildland settings (described as the wildland urban interface), a factor that is also an issue for the eastern states, including the Mount Rogers region.

It is possible to group wildfires into four categories, as follows:

- Wildland fires occur in national forests and parks and are fueled by natural vegetation. Federal agencies typically hold the lead role for fire management and suppression for this group of fires.
- Interface or intermix fires happen at or near the junction between natural vegetation and the built environment.
- Firestorms are high-intensity fire events that are impossible to control or suppress until conditions change or the available fuel is gone. Firestorms have been a particular problem in the western states.

Prescribed fires and prescribed natural fires include those that are intentionally set and those that are allowed to burn as part of a fire management program to help clear out excessive accumulations of vegetative fuels.

A map showing wildfire risk in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Wildfires in the Mount Rogers region are not as prevalent or as damaging as the massive fire events that occur every year in the western states. But the risks still exist due to the amount of forested land in the region, presence of contributing factors (steep slopes, pine woods, wildfire history), and residential development in remote, wooded areas throughout the region.

From 1995 through 2011 the Mount Rogers region had roughly 505 fires causing an estimated $730,000 in damages as shown in the table below. Total property saved from destruction was estimated at more than $23 million, according to data by the Virginia Department of Forestry (VDOF). The greatest number of fires occurred in Carroll County. Though it had fewer fires during the seven-year period, Washington County sustained fire damage to the largest total land mass.

VDOF data also points to debris burning and incendiary (arson) sources as the most common cause of fires in the Mount Rogers region. Those two sources accounted for 370, or 73%, of the 505 fires occurring between 1995 and 2011. Less frequent fire causes included equipment use, miscellaneous, smoking and children.

On the federal level, catastrophic fire losses in the western states have led to the development of the National Fire Plan and the Healthy Forests Initiative.

The National Fire Plan has resulted in more spending by state and federal agencies for improved prevention of wildfires. In the George Washington and Jefferson National Forests, which include the Mount Rogers region, the added funding supported efforts to reduce levels of fire-prone fuels and to establish a Type I firefighting crew. The National Fire Plan aims to provide sufficient resources for firefighting, rehabilitate fire-damaged ecosystems, reduce levels of fire-prone fuels found in the forests, and reduce fire risk faced by woodland property owners.

The Healthy Forests Initiative is a long-term plan promoted by federal agencies to improve management of federal lands and expedite forest and rangeland restoration projects. This effort is focused on communities near the wildland urban interface, in high-risk municipal watersheds, in watersheds containing habitat for threatened and endangered species, and where ecosystems are being destroyed by insect and disease epidemics and face increased threat of catastrophic wildfire. The wildland urban interface, particularly where rural housing development intermingles with the forest, is a concern for the Mount Rogers region.

Risk Assessment and Vulnerability

The Mount Rogers region covers an estimated 1.77 million acres of land. Of that total, an estimated 1 million acres of land (roughly 58%) is classified as forestland, with nearly all used as timberland. Areas subject to fire risk include the forestlands and places where people are building homes and residential subdivisions in wooded settings.

Virginia Department of Forestry (VDOF) criteria for determining areas of highest risk take into account factors such as density of historical wildfires, nature of the land cover (pines are more flammable than hardwoods), steepness and orientation of slope, population density, distance to roads, road density and developed areas, and presence of railroads. VDOF is incorporating its data into a GIS-based mapping system called ForestRIM to help make wildfire risk assessments and to identify woodlands home communities.

VDOF statistics for the state show most fires occur during the spring fire season (February-May) and on a lesser level during the fall fire season (October-December). More fires occur during these periods due to drier weather conditions, higher winds and the presence of cured fuels that can easily ignite. Causes of fires statewide include: open burning (30%), arson (20%), smokers (14%), miscellaneous (11%), children (9%), equipment use (7%), railroads (5%), lightning (3%), and campfires (1%).

In any given year on average, the Mount Rogers region may experience 70 wildfires, based on the state forestry data over the past 15 years.

Information on wildfire risk was being developed through VDOF and its GIS-based ForestRIM program, which mapped areas of risk into categories of low, moderate and high, based on criteria described above. The VDOF data did not include information on wildfires occurring on

federal lands (which would include the national forests and the Mount Rogers National Recreation Area).

The VDOF wildfire risk data as available in early 2004 showed:

- Carroll and Washington counties contained the largest amount of land subject to high risk of wildfire (more than 100,000 acres for each county).
- Washington County appeared to have the highest number of woodland homes subject to high risk of wildfire, followed by Carroll County.
- Substantial regions of high wildfire risk were also apparent for Smyth County (in its midsection and far northwestern corner, roughly 70,000 acres) and Grayson County (all along its eastern border and generally along the U.S. Rt. 58 corridor, roughly 60,000 acres).
- Areas with lesser acreages subject to high risk of wildfire included Bland (approximately 27,000 acres) and Wythe counties (roughly 20,000 acres).

Loss estimates have been based on the preliminary data available through the ForestRIM program (for housing counts) and estimates (for housing values) as applied by the MRPDC.

The values shown in the table below reflect the estimated value of all woodland homes in the region. In any given wildfire, only a portion of this housing stock would be at risk of destruction. However, any given woodland home that catches on fire faces a high risk of substantial or total destruction in some of the more remote parts of the local region. We have no way of estimating the potential loss for any given wildfire event.

LOSS ESTIMATES FOR WOODLAND HOMES, as of 2018

Locality	Est. Number Homes at Risk	Total Value of Homes at Risk	Est. Total Land Mass at Risk
Bland County	265	$34,430,390	27,000 acres
Carroll County	712	$92,507,312	> 100,000 acres
Grayson County (incl. Galax)	258	$33,520,908	60,000 acres
Smyth County	475	$56,895,500	70,000 acres
Washington County	804	$96,303,120	> 100,000 acres
Wythe County	No data avail.		20,000 acres
City of Bristol	No data avail.		
City of Galax	67	$8,705,042	

People with homes in woodland communities can face a substantial risk of wildfire and catastrophic loss. These homes generally cannot be insured against loss, which places the

entire financial burden on the homeowners. In some cases, private housing developments in wooded settings contain narrow, poorly designed roads that cannot accommodate fire-fighting equipment. Other potentially serious issues include lack of access to a water supply, remote location, unidentified roads, and presence of vegetation (pines, broom sage) that is more prone to catch on fire. Wildfire can result in loss of property, injury and loss of life. In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to wildfires has not changed. This is due to a lack of development in this short time span, and or lack of historical events.

The table on the following page shows a detailed breakdown the land cover in the Counties of the Mount Rogers Region.

Land Cover Information: Mount Rogers Region

County	All Land	Forest Land				Non-forest Land
		Total	Timberland	Woodland	Reserved	
Bland	229,545	172,214	166,519	na	5,695	57,331
Carroll	308,115	162,291	160,499	na	1,792	144,141
Grayson	285,304	173,873	161,883	na	11,991	111,431
Smyth	289,337	183,428	178,103	na	5,325	105,909
Washington	368,481	192,734	191,190	na	1,544	174,119
Wythe	296,480	153,942	153,610	na	332	142,538
Total	1,777,262	1,038,482	1,011,804	na	26,679	735,469

Windstorms

Description

Wind can be defined as the motion of air relative to the earth's surface. Extreme wind events may come in the form of cyclones, severe thunderstorms, tornadoes, downbursts and microbursts.

Wind speeds may vary from 0 at ground level to 200 mph in the upper atmosphere. Nationwide the mean annual wind speed falls in the 8-12 mph range. Frequently, wind speeds reach 50 mph and sometimes exceed 70 mph. Coastal areas from Texas to Maine may experience tropical cyclone winds with speeds of greater than 100 mph. The Mount Rogers region is located in Wind Zone III, with winds reaching up to 200 mph. A *special wind region* is known to occur in an area reaching from northeast Tennessee into southwest Virginia.

History

High winds in the Mount Rogers region blow down trees and power lines and cause varying amounts of property damage. A wind tunnel effect observed in a *special wind region* reaching from northeast Tennessee into southwest Virginia sometimes blows tractor trailers off I-77 in Carroll County. Some winds have lifted trucks off the highway and deposited them some distance away, like the effects of tornadoes. The image below is of such a storm that occurred in January 2003.

Since the writing of the original Hazard Mitigation Plan in 2005, Virginia Department of Transportation has installed a highway warning system, (overhead signs) designed to alert truck drivers to wind and fog incidents in the Fancy Gap area as well as other areas along the interstate system. The system is intended to help drivers avoid these hazards to the extent possible. In the Mount Rogers region, high winds have been known to tear down trees and power lines, blow in parts of buildings, and cause other kinds of property damage. An accounting of several recent high-wind incidents in the region is shown in the table below.

High Wind Incidents as of 2018

Date	Location	Description	Damages
10-5-95	Entire Mount Rogers region, plus much of SW VA	No description available.	$20,000 property
11-11-95	Bland, Carroll, Galax	Two windstorms occurred on same day.	$8,000 property
1-19-96	Carroll, Galax	No description available.	None reported
9-6-96	Carroll, Galax, Floyd, Franklin, Patrick	No description available.	$175,000 property, $200,000 crops
4-1-97	Carroll, Galax	Tractor-trailer blown over on I-77.	$7,000 property

Date	Location	Description	Damages
2-4-98	Carroll, Galax, Patrick	Winds downed trees and damaged some mobile homes.	$15,000 property
3-3-99	Bland, along with Floyd, Giles, Montgomery, Pulaski	Winds downed trees and power lines.	$11,000 property
4-12-99	Carroll, Galax, Franklin, Patrick	High winds blew over a tractor-trailer on Rte. 58 and a mobile home (Patrick County). Winds blew over two tractor-trailers 5 miles south of Fancy Gap on I-77.	$14,000 property
1-13-00	Entire Mount Rogers region, plus much of SW VA	Winds downed large trees and power lines, caused minor property damage in all counties. Winds at 68 knots in Bland County.	$180,000 property
3-20-00	Smyth, Wythe	Winds downed trees and power lines.	$6,000 property
1-10-01	Carroll, Galax, Bedford	Winds of 65 knots blew over 3 tractor-trailers on I-77. Much damage in Bedford County with shingles and siding stripped off more than 90 homes. Winds also downed power lines, power poles and numerous trees.	$410,000 property
3-6-01	Carroll, Galax, Grayson, Patrick	Winds associated with a snowstorm downed trees and power lines. Winds blew in a wall and partly collapsed a roof on an auto repair shop in Carroll County.	$80,000 property
3-10-02	Carroll, Galax, Grayson	High winds downed trees across Grayson and Carroll counties.	None reported
12-25-02	All of Mount Rogers region, plus wide area of SW VA	Winds downed numerous trees and power lines. A tree fell on a house in Roanoke, damaging the roof and crushing the front porch.	$20,000 property
1-8-03	Carroll, Galax, Grayson, other parts of SW VA	Winds of 50 knots downed trees and power lines. Many downed trees in Grayson County damaged several homes.	$80,000 property
1-9-03	Carroll, Galax, Wythe, plus 6 other SW VA counties	Winds of 60 knots downed trees and power lines.	None reported
1-23-03	Carroll, Galax, Wythe, other parts of SW VA	Winds of 100 knots blew over 6 tractor-trailers on I-77, near Fancy Gap. Trees and power lines downed throughout region.	$50,000 property
2-22-03	All of Mount Rogers region, plus wide reaches of SW VA	Winds of 80 knots downed numerous trees and power lines. Many people lost power across the region. Roof blown off an outbuilding in Tazewell County.	$3,000 property

Date	Location	Description	Damages
5-11-03	Bland County	Winds of 70 knots downed several trees and power lines.	None reported
7-15-05	Grayson County	A small microburst causing winds of 70 knots blew the roof off a vacant hotel, and damaged 10 trees.	None reported
3-06-11	Carroll County	High winds overturned 2 tractor trailers on Interstate 77 at the 2.8 mile marker.	$200,000 property
4-17-14	Carroll County	High winds overturned 2 tractor trailers on Interstate 77 at the between the 2.7 and 2.8 mile marker.	$300,000 property

The details for these high wind events were drawn from the National Climatic Data Center's database, as well as from news reports and emergency management personnel. For some incidents, even when damages are reported, an accompanying description of the event is not always available.

Risk Assessment and Vulnerability

Of the high wind events reported to the National Climatic Data Center, some part of the Mount Rogers region experienced damaging winds at least 15 times in eight years. That amounts to an average of roughly twice a year when winds are known to cause at least some damage.

Though the entire region is subject to high winds, Carroll County and the City of Galax appear to be hit the most often. Given the regionalized nature of the available data, it is not possible to quantify what a typical wind incident might consist of and how much cost it may create for the community or to private individuals.

Damage estimates through the National Climatic Data Center are reported by incident rather than by locality, unless the damages are confined to a small geographic area. Based on the reported incidents, damages may range from zero to up to more than $400,000

The reported damages include downed trees, tree limbs and power lines; shingles, siding and roofs torn away from homes; damage and uprooting of mobile homes; tractor-trailers blown over and sometimes lifted off the highway, particularly near the Fancy Gap area of Interstate 77; and loss of electrical power. High wind events, while they occur frequently, appear to cause only scattered property damage. This hazard does not appear to pose a disaster-level hazard to the Mount Rogers region as a whole, although some localities regularly sustain high winds.

In the five-year time span since the original Hazard Mitigation Plan was written, the region's vulnerability to windstorms has not changed.

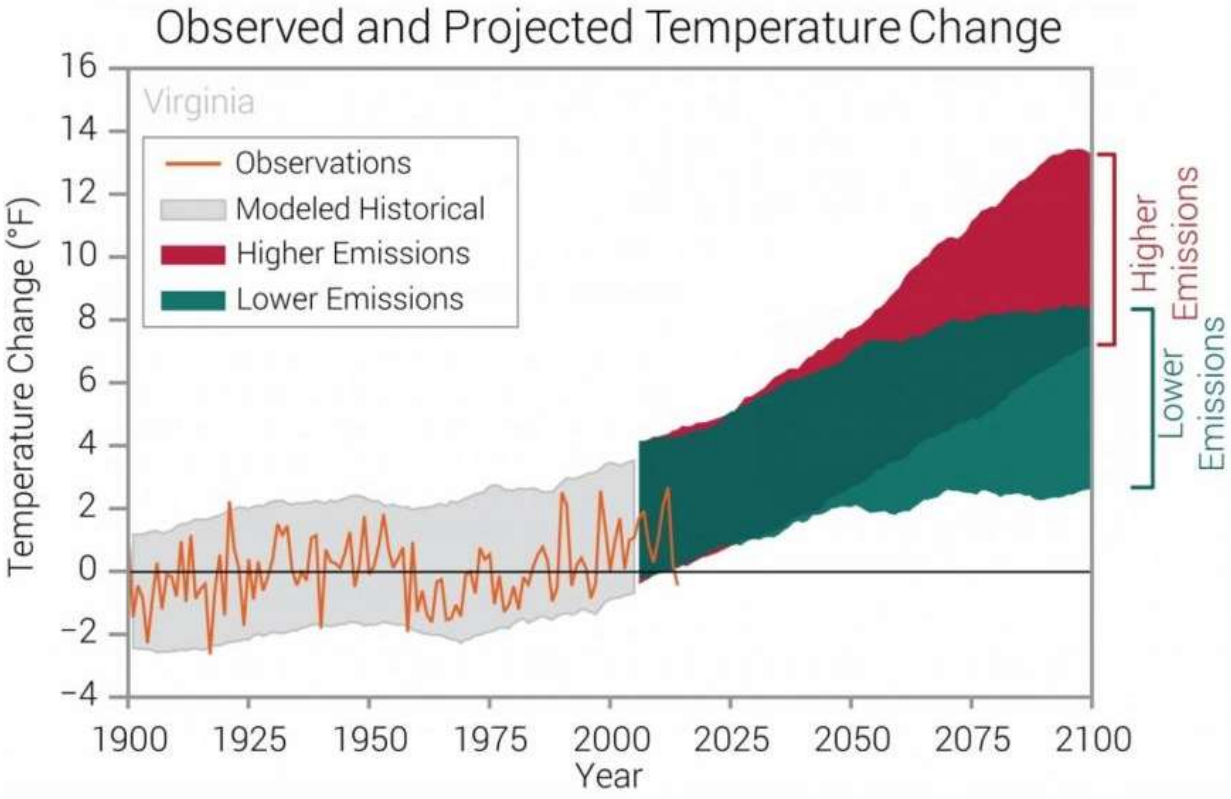
Climate Change

2017 NOAA Technical Report NESDIS[3]

Virginia has a humid climate with very warm summers and moderately cold winters. The climate exhibits substantial regional variation due to the state's diverse geographic elements, which include the Appalachian Mountains and Blue Ridge Mountains in the west and the Atlantic coastal region in the east. Temperature and precipitation patterns are highly influenced by these geographic features with the west and north being cooler and drier than the eastern coastal region. Statewide average temperatures range from 35°F in January to 75°F in July. The amount of rainfall generally decreases toward the west. For example, total annual precipitation is less than 40 inches in parts of the central mountain region of the state compared to around 50 inches along the tidewater coastal region.

[3] Runkle, J., K. Kunkel, L. Stevens, S. Champion, B. Stewart, R. Frankson, and W. Sweet, 2017: Virginia State Summary. *NOAA Technical Report NESDIS*

Figure 1: Observed and Projected Temperature Change



Observed and projected changes (compared to the 1901-1960 average) in near-surface air temperature for Virginia. Observed data are for 1900-2014. Projected changes for 2006-2100 are from global climate models for two possible futures: one in which greenhouse gas emissions continue to increase (higher emissions) and another in which greenhouse gas emissions increase at a slower rate (lower emissions). Temperatures in Virginia (orange line) have risen about 1.5°F since the beginning of the 20th century. Shading indicates the range of annual temperatures from the set of models. Observed temperatures are generally within the envelope of model simulations of the historical period (gray shading). Historically unprecedented warming is projected during the 21st century. Less warming is expected under a lower emissions future (the coldest years being about as warm as the hottest year in the historical record; green shading) and more warming under a high emissions future (the hottest years being about 11°F warmer than the hottest year in the historical record; red shading). Source: CICS-NC and NOAA NCEI.

Since the beginning of the 20th century, temperatures have risen approximately 1.5°F. The 1930s and 1950s were very warm, followed by a period of generally below average temperatures during the 1960s through early 1980s (Figure 1). Although the 5-year average highest number of very hot days (maximum temperature above 95°F) and corresponding number of very warm nights (minimum temperature above 75°F) occurred in the early 1930s (Figures 2a and 2b), gradual warming has occurred since the early 1990s.

Figure 2: Observed Number of Very Hot Days and Very Warm Nights

Figure 2: The observed (a) number of very hot days (maximum temperature above 95°F), (b) number of very warm nights (minimum temperature above 75°F), (c) annual precipitation, and (d) summer precipitation, averaged over 5-year periods. The values in Figures 2a and 2b are from nine long-term reporting stations. The values in Figures 2c and 2d are from NCEI's version 2 climate division dataset. The dark horizontal lines represent the long-term average. The number of very hot days and very warm nights peaked in the 1930s and has subsequently remained near to below the long-term average. There is no overall trend in average annual precipitation; summer precipitation has been below or near average during the most recent decade (2005–2014). Source: CICS-NC and NOAA NCEI.

There is no overall trend in average annual precipitation in Virginia (Figure 2c), although over the past two decades (1995–2014), annual precipitation has been generally above the long-term average. The driest multi-year periods were in the early 1930s and late 1960s; the wettest period was in the 1970s. The driest 5-year period was 1963-1967 and the wettest was 1971-1975 (Figure 2c). The year 2003 was the wettest on record (statewide average of 62 inches) while 1930 was the driest (25 inches). There is an upward trend in the annual number

of extreme precipitation events (precipitation greater than 2 inches) over the past two decades (1995–2014), with the number of such events in 1995–1999 surpassing record levels of the early 1940s. Average annual summer precipitation (Figure 2d) has been below or near the long-term average during the most recent decade (2005–2014).

Figure 3: Observed Number of Very Cold Nights

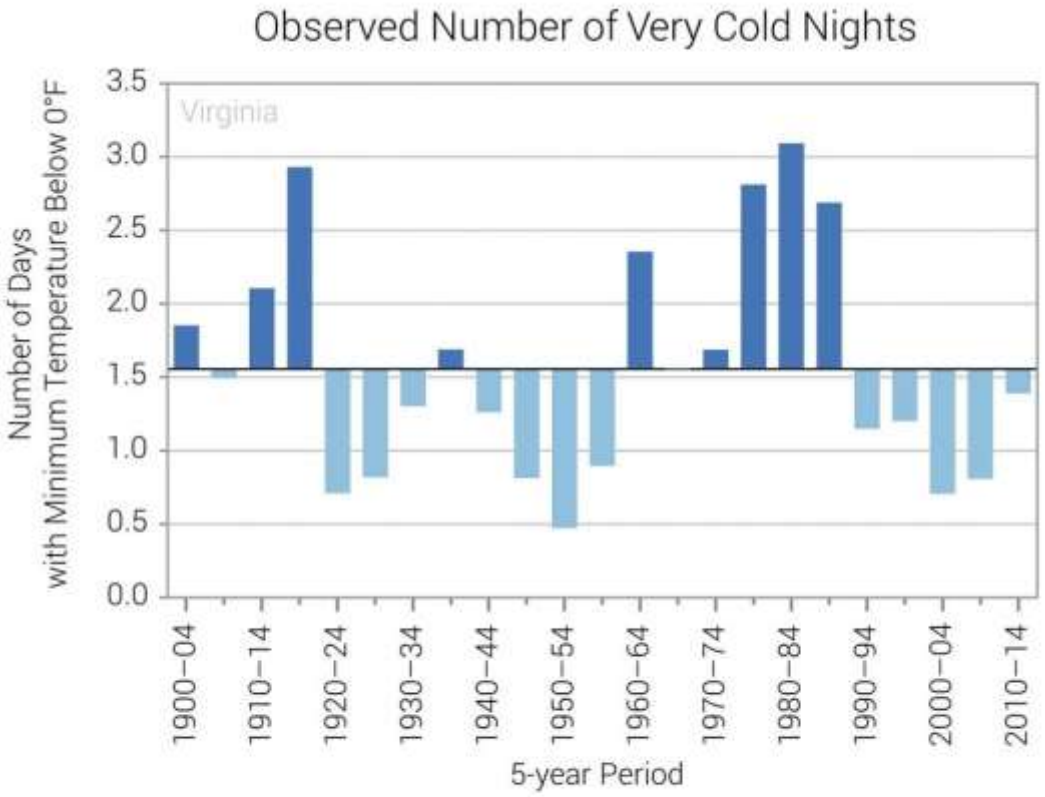


Figure 3: The observed number of very cold nights (minimum temperature below 0°F) for 1900–2014, averaged over 5-year periods. These values are averages from nine long-term reporting stations. The number of very cold nights dropped below the long-term average between the 1920s and 1960s, followed by an above average number of such events until the early 1990s. The number of very cold nights has remained below average for the past two decades (1990–2014). The dark horizontal line is the long-term average (1900–2014) of 1.6 days per year. Source: CICS-NC and NOAA NCEI.

Average annual temperatures during the 21st century (2000–2014) have exceeded the previous highs of the 1930s. A winter warming trend is reflected in the below average number of very cold nights (minimum temperature below 0°F) since 1990 (Figure 3). Average summer temperatures in the most recent decade (2005–2014) exceeded those in the early 1930s (Figure 4).

Figure 4: Observed Summer Temperature

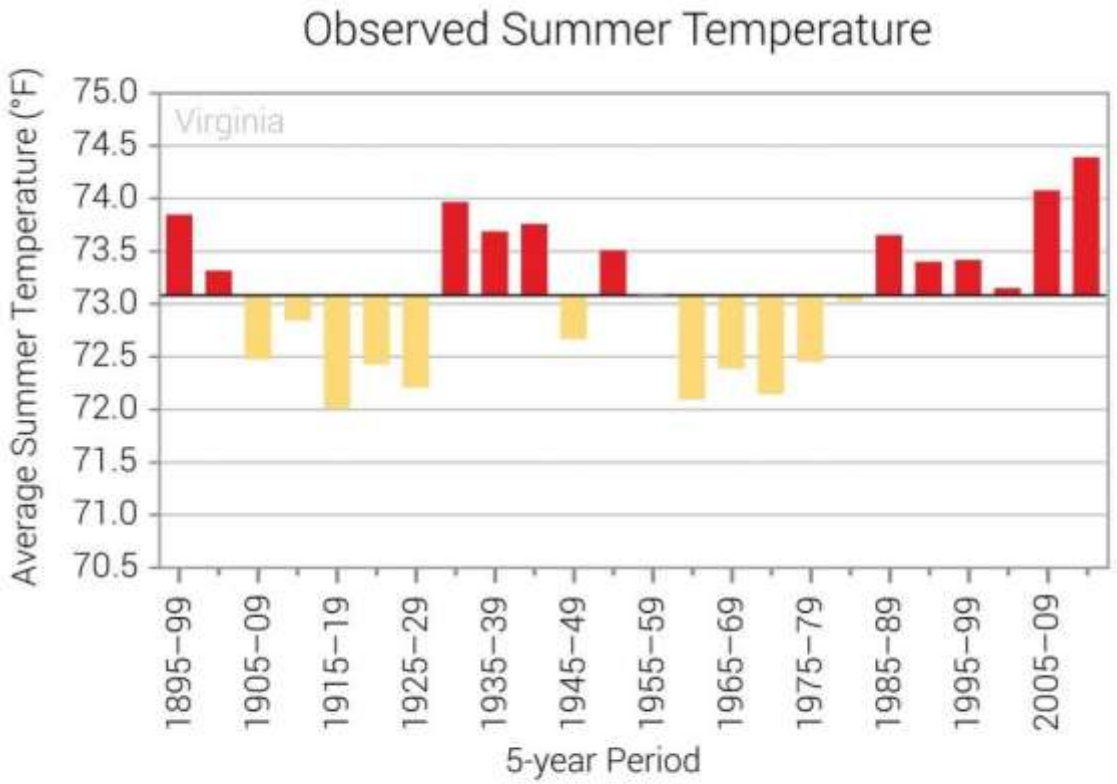


Figure 4: The observed annual summer temperature for 1900–2014, averaged over 5-year periods; these values are averages from NCEI's version 2 climate division dataset. Average annual summer temperature has been the warmest on record over the last decade (2005–2014). The dark horizontal line is the long-term average (1900–2014) of 73.1°F. Source: CICS-NC and NOAA NCEI.

Weather hazards in the state include severe thunderstorms, tornadoes, winter storms, tropical storms, hurricanes, droughts, and heat waves. Virginia was affected by 35 of the 144 U.S. billion-dollar disaster events that occurred between 1980 and 2012. The costliest event to ever affect the state was Superstorm Sandy (a post-tropical storm) in 2012, which caused severe coastal flooding from storm surges. The 2012 North American Derecho, an intense, long-lasting series of thunderstorms characterized by hurricane-force winds, was also very costly to the state, causing $3 billion in total damages. This historic summer derecho event interrupted power for more than 1 million residents in Virginia, Washington D.C., and Maryland. Winds of up to 70 mph were recorded at Reagan National Airport, causing portions of Northern Virginia to be without emergency 911 services. Tropical Storm Lee in 2011 also resulted in total damages of $3 billion, with Washington Dulles International Airport receiving a total of 8.74 inches of rainfall from the storm.

Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century (Figure 1). Even under a pathway of lower greenhouse gas emissions,

average annual temperatures are projected to most likely exceed historical record levels by the middle of the 21st century. However, there is a large range of temperature increases under both pathways, and under the lower pathway, a few projections are only slightly warmer than historical records. If the warming trend continues, future heat waves are likely to be more intense. This will pose human health risks, particularly in the large metropolitan areas. While heat waves are projected to become more intense, cold waves are projected to become less intense.

Figure 5: Projected Change in Annual Precipitation

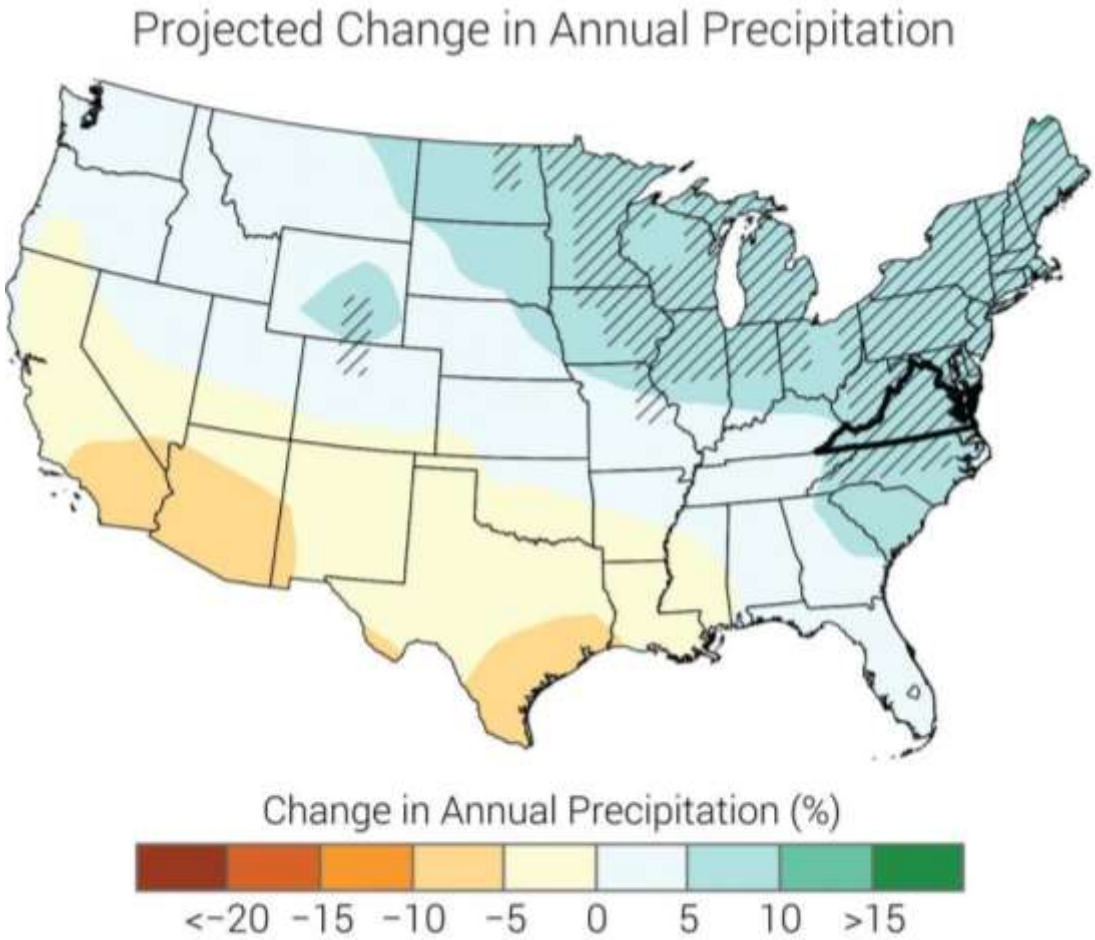
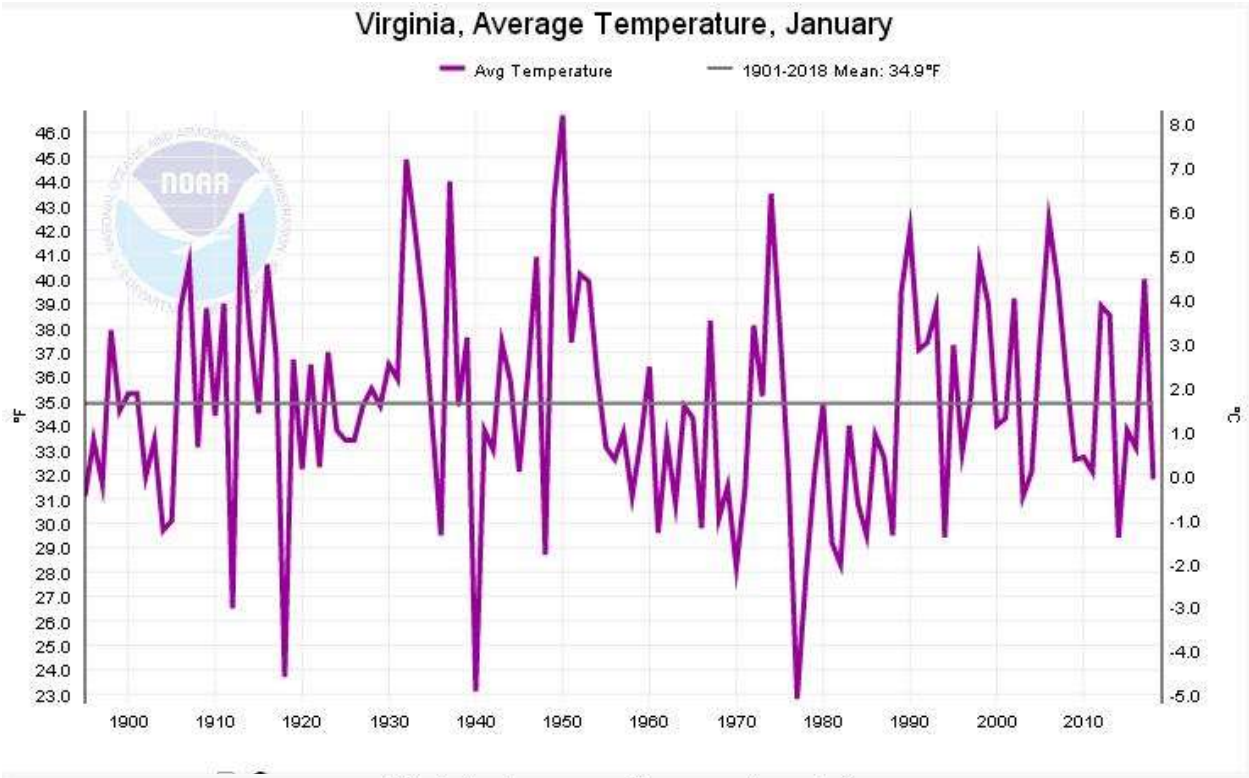


Figure 6: Projected change in annual precipitation (%) for the middle of the 21st century compared to the late 20th century under a higher emissions pathway. Hatching represents areas where the majority of climate models indicate a statistically significant change. Virginia is part of a large area of projected increases that includes all of the northeastern United States. Source: CICS-NC, NOAA NCEI and NEMAC.

Annual precipitation is projected to increase in Virginia (Figure 5). The state is part of a large area of projected increases in precipitation across the northern and central United States by the middle of the 21st century. The number and intensity of heavy precipitation events is also projected to increase, continuing recent trends. Drought is a periodically-occurring natural

phenomenon within the state. Even if overall precipitation increases, naturally occurring droughts are projected to be more intense because higher temperatures will increase the rate of loss of soil moisture during dry spells. During such periods, decreased water availability will likely have important implications for the state's agricultural economy.

Increasing temperatures raise concerns for sea level rise in coastal areas. Since 1880, global sea level has risen by about 8 inches. It has risen even more along the Virginia coast with a rise of 14.5 inches between 1930 and 2010 at Sewell Point, Global sea level is projected to rise another 1 to 4 feet by 2100 as a result of both past and future emissions due to human activities with greater rises possible along the Virginia coast following historical trends. Sea level rise has caused an increase in tidal floods associated with nuisance-level impacts. Nuisance floods are events in which water levels exceed the local threshold (set by NOAA's National Weather Service) for minor impacts. These events can damage infrastructure, cause road closures, and overwhelm storm drains. As sea level has risen along the Virginia coastline, the number of tidal flood days (all days exceeding the nuisance level threshold) has also increased, with the greatest number occurring in 2007.


Virginia, Average Temperature, January
Avg Temperature
1901-2018 Mean: 34.9°F
°F
°C
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
36.0
35.0
34.0
33.0
32.0
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23.0
8.0
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4.0
3.0
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1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
1900
1910
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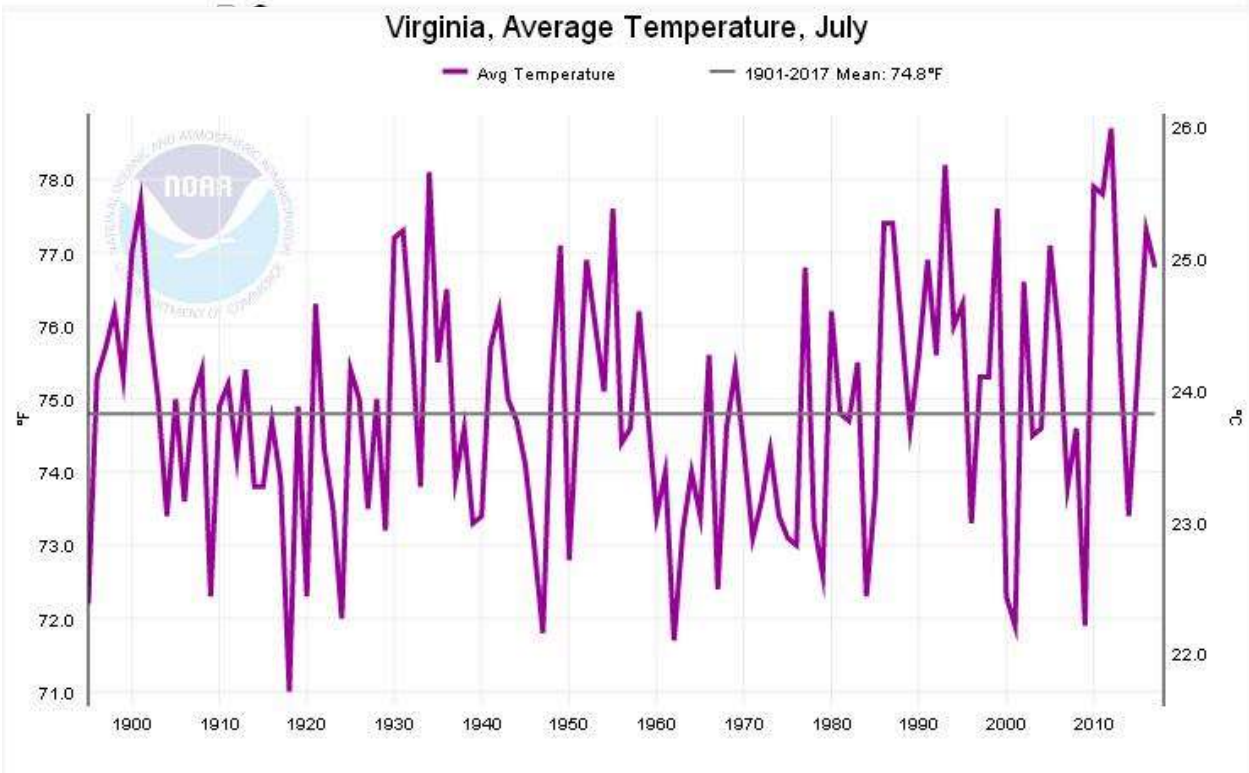
Virginia, Average Temperature, July
Avg Temperature
1901-2017 Mean: 74.8°F
°F
°C
78.0
77.0
76.0
75.0
74.0
73.0
72.0
71.0
26.0
25.0
24.0
23.0
22.0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Other Hazards

Animal-related Damage

Appalachian Power have had a problem in the past 5 years with bears scratching power poles rendering them structurally weakened to the point they need to be replaced. Bears have also been known to climb the poles and electrocute themselves to death causing a localized power outage. This problem has been reported in Washington and Grayson counties in the Mount Rogers District.

Hazard Identification and Risk Assessment: Conclusions

Hazard Risk Matrix

The risk assessment analysis has been used to create the Hazard Risk Matrix shown below to provide a guideline on the relative importance of natural hazards across the entire Mount Rogers region. The rankings for individual localities will differ from the regional matrix due to differences in terrain, impacts from flooding, potential for wildfire, and so on. This plan rates natural disasters as an average over time. It was the view of the steering committee that our risk to various natural hazards in the Mount Rogers Region had changed little since the plan update five years ago. The risk ratings went down slightly for dams and earthquakes. Our rankings do not necessarily reflect the rankings shown the Hazard Rankings Maps in the Appendix, however, we feel confident that these rankings are consistent with the priorities of our region.

Hazard Risk Matrix

Hazard	Frequency	Geographic Extent	Impact	Hazard Risk Index Rating
Dam Safety	2	1	3	6
Drought	2	4	1	7
Earthquakes	1	2	1	4
Flooding	4	2	3	9

Hazard	Frequency	Geographic Extent	Impact	Hazard Risk Index Rating
Karst and Sinkholes	2	1	1	4
Landslides	1	1	2	4
Snow/Ice	4	4	1	9
Thunderstorms/Lightning	4	1	1	6
Tornadoes/Hurricanes	4	1	1	6
Wildfires	4	1	2	7
Winds	4	2	1	7

***Note**: Highest numbers mean highest risk or impact.*

The frequency column is based on likelihood of occurrence: 4=More than once in 10 years 3=More than once in 10-100 years 2=More than once in 100-1,000 years 1=Less than once in 1,000 years	The geographic extent column relates to the extent any given hazard affects the jurisdiction: 4=More than 50% of jurisdiction affected 3=Estimated 25-50% of jurisdiction affected 2=Estimated 10-25% of jurisdiction affected 1=Less than 10% of jurisdiction affected

The impact column relates to the amount of death, injury, destruction and inconvenience created for the affected area, as shown below:
4=Many deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.
3=Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities more than one week.
2=Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities more than one day.
1=Very few injuries, if any. Only minor property damage and minimal disruption of quality of life. Temporary shutdown of critical facilities.

Natural hazards on a regional basis can then be ranked as shown in the table below. As already noted, there will be some variances for some localities.

Hazard Risk Categories

High Risk Hazards (score 8 or higher) ➡	Flooding Severe Winter Storms/Ice
Moderate Risk Hazards (score of 7) ➡	Drought Wildfires Winds
Low Risk Hazards (score of 6 or less) ➡	Dam Safety Earthquakes Karst and Sinkholes Landslides Thunderstorms/Lightning Tornadoes/Hurricanes

Hazard Risk Assessment By Jurisdiction

The main natural hazards faced by the 20 local jurisdictions in the Mount Rogers region are displayed in the matrix shown below. This data has been drawn from the descriptions given in the preceding pages of this section. The table below was reviewed and updated by the steering committee in the Hazard Mitigation Plan Update.

Identified Natural Hazards, By Locality
Mount Rogers Region, Virginia (6 counties, 2 cities, and 12 towns)

Hazard Type	Hazards Identified	Individual Localities																			
		Bland County	Carroll County	Grayson County	Smyth County	Wash. County	Wythe County	City Bristol	City Galax	Abingdon	Chilhowie	Damascus	Fries	Glade Spring	Hillsville	Independence	Marion	Rural Retreat	Saltville	Troutdale	Wytheville
Avalanche																					
Coastal Erosion																					
Coastal Storm																					
Dam Safety	X	X	X	X	X	X	X	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Drought	X	M	M	M	M	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Earthquake	X	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Expansive Soils																					
Extreme Heat																					
Flood	X	H	L	H	H	H	H	H	H	H	H	H	H	H	L	L	H	L	H	L	M
Hailstorm																					
Hazardous Material Spills	X	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Hurricane (see Tornadoes)																					
Karst and Sinkholes	X	X	na	na	X	X	X	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Landslide	X	L	H	H	H	H	L	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Severe Winter Storm/Ice	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Tornadoes/Hurricanes	X	L	L	L	M	M	L	L	L	M	M	L	L	M	L	L	L	L	L	L	L
Tsunami																					
Volcano																					
Wildfire	X	M	H	M	H	H	H	na	M	na	na	na	na	na	na	na	na	na	na	na	na
Windstorm	X	M	H	M	M	M	M	M	H	M	M	M	M	M	H	M	M	M	M	M	M
Thunderstorms/Lightning	X	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Notes:
The term "na" means the hazard data is not available.
The H, M, and L symbols refer to the relative likelihood and/or relative severity of given hazards, comparing one locality to another. H = highest likelihood, M = moderate likelihood, and L = low likelihood. X indicates the hazard was identified, but further hazard assessment data was lacking.

MITIGATION STRATEGY

Defining Hazard Mitigation

FEMA defines hazard mitigation as "sustained actions taken to reduce or eliminate long-term risk from hazards and their effects."

These sustained actions can come in the form of physical projects (enlargement of drainage culverts, streambank stabilization and restoration, vegetation removal, installation of advance warning systems, etc.) or educational programs designed to help local officials and property owners understand and reduce hazard risk (media campaigns, special mailings, special events, self-help guides, etc.).

For some hazards, these actions could involve simply getting out of the way – such as not building in the floodplain or removing structures from the floodplain, when feasible. For other hazards, such as major weather events that cover large areas of landscape, the mitigations could involve more indirect methods, such as improved building codes to strengthen structures and reduce damages from violent windstorms or major blizzards. Some hazards – such as an F4 or F5 tornado – carry such force that a direct hit means destruction is assured, although properly built "safe rooms" can reduce loss of life.

In the previous section of this study, we have identified and ranked the main natural hazards that can afflict communities in the Mount Rogers region of southwest Virginia. We are now moving on in this next section to describe the following:

- Planning process used to develop the hazard mitigation strategy.
- Goals and objectives for the overall hazard mitigation strategy for the region.
- Recommended hazard mitigations on a locality-by-locality basis.

Process Used to Develop Mitigation Strategy

MRPDC staff, the Hazard Mitigation Advisory Team, and representatives from the local jurisdictions worked together to develop the Hazard Mitigation Strategy for the Mount Rogers region.

Following the guidance found in the FEMA Local Multi-Hazard Mitigation Planning Guidance, MRPDC staff identified the at-risk hazards that affect the region and its 20 local jurisdictions.

This was done based on available data. With the basic data assembled, the MRPDC organized a Hazard Mitigation Steering Committee to review and make comments on the hazard vulnerability assessments. Some of the recommended mitigations emerged from those discussions, such as a suggestion by a representative from Appalachian Power to work to improve coordination among emergency response organizations to improve snow-removal and accelerate restoration of electric power following major snow and ice storms. In addition, the MRPDC mailed out draft copies of the hazard vulnerability assessments to the 20 local jurisdictions and invited comments from local planners, emergency services personnel, and the public.

MRPDC staff moved on to develop the specifics for both the Hazard Mitigation Strategy and proposed mitigations. In some cases, we have followed the advice of experts, such as the applications of Firewise methods to reduce wildfire risks. In other cases, we have proposed mitigation strategies based on limitations of the available data and on long-understood shortcomings, such as the lack of accurate floodplain mapping (as determined by hydrological engineering studies) and the lack of floodplain mapping in some areas known to be flood-prone but passed over by previous mapping efforts.

For flood hazards, which affect much of the population of the Mount Rogers region, MRPDC staff applied the principles of FRED (i.e., Fix and Repair, Elevate, Relocate or Demolish). Staff developed generalized cost estimates based on the experience of the staff and others in the region that had past experience in such matters.

All participants in the process have always recognized that any major undertakings will only be possible with outside funding support (i.e., state and federal grants), since most localities in the Mount Rogers region are sparsely populated, sparsely staffed, and lack the financial means to provide little other than basic government programs and services.

Regional Hazard Mitigation Strategy

The following outline consists of goals and objections for the natural hazard mitigation strategy to be applied in the Mount Rogers region of Virginia. These goals were reviewed by the members of the steering committee as well as other stakeholders during the update process. They were reviewed in our meetings throughout the summer months of 2011, as well as reviewed by participants on an individual basis.

Goal: Addition of a Nexedge System or the RIOS-Comlinc system (radio communications system) for each locality in the Mount Rogers District

Objective: Make communications better across different localities.

Strategy:

- Link counties together for a better coverage of communications and reduce response time in times of natural disasters.

Cost Benefit: Better communications will help reduce the loss of live and property

Responsible Office: Police; Fire; and Rescue.

Goal: Protect Lives and Property from Flooding

Objective: Increase Public Awareness

Strategy:

- Promote and make the public aware of the need for mitigation
- Promote planning as well as membership in the National Flood Insurance Program

Objective: Improve data resources to improve the regional Hazard Mitigation opportunities.

Strategy:

- Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.
- Update FEMA flood plain maps throughout the Mount Rogers region. (FEMA/DCR responsible for updating floodplain maps).
- Develop new FEMA floodplain maps for areas not previously mapped.

Objective: Provide opportunities for property owners of flood prone and/or repetitive loss properties to acquire and relocate from the flood plain, elevate structures, acquire and demolish, flood proof their property, or apply for funds to construct minor localized flood control projects.

Strategy:

- Pursue funding for such projects from federal and state agencies such as FEMA, VDEM, as well community development block grants.

Cost Benefit: The benefits of flood protection are ongoing. Money should be invested wisely to protect existing structures, as well as to prevent future losses to new structures. This will be a savings to the localities, as well as to the property owners in the form of repair and insurance cost. $100,000 spent today, could save millions of dollars in damage over long periods of time, as well as save lives.

Responsible Office: MRPDC; local Board of Supervisors; Local Emergency Management

Goal: Encourage Public Safety in the Event of Snowstorms, Ice and High Winds, Earthquakes, Landslides, Tornadoes, Hurricanes, and/or Drought

Objective: Increase public awareness of actions before, during, and after such events.

Strategy:

- Educate public on the methods recommended by the American Red Cross to prepare for these events.
- Inform motorist of high wind potential along selected highways.

Cost Benefit: Public awareness is crucial to prevent losses due to natural hazards. Not only prevention, but a large savings of time and money could be seen during and after such adverse weather. $100,000-$500,000 spent on increased road advisories will save money on working traffic accidents, as well as work hours lost in Traffic.

Responsible Office: VDOT; Local Board of Supervisors; Red Cross; VDEM

Goal: Increase Dam Safety for the Mount Rogers Region

Strategy:

- Improve the availability of data resources for dam safety to save lives and property coordinated through agencies such as FEMA and the Department of Conservation and Recreation.

Cost Benefit: Knowledge and being aware of potential hazards plays a key role in their prevention. Due to many recent events, information on dams in the region is hard to come by. Property owners in a high-risk area could benefit from greater knowledge of possible dangers. For a minimal cost, this could save property as well as lives.

Responsible Office: Department of Conservation and Recreation; Corps of Engineers

Goal: Minimize the Impact of Wildfires on Woodland Communities.

Objective: Increase public awareness.

Strategy:

- Educate homeowners on Firewise and Department of Forestry programs on methods to cope with drought.
- Support and encourage the existing education efforts of the American Red Cross in ways homeowners can reduce the risk of wildfires by property maintenance and cleanup.
- Projects creating perimeters around homes, structures, and critical facilities through the removal of reduction of flammable vegetation.
- Projects that apply ignition resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities.
- Projects that remove vegetative fuels proximate to the at-risk structure that, if ignited, pose significant threat to human life and property, epically critical facilities.

Cost Benefit: Education is invaluable to prevent Wildfires. For a minimal cost, educational programs for homeowners in woodland communities will help minimize fire damage to property, and natural resources.

Responsible Office: USDA; VA Dept. of Forestry; American Red Cross; FireWise; Local Fire and Rescue

Goal: Encourage Citizens to Prepare for Possible Damage from Sinkholes and Karst

Objective: Increase public awareness

Strategy:

- Make sure local building codes and zoning ordinances address placement of structures in such areas.
- Educate the public on karst safety through educational efforts such as agencies like the Virginia Cave Board.
- Map areas that are in danger of karst and sinkholes with the state division of mineral resources, and the Virginia Cave Board.

Cost Benefit: Having and making available good data where land is susceptible to karst and sinkholes can pay dividends in the future. Accurate mapping of such areas made available to local officials can greatly reduce the risk of structures and roads being damaged by these hazards.

Responsible Office: Local Building inspector; VDOT, Department of Conservation and Recreation

Goal: Minimize Damage due to Thunderstorms as well as Tornadoes/Hurricanes

Strategy:

- Support and encourage existing efforts by the American Red Cross to educate homeowners on retrofitting and mitigation.
- Educate citizens on tornado and severe storm safety.

Cost Benefit: Public awareness is crucial to prevent losses due to natural hazards. Not only prevention, but a large savings of time and money could be seen during and after such adverse weather.

Responsible Office: Local emergency management departments

Goal: Reduce the risk of hazards on new buildings and infrastructure

Objective: Encourage continued practice of proper building site construction.

Strategy:

- Incorporate the hazard mitigation plan into comprehensive planning.
- Use the hazard mitigation plan in the permit process for new construction in floodplain or high hazard areas.

Cost Benefit: Proper planning in new construction will result in a large savings after natural disasters.

Responsible Office: Local building inspectors.

Regional Strategic Priorities

This section outlines the top regional priorities for Pre-Disaster Hazard Mitigation in the Mount Rogers region. These have been determined through discussions among MRPDC staff and the members of the Hazard Mitigation Steering Committee. The priorities presented in this section correspond to the objectives listed under the six goal statements given for the regional strategic plan described above. MRPDC staff initially developed the goals-and-objectives outline, and then presented it to the Hazard Mitigation Advisory Team for comment.

The Steering Committee ranked individual objectives as follows, high priority, mid-level priority, and lowest priorities. More than one objective could be assigned to any given priority level. Each marker carried a value of one point, with the highest point scores indicating the objectives of highest importance. The Steering Committee reviewed the table below from the original 2005 Hazard Mitigation Plan and determined that it was still applicable.

Prioritized Listing of Hazard Mitigation Objectives

Objective	Points
Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	12
Promote need for pre-disaster mitigation to prevent future losses.	12
Update FEMA floodplain maps as applicable throughout the Mount Rogers Region.	12
Promote prevention methods homeowners can undertake.	12
Implement in-the-ground projects to reduce natural hazard risks.	9
Provide copies of the Pre-Disaster Hazard Mitigation Plan to the 20 local jurisdictions in the Mount Rogers region.	8
Support projects offering the best benefit/cost ratio.	6
Publicize successful mitigation projects.	5
Support guidelines for flood mitigation:	5
A property is a candidate for relocation if the first-floor floods twice (or more) in 50 years.	5
A property is a candidate for elevation or flood-proofing if flooding occurs below the first floor twice (or more) in 50 years.	5
Meet requirements of the Uniform Relocation Act.	5
The top priorities for federal relocation assistance should be based on need, frequency of flooding, and a favorable benefit/cost ratio.	5
Create project serving multiple objectives (social, community, economic, mitigation).	4
Support educational efforts of existing organizations, such as the American Red Cross.	4
Develop new FEMA floodplain maps for flood-prone areas not previously mapped.	3
Promote useful programs, such as the National Flood Insurance Program.	1

Support state/federal efforts to improve data resources for dam safety, drought, karst and sinkholes, landslides, thunderstorms, and windstorms.	1

Capabilities Assessment

Most localities in the Mount Rogers region are for the most part limited by financial issues and staff size. The capabilities of the localities are largely defined through staff and organizational capacity, technical capacity, and fiscal capacity. Most of our localities, especially the towns, require assistance due to the size of budgets, and number of personal. Many of the strategies from the 2012 plan have not been completed due to the lack of existing resources.

Existing Locality Staffing, as of 2018	
Locality	Number of Staff
Bland Bland	1
Carroll County	1
Grayson County	1
Smyth County	2
Washington County	2
Wythe County	1
City of Galax	1
City of Bristol	1
Hillsville	1
Independence	0
Fries	0
Troutdale	0
Marion	1
Chilhowie	1
Saltville	0
Abingdon	6
Damascus	0
Glade Spring	0
Wytheville	1
Rural Retreat	1

All localities in the Mount Rogers Planning District have little to no staff dedicated to work on natural hazards and mitigation planning. For the counties, cities and larger towns, other departments are available to assist on special projects and in times of emergency. For the six smallest towns, there is no staff dedicated to all hazards planning; in fact, for five of the six smallest towns, MRPDC staff provides town management, due to small populations and lack of funding for full-time staff. The Mount Rogers PDC is the agency that fills this role in almost

100% capacity. The PDC also assists all 20 localities in hazard mitigation planning. Contact information for these departments is listed in the multi-jurisdiction summary sheet in the appendix.

Community Summaries & Recommended Mitigations

The following section provides descriptions, by jurisdiction, of high- and moderate-risk natural hazards, past or ongoing mitigations (if any), and recommended mitigations resulting from this study. For the hazards of floods, wildfire, dam safety, snowstorms/ice, high winds, landslides, sinkholes/karst, drought, hurricanes/tornados, and earthquake mitigation strategies for each locality are included in the recommended mitigations section. The hazard of thunderstorm/lightening did not warrant a local mitigation action due to its low risk. The section is organized in alphabetical order by county and the towns contained within that county, followed by the cities. This includes:

- Bland County
- Carroll County and the Town of Hillsville
- Grayson County and the towns of Fries, Independence, and Troutdale
- Smyth County and the towns of Chilhowie, Marion, and Saltville
- Washington County and the towns of Abingdon, Damascus, and Glade Spring
- Wythe County and the towns of Rural Retreat and Wytheville
- The City of Bristol
- The City of Galax

Regionwide Weather Events in the Past Five Years, As Reported by Localities

Below is a listing of major weather events within the region, for a more detailed list of all weather events see the community hazard profile for each locality. Within the community hazards profiles, there may or may not be more weather events officially recorded, some were omitted due to redundancy in geographic distance or the weather event being too insignificant to list.

7-27-12 Regionwide

The Mount Rogers Region was affected by a Derecho that knocked down road signs, disrupted power, and brought down several trees and limbs. As a result, several power outages were reported.

1-17-13 Bland County

Bland County was hit by a winter storm that brought heavy snow fall ranging from 12 inches in Rocky Gap to 6.0 inches in Ceres. This winter storm brought the interstate to a standstill with accidents and heavy snow fall. A local emergency was declared and a shelter was opened at the Bland County Rescue Squad. The shelter received approximately 40 individuals.

3-31-13 Carroll County

"Excessive fog" in the Fancy Gap Mountain area, near the North Carolina border, caused at least 75 vehicles to crash in the southbound lanes of the I-77. Three people were killed and at least 25 were taken to the hospital after the pile-up.

5-19-13 Saltville, Smyth County

A torrential downpour caused a flood through the streets of Saltville. Drains and ditches overflowed sending rushing water into several businesses and rocks the size of baseballs hurtling down Palmer Avenue. Saltville fire, police, and rescue responded in minutes to the danger. Town employees and VDOT helped clear the town roads. The National Weather Service said that over five inches of rain fell in about an hour.

7-12-13 Galax

July of 2013 saw 600% of the average expected rainfall for the month. On the 12th the streets of downtown Galax were flooded causing damage to cars and businesses. The flooding was due to storm drains not being able to handle the amount of water from the massive downpour.

4-17-14 Carroll County

Estimated Wind gust of 100 miles per hour caused 2 tractor trailers to overturn on I-77 north. Both tractor trailers overturned between the 2.7 and 2.8-mile marker. As the trailers were being overturned the wind blew one 30 feet and fell against the side of a state trooper car and a VDOT truck.

3-5-15 Chilhowie, Smyth County

Heavy rain and melting snow caused the Holston River to overflow its banks. Rt. 604 (Dry Fork Rd) was closed in Chilhowie. A small mud slide on B.F. Buchanan Hwy caused an interruption in one lane of traffic which was cleared by VDOT.

4-19-15 Bland County

Wolf Creek flooded into the road at Shady Branch Circle. The rain left several roads flooded with debris due to clogged culverts. Also, Several Houses had flooded basements. This caused the county roads of West Bluegrass Trail, Suiter Road, Waddletown Road, and White Pine Drive to be closed and schools were also closed for one day.

4-19-15 Wythe County

Between 2.5 and 3.5 inches of Rain fell in one day. The Schools as well as 20 roads were closed in the county due to washouts, flooding, and downed Trees. The hardest hit areas were Max Meadows, the Stony Fork area off of Highway 52, and Ivanhoe along the New River. The trash convenience center in Max Meadows was flooded. A man had to be rescued from a truck in Ivanhoe. According to the U.S. Geological Survey, Reed Creek at Graham's Forge crested at 9.14 feet. That's the highest reading since a level of 10 feet on April 5, 1977.

4-26-17 Marion, Smyth County

The Bridge to the Holston Hills Community Golf Course was critically damaged by flood waters.

4-26-17 Smyth County

A 14-inch sewer line was damaged in Seven Mile Ford. Houses were flooded in the McCready and North Holston communities outside of Saltville.

4-26-17 Chilhowie, Smyth County

Berry Metals along the Holston River received flood damage. A Section of 107 was closed near McDonalds due to high water. Springs serving the town were out of commission for about a week and water had to be purchased from Washington County.

5-22-17 Hillsville, Carroll County

Members of the Carroll County Fire/EMS are reporting several roads are flooded to excessive rain that fell over the county Thursday evening.

Flooding was also reported along Pilgrims Trail, depositing debris along 221. Several mudslides have been reported along Buck Horn Road. Additional reports of flooding in the vicinity of Hillsville and Dugspur.

Water is flowing onto many roadways along creeks and poor drainage areas. A flash flood warning was issued for Carroll County until 8:30 p.m.

10-23-17 Fries, Grayson County

An F-1 Tornado Touched down at 5:47 in the evening of October 23. The tornado traveled about a third of a mile and caused damage about 150 yards wide. The storm caused trees to be uprooted and barns to be damaged. There was also localized flooding in the area.

Recommended Mitigations

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Addition of a Nexedge System or the RIOS-Comlinc system for each locality in the Mount Rogers District.	All hazards	All Localities, MRPDC, VITA	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	All localities, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take before, during, and after an earthquake strikes.	Earthquake	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Make sure local building codes and zoning ordinances address placement of structures in areas susceptible to karst and sinkholes, and map areas that are in danger of such hazards.	Karst/Sinkholes	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Make sure local building codes and zoning ordinances address placement of structures in areas susceptible to landslides, and map areas that are in danger of such hazards.	Landslides	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take before, during, and after a tornado or hurricane event strikes.	Tornados/ Hurricanes	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take during a severe drought if water supplies are depleted.	Drought	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Bland County

Community Hazard Profile

Bland County is a rural, lightly populated community of nearly 6,511 (which is a decrease of 4.6% since the last plan update) with Interstate 77 bisecting the county as the highway travels in a north-south direction. There are no incorporated towns, though county administrative functions are centered in the community of Bland, located at the junction of I-77 and State Rt. 42. The Appalachian Trail crosses through parts of the county.

The main natural hazards faced in Bland County are flooding, severe snow and ice storms, wildfire, and potential dam failure. Due to its mountainous terrain, communities are subject to flash flooding caused by heavy rainfalls and snowmelt; this is especially true for Rocky Gap, a small, unincorporated community located almost entirely in the floodplain. Bland County also experiences its share of high-wind conditions, though these have not been known to create natural disasters.

In January 1957, the community of Bland sustained substantial damage from a failure in the Crab Orchard Creek Dam, which had been under development as a privately-owned recreation attraction. The dam break occurred following three days and nights of continuous rain, and the resulting flood caused $500,000 worth of damage to the small community. There is now some thought that, with construction of I-77 (which passes between the dam and the community), a similar event would not happen again, since I-77 and its drainage systems would redirect the flood flows.[4]

Past or Ongoing Mitigations

Bland County centralizes its emergency response system through its E-911 and emergency services coordinator (one individual). Emergency responders include a system of local volunteer fire departments and rescue squads, as well as the sheriff's department and state police. The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009.

Bland County has not engaged in pre-disaster mitigation efforts in the past.

For flood hazards, Bland County contains six repetitive loss properties, including four in the community of Rocky Gap.

[4] This information was given to us by an engineer at a hazard mitigation meeting in the early 2000s.

Severe Weather Events

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	4/4/13	Winter Weather	0	0	$-	0	County Official
Stowersville	5/19/13	Flood	0	0	$-	0	State Official
Point Pleasant	5/22/13	Hail	0	0	$-	0	Public
Ceres	8/12/13	Flash Flood	0	0	$5,000	0	Trained Spotter
	12/8/13	Ice Storm	0	0	$-	0	Trained Spotter
	1/7/14	Cold/Wind Chill	0	0	$-	0	AWOS
	2/12/14	Heavy Snow	0	0	$-	0	Trained Spotter
Bland	6/10/14	Hail	0	0	$-	0	911 Call Center
	11/1/14	Winter Weather	0	0	$-	0	Law Enforcement
	11/26/14	Winter Weather	0	0	$-	0	Public
	1/23/15	Winter Weather	0	0	$-	0	Public
	2/16/15	Winter Storm	0	0	$-	0	Trained Spotter
	2/19/15	Extreme Cold/Wind Chill	0	0	$-	0	Mesonet
	2/21/15	Winter Storm	0	0	$-	0	Public
	2/25/15	Winter Weather	0	0	$-	0	Trained Spotter
Long Spur	4/19/15	Flood	0	0	$-	0	Trained Spotter
Holly Brook	4/20/15	Flood	0	0	$-	0	State Official
	1/22/16	Winter Storm	0	0	$-	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$-	0	Broadcast Media
	4/3/16	Avalanche	0	0	$1,000	0	Law Enforcement
Bastian	6/27/16	Flash Flood	0	0	$75,000	0	Broadcast Media
Rocky Gap	4/23/17	Flood	0	0	$-	0	Public
			0	0	$81,000	0	

Flood Loss Statics, as of 3/31/2017
Total Losses-56
Closed losses-42
Open losses-0
CWOP (Closed without Payment losses-14
Total Payments $726,016.36

Recommended Mitigations

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Bland County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to properly determine Base Flood Elevations in those watersheds with estimated floodplains.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct detailed studies to determine the most cost-effective mitigations for communities with flooding issues, which include Bland, Bastian, and Rocky Gap.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Mitigate against future flood losses, with highest priority given to repetitive loss properties.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Bland County, MRPDC, DCR, VDEM	1-3 Years/ Ongoing	Done through compliance with NFIP
Medium	Promote the Firewise program for people who live in woodland	Wildfire	Bland County, MRPDC,	3-5 Years/	Funding needed from

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
	communities. An estimated 265 homes fall into this category in various parts of Bland County.		RC&D, DOF	Not Started	VDEM/FEMA
Medium	Work with the New River-Highlands RC&D Council a wildfire strategic plan for Bland County.	Wildfire	Bland County, MRPDC, RC&D, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Bland County, MRPDC, DCR, VDEM, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Continue inspection and enforcement as necessary on the Crab Orchard Creek Dam, rated Class I for hazard potential.	Dam Safety	Bland County, MRPDC, DCR	1-3 Years/ Ongoing/	Done through Federal State and local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Bland County, MRPDC, DCR, VDEM	1-3 Years/ Not Started	Will start next year

Carroll County and Hillsville

Community Hazard Profile

Carroll County abuts the northern border of North Carolina and includes a section of the Blue Ridge Parkway and the New River Trail State Park. A community of 29,212 (decrease of 2.8% since 2012), the county includes the incorporated Town of Hillsville, which serves as the county seat, and abuts the City of Galax to the west. Elevations vary from 3,570 feet above sea level at Fisher Peak to 1,110 feet above sea level at Cana. The county also is notable for the Blue Ridge Escarpment (steep slope) that separates the piedmont of North Carolina from the Blue Ridge Plateau. More than half of the land area has slopes greater than 20%, which precludes most development.

Carroll County is bisected by Interstate 77 in a north-south direction and by U.S. Rt. 58 in an east-west direction. The county is known for high wind conditions at Fancy Gap, where tractor trailers sometimes get blown over or even lifted away from the highway altogether and dumped into a field some distance away. Carroll County is part of a Special Wind Region, with potential wind speeds up to 200 mph.

Other natural hazards experienced in Carroll County include severe winter storms and ice, wildfires, drought, and undefined risk potential for landslides and impacts from karst terrain. Flood hazards are limited (one repetitive loss property in or near Hillsville). There are two federally regulated hydroelectric dams and one state-regulated dam in Carroll County.

Past or Ongoing Mitigations

A special project by the New River-Highlands RC&D Council has produced a draft strategic plan for wildfire hazard reduction in Carroll County. For emergency response, the area is served by the Twin County E-911 system, volunteer fire departments and rescue squads, a paid EMS, and the sheriff's department and state police.

VDOT has installed a warning system to help truckers get off I-77 and find alternate routes during high-wind conditions and other potentially dangerous conditions, such as fog, another ongoing problem in the Fancy Gap area. Members of the Hazard Mitigation Advisory Team have said the warning system has limited usefulness since there are few exits from the highway.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009.

Severe Weather Events

Multicar Pileup Due to Dense Fog

On March 31, 2013, at least three people were killed and at least 25 were taken to the hospital after a pile-up involving dozens of cars today on a Virginia interstate.

Virginia State Police said "excessive fog" in the Fancy Gap Mountain area, near the North Carolina border, caused at least 75 vehicles to crash in the southbound lanes of the I-77.

The first emergency calls began coming in at 1:15 p.m. ET, authorities said. The northbound lanes were closed to allow emergency vehicles to quickly reach people needing assistance at the scene, according to a statement from the Virginia State Police.

While the cause of the initial crash remains under investigation, Virginia State Police spokeswoman Corinne Geller said it was a classic pile up.

"[There were] 17 separate traffic crashes, but they all occurred as a chain reaction in that one-mile stretch of Interstate 77," Geller said. "The initial crash, the very first one, we're still investigating obviously what caused that one exactly, that's still under investigation."

After the first crash, she said, other vehicles on the highway were traveling too fast to stop by the time they saw the accidents ahead of them in the thick fog.

"People were traveling too fast for the road conditions and you had the initial crash and then you had a chain reaction, a series of crashes because the fog was so thick, people could not see what was up ahead," she said.

Traffic was re-directed in both directions as authorities worked to clear the scene and investigate the crashes, the Virginia State Police said.

The highway was expected to reopen at around 9 p.m. ET.

Authorities advised travelers, many of whom may be traveling for the Easter holiday, to make alternate travel plans or to expect significant delays.

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	3/31/13	Dense Fog	3	25	$500,000[5]	0	Newspaper
	4/4/13	Winter Weather	0	0	$-	0	Trained Spotter
Eona	6/7/13	Flash Flood	0	0	$-	0	911 Call Center
Pipers Gap	6/7/13	Flash Flood	0	0	$-	0	911 Call Center
Cliffview	6/7/13	Flash Flood	0	0	$-	0	911 Call Center
Gladeville	6/25/13	Hail	0	0	$-	0	Public
Dugspur	6/25/13	Hail	0	0	$-	0	Public
Hillsville	7/5/13	Flash Flood	0	0	$-	0	Trained Spotter
Fries Jct	8/12/13	Flash Flood	0	0	$-	0	County Official
	12/8/13	Ice Storm	0	0	$-	0	COOP Observer
	1/7/14	Cold/Wind Chill	0	0	$-	0	AWOS
	2/12/14	Heavy Snow	0	0	$-	0	Trained Spotter
	3/6/14	Winter Storm	0	0	$-	0	Public
Hillsville	5/15/14	Flash Flood	0	0	$-	0	911 Call Center
Fries Jct	6/16/14	Hail	0	0	$-	0	Trained Spotter
Hilltown	6/16/14	Hail	0	0	$-	0	Public
	11/1/14	Winter Weather	0	0	$-	0	CoCoRaHS
	11/26/14	Winter Weather	0	0	$-	0	Trained Spotter
	1/23/15	Winter Weather	0	0	$-	0	Trained Spotter
	2/16/15	Winter Storm	0	0	$-	0	Public
	2/19/15	Extreme Cold/ Wind Chill	0	0	$-	0	AWOS
	2/25/15	Winter Storm	0	0	$-	0	Amateur Radio
Cana	4/19/15	Flash Flood	0	0	$-	0	State Official
Hillsville	6/18/15	Hail	0	0	$-	0	Trained Spotter
	1/22/16	Winter Storm	0	0	$-	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$-	0	Trained Spotter
	4/5/16	Frost/Freeze	0	0	$-	0	County Official
	1/6/17	Winter Storm	0	0	$-	0	Trained Spotter
Dugspur	5/18/17	Hail	0	0	$-	0	Public
Dugspur	5/18/17	Heavy Rain	0	0	$-	0	Public
Dugspur	5/18/17	Flash Flood	0	0	$5,000	0	911 Call Center
Cana	5/19/17	Hail	0	0	$-	0	Public
Hilltown	5/24/17	Flood	0	0	$75,000	0	Broadcast Media
Gladeville	7/18/17	Hail	0	0	$-	0	Trained Spotter

[5] The total amount of damage included the 75 damaged vehicles

TOTAL	3	25	$580,000		

Recommended Mitigations: Carroll County and Hillsville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Promote the Firewise program for people who live in woodland communities. An estimated 712 homes fall into this category in various parts of Carroll County. This represents one of the worst natural hazard threats in the region.	Wildfire	Carroll County RC&D, Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Carroll County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Carroll County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Carroll County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with NFIP
Low	Consider flood-proofing or relocation/demolition for the repetitive loss property near Hillsville.	Floods	Town of Hillsville, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams.	Dam Safety	Carroll County, MRPDC, DCR	1-3 Years/ Ongoing	Done through Federal, State, and Local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Carroll County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Will be looked at next year

Grayson County and Fries, Independence and Troutdale

Community Hazard Profile

Grayson County is a remote, rural area with a population of 15,669 (increase of 0.9% since 2012). The county is traversed east-west by U.S. Rt. 58, north-south by State Rt. 16 (passing through the Town of Troutdale), and north-south by U.S. Rt. 21 (passing through the Town of Independence). The three incorporated towns include Fries, Independence, and Troutdale. Parts of the county border the independent City of Galax at the county's eastern border. Grayson's mountainous terrain includes Grayson Highlands State Park in the western end and parts of the Mount Rogers National Recreation Area running roughly along the county's northern border.

Chief natural hazards occurring in Grayson County include flooding, severe snow and ice storms, high winds, and risk of wildfire. Flooding affects relatively few properties, and there is no FEMA record of repetitive loss properties. Substantial parts of Grayson, encompassing roughly 60,000 acres, are subject to wildfire risk. Grayson also contains four dams rated for significant hazard potential and has a risk of potential for landslides, especially in the northern part of the county.

Past or Ongoing Mitigations

A special project by the New River-Highlands RC&D Council has produced a draft strategic plan for wildfire hazard reduction in Grayson County. The emergency services system includes the Twin County E-911 center, several volunteer fire departments and rescue squads, the sheriff's department and the state police.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009.

Grayson County has not participated in the pre-disaster hazard mitigation projects in the past, other than what has already been noted. Like the other localities in the Mount Rogers region, most hazard mitigation efforts are not possible without substantial outside support from state and federal grants.

Severe Weather Events

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	4/4/13	Winter Weather	0	0	$-	0	Trained Spotter
Reavistown	7/12/13	Flash Flood	0	0	$5,000[6]	0	Trained Spotter
Reavistown	7/19/13	Hail	0	0	$-	0	Public
	12/8/13	Winter Weather	0	0	$-	0	Trained Spotter
	1/7/14	Cold/Wind Chill	0	0	$-	0	AWOS
	2/12/14	Heavy Snow	0	0	$-	0	Public
Independence	5/10/14	Hail	0	0	$-	0	Trained Spotter
	11/1/14	Winter Weather	0	0	$-	0	Trained Spotter
	11/26/14	Winter Storm	0	0	$-	0	Park/Forest Service
	1/23/15	Winter Weather	0	0	$-	0	Trained Spotter
	2/15/15	Extreme Cold/Wind Chill	0	0	$-	0	Mesonet
	2/16/15	Winter Storm	0	0	$-	0	Trained Spotter
	2/19/15	Extreme Cold/Wind Chill	0	0	$-	0	Mesonet
	2/25/15	Winter Storm	0	0	$-	0	Trained Spotter
Reavistown	4/19/15	Flash Flood	0	0	$-	0	State Official
Benington Mills	5/11/15	Flash Flood	0	0	$-	0	Public
Carsonville	5/11/15	Debris Flow	0	0	$-	0	Law Enforcement
	1/22/16	Winter Storm	0	0	$ -	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$ -	0	Trained

[6] Property Damage Totals resulted from septic system damage

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
							Spotter
	1/6/17	Winter Storm	0	0	$ -	0	Trained Spotter
Stevens Creek	4/24/17	Flood	0	0	$ -	0	911 Call Center
Rugby	5/9/17	Hail	0	0	$ -	0	Park/Forest Service
Rugby	5/20/17	Flash Flood	0	0	$ -	0	Public
Oak Hill	5/24/17	Flood	0	0	$150,000 [7]	0	Broadcast Media
Carsonville	6/15/17	Heavy Rain	0	0	$ -	0	Trained Spotter
Carsonville	6/15/17	Heavy Rain	0	0	$-	0	Trained Spotter
Independence	6/15/17	Flash Flood	0	0	$2,000	0	911 Call Center
Riverside	7/12/17	Hail	0	0	$-	0	Public
		TOTAL	0	0	$157,000	$ -	

Recommended Mitigations: Grayson County and Fries, Independence, and Troutdale

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Pursue federal certification of the Base Flood Elevation of the Grayson Highlands Combined School floodwall, as well as funds for possible repairs or additions, as needed, to the floodwall	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support implementation of the strategic plan for wildfire hazard reduction in Grayson County.	Wildfire	Grayson County RC&D MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

[7] Property Damage Totals resulted from campers and camper covers that sustained flood damage along the New River

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 258 homes are part of woodland communities in Grayson County.	Wildfire	Grayson County RC&D Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Grayson County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Grayson County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Conduct hydrological/engineering studies to properly determine Base Flood Elevations in those watersheds with estimated floodplains.	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Conduct hydrological /engineering studies to determine Base Flood Elevations within the Town of Troutdale, which presently lacks a recognized floodplain.	Floods	Grayson County, MRPDC, VDEM, DCR	Project Complete	Flood mapping has been provided
Medium	Identify flood prone properties for potential acquisition/demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Conduct hydrological/ engineering studies to determine Base Flood Elevations within the Towns of Fries and Independence.	Floods	Town of Independence, Town of Fries, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Medium	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Grayson County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with the NFIP
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams.	Dam Safety	Grayson County, MRPDC, DCR	1-3 Years/ Ongoing	Done though local and state codes

Smyth County and Chilhowie, Marion, and Saltville

Community Hazard Profile

Smyth County, with a population of 30,686 (decrease of 4.7% since 2012), stands along the east-west path of I-81 and also is part of the Mount Rogers National Recreation Area. Population growth is stagnant, due in part to loss of the traditional industrial base and limited housing development. Despite those drawbacks, the county is traversed by the Appalachian Trail, offers appealing country vistas, and stands within easy reach of many natural resource attractions.

The main natural hazards affecting Smyth County include flooding along the North, Middle, and South Forks of the Holston River, as well as several tributaries; severe winter storms and ice; some potential for dam failure; drought; and undetermined risk from landslides and karst terrain, which appears in an estimated 30% of the county's territory. The county is also part of a Special Wind Region (with wind speed potential of 200 mph), but this problem rarely causes enough damage to be considered a major hazard. Smyth County contains seven repetitive loss properties. The county has the most flood-prone properties in the Mount Rogers Region (see At-risk Structures in the 100-year Flood Plain table in the Flood Risk Assessment and Vulnerability Section). While not a frequent event as defined by our hazard matrix, Smyth and Washington Counties suffered a severe tornado in April of 2011 that resulted in 4 deaths (all in Washington County), and over 50 injuries throughout the two counties.

Past or Ongoing Mitigations

Due to its long history with disaster-level flooding, Smyth County and its communities have participated in special flood mitigation projects. Record-level disasters resulting from the floods of 1977 led to a flood mitigation engineering study for the towns of Chilhowie and Marion, as well as the nearby communities of Atkins and Seven Mile Ford. In Chilhowie, the work resulted in the eventual relocation of 67 families and the creation of the Chilhowie Recreation Park. Other recommended flood mitigations have not been pursued due to lack of funding.

Also, as a result of flooding in 2001 and 2002, Smyth County obtained federal disaster relief funds and relocated five homes out of the floodplain in River Bottom Circle, located near the Broadford community along the North Fork of the Holston River.

More recently the Town of Chilhowie participated in a preliminary flood reduction study by the U.S. Army Corps of Engineers. About 12-15 properties continue to sustain flood damage within town borders. The town has opted against pursuing a more detailed study due to the high cost and instead is advocating for mitigating the most flood-prone structures in the town.

Emergency response is coordinated through Smyth County's centralized E-911 system. The county also creating a modernized countywide communications system for emergency response and direct radio communications among police, fire departments, and rescue squad organizations.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009.

Severe Weather Events

In April of 2017, the Holston Hills Country Club bridge was critically damaged in a massive flood event, rendering the bridge impassable. Since that time the bridge has been rebuilt and reopened to through traffic.

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	4/4/13	Winter Weather	0	0	$ -	0	Public
Marion	5/10/13	Heavy Rain	0	0	$ -	0	Public
Saltville	5/19/13	Hail	0	0	$ -	0	Public
Saltville	5/19/13	Flash Flood	0	0	$ -	0	State Official
Groseclose	6/13/13	Lightning	0	0	$5,000	0	State Official
Adwolf	7/10/13	Flood	0	0	$ -	0	Emergency Manager
	1/7/14	Cold/Wind Chill	0	0	$ -	0	AWOS
	1/25/14	Winter Weather	0	1	$50,000	0	911 Call Center
	2/12/14	Heavy Snow	0	0	$ -	0	Trained Spotter

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
Chilhowie	6/29/14	Flash Flood	0	0	$250,000[8]	0	911 Call Center
	11/1/14	Winter Weather	0	0	$ -	0	Trained Spotter
	11/26/14	Winter Weather	0	0	$ -	0	Public
	2/15/15	Extreme Cold/Wind Chill	0	0	$ -	0	AWOS
	2/16/15	Winter Storm	0	0	$ -	0	Trained Spotter
	2/19/15	Extreme Cold/Wind Chill	0	0	$ -	0	AWOS
	2/21/15	Winter Storm	0	0	$ -	0	Trained Spotter
	2/25/15	Winter Weather	0	0	$ -	0	Trained Spotter
Sugar Grove	4/19/15	Flood	0	0	$ -	0	Department of Highways
Thomas Bridge	4/20/15	Flood	0	0	$ -	0	State Official
	1/22/16	Winter Storm	0	0	$ -	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$ -	0	Trained Spotter
Saltville	8/16/16	Hail	0	0	$ -	0	Trained Spotter
Mt Carmel	4/23/17	Flood	0	0	$75,000[9]	0	Newspaper
Mc Mullin	4/23/17	Flash Flood	0	0	$ -	0	County Official
Marion	4/29/17	Hail	0	0	$ -	0	Trained Spotter
Furnace Hill	4/29/17	Hail	0	0	$ -	0	Broadcast Media
Chilhowie	4/29/17	Hail	0	0	$ -	0	Trained

[8] Total Property Damage includes homes damaged in northern parts of the county and in the Town of Saltville.
[9] Property Damage Totals includes flooding in downtown Town of Chilhowie, which caused damage to buildings and vehicles.

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
							Spotter
Saltville	5/27/17	Hail	0	0	$ -	0	Broadcast Media
Saltville	5/27/17	Hail	0	0	$ -	0	Broadcast Media
McCrady	5/27/17	Hail	0	0	$ -	0	Public
Broadford	5/27/17	Hail	0	0	$ -	0	Broadcast Media
Adwolf	5/27/17	Hail	0	0	$ -	0	Public
Sevenmile Ford	5/27/17	Hail	0	0	$ -	0	Broadcast Media
Mc Mullin	5/27/17	Hail	0	0	$ -	0	Amateur Radio
Thomas Bridge	5/27/17	Hail	0	0	$ -	0	Public
Sugar Grove	10/23/17	Flash Flood	0	0	$ -	0	Emergency Manager
		TOTAL	0	1	$380,000	0	

Recommended Mitigations: Smyth County and Chilhowie, Marion, and Saltville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Mitigate against future flood losses, with highest priority given to the repetitive loss properties.	Floods	Smyth County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Smyth County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with NFIP
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	When this issue arises, flood analysis is used
High	Identify flood prone properties for potential acquisition/demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	Smyth County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support the continued development of the improved countywide radio communications system to improve emergency response and coordination during major disasters and other emergencies.	All	Smyth County, MRPDC, VDEM	1-3 Years/ Ongoing	Worked on when possible
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 475 homes are located in wooded settings and subject to risk of wildfire.	Wildfire	Smyth County RC&D Firewise MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Smyth County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. Presently Hungry Mother Dam is regulated as a high-risk potential dam in the county.	Dam Safety	Smyth County, MRPDC, DCR	1-3 Years/ Ongoing	Done though federal, state, and local codes

Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Will be looked at next year

Washington County and Abingdon, Damascus, and Glade Spring

Community Hazard Profile

Washington County is a rapidly developing area located on the west end of the Mount Rogers region and is bisected by Interstate 81 in an east-west direction. Within the past decade the most change and growth has been occurring along the I-81 corridor between the Town of Abingdon and the City of Bristol, with much housing development, as well as burgeoning commercial development at the Exit 7 area. Former communities consisting largely of open space and farming are being converted into residential subdivisions to accommodate the population of 53,789 (decrease of 2.0% since 2012).

The chief natural hazards of concern to Washington County and its localities include flooding, wildfires, severe winter storms and ice, drought, undetermined risk for impacts from landslides and karst terrain (which occurs in 50% of the county's territory), and high winds. While not a frequent event as defined by our hazard matrix, Smyth and Washington Counties suffered a severe tornado in April of 2011 that resulted in 4 deaths (all in Washington County), and over 50 injuries throughout the two counties.

The flooding results from sustained heavy rainfalls, violent thunderstorms, or as the aftermath of a major snowstorm. FEMA records show three repetitive loss properties with an average claim of $10,063.89. Wildfire risks derive from being located in a rural, forested region and development of woodland home communities (encompassing more than 100,000 acres in the county). Severe winter storms and/or ice have been known to lead to disaster declarations, while drought is only an occasional hazard with impacts mainly for the farming community.

Washington County also contains four dams rated for high- or significant-hazard in the event of failure. Two are flood control structures owned by the Tennessee Valley Authority and one is a hydroelectric dam that has been breached and is no longer active. A fourth dam, owned by the state Department of Game and Inland Fisheries, is a recreational area regulated by the state.

Past or Ongoing Mitigations

Washington County operates its own E-911 system for emergency response from among an array of volunteer fire departments and rescue squads, the sheriff's department and the state police.

A long history of disaster-level flooding led to a comprehensive flood mitigation study for the Town of Damascus completed in 1979. In time, with support from outside grant funding, the town relocated 34 families (88 people) and three local businesses out of the floodplain. The town also was able to install storm drainage systems along flood-prone areas in Mock, Surber, and Haney Hollows. Damascus continues to face a serious flood threat due to its location at the confluence of Beaverdam and Laurel creeks and the lack of developable land outside of the floodplain.

As with the flood mitigation studies done for Smyth County, Damascus could not afford the high cost of the comprehensive approach. In addition, some mitigations considered in the 1970s and 1980s – including stream channelization and installation of levees – would not be allowed under modern state and federal regulations.

The Town of Glade Spring obtained funding to install a culvert underneath Grace Street and the Town Square intersection as part of a downtown revitalization effort.

The Town of Abingdon has recently updated some of its floodplain maps but has not been involved in mitigation efforts such as elevations or relocations and demolitions. Currently Abingdon is pursuing funding from FEMA to mitigate against losses associated with flooding in the Country Club Estates and surrounding areas. This area is in the southern portion of the town. Over the past 25 years there have been several rainfall events that have caused localized flooding to several homes in the drainage swale that conveys stormwater from east to west, crossing Fairway Drive, Bogey Drive, and Birdie Drive. After a flooding event in 1992, the Town Council commissioned the "Preliminary Engineering Report, Country Club Estates, Storm Drainage Improvements, Abingdon, Virginia." This study resulted in solution alternatives with associated cost estimates. Very few, if any, of the recommendations in that report were implemented. There have been other flood events in this area, most recently in July of 2009. During that storm, stormwater encroached nearby and even into several of the residences along the drainage path. Another Preliminary Engineering Report has since been commissioned by the Town Council to update the previous study discussed above.

The Town of Abingdon identifies as an ongoing need for the immediate future the review of all streams and creeks within the Town's corporate limits, which includes the Town Creek and Wolf Creek drainage basins and their tributaries and a drainage swale paralleling Hillman Highway that contributes floodwaters to Fifteen Mile Creek.

Flooding issues affecting private and public property specifically identified within the Town Creek Basin are:

1) Tributary #1 to Town Creek – This tributary is in FEMA Special Flood Hazard Zone A from Hillside Drive downstream to Railroad Street
2) Tributary #2 to Town Creek- This tributary is in FEMA Special Flood Hazard Zone A from Thompson Drive downstream to Tanner Street
3) Tributary #3 to Town Creek – This tributary is in FEMA Special Flood Hazard Zone A from Washington County along Whites Mill Road downstream to Town Creek and
4) Town Creek – In FEMA Special Flood Hazard Zones AE and X and experiences localized flooding from Branch Street to Interstate 81.

Flooding issues specifically identified within the Wolf Creek Basin occur within Tributary #2 to Wolf Creek. Portions of this tributary are in FEMA Special Flood Hazard Zone A and flooding affects private and public property along the drainage path from Hill Street to Wolf Creek.

Although not specifically identified on the Town of Abingdon Flood Insurance Rate Map, private properties located within the drainage swale paralleling Hillman Highway experience damage from floodwaters of the drainage basin. The headwaters of this swale begin near East Main Street and discharge into Fifteen Mile Creek. Continued development within the watershed areas, which includes portions of Washington County, has created additional impervious surfaces, such as roofs and pavements that increase storm water runoff. Portions of all of the aforementioned sections within the Town are prone to flooding, property damage, loss and possible harm to residents.

In order to mitigate the conditions as described briefly above, the Town must perform hydrologic and hydraulic analyses of the watershed areas that specifically identify the problem areas and develop solutions and plans that address the problems. The aforementioned practices including analysis, planning, establishing priorities and application for available funds will help enable project work to progress so that all concerned can be protected from flooding.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009.

Severe Weather Events

The Town recently had to intercede and perform emergency repairs on a property at 341 East Main Street, Abingdon, VA (Tax # 013-1-79) to allow Town Creek to flow properly and eliminate a blockage that was ponding water in East Main Street and became a potential flood hazard for neighboring properties. The Town would like to purchase the property to perform improvements to help alleviate the potential for high water at the intersection of East Main Street and Town Creek and the potential flooding of adjacent properties. The building on the property dates from the 1930s and it would not be cost effective to attempt to renovate or flood proof. Our intent will be to demolish the existing building and pavement, reestablish the stream bank on both sides of Town Creek, and to create a floodplain on the rest of the property for future storm events. This will be a precursor to a larger project to improve the existing drainage under East Main Street and improve pedestrian movement.

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	3/5/13	Heavy Snow	0	0	$ -	0	Law Enforcement
Damascus	5/22/13	Flash Flood	0	0	$5,000	0	911 Call Center
	2/13/14	Heavy Snow	0	0	$ -	0	Trained Spotter
	2/13/14	Heavy Snow	0	0	$ -	0	Amateur Radio
	2/13/14	Heavy Snow	0	0	$ -	0	Public
	2/13/14	Heavy Snow	0	0	$ -	0	Public
	2/13/14	Heavy Snow	0	0	$ -	0	Public
Shakesville	9/4/14	Flash Flood	0	0	$ -	0	Broadcast Media
	11/1/14	Heavy Snow	0	0	$ -	0	911 Call Center
	11/1/14	Heavy Snow	0	0	$ -	0	911 Call Center
	2/16/15	Heavy Snow	0	0	$ -	0	Trained Spotter
	2/16/15	Heavy Snow	0	0	$ -	0	Public
	2/17/15	Heavy Snow	0	0	$ -	0	Emergency Manager
	2/21/15	Heavy Snow	0	0	$ -	0	Public
	2/26/15	Heavy Snow	0	0	$ -	0	COOP Observer
Saltville	3/5/15	Flood	0	0	$1,000	0	Emergency Manager
Saltville	4/25/15	Hail	0	0	$ -	0	Public
Saltville	4/25/15	Hail	0	0	$ -	0	Public
Damascus	8/14/15	Flash Flood	0	0	$ -	0	911 Call Center
	1/22/16	Heavy Snow	0	0	$ -	0	Public
	1/22/16	Heavy Snow	0	0	$ -	0	Broadcast Media
	2/8/16	Heavy Snow	0	0	$ -	0	911 Call Center

	2/14/16	Heavy Snow	0	0	$ -	0	Public
Watauga	3/14/16	Hail	0	0	$ -	0	Public
Abingdon	6/22/16	Hail	0	0	$ -	0	Post Office
	1/6/17	Heavy Snow	0	0	$ -	0	Public
	1/6/17	Heavy Snow	0	0	$ -	0	Public
			0	0	$6,000	0	

Recommended Mitigations: Washington County and Abingdon, Damascus, and Glade Spring

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Make flood improvements at the intersection of E. Main St. and Town Creek; reestablish the stream bank and create a floodplain.	Floods	Town of Abingdon, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Washington County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Washington County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Encourage more property owners to insure their homes through the National Flood Insurance Program.	Floods	Washington County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Residents are encouraged to do so
High	Consider appropriate mitigation projects for the three repetitive loss properties identified by FEMA data.	Floods	Washington County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/ engineering studies to determine Base Flood Elevations and create new floodplain map for Cedar Creek in the Meadowview community.	Floods	Washington County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Washington County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	When this issue arises flood analysis is used
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Washington County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with the NFIP

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 804 homes are located in wooded settings and subject to risk of wildfire.	Wildfire	Washington County, RC&D, Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Washington County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. There are four such dams in Washington County, one of which has been breached.	Dam Safety	Washington County, MRPDC, DCR	1-3 Years/ Ongoing	Done though federal, state, and local codes
Low	Verify the geographic location of all NFIP repetitive losses, and making inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Washington County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Will be looked at next year

Wythe County and Rural Retreat and Wytheville

Community Hazard Profile

Wythe County is a community of 28,723 that is traversed north-south by Interstate 77 and east-west by Interstate 81, as well as routes 21, 52, and 94. The county includes the incorporated towns of Rural Retreat and Wytheville, which serves as the county seat. The county caters to the trucking industry and also facilitated the construction of a major new Pepsi bottling plant along the I-81 corridor. More than 50% of the county contains slopes of more than 20%, which hinders development in those steep areas.

Chief natural hazards experienced in Wythe County and its localities include flooding, severe winter storms and ice, high winds, drought, and undetermined hazards from karst terrain (which appears in roughly 30% of the county's landscape). There is one high-hazard potential dam (Rural Retreat Dam) owned as a recreational attraction by the Virginia Department of Game and Inland Fisheries.

The flooding results from sustained heavy rainfalls, violent thunderstorms, and melting as the aftermath of a major snowstorm. Flood hazards have been identified for the Town of Wytheville and the community of Max Meadows east of Wytheville. There are two repetitive loss properties in Wythe County.

Past or Ongoing Mitigations

Emergency response is based around the county's E-911 system, the sheriff's department, the state police, and several fire departments and rescue squads, including both paid and volunteer units.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009. These modern codes help protect against hazard damages, such as those from high winds.

Severe Weather Events

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	4/4/13	Heavy Snow	0	0	$-	0	Public
Catron	7/10/13	Flash Flood	0	0	$5,000	0	911 Call Center
Lots Gap	7/11/13	Flash Flood	0	0	$16,000	0	Emergency Manager
Blacklick	7/17/13	Lightning	0	0	$1,500	0	911 Call Center
Fort Chiswell	8/12/13	Flash Flood	0	0	$-	0	Law Enforcement
	12/8/13	Winter Weather	0	0	$-	0	Trained Spotter
	1/7/14	Cold/Wind Chill	0	0	$-	0	AWOS
	1/10/14	Winter Weather	0	0	$50,000	0	911 Call Center
	2/12/14	Heavy Snow	0	0	$-	0	Public
	11/1/14	Winter Weather	0	0	$-	0	Public
	11/26/14	Winter Weather	0	0	$-	0	Public
	1/23/15	Winter Weather	0	0	$-	0	COOP Observer
	2/16/15	Winter Storm	0	0	$-	0	Trained Spotter
	2/19/15	Extreme Cold/ Wind Chill	0	0	$-	0	Mesonet
	2/25/15	Winter Weather	0	0	$-	0	Trained Spotter
Cedar Springs	4/19/15	Flood	0	0	$50,000	0	Newspaper
Simmerman	4/19/15	Flood	1	0	$-	0	Broadcast Media
Max Meadows	4/20/15	Flood	0	0	$-	0	Trained Spotter
Wytheville	4/20/15	Hail	0	0	$-	0	Public
Max	4/20/15	Flash Flood	0	0	$-	0	State Official

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
Meadows							
Fort Chiswell	4/20/15	Flash Flood	0	0	$-	0	State Official
	1/22/16	Winter Storm	0	0	$-	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$-	0	Trained Spotter
	1/6/17	Winter Storm	0	0	$-	0	Trained Spotter
Porters Crossroads	4/24/17	Flood	0	0	$-	0	Department of Highways
Favonia	4/24/17	Flood	0	0	$-	0	Newspaper
Max Meadows	4/24/17	Flood	0	0	$-	0	Department of Highways
Rural Retreat	4/29/17	Hail	0	0	$-	0	Broadcast Media
Haven	4/29/17	Hail	0	0	$-	0	Trained Spotter
Rural Retreat	4/29/17	Flash Flood	0	0	$1,000	0	Public
Gunton Park	5/24/17	Flood	0	0	$-	0	Emergency Manager
		TOTAL	1	0	$123,500	0	

Recommended Mitigations: Wythe County and Rural Retreat and Wytheville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Apply for funding to purchase and install generators at Wythe County's main pumping station.	All hazards	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/ engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Wythe County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with the NFIP
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Used when these projects are looked at
Medium	Support development of strategic wildfire risk reduction plans such as being promoted by the New River-Highlands RC&D Council.	Wildfire	Wythe County, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 20,000 acres of land (unknown number of woodland homes) are subject to wildfire risk in Wythe County.	Wildfire	Wythe County, RC&D, Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Wythe County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. Rural Retreat Dam falls into the high-hazard potential category in Wythe County.	Dam Safety	Wythe County, MRPDC, DCR	1-3 Years/ Ongoing	Done through Federal, State, and local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Will start next year

City of Bristol

Community Hazard Profile

The City of Bristol, Virginia is a community of 17,160 (decrease of 3.8% since 2012) located along Interstate 81 and abutting the far southwestern reach of Washington County. The city has experienced some transition in some traditional residential areas being converted to commercial uses and some shift toward high-tech industry. Bristol stands in the lowlands of the Valley and Ridge physiographic province, and this area is characterized by karst terrain.

Chief natural hazards experienced in the City of Bristol include flooding, which in the past has caused damages in the millions of dollars according to a study by the U.S. Army Corps of Engineers. Other natural hazards faced in Bristol include severe winter storms and ice, high winds, and undetermined hazard risks from karst terrain and landslides. Two high-hazard potential dams affecting Bristol include Clear Creek Dam and Beaver Creek Dam, both located upstream in Washington County. The City of Bristol contains two repetitive loss properties.

Past or Ongoing Mitigations

Emergency response is based around the city's E-911 system, the Washington County Sheriff's Department, the City of Bristol Police Department, the state police, and fire department and rescue squads.

In the spring of 2015, the City of Bristol installed a new water management device at Sugar Hollow Dam. The 1.1 million Dollar phase was part of a larger $6.9 million project by the U.S. Army Corps of Engineers. The project addresses flood events along Beaver Creek by replacing a water control structure on the upstream side of the dam.

The City of Bristol, Virginia teamed up with the City of Bristol, Tennessee to work with the U.S. Army Corps of Engineers to conduct the "Flood Damage Reduction Feasibility Study" of 2003 to identify ways to reduce continuing flood damage, especially along the main stem of Beaver Creek, which passes through the center of the adjacent cities. The Corps of Engineers recommended the following flood mitigations in July 2003:

- Widening the Beaver Creek channel near 6th Street (in Bristol, Tennessee)
- Replacing a pedestrian bridge and removing the 8th Street Bridge (in Bristol, Tennessee)
- Removing the old Sears commercial building near State Street (in Bristol, Tennessee)

- Replacing the existing outlet structure (a 48-inch diameter pipe) on Beaver Creek Dam with a larger reinforced concrete structure to more effectively hold back flood flows.

The Corps of Engineers estimated the proposed mitigations will reduce total average annual flood damages by 20% and reduce flood levels by nearly one foot in the central business districts of both Bristol, Virginia and Bristol, Tennessee.

The city's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009. These modern building codes help offset damages caused by natural hazards, such as high winds, for new construction.

Severe Weather Events

The City of Bristol, VA experienced flooding conditions due to a heavy rainfall event on August 18, 2018. A small un-named stream that flows from the north side of Interstate 81 through the Briarwood Subdivision (located just south of the interstate) overflowed and flooded basements of several homes specifically along Brookdale Circle, in addition to the parking lot of a neighboring business located on Lee Highway (Rt. 11). The FIRM panel map (510022-0008 D) shows no Special Flood Hazard Area for this area. The City would like to do a flood risk analysis of this area and a mitigation plan for measures that could be done to address future flood events. In addition, Mumpower Creek which is a small tributary to Beaver Creek overflowed its banks with the same event on the 18th, affecting several homes located in the floodplain. If resources are available, the City would like to also do a flood study of this area between Valley Drive and Beaver Creek to address mitigation.

The anticipated cost of the study would be $60,000. The City would provide the required 25% match with in-kind staff time (valued at $15,000 – salary and fringes) from our Engineering staff.

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	3/5/13	Heavy Snow	0	$-	0	0	Law Enforcement
	2/13/14	Heavy Snow	0	$-	0	0	Trained Spotter
	2/13/14	Heavy Snow	0	$-	0	0	Public
Bristol	7/27/14	Hail	0	$-	0	0	Trained Spotter
	11/1/14	Heavy Snow	0	$-	0	0	911 Call Center
	2/16/15	Heavy Snow	0	$-	0	0	Trained Spotter
	2/17/15	Heavy Snow	0	$-	0	0	Emergency Manager
	2/21/15	Heavy Snow	0	$-	0	0	Public
	2/26/15	Heavy Snow	0	$-	0	0	COOP Observer
	1/22/16	Heavy Snow	0	$-	0	0	Broadcast Media
	2/8/16	Heavy Snow	0	$-	0	0	911 Call Center
	2/14/16	Heavy Snow	0	$-	0	0	Public
	1/6/17	Heavy Snow	0	$-	0	0	Public
		TOTAL	0	$0	0	0	

Recommended Mitigations: City of Bristol

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Perform flood studies at Briarwood Subdivision along Brookdale Circle and along Lee Hwy; also at Mumpower Creek between Valley Drive and Beaver Creek.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funded by Bristol, TN/VA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support implementation of the remedies outlined by the U.S. Army Corps of Engineers for the cities of Bristol in Virginia and Tennessee.	Floods	City of Bristol, MRPDC, VDEM, DCR	3-5 Years/ Ongoing	Funded by Bristol, TN/VA
High	Identify flood prone properties for potential acquisition/demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	City of Bristol, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with the NFIP
Medium	Support educational programs to promote Firewise methods, as appropriate to residents of woodland communities. More specific data for the city was not available at the time this report was written.	Wildfire	City of Bristol, Firewise, MRPDC, VDEM, DCR, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	City of Bristol, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. These include Clear Creek Dam and Beaver Creek Dam.	Dam Safety	City of Bristol, MRPDC, DCR	1-3 Years/ Ongoing	Done through Federal, State, and Local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Will start next year

City of Galax

Community Hazard Profile

The City of Galax, a community of 6,748 (decrease of 4.2% since 2012), is located in a hilly area with above-sea elevations ranging from 2,340 feet to 2,980 feet at Ward Knob.

While the City of Galax contains a defined floodplain along Chestnut Creek, which flows north-south through the city core, Galax does not participate in the National Flood Insurance Program and has resisted suggestions it rejoin the program, despite disaster-level flooding in November 2003 and repeat flooding problems in 2004. For communities that refuse to participate in NFIP, disaster help from FEMA is not available in the defined floodplains. Flooding problems also have been evident recently along the tributary of Mill Creek, which is not part of a recognized FEMA floodplain. Flooding on the tributaries occurs because the city's storm drainage system is aging (50 years old), with parts of the piping collapsing; these problems block storm water drainage and worsen flooding problems in some residential neighborhoods.

Other natural hazards faced by the City of Galax include wildfires and high winds. The city, along with much of the Mount Rogers region, is part of a Special Wind Zone (winds up to 200 mph), although the problems created do not appear to be of disaster level and the city does enforce current building codes.

Past or Ongoing Mitigations

The City of Galax grew up around its industrial district along Chestnut Creek in the core of the city. Due to disastrous flooding problems along Chestnut Creek (especially in 1940), the U.S. Army Corps of Engineers in 1950 channelized the creek through the downtown area and flood-proofed the industrial buildings located there. Following the flood disaster from November 2003, Galax city officials said they had developed a P.E.R. to improve the drainage system to help alleviate flooding problems, but this was not in the city budget at this time. Galax recently submitted a request to the US Army Corps of Engineers to look at possible projects upstream of Chestnut Creek through the Flood Damage Reduction Program (Section 205 of the 1948 Flood Control Act). The end result would be a project that would reduce the 100-year flood plain to the Chestnut Creek channel.

The city's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2009. These modern codes help to

offset the impacts of natural hazards such as winds for new construction. For emergency response, the City of Galax participates in the Twin County E-911 system, which covers the entire city, along with the adjoining counties of Carroll and Grayson. Responders include fire departments and rescue squads, local police and sheriff's departments, and the state police.

Severe Weather Events

Begin Location	Begin Date	Event Type	Deaths Direct	Injuries Direct	Damage Property Number	Damage Crops Number	Source
	4/4/13	Winter Weather	0	0	$-	0	Trained Spotter
Galax	6/18/13	Heavy Rain	0	0	$-	0	Law Enforcement
Galax	7/3/13	Flood	0	0	$-	0	Trained Spotter
Galax	7/11/13	Heavy Rain	0	0	$-	0	Trained Spotter
Galax	7/12/13	Flash Flood	0	0	$-	0	Trained Spotter
Galax	7/27/13	Flash Flood	0	0	$20,000	0	Trained Spotter
Galax	8/12/13	Flash Flood	0	0	$-	0	Public
	12/8/13	Ice Storm	0	0	$-	0	COOP Observer
	1/7/14	Cold/Wind Chill	0	0	$-	0	AWOS
	2/12/14	Heavy Snow	0	0	$-	0	Trained Spotter
	3/6/14	Winter Storm	0	0	$-	0	Public
Galax	7/3/14	Flood	0	0	$-	0	911 Call Center
	11/1/14	Winter Weather	0	0	$-	0	CoCoRaHS
	11/26/14	Winter Weather	0	0	$-	0	Trained Spotter
	1/23/15	Winter Weather	0	0	$-	0	Trained Spotter
	2/16/15	Winter Storm	0	0	$-	0	Public
	2/19/15	Extreme Cold/Wind Chill	0	0	$-	0	AWOS
	2/25/15	Winter Storm	0	0	$-	0	Amateur Radio
	1/22/16	Winter Storm	0	0	$-	0	Trained Spotter
	2/14/16	Winter Storm	0	0	$-	0	Trained Spotter
	4/5/16	Frost/Freeze	0	0	$-	0	County Official
	1/6/17	Winter Storm	0	0	$-	0	Trained Spotter
			0	0	$20,000	0	

Recommended Mitigations: City of Galax

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Addition of a Nexedge System or the RIOS-Comlinc system for Twin County Region (counties of Carroll and Grayson and the City of Galax).	All hazards	City of Galax, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for all types of natural disaster.	All hazards	City of Galax, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	City of Galax, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support development of strategic wildfire risk reduction plans such as being promoted by the New River-Highlands RC&D Council.	Wildfire	City of Galax, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 67 homes in Galax are in wooded settings and at risk of wildfire.	Wildfire	City of Galax Firewise, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

PLAN MAINTENANCE

Plan Adoption

It is anticipated that the 2018 revision of the Mount Rogers Hazard Mitigation Plan will be adopted in the summer of 2018. All resolutions for adoption of the plan by participating localities will be included in the final document. The plan was available for public comment throughout the update process. The Public will also have an opportunity to view the plan during the final adoption phase by the localities. The MRPDC will assist any locality in guiding the plan through the adoption process with all necessary public hearings and provide the adoption resolutions.

Plan Implementation

The Mount Rogers Hazard Mitigation Plan will be implemented as follows:

1) policy changes that avoid development in hazard areas or that protect buildings from future impacts, and
2) implementation projects that physically change the environment to reduce impacts or educate landowners and residents on how to protect themselves and their property in the case of an event.

The goal of implementing the identified strategies is to reduce the loss of life and/or property due to natural hazard events. Policy changes are an ongoing way to implement the hazard mitigation plan. As local plans are updated, such as comprehensive plans, zoning and subdivision ordinances, or capital improvement plans, strategies for mitigating hazard impacts can be included. Changes to these plans do require some foresight and public involvement but can be a way for localities to make significant progress with little capital investment. The MRPDC works regularly with its member localities as they update these plans and is willing to provide technical assistance for including hazard mitigation specific strategies and language when requested.

Implementing projects require more work and investment from the locality or lead agency. Many of the identified projects are contingent on finding grant funding and partnering with other agencies and organizations to complete the project. Grant funding is especially critical in the current economic situation.

Plan Maintenance

The Mount Rogers Hazard Mitigation Plan will be reviewed annually by the staff of the Mount Rogers Planning District Commission with local government staffs to ensure that the project list stays up-to-date (and completed projects are noted). If necessary, the plan will be reviewed and revised after significant hazard events impacting the region. Cost-effective projects may be added to the locality project list each year, with that local government's approval. This review and potential update may be conducted electronically or through an annual meeting of the Hazard Mitigation Steering Committee. The PDC will ensure that each locality section of the mitigation plan is integrated into the comprehensive plans as updates occur. The method of review will depend on the events of the previous year and the extent of potential revisions to be made. An annual report of the status of mitigation actions will be reviewed and sent to VDEM to reduce the burden of evaluating strategies for the required five-year revision.

In five years, the Mount Rogers PDC will work to find funding from VDEM and/or FEMA to update the Mount Rogers Hazard Mitigation Plan. Any update of the plan will include a public input session or strategy to engage the community in this planning effort. At the time of the next update, the effectiveness of the mitigation strategies will be evaluated by determining any reduction in vulnerability to a particular hazard. New vulnerabilities will be identified by looking at event history in the past five years, as well as development that may have occurred in hazard areas. During the interceding five years, the Mount Rogers PDC will maintain the hazard mitigation website and will update it periodically with grant funding availability and project updates from localities, if available. This will also allow for continued public input throughout the plan implementation phase.

Strengthen public participation by providing more avenues for the public to comment on and ask questions about the Hazard Mitigation Plan and its development. The PDC recommends holding at least two regional public input sessions, one to be held in Wytheville for the Bland, Wythe, Carroll, Galax, areas, and one to be held in Marion for the Grayson, Smyth, Washington, Bristol areas. The PDC will also stress to the localities the importance of educating the public on the Mitigation Plan and the need for community support. This outreach can be done via websites and social media.

APPENDIX I

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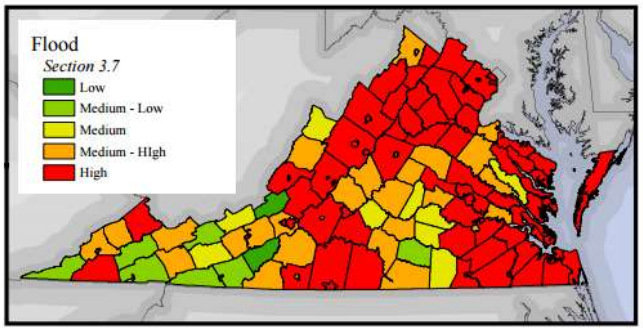
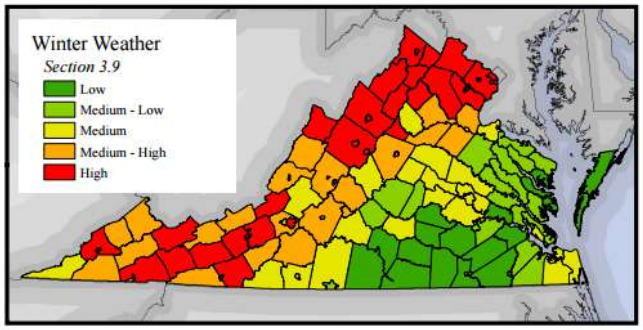
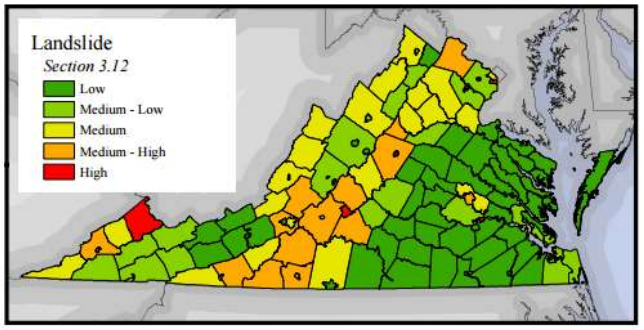
Emergency Management Personnel Contact Information

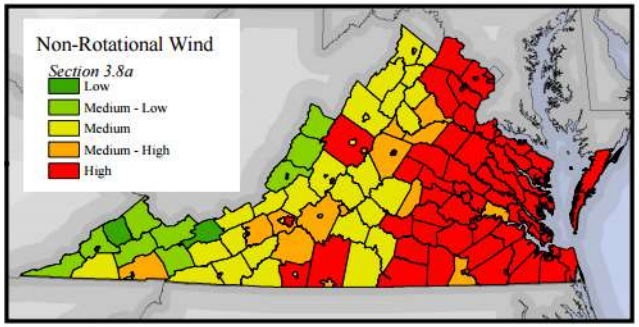
Jurisdiction Name	Plan POC	Mailing Address	Email	Phone
Bland County	Jenna Dunn	612 Main St. Bland VA24315	jdunn@bland.org	276-688-4641
Carroll County	Everett Lineberry	605-2 Pine St, Hillsville, VA 24343	elineberry@carrollcountyVAorg	276-730-3012
Grayson County	Jimmy Moss	129 Davis St. Independence VA 24348	jmoss@graysoncountyVAgov	276-773-3673
Smyth County	Charles Harrington	121 Bagley Circle Suite 100. Marion VA 24354	cph@marionrha.com	276-783-3381
Washington County	Theresa Kingsley	20281 Rustic Ln, Abingdon VA 24210	tkingsley@washcoVAcom	276-525-1330
Wythe County	Curtis Crawford	340 6th Street, Wytheville VA 24382	ccrawford@wytheco.org	276-724-6000
City of Galax	Mike Ayers	300 West Grayson St., Galax VA, 24333	mayers@galaxVAcom	276-235-9580
City of Bristol	Mike Armstrong	211 Lee St. Bristol VA 24201	Mike.armstrong@bristolVAorg	276-645-7303
Town of Hillsville	Retta Jackson	410 N. Main St., P.O. Box 545, Hillsville, VA 24343	hillsville@townofhillsville.com	276-728-2128
Town of Independence	Jimmy Moss	129 Davis St. Independence VA 24348	jmoss@graysoncountyVAgov	276-773-3673
Town of Fries	Scott McCoy	1021 Terrace Drive, Marion, VA 24354	smccoy@mrpdc.org	276-783-5103
Town of Troutdale	Scott McCoy	1021 Terrace Drive, Marion, VA 24354	smccoy@mrpdc.org	276-783-5103
Town of Marion	Bill Rush	138 W. Main Street, Marion VA 24354	brush@marionVAorg	276-783-4113
Town of Chilhowie	John Clark	325 East Lee Highway, PO Box 5012, Chilhowie, VA 24319	chilhowie.townmgr@chilhowie.org	276-646-3232
Town of Saltville	Brian Martin	217 Palmer Ave. Saltville VA 24370	townmanager@saltville.org	276-496-5342
Town of Abingdon	Tyler Vencill	P.O. Box 789, Abingdon VA 24212	tvencill@abingdon-va.gov	276-628-3167
Town of Damascus	Gavin Blevins	1021 Terrace Drive, Marion, VA 24354	gblevins@mrpdc.org	276-783-5103
Town of Glade Spring	Aaron Sizemore	1021 Terrace Drive, Marion, VA 24354	asizemore@mrpdc.org	276-783-5103
Town of Wytheville	Ian Bishop	150 E. Monroe St, Wytheville, VA 24382	iab@wytheville.org	276-223-3302
Town of Rural Retreat	Jason Childers	PO Box 130, Rural Retreat, VA 24368	jasonc@townofruralretreat.com	276-686-4221

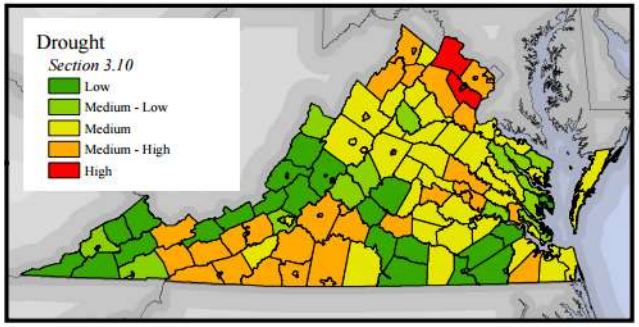
Hazard Ranking Risk Maps

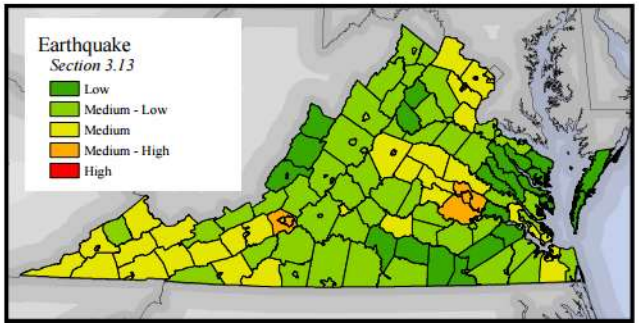


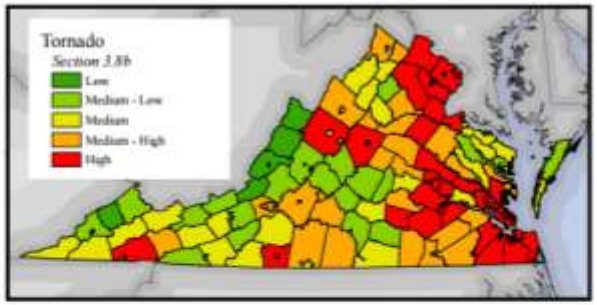


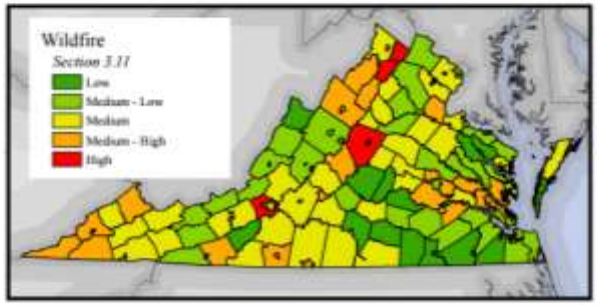


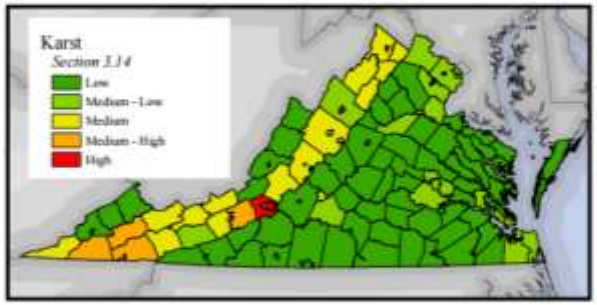

Non-Rotational Wind
Section 3.8a
Low
Medium - Low
Medium
Medium - High
High


Drought
Section 3.10
Low
Medium - Low
Medium
Medium - High
High


Earthquake
Section 3.13
Low
Medium - Low
Medium
Medium - High
High







HAZARD RANKING

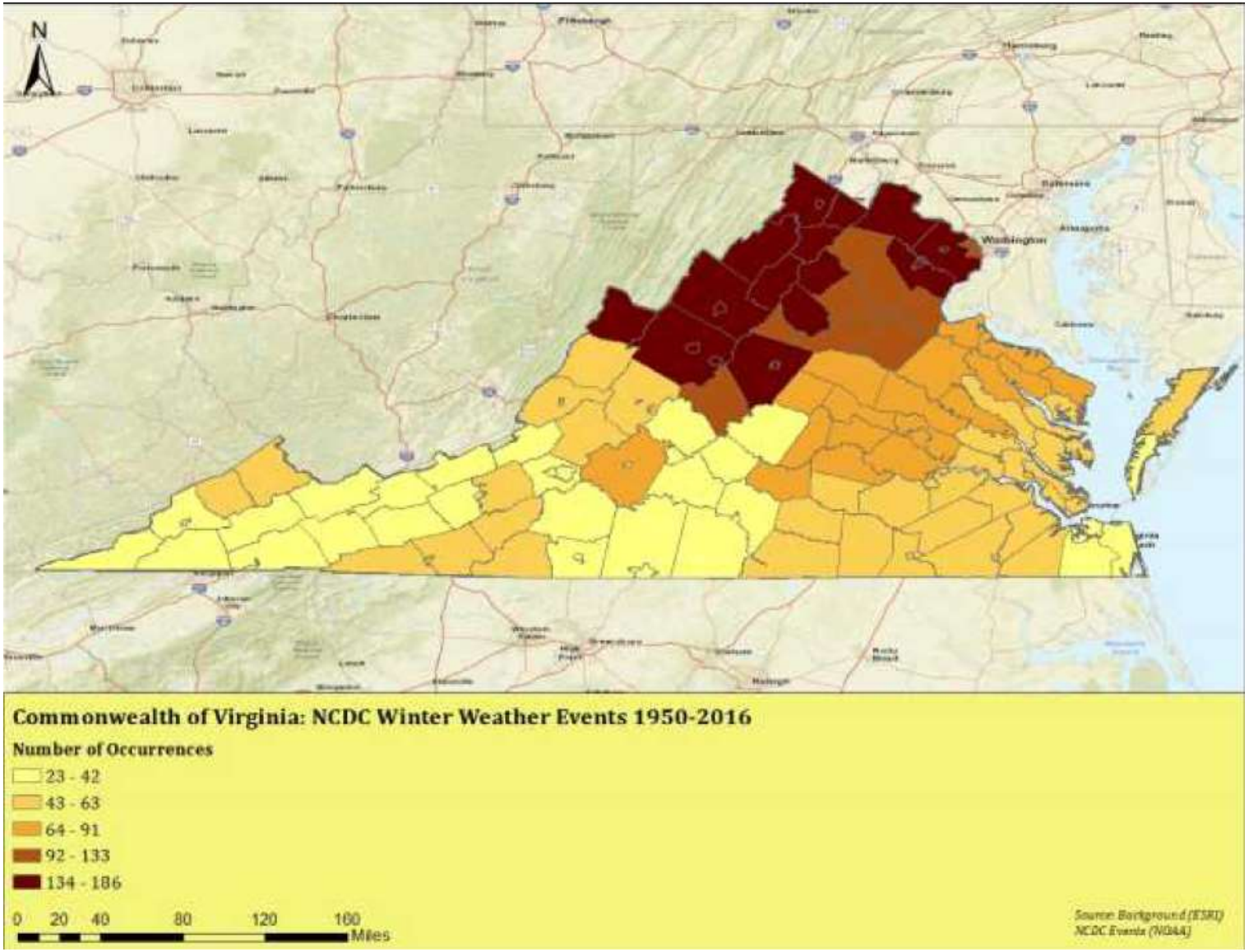
This is a summary of the individual hazard risk maps found in Section 3.7 through Section 3.14. The parameters used to create the Hazard Ranking Parameters and Risk Maps are explained in Section 3.5.

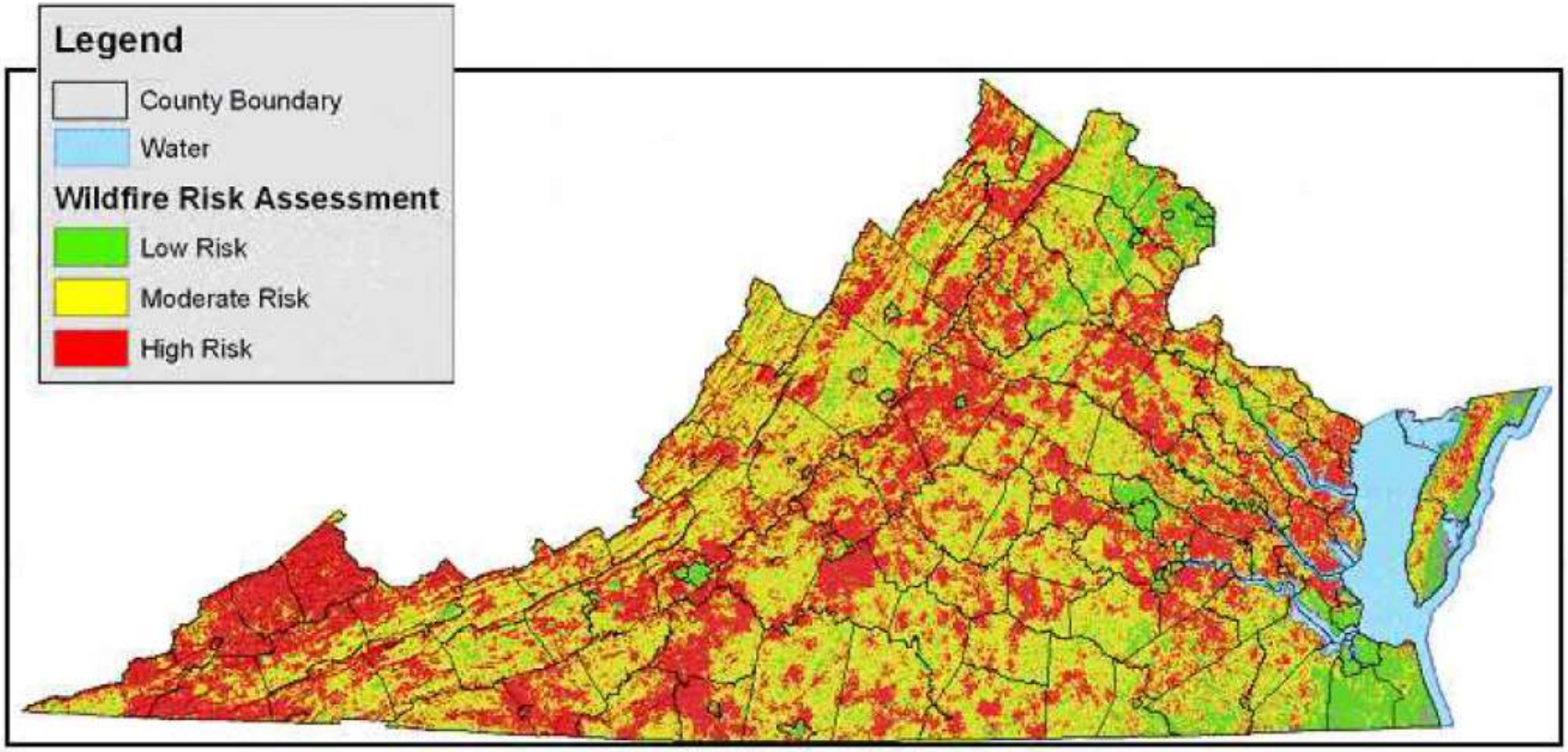
DATA SOURCES

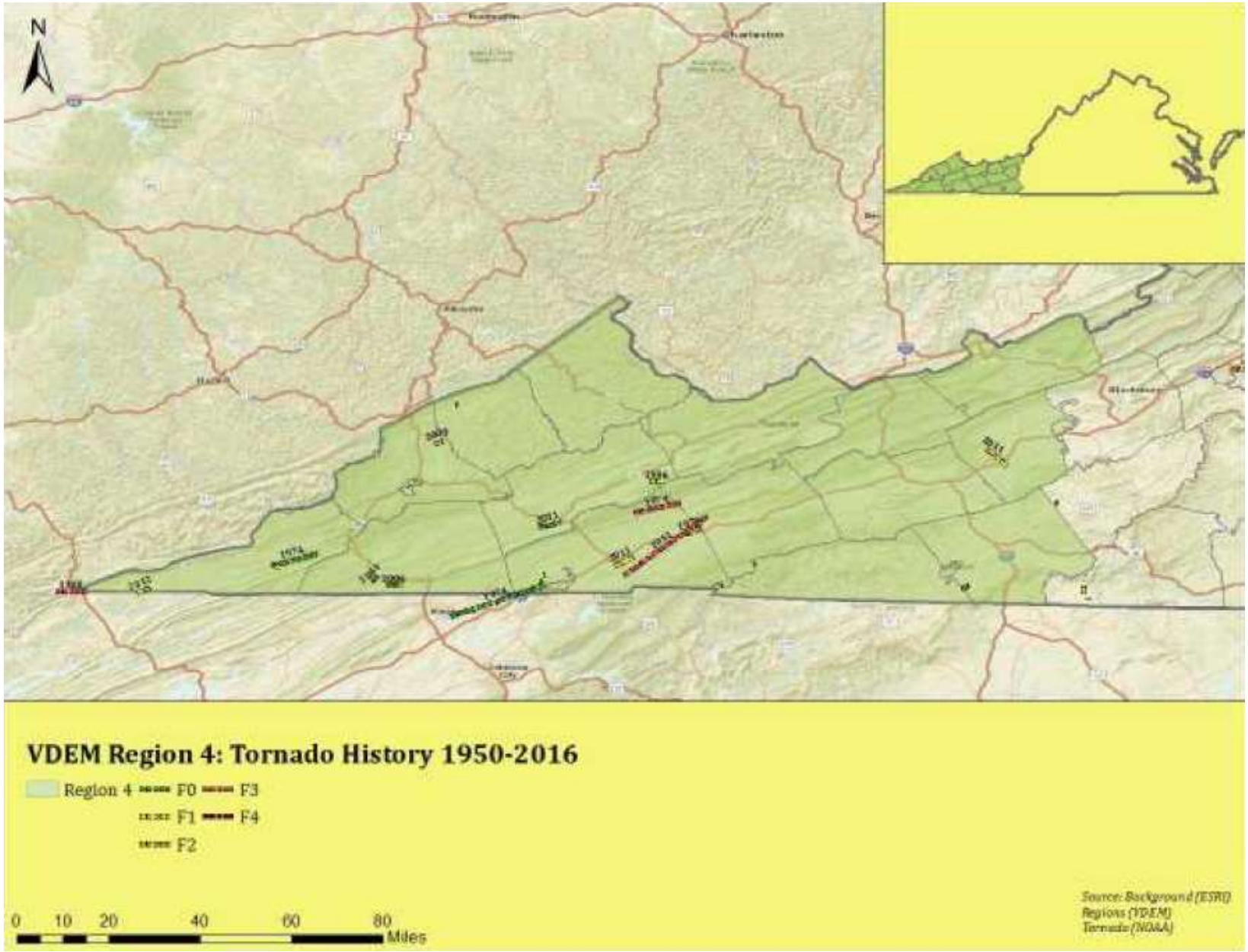
CGIT Ranking Methodology
VGIN Jurisdictional Boundaries
ESRI State Boundaries

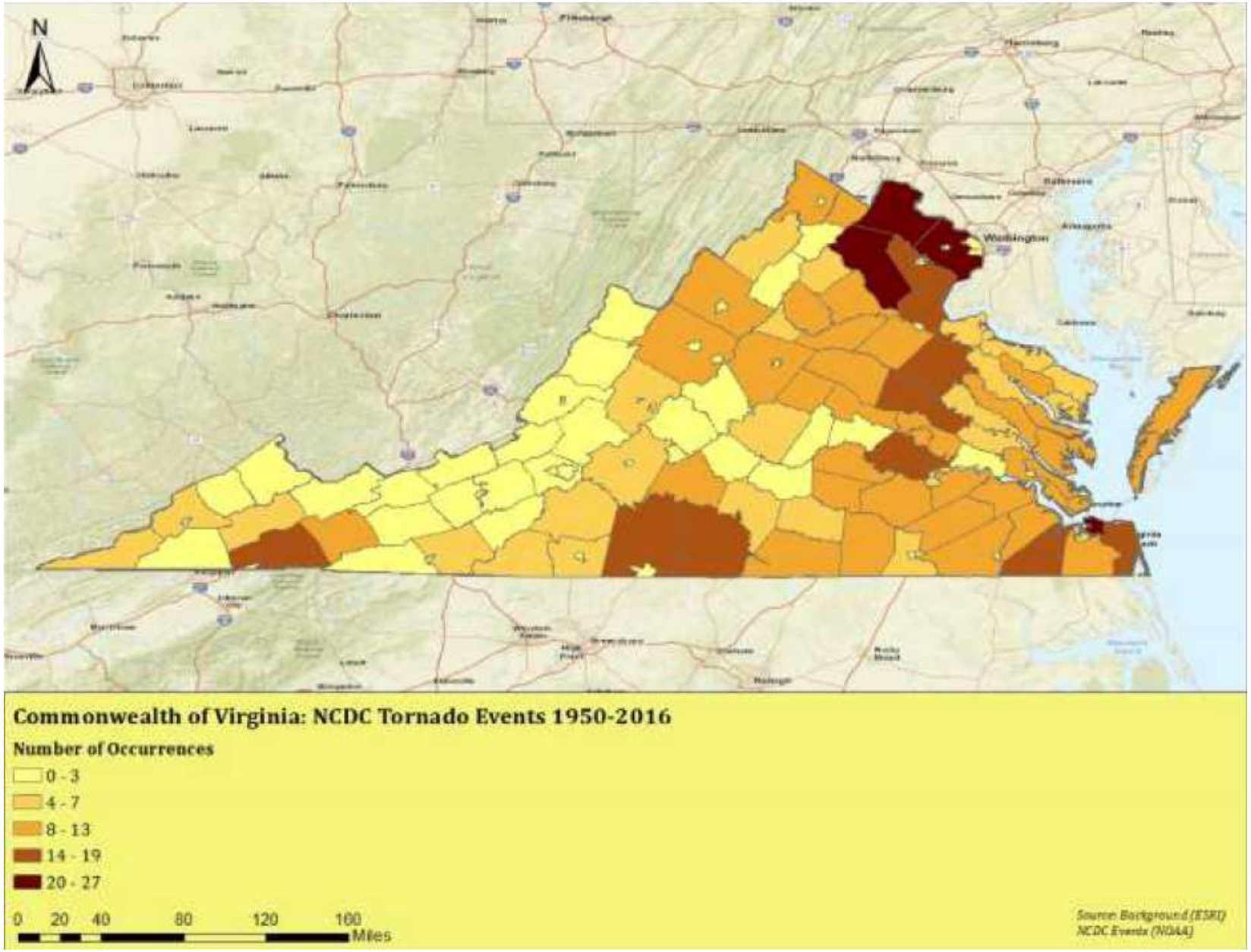
Hazard Identification Maps

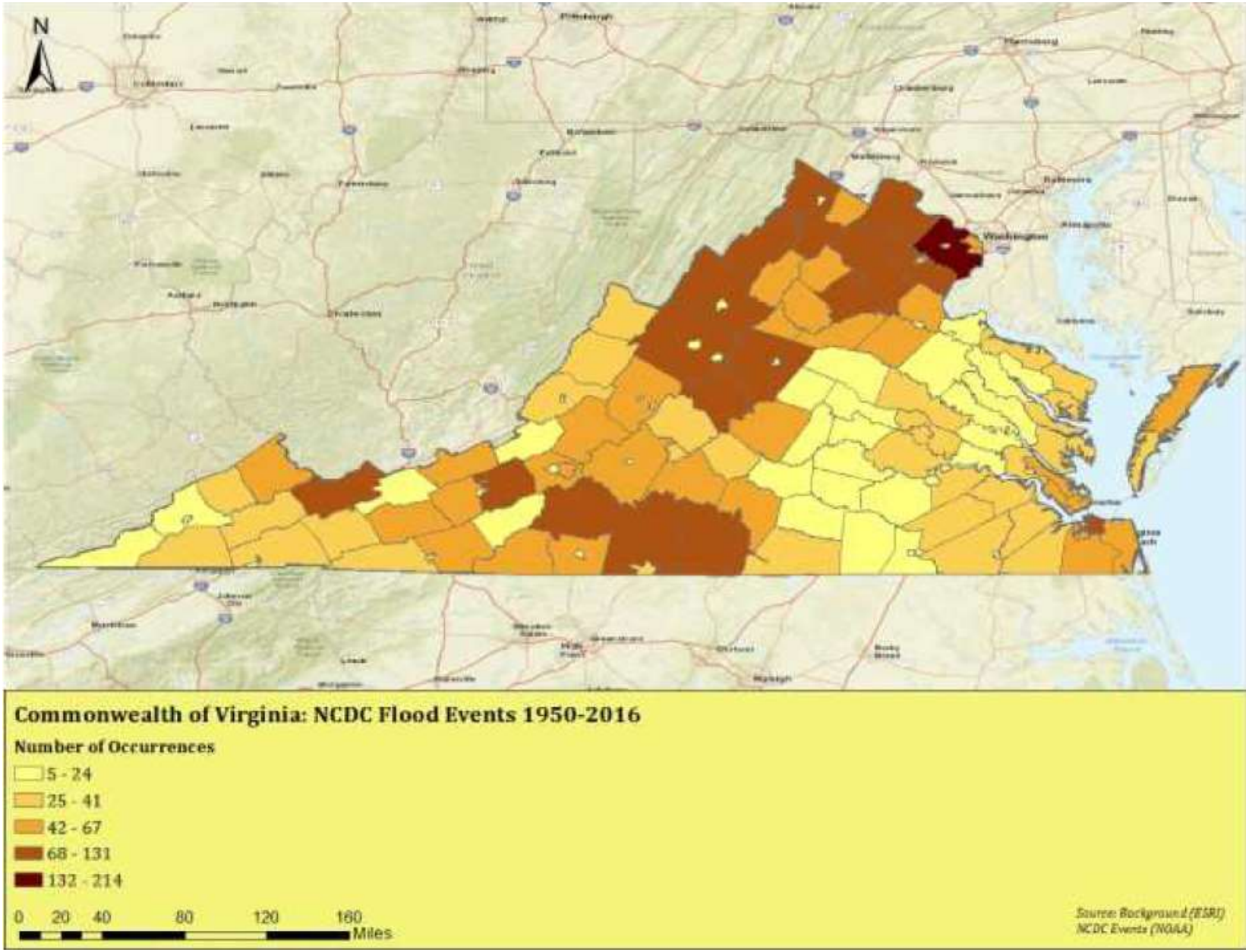
The following maps are sourced from the Virginia Hazard Mitigation Plan.

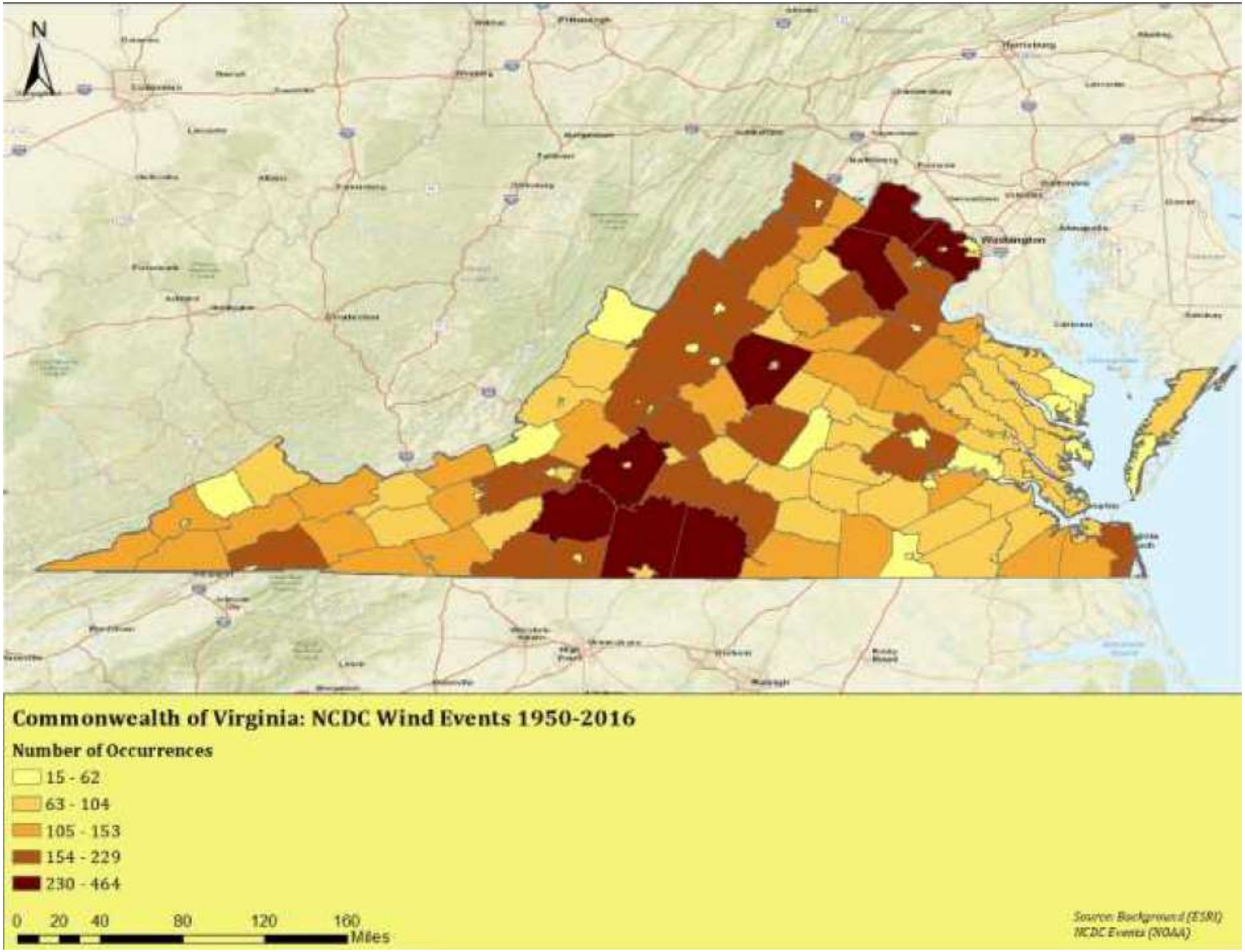

N
Commonwealth of Virginia: NCDC Winter Weather Events 1950-2016
Number of Occurrences
23 - 42
43 - 63
64 - 91
92 - 133
134 - 186
0 20 40 80 120 160
Miles
Source: Background (ESRI)
NCDC Events (NOAA)


Legend
County Boundary
Water
Wildfire Risk Assessment
Low Risk
Moderate Risk
High Risk


N
VDEM Region 4: Tornado History 1950-2016
Region 4
F0
F1
F2
F3
F4
0 10 20 40 60 80
Miles
Source: Background (ESRI)
Regions (VDEM)
Tornado (NOAA)

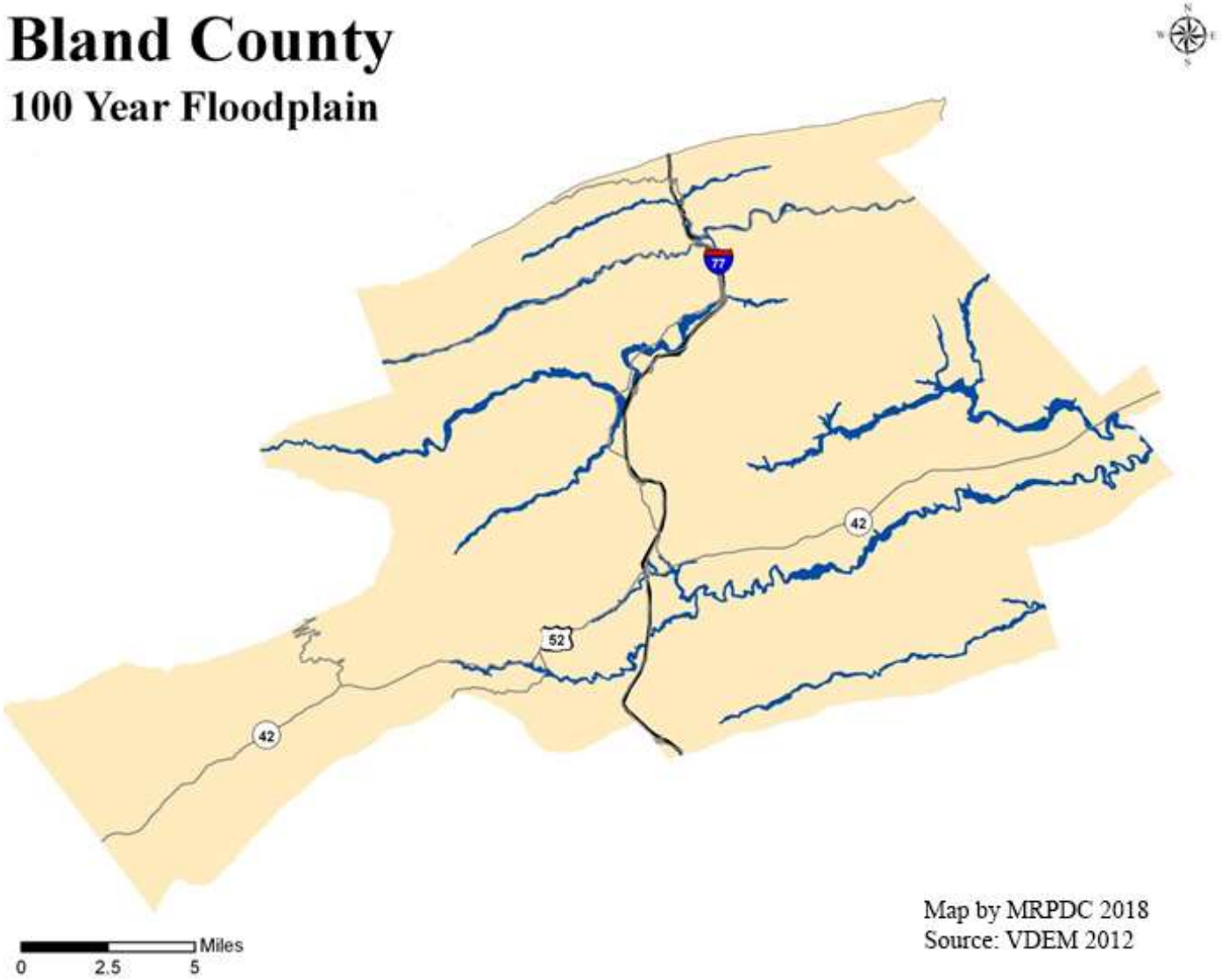

N
Commonwealth of Virginia: NCDC Tornado Events 1950-2016
Number of Occurrences
0 - 3
4 - 7
8 - 13
14 - 19
20 - 27
0 20 40 80 120 160
Miles
Source: Background (ESRI)
NCDC Events (NOAA)


N
Commonwealth of Virginia: NCDC Flood Events 1950-2016
Number of Occurrences
5 - 24
25 - 41
42 - 67
68 - 131
132 - 214
0 20 40 80 120 160
Miles
Source: Background (ESRI)
NCDC Events (NOAA)

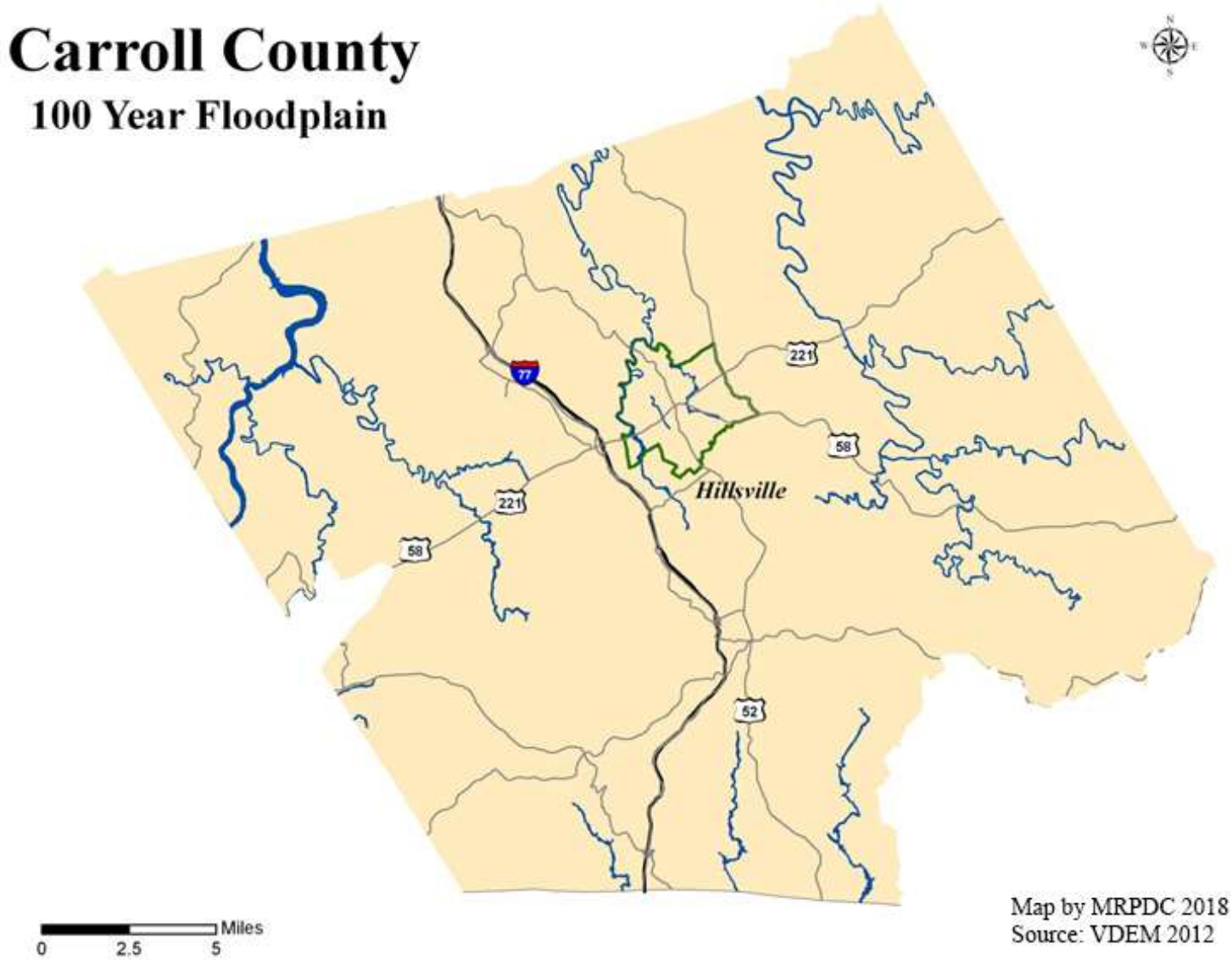

N
Commonwealth of Virginia: NCDC Wind Events 1950-2016
Number of Occurrences
15 - 62
63 - 104
105 - 153
154 - 229
230 - 464
0 20 40 80 120 160
Miles
Source: Background (ESRI)
NCDC Events (NOAA)

Bland County

100 Year Floodplain

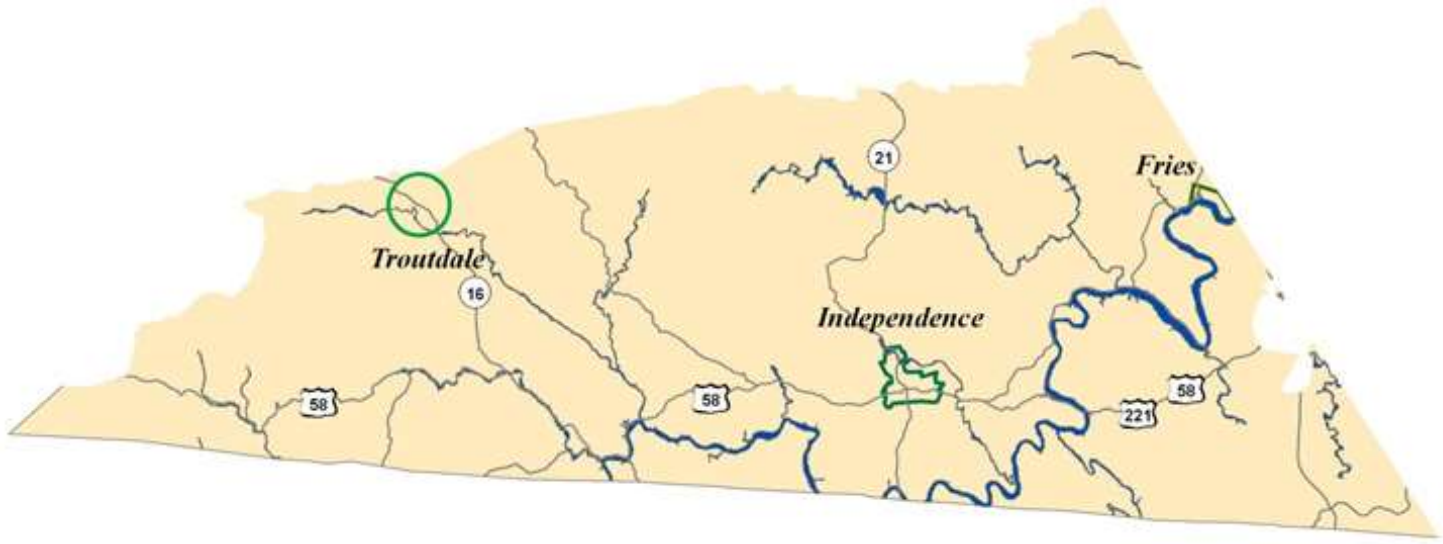


Map by MRPDC 2018
Source: VDEM 2012


Carroll County
100 Year Floodplain
77
221
58
Hillsville
221
58
52
Miles
0
2.5
5
Map by MRPDC 2018
Source: VDEM 2012

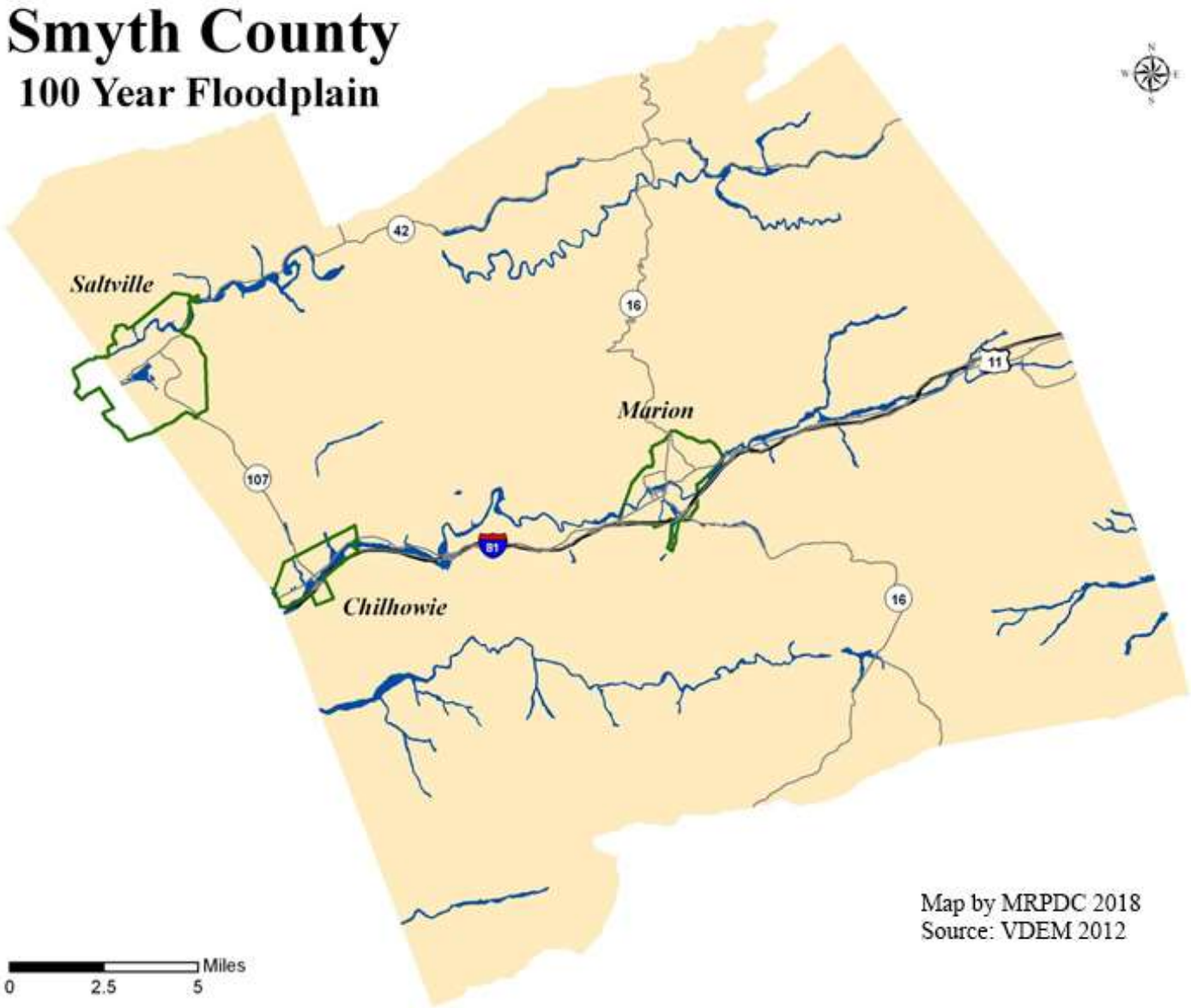
Grayson County

100 Year Floodplain



Map by MRPDC 2018
Source: VDEM 2012

Miles
0 2.5 5


Smyth County
100 Year Floodplain
Saltville
Marion
Chilhowie
42
16
11
107
81
16
Map by MRPDC 2018
Source: VDEM 2012
Miles
0
2.5
5

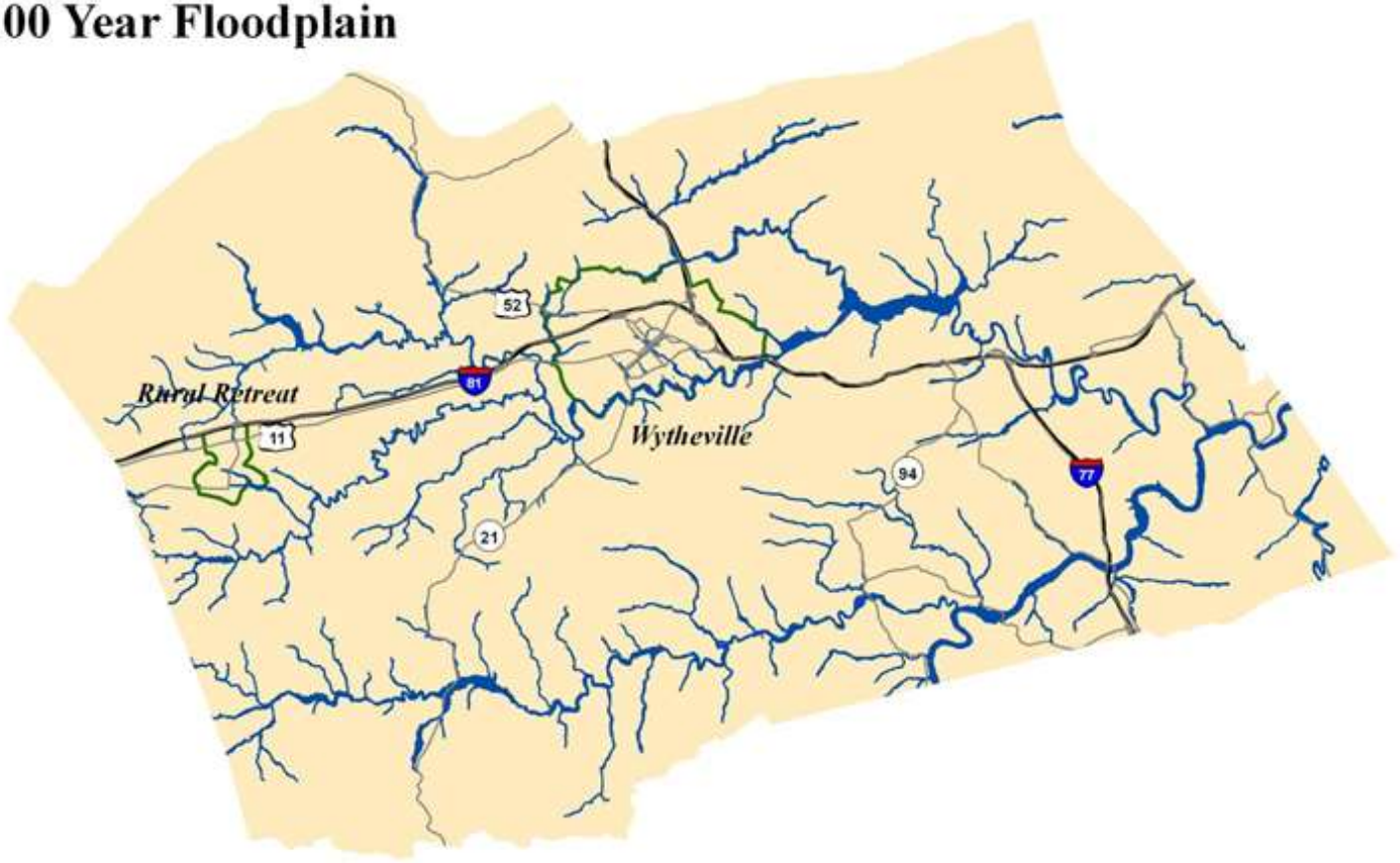
Washington County
100 Year Floodplain

Map by MRPDC 2018
Source: VDEM 2012

Miles
0 2.5 5

Wythe County

100 Year Floodplain



Map by MRPDC 2018
Source: VDEM 2012

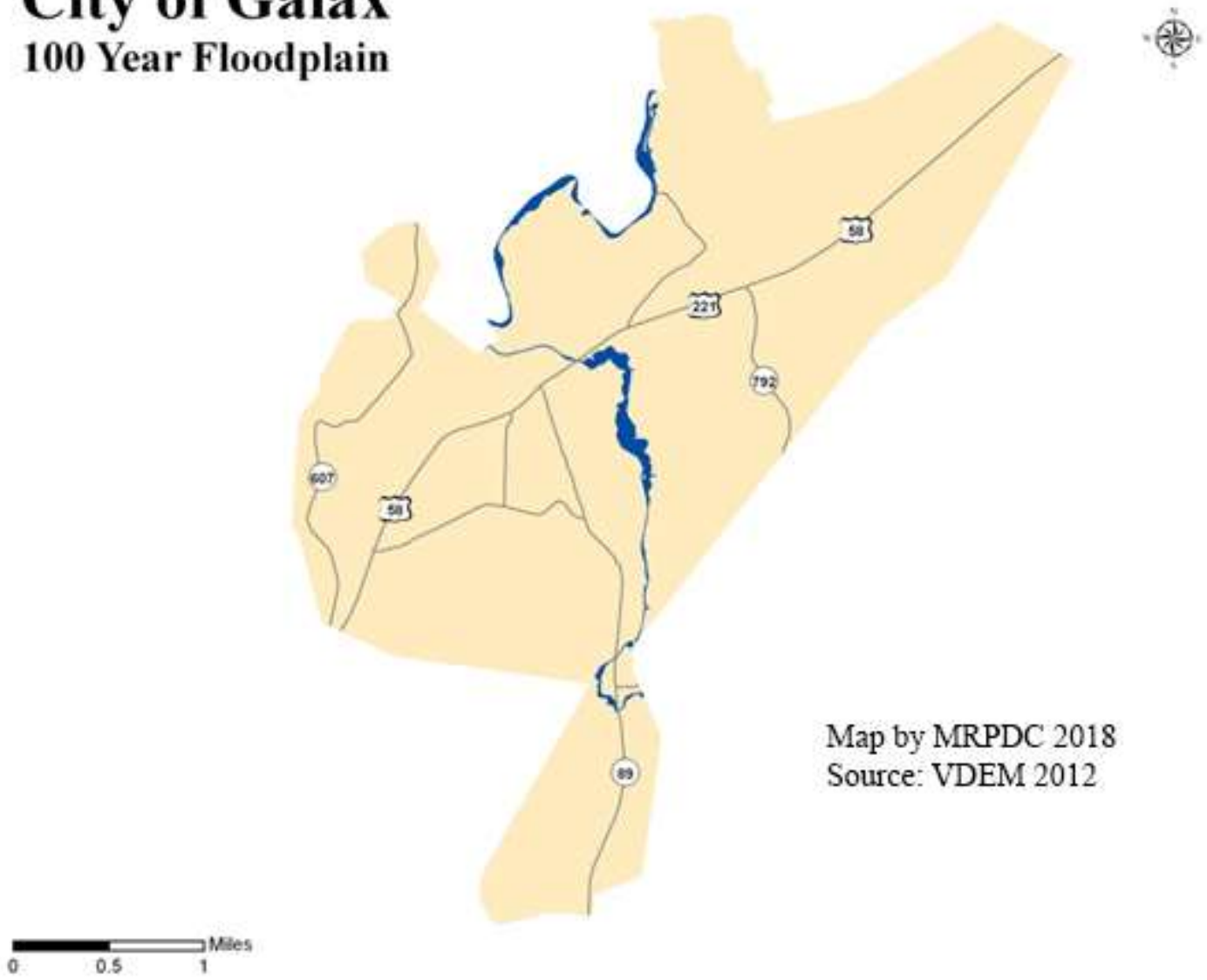
0 2.5 5 Miles

City of Bristol
100 Year Floodplain

Map by MRPDC 2018
Source: VDEM 2012

Miles
0 0.5 1

City of Galax
100 Year Floodplain



THIS LEASE AGREEMENT made the 12th day of March, 2019, by and between the CITY OF BRISTOL, VIRGINIA ("City"), a municipal corporation, 300 Lee St., Bristol, VA 24201, and BRISTOL BASEBALL, INC. ("BBI"), a non-profit non-stock corporation organized and existing under the laws of the Commonwealth of Virginia, P.O. Box 1434, Bristol, VA 24203:

WITNESSETH

WHEREAS the City owns certain real estate suitable for use as a baseball playing field, situated within the City of Bristol, Virginia, and lying between Euclid Avenue and Randolph Street, and commonly and popularly known as Boyce Cox Field (the "Field"); and

WHEREAS the Field is surrounded by grandstands, home and visitors' clubhouses, batting cages, concession stands, press boxes, gates, signage, parking areas and a pavilion (collectively, the "Ballpark"); and

WHEREAS BBI currently does, and desires to continue to, operate a professional minor league baseball franchise in the City of Bristol, Virginia; and

WHEREAS the City deems it important to afford and advance professional baseball to its citizens and visitors to the City of Bristol, Virginia.

NOW THEREFORE, in consideration of the foregoing, and of the mutual benefit to be derived by the parties hereto, it is agreed:

1. BBI shall be allowed primary use of the Ballpark during minor league baseball competitions, including both regular season and playoff games, and practices, from two weeks before the first regularly scheduled game of each Appalachian League season until the final playoff game of each Appalachian League season, provided however, in the event the Virginia High School baseball season is still ongoing (including playoffs) the field shall be shared and any conflicts shall be resolved at the sole discretion of the City Manager, with input from the Bristol Virginia Public Schools, BBI, the Appalachian League and Minor League Baseball. BBI shall notify the City when the annual Appalachian League season schedule is announced, so that the City is aware of same. BBI shall be allowed reasonable use of the Field at other times, and shall be allowed use of the other parts of the Ballpark with prior permission of the City Manager or his designee, which shall not be unreasonably withheld, for the purpose of carrying on activities related to the operation of a professional minor league baseball franchise, including but not limited to fundraising. The City will ensure that Virginia High School baseball exercise the same level of care for the Field and any property of BBI at the Ballpark as does BBI. The City will also ensure that the Field is restored to the Standards for Minor League Playing Facilities as

set forth in Rule 58 and Attachment 58 of the Rules of Major League Baseball immediately after the playing of any travel ball or other tournaments, games, or practices, other than those permitted as part of the Virginia High School baseball season, which occur at the Ballpark or on the Field during the period beginning two weeks before the first regularly schedule game of each Appalachian League season until the final playoff game of each Appalachian League season.

2. BBI shall have the right to erect signs in the Ballpark. BBI agrees to pay for such signs and to maintain them, and shall be entitled to the proceeds from the sale of advertising on such signs to help pay Appalachian League fees and/or other expenses related to the operation of a minor league baseball team, including but not limited to assisting in making additional improvements to the Field and the other parts of the Ballpark.

3. BBI shall have the sole rights to operate all souvenir sales at the Ballpark, to assess parking fees at the Ballpark and to sell tickets and programs at or to the Ballpark in connection with any of the games or practices set forth above in Paragraph 1, and shall retain the proceeds therefrom to help pay Appalachian League fees and/or other expenses related to the operation of a minor league baseball team, including but not limited to assisting in making additional improvements to the Field and the other parts of the Ballpark. BBI shall be permitted to operate concessions at the Ballpark, with the understanding that the Virginia High Boosters Club will be permitted to use the concession stands located under the press box. The City shall encourage the Virginia High Boosters Club to assist financially with the upkeep and maintenance of the Ballpark. BBI shall have the sole rights to sell beer at the Ballpark, and shall be responsible for obtaining any and all Alcoholic Beverage Control permits and approvals for such, and compliance with such permits upon the premises covered by the permits obtained, and held by, BBI. However, BBI shall ensure that at all times, a designated alcohol-free zone is available at the Ballpark. BBI shall be responsible for clearly designating, denoting or marking the alcohol-free zone, in which no alcohol may be consumed, or possessed in a container. BBI shall be responsible for taking appropriate steps to prevent persons who are not permitted to consume or possess alcohol, which may include the placement of wristbands on those persons legally permitted to consume or possess alcohol.

4. As between these two parties, BBI shall retain all broadcast rights to the games and practices set forth above in Paragraph 1.

5. BBI shall have the exclusive right to occupy clubhouse manager's office in the home clubhouse, as well as the General Manager's office and "The Dugout" in the press box. The City shall have the right to access those spaces, but shall not allow third parties to access those spaces. The City shall provide BBI sufficient space at the Ballpark to store and safeguard items belonging to BBI or such major league team as is affiliated with BBI.

6. BBI shall pay the City $8,000.00 per year, to be paid in equal installments in the months of June, July, August, September, and October of each year. The parties agree that the provisions of Chapter 78, Article IX, Section 78-251(2) apply to admissions charged by BBI.

7. BBI agrees to obtain and maintain insurance in the minimum amount of $1,000,000 General Liability at all times during which games or practices set forth above in Paragraph 1 are ongoing.

8. BBI agrees to refrain from using the Ballpark when use thereof would irreparably damage the Field. Subject to the rules governing the play of baseball games, the City, by and through its City Manager, may cancel a game or practice set forth above in Paragraph 1, if in his or her judgment, the use of the Field would irreparably damage it.

9. BBI shall observe all federal, state and local laws with respect to its actions herein authorized.

10. The use of tobacco products in the public seating areas will be prohibited during minor league baseball competitions, including both regular season and playoff games.

11. In recognition of the fact that the Field needs to be properly cared for and given time to heal and be repaired, so that it can remain in good shape for the playing of professional baseball in order to continue to allow the City to offer professional baseball to its citizens and visitors. The City shall have sole discretion over the use of the Field, except to the extent BBI does not have rights to the same under this Lease Agreement, and will prohibit any use by anyone that may irreparably damage the Field, or would create damage which could not practically be repaired before one week before the first regularly scheduled game of each Appalachian League season. The clubhouses will be cleaned by the City at least one week before the first regularly scheduled game of each Appalachian League season to restore them to at least the condition in which they were left at the end of the previous Appalachian League season.

12. a. The City agrees to furnish equipment and staff to provide routine maintenance of the Field and Ballpark as prescribed in Rule 58 of the Rules of Major League Baseball. The City shall also supply paper towels, soap, toilet paper, and all other standard equipment and supplies in such restrooms.

b. The City and BBI will equally share the expenses of white sand for sodding and overseeding of turf, Marbet's Infield Mix, brick trax or chat for the Field's warning track for brick trax or chat used for Appalachian League competitions and related practices.

c. BBI will drag and line the Field prior to each game, in a manner so that play of each game may begin by its announced time, and shall pay for mound clay and Turface used for Appalachian League competitions and related practices.

d. The City shall provide one or more covered storage areas at the Ballpark at no charge for such mound clay and Turface, as well as brick chat or trax, infield dirt mix and sand, although if any new storage areas must be constructed for this purpose, the City shall furnish the labor for the same and BBI shall furnish the materials for the same.

e. The parties agree that items purchased by BBI shall not be used for non-Appalachian League games or practices.

f. The City also agrees to clean, or have cleaned, the Ballpark, including but not limited to the visitors' clubhouse and umpires' room, both dugouts, and all public restrooms, at least six hours before each game set forth above in Paragraph 1. It is expressly understood that the City may use trustees from the City jail for this purpose.

g. The City also agrees to employ a certified sports turf manager whose duties shall include, but not be limited to, supervision over the grass surface of the Field.

13. BBI and the City shall ensure that the Field meets the Standards for Minor League Playing Facilities as set forth in Rule 58 and Attachment 58 of the Rules of Major League Baseball, as well as any standards established by the Appalachian League. The City shall seed, fertilize, reseed, water, aerate and mow the Field in accordance with the standards set forth by the aforementioned certified turf manager. Additionally, the City will give reasonable consideration to the recommendations of the Brickman Group, or other professional baseball field consultants. At the expense of BBI and/or the Pittsburgh Pirates, the City will send at least one of its employees to the Pirates' spring training facility in Bradenton, Florida to learn proper field care maintenance techniques and procedures. The City shall permit such trained employee time to work on the Field throughout the year in order to practice the techniques and procedures learned, and to keep the Field properly maintained throughout the year. The City will ensure that the defects along the right field line of the Field are all corrected two weeks before the first regularly scheduled game of the 2019 Appalachian League season. The City will do everything possible to correct the unevenness in the outfield of the Field, at no cost to BBI, other than BBI paying one-half of the cost for grass seed for such work, immediately after the conclusion of the final playoff game of the 2019 Appalachian League season. BBI will seek funding from sources other than the City for a possible artificial infield at the Field, and will consider fundraising.

14. The City will be responsible for all ordinary exterior and structural maintenance of the Ballpark.

15. BBI and the City shall jointly work to provide and maintain training programs for groundskeeping personnel to ensure properly prepared playing surfaces.

16. BBI and the City shall jointly work to pay for, or help in obtaining the funding to pay for, the materials and supplies involved in any capital improvements to the Ballpark, and the City will assist in providing labor and equipment for such improvements. BBI and the City shall seek grants and private funding to assist with capital improvements to the Ballpark.

17. The City will provide, or pay for, all lights, water, sewer and trash utility services at the Ballpark. The lighting must be maintained to meet the Standards for Minor League Playing Facilities as set forth in Rule 58 and Attachment 58 of the Rules of Major League Baseball.

18. BBI agrees to provide adequate personnel to operate a tarp and shall operate such tarp to cover the Field during a game or practice set forth above in Paragraph 1, or during the time beginning one hour before a scheduled game. The City shall provide adequate personnel to operate a tarp and shall operate such tarp during all other times.

19. This Agreement constitutes the only agreement of the parties and cannot be changed or supplemented except by a writing signed by both parties. The signers of this document warrant that they have the authority to execute this Agreement on behalf of the party for whom they sign. This Agreement shall be interpreted under the laws of the Commonwealth of Virginia, and the parties hereto recognize that both of them have contributed to this Agreement and that it should not be construed against either of them as drafter of the Agreement.

20. This Lease Agreement shall be valid for a five-year term beginning on the date printed above. Subject to paragraph 18 below, at the expiration of that five-year term or of any renewal term, the Lease Agreement shall renew for successive five-year terms unless one party gives the other party written notice, at the addresses set forth above, of its intent to terminate and renegotiate the Lease Agreement by the January 1 preceding the expiration of the then-current term.

21. Should BBI lose its affiliation with a Major League Baseball team, this Lease Agreement may be terminated by BBI upon its giving 15 days written notice to the City at the City's address set forth above.

_____

CITY OF BRISTOL, VIRGINIA
By Randall E. Eads, Its City Manager

_____

BRISTOL BASEBALL, INC.
By Mahlon Luttrell, its President

BRISTOL, VIRGINIA CITY COUNCIL
AGENDA ITEM SUMMARY

Meeting Date: March 12, 2019
Department: Transit/Special Events
Staff Contact: Jay Detrick

AGENDA ITEM WORDING:

Consider a Street Closure Request for the Bristol Wing War – May 25, 2019.

ITEM BACKGROUND:

Believe in Bristol has made a request to close Piedmont Avenue from State Street to Cumberland Street to sponsor a special event. The event is the Bristol Wing War, which is an outdoor cooking contest and it is a ticketed event. There will be food, activities and live music. The event is proposed to begin at 1:00 PM on Saturday May 25, 2019 and end at 5:00 PM. The street closure would need to begin at approximately 10:00 AM and end around 7:00 PM to accommodate setup and teardown of the tents and structures.

PREVIOUS RELEVANT ACTION:

This is the first year for this event.

Staff Recommendations:

Staff recommends the street closure be approved as requested.

DOCUMENTATION: Included _X__ Not Required____

MOTION: I move to approve all items on the consent agenda as presented.

BRISTOL, VIRGINIA CITY COUNCIL
AGENDA ITEM SUMMARY
Item #6.2

Meeting Date: March 12, 2019
Department: Finance
Staff Contact: Tamrya Spradlin

AGENDA ITEM WORDING:

Consider Purchase Requisitions –Total Amount:	$151,000.00
Public Works; Fuel Tank Replacement	$110,000.00
Sheriff's Department; Inmate Housing January 2019	$41,000.00

ITEM BACKGROUND:

The items are presented to City Council for payment approval.

PREVIOUS RELEVANT ACTION:

N/A

STAFF RECOMMENDATIONS:

Approval.

DOCUMENTATION: Included X Not Required_____

MOTION: I move to approve all items on the consent agenda as presented.

City of Bristol Virginia
Department Purchase Requisition Form

Date of Requisition	Wednesday, February 13, 2019
Department Name:	Bristol VA Sheriff's Office
Purpose/Description	Inmate Housing January 2019

Vendor Ordered/Purchased From	Southwest VA Regional Jail Authority	
Payment to: please check one	☑ Vendor ☐ paid by City Credit Card	

Purchase Order #		**A purchase order is required if the amount purchase is over $500. A purchase order is to be obtained before making purchase**
Invoice Number:		
Invoice Date:		
Received By:	Capt Collins	

Material & Descripton	Charge to Dept #	Charge to Account #	Unit Price	QTY (#)	AMOUNT
INMATE HOUSING January 2019	33010	3142	40,000.00	1	40,000.00
Medical Expense	33010	3143	1,000.00	1	1,000.00
					0.00
					0.00
					0.00
				Total	41,000.00

Fiscal Year Budget 2018-2019 $ 506,756

Budget Remaining After Purchase $ 177,491

		Approval Level
Department Approval:		Up to $5,000
CFO Signature:	Tamrya Spradlin	Up to $10,000
City Manager Signature:	Randell P. Faw	Up to $15,000
Council Approved Date		Over $15,000
Quotes Attached		rev 12/06/2017
Packing Slip/Bill of Lading Attached		DMD 3-1-19

City of Bristol Virginia
Department Purchase Requisition Form

Date of Requisition	Tuesday, March 5, 2019
Department Name:	Public Works - Fleet
Purpose/Description	Fuel Tank Replacement

Vendor Ordered/Purchased From	Petro Services, Inc.	
Payment to: please check one	☐ Vendor ☑ paid by City Credit Card	

Purchase Order #		**A purchase order is required if the amount purchase is over $500. A purchase order is to be obtained before making purchase**
Invoice Number:		
Date Received:	Monday, March 4, 2019	
Received By:	Wallace McCulloch	

Material & Descripton	Charge to Dept #	Charge to Account #	Unit Price	QTY (#)	AMOUNT
Fuel Tank Replacement 4-009-	41050	8112			$ 110,000.00
			Total		$ 110,000.00

Fiscal Year Budget $210,100

Budget Remaining After Purchase $100,100

		Approval Level
Department Approval:		Up to $5,000
CFO Signature:	Tamara Spradlin	Up to $10,000
City Manager Signature:	Randall C. Reed	Up to $15,000
Council Approved Date		Over $15,000
Quotes Attached		

rev 06/29/2017

DMO 3/6/19

City of Bristol, Virginia
Documentation of Quotes

The procurement of goods and services shall require the following:
greater than $5000.00 & less than $25,000=3 written quotes
greater than $25,000.00 & less than $100,000=4 written quotes

Department Purchased For: Public Works - Fleet **Purchase Order #:**
Quotes to be obtained before a purchase order is issued.

Description of Item/Service: City Fuel Tank Replacement

Remove two 10,000 gal fuel tanks and one 1,000 gal waste oil tank. Install one 20,000 gal, two compartment fuel tank with double bulkhead (10,000 gal gas/10,000 gal diesel)

Summary of Quotation Information

	Date	Vendor & Name of Salesperson/Individual Quoting Price	Cost
1	01/11/19	Petro Services, Inc., - Scott Honeycutt	95,747.00
2			
3			
4			

Quote documenation from the vendor should be attached to this paperwork.

Explanatory Remarks: Include any negative consequences to the City if this purchase is not approved.

The project was advertised on December 14, 2018 with bids due on January 11, 2019. Only one bid received.

Department Signature **Date**

This form along with quote documentation should be forwarded to the purchasing department to be attached to the purchase order.

City of Bristol, Virginia

Office of the Purchasing Agent
300 Lee Street
Bristol, Virginia 24201
(276) 645-7328

December 14, 2018

Dear Madam or Sir:

The City of Bristol, Virginia is accepting sealed bids for the removal of two (2) existing ten thousand (10,000) gallon fuel tanks, the removal of one (1) one thousand (1000) gallon waste oil tank and the installation of one (1) new Modern Welding Glasteel II, twenty thousand (20,000) gallon, two-compartment fiberglass coated steel tank, split with double bulkhead (10,000 gas/10,000 diesel) or approved equal with a minimum thirty (30) year warranty. Bids must be in accordance with the attached specifications and requirements. Bids must be sealed, addressed and clearly labeled as follows:

Mr. Don Quesenberry, Procurement Manager
City Hall, Room 208
300 Lee Street
Bristol, Virginia 24201

"Bid on Removal/Installation of Fuel Tanks"
Friday, January 11, 2019 – 2:00 p.m.

Questions regarding specifications should be directed to Mr. Wallace McCulloch, Director of Public Works at wallace.mcculloch@bristolva.org or telephone 276-642-2316. The City of Bristol, Virginia reserves the right to reject any or all bids, to waive informalities and to negotiate with the lowest responsive and responsible bidder if the bid amount exceeds available funds. Thank you for your bid.

Sincerely,

Don Quesenberry
Procurement Manager

FUEL TANK REMOVAL/INSTALLATION

BONDS

Bid Bond – Bids must be accompanied by a bid bond in the amount of five percent (5%) of the sum of the contract amount.

Performance and Payment Bonds – the successful bidder will be required to provide performance and payment bonds for one hundred percent (100%) of the sum of the contract amount.

INSURANCE

The successful bidder will be required to provide proof general liability insurance in the minimum amount of one million dollars ($1,000,000.00) and provide a certificate of insurance naming the City of Bristol, Virginia as an additional insured.

EMPLOYMENT DISCRIMINATION, DRUG FREE WORKPLACE, IMMIGRATION LAWS:

By accepting an award to provide the requested services the successful bidder must acknowledge, in writing, compliance with the following provisions of the Virginia Public Procurement Act:

Section 2.2-4311 – Employment discrimination by contractor prohibited; required contract provisions – All public bodies shall include in every contract of more than $10,000.00 the following provisions:

1. During the performance of the contract, the contractor agrees as follows:
   a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
   b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
   c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for meeting the requirements of this section.
2. The contractor shall include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order over $10,000.00, so that the provisions will be binding upon each subcontractor or vendor.

Section 2.2-4312 – Drug-free workplace to be maintained by contractor; required contract provisions – All public bodies shall include in every contract over $10,000.00 the following provisions:

During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violation of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order over $10,000.00, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Section 2.2-4311.1 Compliance with federal, state and local laws and federal immigration law; required contract provisions. – All public bodies shall provide in every written contract that the contractor does not, and shall not during the performance of the contract for goods and services in the Commonwealth, knowingly employ an unauthorized alien as defined in the federal Immigration reform and Control Act of 1986.

General:

Remove two existing 10,000-gallon fuel tanks and one 1,000-gallon waste oil tank. Install one new *Modern Welding Glasteel II* 20,000 gallon two-compartment fiberglass coated steel tank split with double bulkhead (10,000 gas/10,000 diesel) or approved equal. Minimum 30-year warranty.

Scope:

1. Remove asphalt/concrete surface over existing tanks. Excavate each of three tanks, de-gas, crush and load onto City trucks for disposal by City.
2. All excavated material to remain on-site until tested by City supplied environmental consultant and removal is approved by Virginia DEQ. The City will haul excavated material off-site once appropriate means of disposal is determined.
3. Modify existing hole as necessary to accommodate new 20,000-gallon fuel tank. Bed tank hole with #8 stone. Set and level tank with deadman anchors and straps and then backfill with #8 stone.
4. Furnish and install APT containment sumps with pipe entry boots
5. Furnish and install product piping transition sump for two (2) product lines.
6. Furnish and install 2" fiberglass pipe necessary to tie into existing product piping and vent lines.
7. Install spill containment and overfill prevention equipment.
8. Install tank and sump sensors and wire into existing Veedor Root ATG.
9. Air test product piping at 50 psi.
10. Backfill remainder of tank hole to sub-grade.
11. Install 36' x 10' x 7" thick concrete pad centered above fuel tank. Install concrete collars around any manholes, valves, etc. not within main concrete pad. Individual concrete collars shall be a minimum of 7" thick by 36" square plus the diameter of the manhole, valve, etc.
12. Excavation is based on normal soil conditions with de-watering expected. Pre-approved labor and material for additional work such as rock excavation or excessive cave-in may be invoiced at a standard labor rate as listed on the bid form and materials at cost plus 10%.

Miscellaneous:

1. Sales tax will not be applied. The city will provide the tax-exempt certification.
2. Any freight charges shall be included in the material cost.

City furnished tasks, equipment and material:

1. Crane with operator for setting 20,000-gallon fuel tank.
2. A Komatsu PC200-8 Hydraulic Excavator (or equivalent) with hydraulic thumb will be provided for use by contractor with contractor supplied operator. A rock hammer will be provided if required.
3. Building permits.
4. Environmental testing and permitting.
5. Sludge removal from tanks.
6. Fuel and waste oil tank disposal.

7. City staff will provide for dewatering as required.
8. Bedding and backfill material and ready-mix concrete for use/placement by contractor.
9. Final asphalt surface around concrete pad above fuel tank shall be installed by city staff.

CITY OF BRISTOL, VIRGINIA

FUEL TANK REPLACEMENT

2107 SHAKESVILLE ROAD

BID FORM

	Description	Quantity	Unit	Unit Price	Total
1	Modern Welding Glasteel II 20,000 gallon two-compartment fiberglass coated steel tank split with double bulkhead. 10,000 gas/10,000 diesel.	1	EA		$ 30,350.00
2	Deadman anchor with straps for 20,000 gallon tank	1	LS		2,500.00
3	EBW 5 gallon thread-on spill buckets	2	EA	465.00	$ 930.00
4	EBW overfill prevention valves	2	EA	595.00	$ 1,190.00
5	Vapor vent housings	2	EA	125.00	$ 250.00
6	APT tank sumps with tank adapters	2	EA	945.00	$ 1,890.00
7	APT piping transition sump	1	EA	345.00	$ 345.00
8	APT pipe entry boots	6	EA	51.00	$ 306.00
9	APT sensor conduit entry boot	3	EA	38.00	$ 114.00
10	Veedor Root sump sensor	3	EA	249.00	$ 747.00
11	Veedor Root interstitial tank sensor	1	EA	440.00	$ 440.00
12	Veedor Root 10 foot mag plus tank probes	2	EA	2,067.00	$ 4,134.00
13	Veedor Root probe install kits	2	EA	75.00	$ 150.00
14	Veedor Root gas/diesel float kits	2	EA	355.00	$ 710.00
15	EBW 4" fill caps	2	EA	55.00	$ 110.00
16	EBW 4" fill adapter	2	EA	88.00	$ 176.00
17	EBW 4" vapor cap	1	EA	52.00	$ 52.00
18	EBW 4" vapor adapter	1	EA	98.00	$ 98.00
19	Universal 18" round probe access manhole	2	EA	155.00	$ 310.00
20	Universal 38" round suction access manhole-tanks	2	EA	450.00	$ 900.00
21	Universal 30" round transition sump access manhole	1	EA	350.00	$ 350.00
22	Universal 12" round vent & interstice access manhole	3	EA	65.00	$ 195.00
23	Blank				
24	Total Work Scope - Labor & Miscellaneous	1	LS		48,500.00
25	Blank				
26	Standard Labor Rate for additional work	24	Hour	69.00	69.00/HR
27	Blank				
	TOTAL PROJECT COST				$ 95,747.00

* Comparable products may be substituted with prior written approval.

THE CINCINNATI INSURANCE COMPANY
CINCINNATI, OHIO

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we PETRO SERVICES, INC
325 JOULE STREET, ALCOA, TN 37701

as Principal, hereinafter called the Principal, and THE CINCINNATI INSURANCE COMPANY, a corporation duly organized under the laws of the State of Ohio, as Surety, hereinafter called the Surety, are held and firmly bound unto CITY OF BRISTOL, VIRGINIA, OFFICE OF THE PURCHASING AGENT, CITY HALL ROOM 208, 300 LEE STREET, BRISTOL, VIRGINIA 24201

as Obligee, hereinafter called the Obligee, in the sum of FIVE PERCENT (5%) OF THE AMOUNT BID

Dollars ($ 5%),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid TRANSIT FACILITY TANK REPLACEMENT

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 9TH day of JANUARY , 2019

Cali Carruthers
(Witness)

PETRO SERVICES, INC
(Principal) (Seal)

By: Charles W. Carruthers
CHARLES W. CARRUTHERS (Title)

Rhonda C Berry
(Witness)

THE CINCINNATI INSURANCE COMPANY
(Surety) (Seal)

By: R M Johnson
RICHARD M JOHNSON Attorney-In-Fact

Printed in cooperation with the American Institute of Architects (AIA), by The Cincinnati Insurance Company who vouches that the language in this document conforms exactly to the language used in AIA Document A310, February 1970 ED.

THE CINCINNATI INSURANCE COMPANY

Fairfield, Ohio

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That THE CINCINNATI INSURANCE COMPANY, a corporation organized under the laws of the State of Ohio, and having its principal office in the City of Fairfield, Ohio, does hereby constitute and appoint

Richard Johnson,

of Norcross, GA its true and lawful Attorney(s)-in-Fact to sign, execute, seal and deliver on its behalf as Surety, and as its act and deed, any and all bonds, policies, undertakings, or other like instruments, as follows:

Twenty Five Million Dollars and 00/100 ($25,000,000.00)

This appointment is made under and by authority of the following resolution passed by the Board of Directors of said Company at a meeting held in the principal office of the Company, a quorum being present and voting, on the 6th day of December, 1958, which resolution is still in effect:

"RESOLVED, that the President or any Vice President be hereby authorized, and empowered to appoint Attorneys-in-Fact of the Company to execute any and all bonds, policies, undertakings, or other like instruments on behalf of the Corporation, and may authorize any officer or any such Attorney-in-Fact to affix the corporate seal; and may with or without cause modify or revoke any such appointment or authority. Any such writings so executed by such Attorneys-in-Fact shall be binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company at a meeting duly called and held on the 7th day of December, 1973.

"RESOLVED, that the signature of the President or a Vice President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Secretary or Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power of certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, continue to be valid and binding on the Company."

IN WITNESS WHEREOF, THE CINCINNATI INSURANCE COMPANY has caused these presents to be sealed with its corporate seal, duly attested by its Vice President this 10th day of May, 2012.

THE CINCINNATI INSURANCE COMPANY

Stephen A. Jutte

Vice President

STATE OF OHIO)
) ss:
COUNTY OF BUTLER)

On this 10th day of May, 2012, before me came the above-named Vice President of THE CINCINNATI INSURANCE COMPANY, to me personally known to be the officer described herein, and acknowledged that the seal affixed to the preceding instrument is the corporate seal of said Company and the corporate seal and the signature of the officer were duly affixed and subscribed to said instrument by the authority and direction of said corporation.

Mark J. Huller

MARK J. HULLER, Attorney at Law
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration
date. Section 147.03 O.R.C.

I, the undersigned Secretary or Assistant Secretary of THE CINCINNATI INSURANCE COMPANY, hereby certify that the above is a true and correct copy of the Original Power of Attorney issued by said Company, and do hereby further certify that the said Power of Attorney is still in full force and effect.

GIVEN under my hand and seal of said Company at Fairfield, Ohio,
this 9TH day of JANUARY 2019

Scott R Bolen

Assistant Secretary

BN-1005 (5/12)