Figure 4.35: Flood Hazard Areas in the Town of Maiden

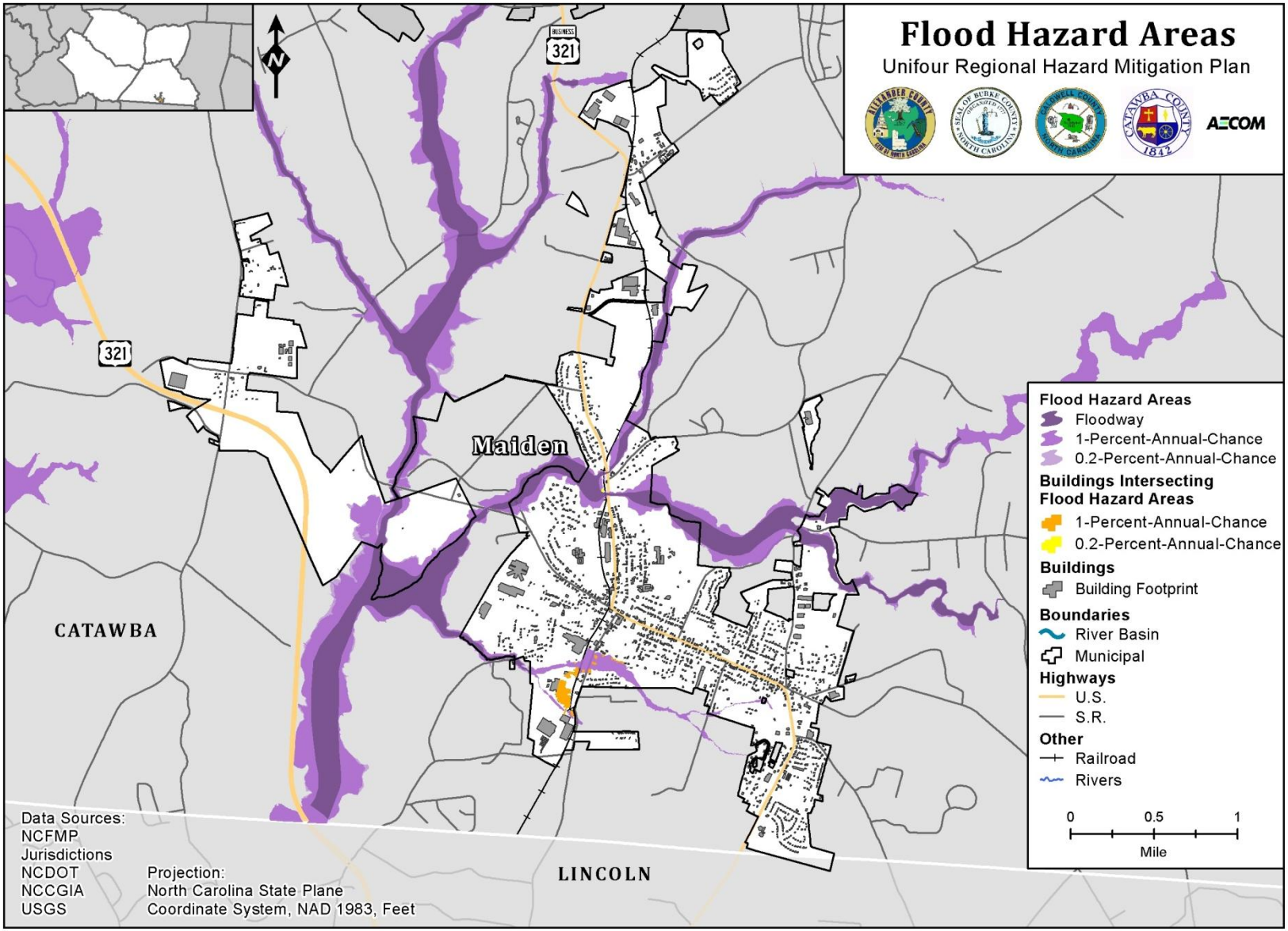


Figure 4.36: Flood Hazard Areas in the City of Newton

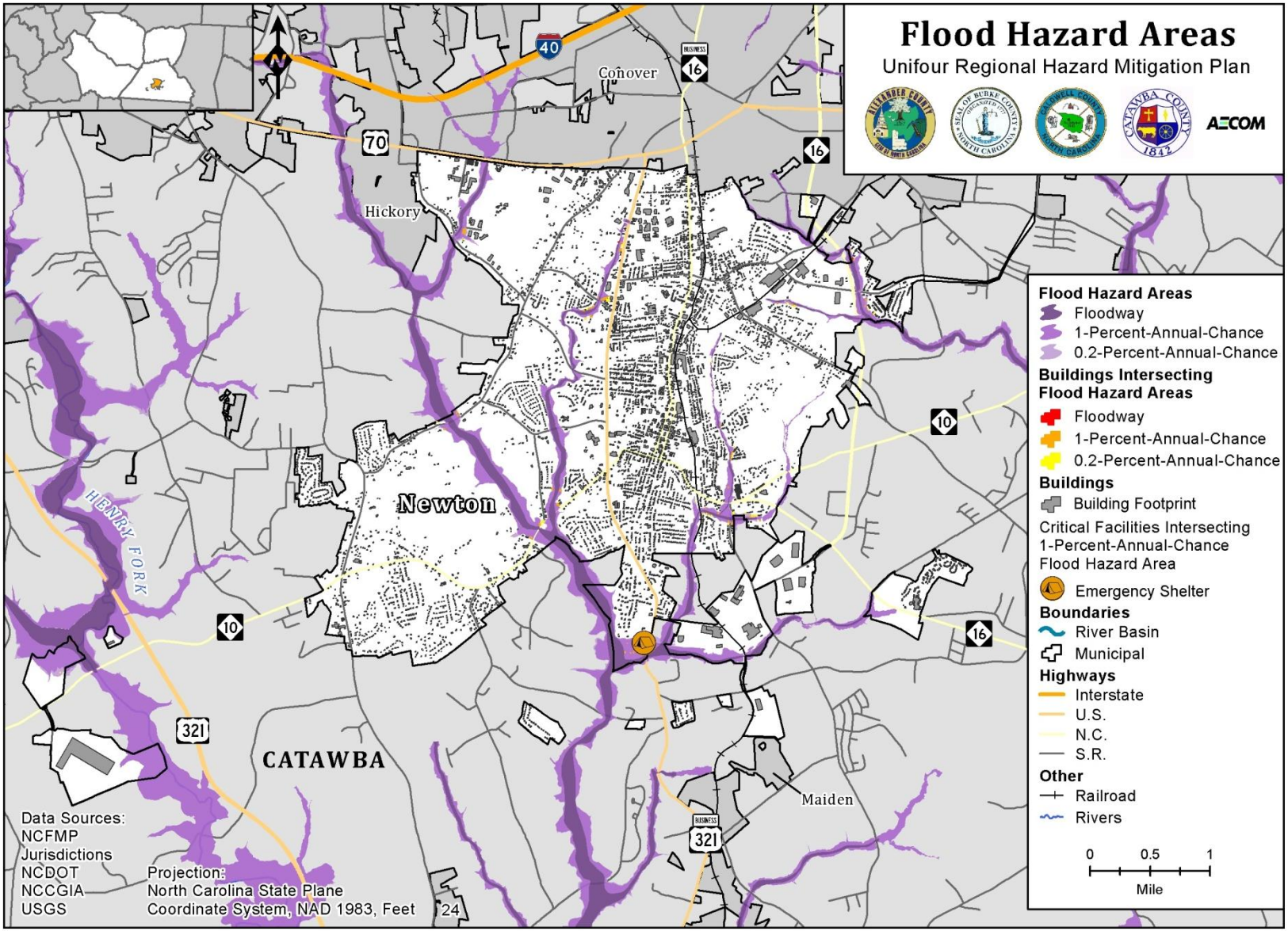


Table 4.9: Historical Occurrences of Flooding (1993-2013)

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
ALEXANDER COUNTY						
Countywide	03/23/93	Flash Flood	N/A	N/A	N/A	N/A
Countywide	03/20/03	Flash Flood	0	0	$0	$0
Bethlehem	06/16/03	Flash Flood	0	0	$0	$0
Countywide	09/07/04	Flood	0	0	$100,000	$0
Vashti	05/26/09	Flash Flood	0	0	$0	$0
All Healing Springs	06/03/09	Flash Flood	0	0	$0	$0
All Healing Springs	01/24/10	Flash Flood	0	0	$0	$0
Millersville	01/24/10	Flash Flood	0	0	$0	$0
All Healing Springs	05/14/12	Flash Flood	0	0	$0	$0
Smiths Store	07/11/13	Flash Flood	0	0	$0	$0
Subtotal Alexander	*10 Events*		*0*	*0*	*$100,000*	*$0*
BURKE COUNTY						
Countywide	10/05/95	Flash Flood	N/A	N/A	$0	$0
Countywide	01/19/96	Flood	0	0	$0	$0
Countywide	01/27/96	Flood	0	0	$0	$0
Table Rock	08/12/96	Flash Flood	0	0	$0	$0
Morganton	08/12/96	Flash Flood	0	0	$0	$0
Morganton	07/29/97	Flash Flood	0	0	$4,300	$0
Morganton	09/06/98	Flood	0	0	$0	$0
Jonas Ridge	07/07/99	Flash Flood	0	0	$0	$0
Morganton	05/20/00	Flood	0	0	$0	$0
Morganton	09/02/00	Flash Flood	0	0	$0	$0
Jonas Ridge	04/17/02	Flood	0	0	$2,000	$0
Morganton	08/17/02	Flash Flood	0	0	$0	$0
Countywide	04/10/03	Flood	0	0	$0	$0
Morganton	06/15/03	Flash Flood	0	0	$0	$0
Morganton	06/16/03	Flash Flood	0	0	$0	$0
Morganton	07/13/03	Flash Flood	0	0	$0	$0
Morganton	08/07/03	Flash Flood	0	0	$0	$0
Hildebran	08/09/03	Flash Flood	0	0	$0	$0
Countywide	11/19/03	Flood	0	0	$0	$0
Countywide	09/07/04	Flood	0	0	$9,000,000	$0
Countywide	09/17/04	Flood	0	0	$0	$0
Northeast Portion	05/19/05	Flash Flood	0	0	$0	$0
Countywide	07/07/05	Flood	0	0	$0	$0
Morganton	07/19/05	Flash Flood	0	0	$0	$0
Morganton	07/27/05	Flash Flood	0	0	$0	$0
Western Portion	08/17/05	Flash Flood	0	0	$0	$0
Countywide	08/18/05	Flood	0	0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Countywide	10/07/05	Flood	0	0	$0	$0
Table Rock	08/26/08	Flash Flood	0	0	$0	$0
Burke Chapel	05/26/09	Flash Flood	0	0	$0	$0
Table Rock	01/24/10	Flash Flood	0	0	$0	$0
Table Rock	01/25/10	Flood	0	0	$0	$0
Table Rock	08/15/10	Flash Flood	0	0	$0	$0
Chesterfield	03/06/11	Flash Flood	0	0	$0	$0
Joy	04/16/11	Flood	0	0	$0	$0
Joy	04/16/11	Flash Flood	0	0	$0	$0
Joy	04/16/11	Flash Flood	0	0	$0	$0
Oak Hill	04/16/11	Flash Flood	0	0	$0	$0
Chesterfield	11/29/11	Flash Flood	0	0	$0	$0
Linville Falls	09/18/12	Flash Flood	0	0	$0	$0
Joy	05/05/13	Flood	0	0	$30,000	$0
Drexel	06/09/13	Flash Flood	0	0	$0	$0
Chesterfield	07/04/13	Flash Flood	0	0	$0	$0
Joy	07/04/13	Flood	0	0	$0	$0
Glen Alpine	07/12/13	Flash Flood	0	0	$60,000	$0
Subtotal Burke	*45 Events*		*0*	*0*	*$9,096,300*	*$0*
CALDWELL COUNTY						
Countywide	01/27/96	Flood	0	0	$0	$0
Draco	08/03/96	Flash Flood	0	0	$0	$0
Mortimer	08/11/96	Flash Flood	0	0	$0	$0
Collettsville	08/11/96	Flash Flood	0	0	$0	$0
Edgemont	08/11/96	Flash Flood	0	0	$0	$0
Collettsville	08/12/96	Flash Flood	0	0	$0	$0
Collettsville	01/08/98	Flash Flood	0	0	$0	$0
Western Portion	03/20/98	Flash Flood	0	0	$0	$0
Lenoir	04/17/98	Flash Flood	0	0	$0	$0
Lenoir	09/02/00	Flash Flood	0	0	$0	$0
Lenoir	07/02/01	Flash Flood	0	0	$50,000	$0
Lenoir	07/25/01	Flash Flood	0	0	$0	$0
Countywide	04/10/03	Flood	0	0	$0	$0
Lenoir	06/14/03	Flash Flood	0	0	$0	$0
Lenoir	06/15/03	Flash Flood	0	0	$0	$0
Lenoir	06/18/03	Flash Flood	0	0	$0	$0
Lenoir	06/19/03	Flash Flood	0	0	$0	$0
Mortimer	07/05/03	Flash Flood	0	0	$0	$0
Lenoir	07/06/03	Flash Flood	0	0	$20,000	$0
Lenoir	08/06/03	Flash Flood	0	0	$5,000	$0
Lenoir	08/07/03	Flash Flood	0	0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Countywide	11/19/03	Flood	0	0	$5,000	$0
Lenoir	05/22/04	Flash Flood	0	0	$0	$0
Lenoir	06/21/04	Flash Flood	0	0	$0	$0
Countywide	09/02/04	Flood	0	0	$0	$0
Countywide	09/07/04	Flood	0	0	$1,000,000	$1,500,000
Countywide	09/17/04	Flood	0	0	$20,000	$0
Lenoir	06/07/05	Flash Flood	0	0	$15,000	$0
Lenoir	06/08/05	Flash Flood	0	0	$0	$0
Lenoir	07/03/05	Flash Flood	0	0	$20,000	$0
Countywide	07/04/05	Flood	0	0	$0	$0
Countywide	07/07/05	Flood	0	0	$0	$0
Countywide	08/18/05	Flood	0	0	$0	$0
Western Portion	08/18/05	Flash Flood	0	0	$0	$0
Collettsville	08/26/08	Flash Flood	0	0	$0	$0
Yadkin Valley	05/16/09	Flash Flood	0	0	$0	$0
Lenoir	06/10/09	Flash Flood	0	0	$20,000	$0
Rufus	03/06/11	Flash Flood	0	0	$0	$0
Mortimer	04/16/11	Flash Flood	0	0	$50,000	$0
Yadkin Valley	05/14/12	Flash Flood	0	0	$0	$0
Warrior	05/14/12	Flash Flood	0	0	$0	$0
Abingdon	05/14/12	Flash Flood	0	0	$0	$0
Rufus	07/11/12	Flash Flood	0	0	$0	$0
Richland	08/09/12	Flash Flood	0	0	$5,000	$0
Edgemont	01/30/13	Flash Flood	0	0	$50,000	$0
Edgemont	05/05/13	Flood	0	0	$30,000	$0
Oak Hill	06/09/13	Flash Flood	0	0	$0	$0
Valmead	06/09/13	Flash Flood	0	0	$0	$0
Draco	07/02/13	Flood	0	0	$0	$0
Mortimer	07/04/13	Flash Flood	0	0	$300,000	$0
Rufus	07/07/13	Flash Flood	0	0	$0	$0
Grace Chapel	07/09/13	Flash Flood	0	0	$0	$0
Collettsville	07/12/13	Flash Flood	0	0	$50,000	$0
Collettsville	07/27/13	Flash Flood	2	0	$0	$0
Dudley Shoals	09/01/13	Flash Flood	0	0	$0	$0
Collettsville	09/02/13	Flash Flood	1	0	$0	$0
Subtotal Caldwell	*56 Events*		*3*	*0*	*$1,640,000*	*$1,500,000*
CATAWBA COUNTY						
Hickory	08/17/02	Flash Flood	0	0	$3,000,000	$0
Countywide	03/20/03	Flash Flood	0	0	$0	$0
Claremont	05/02/03	Flash Flood	0	0	$0	$0
Conover	05/03/03	Flash Flood	0	0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Hickory	06/16/03	Flash Flood	0	0	$60,000	$0
Long View	08/06/03	Flash Flood	0	0	$5,000	$0
Countywide	09/08/04	Flood	0	0	$130,000	$0
Long View	05/19/05	Flash Flood	0	0	$5,000	$0
Hickory	07/07/05	Flash Flood	0	0	$0	$0
Countywide	10/07/05	Flood	0	0	$30,000	$0
Maiden	08/17/08	Flash Flood	0	0	$50,000	$0
Startown	08/27/08	Flash Flood	0	0	$0	$0
Brookford	01/24/10	Flash Flood	0	0	$0	$0
Claremont	05/14/12	Flash Flood	0	0	$20,000	$0
Long View	07/21/12	Flash Flood	0	0	$1,000	$0
Claremont	05/06/13	Flood	0	0	$2,000,000	$0
Startown	06/05/13	Flash Flood	0	0	$0	$0
Claremont	07/27/13	Flash Flood	0	0	$1,000,000	$0
Hickory	07/27/13	Flash Flood	0	0	$3,200,000	$0
Hickory	07/27/13	Flood	0	0	$100,000	$0
Oyama	07/27/13	Flash Flood	0	0	$900,000	$0
Subtotal Catawba	*21 Events*		*0*	*0*	*$10,501,000*	*$0*
TOTAL UNIFOUR	**132 Events**		**3**	**0**	**$21,337,300**	**$1,500,000**

Source: National Climatic Data Center Storm Events Database; local reports provided through the HMPC.

According to NCDC and the HMPC, 132 recorded instances of flooding conditions have affected the planning area since 1993, causing an estimated $21,337,300 in losses to property, $1,500,000 in losses to agricultural crops, 3 deaths, and 0 injuries.

Table 4.10 provides a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

Table 4.10: Summary of Historical Flood Occurrences by Participating Jurisdiction

Jurisdiction	Number of Occurrences	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Alexander County (Unincorporated Area)	10	0	0	$100,000	$0
Taylorsville	0	0	0	$0	$0
Subtotal Alexander	*10*	*0*	*0*	*$100,000*	*$0*
Burke County (Unincorporated Area)	30	0	0	$9,032,000	$0
Connelly Springs	0	0	0	$0	$0
Drexel	1	0	0	$0	$0
Glen Alpine	1	0	0	$60,000	$0

Jurisdiction	Number of Occurrences	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Hildebran	1	0	0	$0	$0
Morganton	12	0	0	$4,300	$0
Valdese	0	0	0	$0	$0
Rutherford College	0	0	0	$0	$0
Subtotal Burke	*45*	*0*	*0*	*$9,096,300*	*$0*
Caldwell County (Unincorporated Area)	37	3	0	$1,510,000	$1,500,000
Cajah's Mountain	0	0	0	$0	$0
Cedar Rock	0	0	0	$0	$0
Gamewell	0	0	0	$0	$0
Granite Falls	0	0	0	$0	$0
Hudson	0	0	0	$0	$0
Lenoir	17	0	0	$130,000	$0
Rhodhiss	0	0	0	$0	$0
Sawmills	0	0	0	$0	$0
Subtotal Caldwell	*54*	*3*	*0*	*$1,640,000*	*$1,500,000*
Catawba County (Unincorporated Area)	6	0	0	$1,060,000	$0
Brookford	1	0	0	$0	$0
Catawba	0	0	0	$0	$0
Claremont	4	0	0	$3,020,000	$0
Conover	1	0	0	$0	$0
Hickory	5	0	0	$6,360,000	$0
Long View	3	0	0	$11,000	$0
Maiden	1	0	0	$50,000	$0
Newton	0	0	0	$0	$0
Subtotal Catawba	*21*	*0*	*0*	*$10,501,000*	*$0*
TOTAL UNIFOUR	**130**	**3**	**0**	**$21,337,300**	**$1,500,000**

Source: National Climatic Data Center Storm Events Database

Table 5.2 in Section 5: *Capability Assessment* lists the number of insured losses and total claims payments for historical flood damages in each jurisdiction as recorded under the NFIP. **Table 4.11** below provides the NFIP entry date for each participating jurisdiction. As explained in subsection 4.3, the NFIP entry date for each jurisdiction was used to determine buildings that were built pre-FIRM and are therefore assumed to be at greater risk to the flood hazard.

Table 4.11: NFIP Entry Dates

Jurisdiction	NFIP Entry Date
Alexander County (Unincorporated Area)	02/01/91
Taylorsville	12/18/07
Burke County (Unincorporated Area)	06/17/91
Connelly Springs	09/05/07
Drexel	08/19/86
Glen Alpine	09/05/07
Hildebran	09/05/07
Morganton	02/19/87
Valdese	07/03/86
Rutherford College	09/05/07
Caldwell County (Unincorporated Area)	08/16/88
Cajah's Mountain	08/16/88
Cedar Rock	07/07/09
Gamewell	08/16/88
Granite Falls	08/16/88
Hudson	08/16/88
Lenoir	08/16/88
Rhodhiss	07/03/86
Sawmills	07/07/09
Catawba County (Unincorporated Area)	09/03/80
Brookford	12/18/79
Catawba	09/03/80
Claremont	09/05/07
Conover	09/03/80
Hickory	08/03/81
Long View	09/03/80
Maiden	09/03/80
Newton	09/03/80

Source: Federal Emergency Management Agency Community Status Book Report: Communities Participating in the National Flood Program, August 2013

Probability of Future Occurrences

Based on the information provided above, it is assumed that the probability of future flood hazard occurrences in the planning area is highly likely.

Flood Hazard Vulnerability

The following tables provide counts and values by jurisdiction relevant to flood hazard vulnerability in the Unifour Region.

Table 4.12: Exposure to the Floodway

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per	Num	Per
Alexander County (Unincorporated Area)	**176**	**1.08%**	**91**	**1.43%**	**37**	**0.14%**	**$296,938**	**0**	**0.00%**	**70**	**0.20%**	**7**	**0.14%**	**2**	**0.10%**
Taylorsville	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Subtotal Alexander	*176*	*1.01%*	*91*	*1.38%*	*37*	*0.13%*	*$296,938*	*0*	*0.00%*	*70*	*0.19%*	*7*	*0.12%*	*2*	*0.09%*
Burke County (Unincorporated Area)	**333**	**1.41%**	**304**	**1.77%**	**47**	**0.14%**	**$2,403,911**	**29**	**0.14%**	**253**	**0.42%**	**33**	**0.37%**	**4**	**0.13%**
Connelly Springs	0	0.00%	1	0.18%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Drexel	8	1.18%	2	1.06%	1	0.13%	$69,072	1	0.16%	5	0.27%	1	0.25%	0	0.00%
Glen Alpine	5	0.78%	10	3.26%	1	0.14%	$0	0	0.00%	12	0.79%	2	0.78%	0	0.00%
Hildebran	13	1.61%	5	1.90%	0	0.00%	$0	0	0.00%	3	0.15%	0	0.00%	0	0.00%
Morganton	195	3.25%	144	7.91%	11	0.15%	$3,371,375	4	0.07%	277	1.64%	78	2.53%	12	1.04%
Valdese	48	2.63%	48	4.90%	9	0.43%	$1,173,766	4	0.25%	39	0.87%	5	0.56%	0	0.00%
Rutherford College	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Subtotal Burke	*602*	*1.73%*	*514*	*2.39%*	*69*	*0.15%*	*$7,018,124*	*38*	*0.12%*	*589*	*0.65%*	*119*	*0.83%*	*16*	*0.32%*
Caldwell County (Unincorporated Area)	**477**	**2.42%**	**335**	**3.15%**	**29**	**0.11%**	**$1,438,800**	**19**	**0.13%**	**295**	**0.68%**	**33**	**0.54%**	**8**	**0.35%**
Cajah's Mountain	2	0.18%	2	0.83%	0	0.00%	$0	0	0.00%	2	0.07%	0	0.00%	0	0.00%
Cedar Rock	2	1.36%	2	2.41%	0	0.00%	$0	0	0.00%	8	2.67%	3	3.23%	0	0.00%
Gamewell	37	2.38%	29	6.87%	4	0.20%	$298,500	1	0.07%	180	4.44%	19	3.04%	10	4.65%
Granite Falls	13	0.68%	22	3.15%	0	0.00%	$0	0	0.00%	4	0.08%	1	0.15%	0	0.00%

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per	Num	Per
Hudson	41	2.70%	40	9.43%	1	0.06%	$499,800	1	0.08%	83	2.20%	10	1.53%	4	1.96%
Lenoir	407	5.25%	171	7.62%	86	1.00%	$19,323,700	58	0.88%	535	2.94%	85	2.52%	25	2.25%
Rhodhiss	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Sawmills	45	2.40%	29	5.13%	0	0.00%	$0	0	0.00%	20	0.38%	2	0.29%	0	0.00%
Subtotal Caldwell	*1,024*	*2.84%*	*630*	*4.06%*	*120*	*0.26%*	*$21,560,800*	*79*	*0.28%*	*1,127*	*1.36%*	*153*	*1.19%*	*47*	*1.01%*
Catawba County (Unincorporated Area)	**782**	**2.04%**	**608**	**4.55%**	**44**	**0.08%**	**$9,856,600**	**11**	**0.05%**	**887**	**1.06%**	**96**	**0.86%**	**32**	**0.67%**
Brookford	29	12.24%	12	23.53%	2	0.68%	$498,500	2	0.82%	12	3.14%	2	2.78%	0	0.00%
Catawba	38	9.69%	18	10.17%	2	0.43%	$0	1	0.30%	24	3.98%	4	3.08%	1	3.70%
Claremont	11	1.47%	8	3.69%	0	0.00%	$0	0	0.00%	8	0.59%	1	0.51%	0	0.00%
Conover	112	3.24%	58	6.26%	7	0.18%	$886,200	4	0.18%	106	1.30%	14	1.01%	8	1.42%
Hickory	516	3.52%	257	7.57%	43	0.26%	$13,596,100	29	0.30%	403	1.01%	40	0.70%	21	0.77%
Long View	50	2.24%	24	5.16%	4	0.15%	$3,212,275	3	0.15%	33	0.68%	4	0.52%	2	0.58%
Maiden	25	1.57%	18	4.04%	0	0.00%	$0	0	0.00%	30	0.91%	3	0.66%	1	0.48%
Newton	202	3.83%	122	10.16%	3	0.05%	$79,400	1	0.02%	171	1.32%	25	1.22%	8	0.84%
Subtotal Catawba	*1,765*	*2.64%*	*1,125*	*5.56%*	*105*	*0.12%*	*$28,129,075*	*51*	*0.11%*	*1,674*	*1.08%*	*189*	*0.87%*	*73*	*0.75%*
TOTAL UNIFOUR	**3,567**	**2.30%**	**2,360**	**3.70%**	**331**	**0.16%**	**$57,004,937**	**168**	**0.14%**	**3,460**	**0.95%**	**468**	**0.86%**	**138**	**0.64%**

Source: GIS Analysis

Table 4.13: Exposure to the 1-Percent-Annual-Chance (100-year) Flood

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per[8]		Num	Per[9]	Num	Per	Num	Per	Num	Per
Alexander County (Unincorporated Area)	**1,549**	**9.49%**	**657**	**10.31%**	**342**	**1.31%**	**$20,938,021**	**78**	**0.54%**	**863**	**2.46%**	**98**	**1.92%**	**28**	**1.36%**
Taylorsville	49	4.67%	7	3.10%	10	0.76%	$1,333,202	10	0.84%	31	1.48%	16	3.05%	0	0.00%
Subtotal Alexander	*1,598*	*9.20%*	*664*	*10.06%*	*352*	*1.28%*	*$22,271,223*	*88*	*0.56%*	*894*	*2.40%*	*114*	*2.03%*	*28*	*1.27%*
Burke County (Unincorporated Area)	**1,336**	**5.65%**	**1,566**	**9.13%**	**289**	**0.89%**	**$14,157,590**	**137**	**0.65%**	**1,950**	**3.27%**	**261**	**2.94%**	**73**	**2.37%**
Connelly Springs	37	5.48%	179	31.79%	4	0.47%	$381,226	4	0.57%	30	1.80%	3	1.04%	0	0.00%
Drexel	6	0.89%	6	3.17%	1	0.13%	$0	0	0.00%	8	0.43%	1	0.25%	0	0.00%
Glen Alpine	8	1.25%	4	1.30%	1	0.14%	$54,634	1	0.15%	6	0.40%	1	0.39%	0	0.00%
Hildebran	7	0.87%	8	3.04%	0	0.00%	$0	0	0.00%	8	0.40%	3	0.75%	0	0.00%
Morganton	97	1.62%	60	3.29%	64	0.88%	$20,505,433	42	0.74%	555	3.28%	113	3.67%	32	2.78%
Valdese	40	2.19%	181	18.47%	18	0.87%	$2,176,381	8	0.49%	110	2.45%	16	1.78%	2	0.75%
Rutherford College	14	2.48%	15	6.49%	2	0.28%	$28,968	2	0.31%	13	0.97%	2	0.85%	0	0.00%
Subtotal Burke	*1,545*	*4.43%*	*2,019*	*9.39%*	*379*	*0.83%*	*$37,304,232*	*194*	*0.61%*	*2,680*	*2.95%*	*400*	*2.77%*	*107*	*2.15%*
Caldwell County (Unincorporated Area)	**1,739**	**8.83%**	**1,161**	**10.91%**	**572**	**2.19%**	**$27,268,000**	**344**	**2.40%**	**1,232**	**2.83%**	**175**	**2.85%**	**35**	**1.55%**
Cajah's Mountain	34	3.04%	6	2.48%	1	0.08%	$14,100	1	0.10%	35	1.24%	5	0.96%	2	1.09%
Cedar Rock	7	4.76%	3	3.61%	0	0.00%	$0	0	0.00%	16	5.33%	6	6.45%	0	0.00%
Gamewell	64	4.12%	41	9.72%	21	1.03%	$1,619,600	13	0.88%	255	6.29%	38	6.08%	13	6.05%
Granite Falls	67	3.51%	84	12.02%	8	0.40%	$1,336,900	4	0.33%	58	1.23%	6	0.90%	5	1.51%
Hudson	39	2.57%	15	3.54%	17	1.02%	$4,486,500	12	0.99%	150	3.97%	16	2.44%	10	4.90%

[8] Percent of total number of buildings in jurisdiction.
[9] Percent of total number of pre-FIRM buildings in jurisdiction.

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per[8]		Num	Per[9]	Num	Per	Num	Per	Num	Per
Lenoir	374	4.82%	112	4.99%	308	3.58%	$52,797,800	241	3.65%	822	4.51%	114	3.38%	44	3.97%
Rhodhiss	19	4.34%	29	15.59%	12	2.49%	$967,694	5	1.50%	29	2.71%	3	2.01%	1	1.49%
Sawmills	95	5.06%	49	8.67%	11	0.42%	$664,300	8	0.40%	93	1.77%	4	0.57%	2	0.66%
Subtotal Caldwell	*2,438*	*6.77%*	*1,500*	*9.67%*	*950*	*2.10%*	*$89,154,894*	*628*	*2.20%*	*2,690*	*3.24%*	*367*	*2.86%*	*112*	*2.41%*
Catawba County (Unincorporated Area)	**3,742**	**9.77%**	**1,360**	**10.18%**	**1,429**	**2.59%**	**$73,266,700**	**356**	**1.46%**	**2,080**	**2.49%**	**240**	**2.16%**	**67**	**1.39%**
Brookford	8	3.38%	3	5.88%	5	1.69%	$681,700	8	3.27%	11	2.88%	2	2.78%	0	0.00%
Catawba	16	4.08%	27	15.25%	5	1.08%	$1,223,800	6	1.83%	27	4.48%	3	2.31%	1	3.70%
Claremont	9	1.20%	18	8.29%	4	0.49%	$501,200	4	0.53%	9	0.67%	1	0.51%	0	0.00%
Conover	58	1.68%	23	2.48%	40	1.01%	$5,807,600	23	1.04%	193	2.36%	15	1.08%	12	2.13%
Hickory	237	1.62%	82	2.42%	137	0.84%	$33,990,800	62	0.63%	581	1.45%	61	1.06%	27	0.99%
Long View	15	0.67%	8	1.72%	17	0.65%	$6,724,546	15	0.74%	65	1.33%	7	0.91%	3	0.87%
Maiden	47	2.95%	24	5.39%	15	0.77%	$9,986,900	8	0.62%	50	1.51%	4	0.88%	3	1.44%
Newton	98	1.86%	49	4.08%	54	0.85%	$5,098,700	29	0.65%	267	2.06%	35	1.70%	12	1.26%
Subtotal Catawba	*4,230*	*6.32%*	*1,594*	*7.88%*	*1,706*	*1.93%*	*$137,281,946*	*511*	*1.11%*	*3,283*	*2.13%*	*368*	*1.69%*	*125*	*1.29%*
TOTAL UNIFOUR	**9,811**	**6.32%**	**5,777**	**9.05%**	**3,387**	**1.64%**	**$286,012,295**	**1,421**	**1.17%**	**9,547**	**2.61%**	**1,249**	**2.29%**	**372**	**1.73%**

Source: GIS Analysis

Table 4.14: Exposure to the 0.2-Percent-Annual-Chance (500-year) Flood

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per	Num	Per
Alexander County (Unincorporated Area)	**6**	**0.04%**	**2**	**0.03%**	**9**	**0.03%**	**$525,231**	**3**	**0.02%**	**3**	**0.01%**	**0**	**0.00%**	**0**	**0.00%**
Taylorsville	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Subtotal Alexander	*6*	*0.03%*	*2*	*0.03%*	*13*	*0.05%*	*$525,231*	*3*	*0.02%*	*3*	*0.01%*	*0*	*0.00%*	*0*	*0.00%*
Burke County (Unincorporated Area)	**28**	**0.12%**	**15**	**0.09%**	**36**	**0.12%**	**$3,098,295**	**23**	**0.11%**	**112**	**0.19%**	**17**	**0.19%**	**2**	**0.06%**
Connelly Springs	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Drexel	3	0.44%	0	0.00%	0	0.00%	$0	0	0.00%	2	0.11%	0	0.00%	0	0.00%
Glen Alpine	4	0.63%	8	2.61%	2	0.28%	$260,877	2	0.31%	16	1.05%	2	0.78%	1	0.96%
Hildebran	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	1	0.05%	0	0.00%	0	0.00%
Morganton	81	1.35%	40	2.20%	95	1.27%	$27,840,170	50	0.88%	110	0.65%	13	0.42%	6	0.52%
Valdese	5	0.27%	1	0.10%	6	0.29%	$334,991	0	0.00%	5	0.11%	0	0.00%	0	0.00%
Rutherford College	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Subtotal Burke	*121*	*0.35%*	*64*	*0.30%*	*139*	*0.31%*	*$31,534,333*	*75*	*0.24%*	*246*	*0.27%*	*32*	*0.22%*	*9*	*0.18%*
Caldwell County (Unincorporated Area)	**84**	**0.43%**	**56**	**0.53%**	**124**	**0.47%**	**$7,322,000**	**102**	**0.71%**	**62**	**0.14%**	**6**	**0.10%**	**0**	**0.00%**
Cajah's Mountain	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Cedar Rock	2	1.36%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Gamewell	20	1.29%	2	0.47%	25	1.22%	$3,229,500	17	1.15%	29	0.72%	1	0.16%	0	0.00%
Granite Falls	3	0.16%	2	0.29%	0	0.00%	$0	0	0.00%	1	0.02%	0	0.00%	0	0.00%
Hudson	8	0.53%	7	1.65%	6	0.36%	$7,484,200	3	0.25%	17	0.45%	0	0.00%	0	0.00%
Lenoir	107	1.38%	34	1.51%	123	1.43%	$170,744,400	90	1.36%	191	1.05%	14	0.42%	5	0.45%
Rhodhiss	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Sawmills	2	0.11%	0	0.00%	1	0.04%	$0	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Number of Pre-FIRM Buildings At Risk		Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per	Num	Per
Subtotal Caldwell	*226*	*0.63%*	*101*	*0.65%*	*279*	*0.62%*	*$188,780,100*	*212*	*0.74%*	*300*	*0.36%*	*21*	*0.16%*	*5*	*0.11%*
Catawba County (Unincorporated Area)	**81**	**0.21%**	**32**	**0.24%**	**50**	**0.09%**	**$12,929,900**	**18**	**0.07%**	**177**	**0.21%**	**5**	**0.04%**	**1**	**0.02%**
Brookford	5	2.11%	0	0.00%	3	1.02%	$210,500	3	1.22%	2	0.52%	0	0.00%	0	0.00%
Catawba	5	1.28%	0	0.00%	1	0.22%	$92,100	0	0.00%	4	0.66%	0	0.00%	0	0.00%
Claremont	2	0.27%	3	1.38%	1	0.12%	$629,400	1	0.13%	2	0.15%	0	0.00%	0	0.00%
Conover	10	0.29%	6	0.65%	9	0.23%	$1,237,100	4	0.18%	21	0.26%	1	0.07%	0	0.00%
Hickory	43	0.29%	14	0.41%	66	0.41%	$17,599,000	26	0.26%	167	0.42%	13	0.23%	4	0.15%
Long View	5	0.22%	0	0.00%	4	0.15%	$190,661	4	0.20%	7	0.14%	0	0.00%	0	0.00%
Maiden	0	0.00%	1	0.22%	1	0.05%	$14,400	0	0.00%	1	0.03%	0	0.00%	0	0.00%
Newton	22	0.42%	13	1.08%	26	0.41%	$2,377,800	18	0.40%	40	0.31%	1	0.05%	1	0.10%
Subtotal Catawba	*173*	*0.26%*	*69*	*0.34%*	*161*	*0.18%*	*$35,280,861*	*74*	*0.16%*	*421*	*0.27%*	*20*	*0.09%*	*6*	*0.06%*
TOTAL UNIFOUR	**526**	**0.34%**	**236**	**0.37%**	**592**	**0.29%**	**$256,120,525**	**364**	**0.30%**	**970**	**0.27%**	**73**	**0.13%**	**20**	**0.09%**

Source: GIS Analysis

Table 4.15: Numbers of Critical Facilities Exposed to the Floodway

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Police Stations	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0	0
Morganton	0	0	0	0	0	0	0	0	0	0
Valdese	0	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0	0	0
Lenoir	0	0	0	0	0	0	0	0	0	0
Rhodhiss	0	0	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Catawba County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	0	0	0	0	0	0
Subtotal Catawba	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL UNIFOUR	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: GIS Analysis

Table 4.16: Numbers of Critical Facilities Exposed to the 1-Percent-Annual-Chance (100-year) Flood

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Police Stations	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0	0
Morganton	0	0	0	0	0	0	0	0	0	0
Valdese	0	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**
Cajah's Mountain	0	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0	0	0
Lenoir	0	0	0	1	1	0	0	0	0	0
Rhodhiss	0	0	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*1*	*0*	*0*	*1*	*1*	*0*	*0*	*1*	*0*	*1*
Catawba County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	0	0	0	0	0	1
Subtotal Catawba	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*
TOTAL UNIFOUR	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**2**

Source: FEMA DFIRM data; critical facilities supplied by participating jurisdictions.

Table 4.17: Numbers of Critical Facilities Exposed to the 0.2-Percent-Annual-Chance (500-year) Flood

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Police Stations	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0	0
Morganton	0	0	0	0	0	0	0	0	0	0
Valdese	0	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0	0	0
Lenoir	0	0	0	0	0	0	0	0	0	0
Rhodhiss	0	0	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*0*	*1*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*
Catawba County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	0	0	0	0	0	0
Subtotal Catawba	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL UNIFOUR	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

Source: FEMA DFIRM data; critical facilities supplied by participating jurisdictions.

Table 4.18: Numbers of High Potential Loss Properties Exposed to the Flood Hazard

Jurisdiction	Airports			Military Facilities			Hazardous Materials Sites			Other[10]		
	FW	1%	0.2%	FW	1%	0.2%	FW	1%	0.2 %	FW	1%	0.2%
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0	0	0	0
Morganton	0	0	0	0	0	0	0	0	0	0	0	0
Valdese	0	0	0	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	1	0	0	0	0
Lenoir	0	0	0	0	0	0	0	1	0	0	1	0
Rhodhiss	0	0	0	0	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	1	0	0	0	0
Subtotal Caldwell	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*0*	*1*	*0*
Catawba County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	1	0	0	0	0	0	0	0
Subtotal Catawba	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL UNIFOUR	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**1**	**0**

Source: GIS analysis.

[10] This category consists of a variety of facilities specified by participating jurisdictions.

Table 4.19: Numbers of Historic Properties Exposed to the Flood Hazard

Jurisdiction	Districts			Buildings			Other		
	FW	1%	0.2%	FW	1%	0.2%	FW	1%	0.2%
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0
Morganton	1	0	0	0	0	0	1	0	0
Valdese	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0
Subtotal Burke	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*
Caldwell County (Unincorporated Area)	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0	0
Lenoir	0	0	0	0	0	0	0	0	0
Rhodhiss	0	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Catawba County (Unincorporated Area)	**8**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0	0
Catawba	1	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0
Hickory	2	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	0	0	0	0	0
Subtotal Catawba	*11*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*
TOTAL UNIFOUR	**13**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**

Source: Jurisdictions and National Register of Historic Places.

Table 4.20 provides a summary count by jurisdiction of Repetitive Loss (RL) properties identified by FEMA through the NFIP.

Table 4.20: Numbers of Repetitive Loss (RL) Properties by Jurisdiction

Jurisdiction	Total Number of Properties	Total Number of Losses	Total Amount of Claims Payments
Alexander County (Unincorporated Area)	**0**	**0**	**0**
Taylorsville	0	0	0
Subtotal Alexander	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**
Connelly Springs	0	0	0
Drexel	0	0	0
Glen Alpine	0	0	0
Hildebran	0	0	0
Morganton	0	0	0
Valdese	0	0	0
Rutherford College	0	0	0
Subtotal Burke	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**1**	**3**	**$60,721**
Cajah's Mountain	0	0	0
Cedar Rock	0	0	0
Gamewell	0	0	0
Granite Falls	0	0	0
Hudson	0	0	0
Lenoir	0	0	0
Rhodhiss	0	0	0
Sawmills	0	0	0
Subtotal Caldwell	*1*	*3*	*$60,721*
Catawba County (Unincorporated Area)	**5**	**11**	**$126,858**
Brookford	0	0	0
Catawba	0	0	0
Claremont	0	0	0
Conover	0	0	0
Hickory	1	3	$14,926
Long View	0	0	0
Maiden	0	0	0
Newton	0	0	0
Subtotal Catawba	*6*	*14*	*$141,784*
TOTAL UNIFOUR	**7**	**17**	**$202,505**

Source: North Carolina Emergency Management.

4.5.1.2 Erosion

Erosion Hazard Description

Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand are most susceptible to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion. Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

During the past 20 years, the importance of erosion control has gained the increased attention of the public. Implementation of erosion control measures consistent with sound agricultural and construction operations is needed to minimize the adverse effects associated with harmful chemicals run-off due to wind or water events. The increase in government regulatory programs and public concern has resulted in a wide range of erosion control products, techniques, and analytical methodologies in the United States. The preferred method of erosion control in recent years has been the restoration of vegetation.

Erosion Hazard Analysis

Erosion in many areas of central and western North Carolina is typically caused by flash flooding events. Unlike coastal areas, where the soil is composed mainly of fine-grained particles such as sand, soils in other parts of North Carolina have a much greater organic matter content.

Location Within the Planning Area

No data is currently available with which to map identified areas of erosion concern.

Extent (Magnitude and Severity)

No data is currently available with which to determine magnitudes or severity of erosion hazard areas within the Unifour Region.

Historical Occurrences
No data is currently available to document historical erosion hazard occurrences.

Probability of Future Occurrences
Erosion will likely remain a natural, dynamic, and continuous process in areas of the Unifour Region, and its probability of future occurrence is certain.

Erosion Hazard Vulnerability
Based upon a lack of historical events, relevant GIS data, and any immediate threat to life or property, a detailed vulnerability assessment has not be conducted for this hazard.

4.5.1.3 Dam/Levee Failure

Dam/Levee Failure Hazard Description

Dam/levee failure is the breakdown, collapse, or other failure of a dam or levee structure characterized by the uncontrolled release of impounded water that results in downstream flooding. In the event of a dam or levee failure, the energy of the water stored behind even a small structure is capable of causing loss of life and severe property damage if development exists downstream. There are varying degrees of failure, and an unexpected or unplanned breach is considered one type of failure. A breach is an opening through a dam or levee which drains the water impounded behind it. A controlled breach is a planned, constructed opening and not considered a failure event, while an uncontrolled breach is the unintentional discharge from the impounded water body and considered a failure.

Dam/levee failure can result from natural events, human-induced events, or a combination of the two. Natural occurrences that may cause dam or levee failure include hurricanes, floods, earthquakes, and landslides; human-induced actions may include the deterioration of the foundation or the materials used in construction. In recent years, dams have also received considerably more attention in the emergency management community as potential targets for terrorist acts.

Dam/levee failure presents a significant potential for disaster, in that significant loss of life and property would be expected in addition to the possible loss of power and water resources. The most common cause of failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes, or landslides are significant because there is generally little or no advance warning. The best way to mitigate dam or levee failure is through the proper construction, inspection, maintenance, and operation of these structures, as well as maintaining and updating Emergency Action Plans (EAPs) for use in the event of a dam failure.

Dam/Levee Failure Hazard Analysis

In Alexander County, many creeks empty into, or become part of, the Catawba River. Catawba River levels are controlled by dams and flood gates. Therefore, high water flooding in these areas is considered to be relatively unlikely. However, there is still a potential threat to flooding.

The most significant threat to Burke County is the impoundment of Lake James, consisting of earthen structures and two spillways that were constructed in 1919 and that impound a maximum 265,182 acre feet of water or a total of 86,422,813,800 gallons within Lake James. A dam failure at Lake James would pose a significant threat to persons and property within the inundation pathway through the entire county. Data provided by Duke Energy on a dam failure flood inundation pathway was entered as a layer onto the County GIS System to identify the properties and areas at risk should an event occur. In the event of a major dam failure at the Bridgewater site, 27,570 people living in 11,508 housing units would be impacted to some extent by inundation. Duke Energy is currently working to reinforce the dam structures and upgrade their construction standards. This process is expected to continue throughout the next 2-5 years.

The entire southern border of Caldwell County is traversed by the Catawba River. During the 1950s a series of dams was constructed along the Catawba River in an effort to harness hydroelectric power. The two specific lakes that border Caldwell County to the south are Lake Rhodhiss to the southwest and Lake Hickory to the southeast. The downstream dam of Lake Rhodhiss is of specific concern to the County. The dam containing Lake Hickory is located a number of miles downstream

in Catawba County. Failure of the dam containing Lake Rhodhiss would almost certainly result in catastrophic damage to life and property within Caldwell County. Also of concern are Oxford Dam, which contains Lake Hickory and Lookout Shoals Dam, which contains Lake Lookout.

The Town of Maiden in Catawba County has expressed some concern over the structural integrity of the Maiden Water Plant Dam and has been coordinating with state agencies on possible remedies, including permanent removal. The Town also recently completed the preparation of an EAP for the dam.

Location Within the Planning Area

Table 4.21 shows counts of high and intermediate hazard dams in each participating jurisdiction. In total there are 53 high hazard dams in the planning area and 36 intermediate hazard dams. **Figure 4.37** shows the locations of all state-regulated dams in and immediately around the planning area,

Table 4.21: Counts of High Hazard and Intermediate Hazard Dams by Jurisdiction

Jurisdiction	High	Intermediate
Alexander County (Unincorporated Area)	**11**	**5**
Taylorsville	0	1
Subtotal Alexander	*11*	*6*
Burke County (Unincorporated Area)	**10**	**11**
Connelly Springs	0	0
Drexel	0	0
Glen Alpine	0	0
Hildebran	0	0
Morganton	1	0
Valdese	0	0
Rutherford College	0	0
Subtotal Burke	*11*	*11*
Caldwell County (Unincorporated Area)	**14**	**8**
Cajah's Mountain	0	0
Cedar Rock	0	0
Gamewell	0	0
Granite Falls	1	0
Hudson	0	0
Lenoir	0	0
Rhodhiss	0	0
Sawmills	0	1
Subtotal Caldwell	*15*	*9*
Catawba County (Unincorporated Area)	**12**	**9**
Brookford	0	0
Catawba	0	0
Claremont	0	0
Conover	1	0
Hickory	1	1
Long View	0	0

Jurisdiction	High	Intermediate
Maiden	1	0
Newton	1	0
Subtotal Catawba	*16*	*10*
TOTAL UNIFOUR	**53**	**36**

Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).

Extent (Magnitude and Severity)

Two factors influence the potential severity of a dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream. The potential extent of dam failure may be classified according to their "hazard potential," meaning the probable damage that would occur *if* the structure failed, in terms of loss of human life and economic loss or environmental damage. The State of North Carolina classifies dam structures under its regulations according to hazard potential as described in **Table 4.22**. It is important to note that these classifications are not based on the adequacy or structural integrity of existing dam structures.

Table 4.22: Classification of Hazard Potential for North Carolina Dams

Hazard Classification	Description	Quantitative Guidelines
Low	1) Interruption of road service, low volume roads 2) Economic damage	1) Less than 25 vehicles per day 2) Less than $30,000
Intermediate	1) Damage to highways, interruption of service 2) Economic damage	1) 25 to less than 250 vehicles per day 2) $30,000 to less than $200,000
High	1) Probable loss of human life due to breached roadway or bridge on or below the dam 2) Economic damage	1) Probable loss of 1 or more human lives 2) More than $200,000

Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).

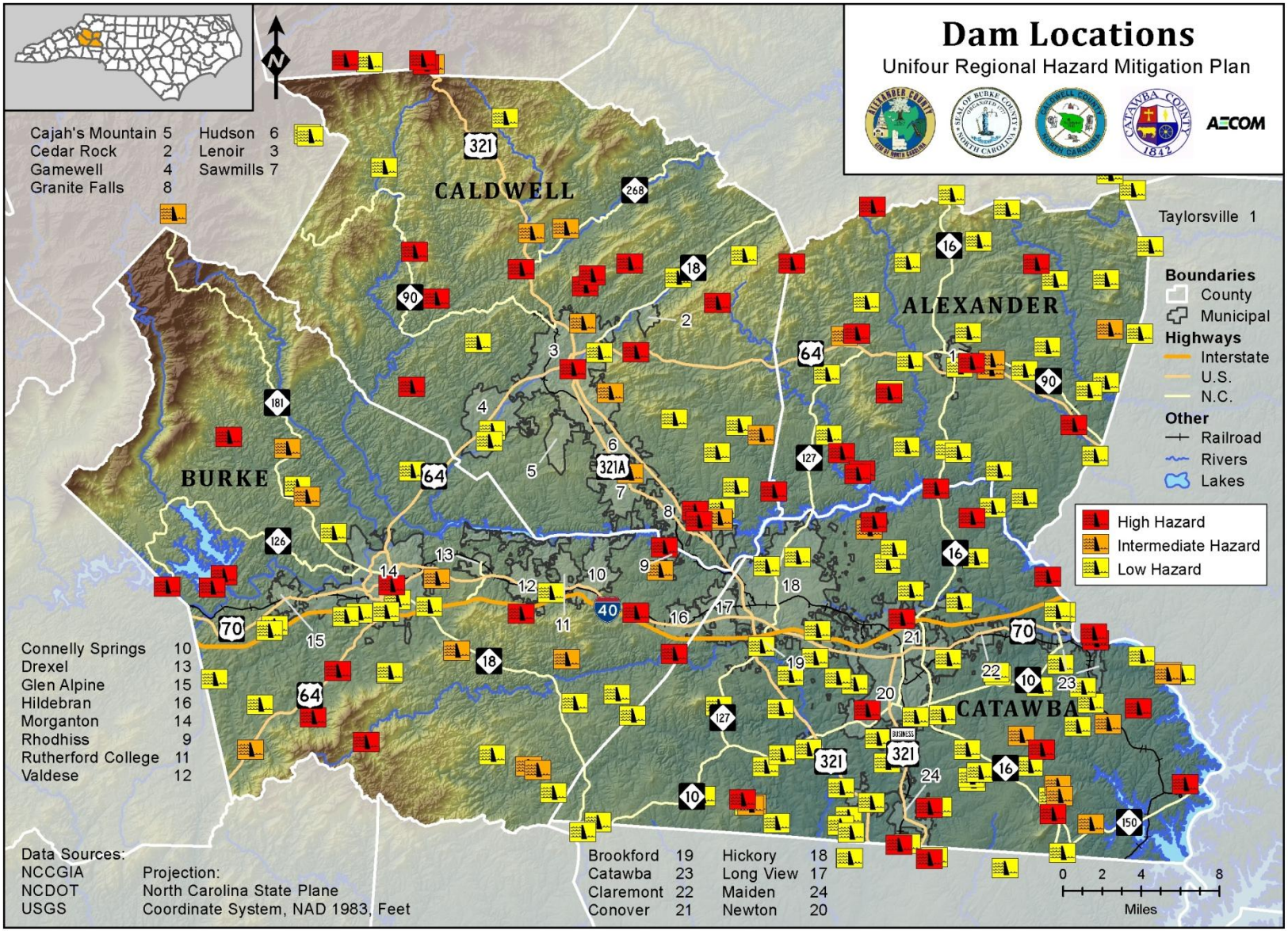
Historical Occurrences

There are no records of historical dam failure occurrences in or affecting the planning area.

Probability of Future Occurrences

The probability of the future occurrence of a failure at a large dam structure, especially one owned by Duke Energy Corporation, is considered to be unlikely. The probability of occurrence at smaller, privately owned dam structures is much more likely, however data is not currently available for these smaller structures, both in terms of point locations and mapped inundation areas. The HMPC does understand however that even if an event is considered to be highly unlikely, there could be high consequences should an event occur.

Figure 4.37: Locations of State-Regulated Dams



Dam/Levee Failure Hazard Vulnerability

There is a fundamental limitation in the data available for vulnerability assessment for the dam/levee failure hazard in the planning area. Excellent data is available for GIS analysis, including point locations and mapped inundation areas, for the dams owned by Duke Energy Corporation. These include the Bridgewater Dam, Lookout Shoals Dam, Oxford Dam, and Rhodhiss Dam PMF Inundation Areas. These are large facilities that would undoubtedly have a profound impact on the planning area should a failure occur; however, such failures are considered to be extremely unlikely and the HMPC feels strongly that these are not the structures that are of concern to the Unifour Region. The dam structures that are of concern are smaller, privately owned, and unregulated dams for which no GIS data or inventories are currently available. These are the facilities that could and likely would cause the most damage and disruption should a more likely failure occur.

It has been determined therefore that presenting detailed risk assessment results for the Duke Energy facilities, even though data is available, would be misleading and unproductive for the purposes of mitigation planning. It has also been determined that any rudimentary calculations based on the point locations for the dams mapped by NCDENR (as shown in Figure 4.37) would also be potentially misleading if any type of buffer or proximity analysis was performed to estimate surrounding impacts should a failure occur.

Any mitigation actions developed for this hazard therefore should be based on addressing data limitations, education and awareness programs, and/or any jurisdiction-specific concerns that may be addressable through an appropriate mitigation project.

4.5.1.4 Drought/Extreme Heat

Drought/Extreme Heat Hazard Description

Drought is a natural climatic condition caused by an extended period of limited rainfall beyond that which occurs naturally in a broad geographic area. High temperatures, high winds, and low humidity can worsen drought conditions, and can make areas more susceptible to wildfire. Human demands and actions can also hasten drought-related impacts.

Droughts are frequently classified as one of the following four types: meteorological, agricultural, hydrological, or socio-economic. Meteorological droughts are typically defined by the level of "dryness" when compared to an average, or normal amount of precipitation over a given period of time. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts (when the amount of moisture in soil does not meet the needs of a particular crop). Hydrological drought is directly related to the effect of precipitation shortfalls on surface and groundwater supplies. Human factors, particularly changes in land use, can alter the hydrologic characteristics of a basin. Socio-economic drought is the result of water shortages that affect people and limit the ability to supply water-dependent products in the marketplace.

Drought conditions typically do not cause property damages or threaten lives, but rather drought effects are most directly felt by agricultural sectors. At times, drought may also cause community-wide impacts as a result of acute water shortages (regulatory use restrictions, drinking water supply, and salt water intrusion). The magnitude of such impacts correlates directly with local groundwater supplies, reservoir storage, and development densities. Drought conditions can also contribute to or exacerbate extreme heat concerns, particularly with regard to elderly populations.

Drought/Extreme Heat Hazard Analysis

In recent years, all of western North Carolina has experienced severe to extreme drought conditions. The drying up of wells and the subsequent necessary replacement of wells is one indicator of the local severity of drought over the past 10 years.

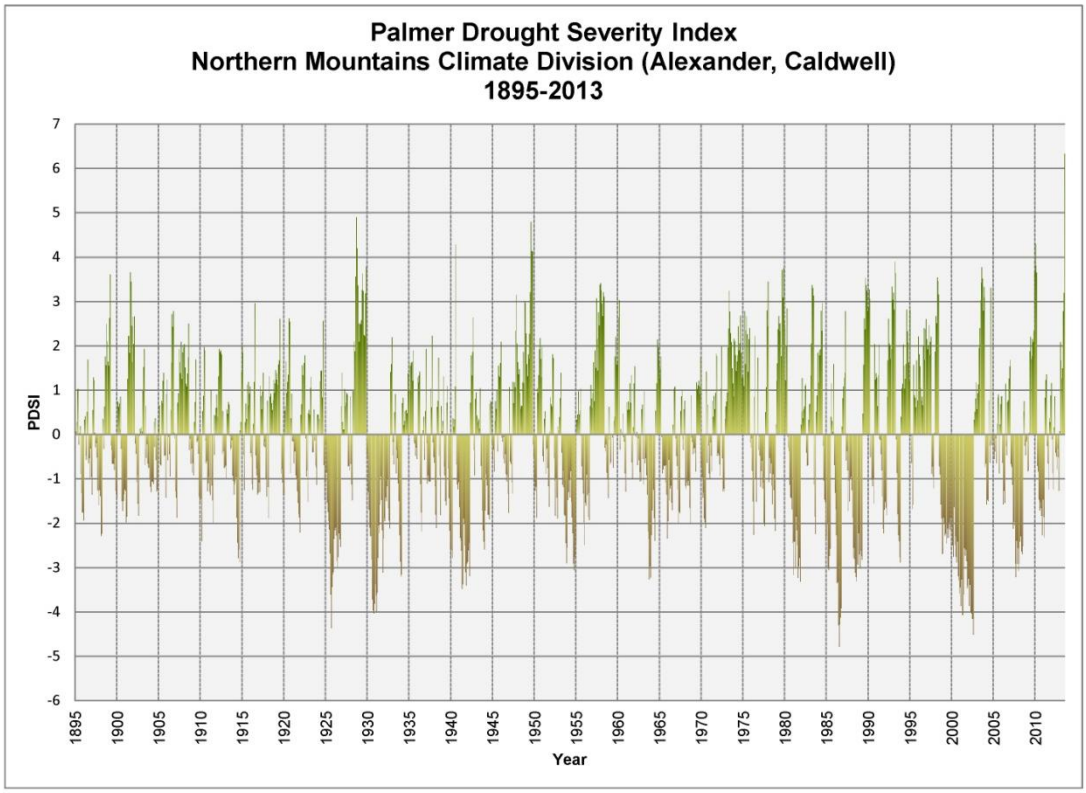
Location Within the Planning Area

Typically the National Weather Service looks at drought and extreme heat as episodes that impact a widespread forecast "zone," and therefore it is not common to pinpoint a specific location within a planning area that is more susceptible to these hazards than others. From this viewpoint, each county is considered uniformly at risk to drought and extreme heat. However, the most significant financial losses are likely to occur in areas that are primarily agricultural.

Extent (Magnitude and Severity)

As supported by the historical occurrences presented in the following subsection, the magnitude and severity of the drought/extreme heat hazard in the planning area is considered to be relatively mild. No deaths, injuries, property damages, or crop damages have been reported according to NCDC since 1998 so it is difficult to assign any specific severity rating to this hazard. **Figure 4.38** shows the Palmer Drought Severity Index (PDSI) for the Northern Mountains Climate Division for Alexander and Caldwell counties from 1895 through July 2013, which is an indication of periodic highs and lows for drought conditions. Similar graphs are available for Burke and Catawba counties.

Figure 4.38: Palmer Drought Severity Index for the Northern Mountains Climate Division



Source: National Oceanic and Atmospheric Administration

Historical Occurrences

The following historical occurrences of drought ranging from 1998 to the present have been identified based on the NCDC Storm Events database (**Table 4.23**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

Table 4.23: Historical Occurrences of Drought

Dates	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
ALEXANDER COUNTY				
07/01/98-11/01/98	0	0	$0	$0
07/01/99-10/01/99	0	0	$0	$0
08/01/00-11/01/00	0	0	$0	$0
02/01/01-12/01/01	0	0	$0	$0
08/01/02	0	0	$0	$0
05/01/04	0	0	$0	$0
05/01/07-12/01/07	0	0	$0	$0
01/01/08-11/01/08	0	0	$0	$0
Subtotal Alexander	0	0	$0	$0

Dates	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
BURKE COUNTY				
07/01/98-11/01/98	0	0	$0	$0
07/01/99-10/01/99	0	0	$0	$0
08/01/00-11/01/00	0	0	$0	$0
02/01/01-12/01/01	0	0	$0	$0
08/01/02	0	0	$0	$0
05/01/04	0	0	$0	$0
Subtotal Burke	0	0	$0	$0
CALDWELL COUNTY				
07/01/98-11/01/98	0	0	$0	$0
07/01/99-10/01/99	0	0	$0	$0
08/01/00-11/01/00	0	0	$0	$0
02/01/01-12/01/01	0	0	$0	$0
08/01/02	0	0	$0	$0
05/01/04	0	0	$0	$0
Subtotal Caldwell	0	0	$0	$0
CATAWBA COUNTY				
07/01/98-11/01/98	0	0	$0	$0
07/01/99-10/01/99	0	0	$0	$0
08/01/00-11/01/00	0	0	$0	$0
02/01/01-12/01/01	0	0	$0	$0
08/01/02	0	0	$0	$0
05/01/04	0	0	$0	$0
05/01/07-12/01/07	0	0	$0	$0
01/01/08-11/01/08	0	0	$0	$0
Subtotal Catawba	0	0	$0	$0
TOTAL UNIFOUR	**0**	**0**	**$0**	**$0**

Source: National Climatic Data Center Storm Events Database

According to NCDC, eight recorded instances of prolonged drought conditions have affected the planning area since 1998, causing an estimated $0 in property damages, $0 in losses to agricultural crops, 0 deaths, and 0 injuries.

Probability of Future Occurrences

Based on the historical occurrences presented in the previous subsection, it is likely that the Unifour Region will continue to experience periods of prolonged drought. It is considered to be unlikely however that the region will experience extreme conditions that would result in deaths, injuries, property damage, or significant crop damage.

Drought/Extreme Heat Hazard Vulnerability

All of the inventoried assets in the Unifour Region are technically exposed to the drought/extreme heat hazard. However, it is not possible through GIS or anecdotal methods to determine specific numbers and values of individual assets that are more vulnerable to this hazard, especially in terms of the built environment. Further, all crops and other natural assets are considered to be equally at

risk based on the data available and therefore no specific breakdown is possible. Any anticipated future damages or losses are expected to be minimal based on historical occurrences and other factors as described above.

4.5.2 Atmospheric Hazards (Severe Storms)

Atmospheric hazards generally have their own individual characteristics, geographic areas that may be affected, time of year they are most likely to occur, severity, and associated risk. Atmospheric hazards include thunderstorm, lightning, and hail; tornado; winter weather; and hurricane and tropical storm. In many cases, a natural hazard event involving atmospheric hazards involves more than one individual atmospheric hazard. For example, severe thunderstorms can produce lighting, hail, tornadoes, and damaging winds. Atmospheric hazards are presented separately from other categories of hazards but they may be interrelated. For example, severe thunderstorms can produce flooding, and other extreme weather events can lead to problems with dams and levees, cause landslides, exacerbate erosion, etc.

4.5.2.1 Thunderstorm, Lightning, and Hail

Thunderstorm, Lightning, and Hail Hazard Description

Thunderstorms are caused when air masses of varying temperatures meet. Rapidly rising warm moist air serves as the "engine" for thunderstorms. These storms can occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours. According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10% of these storms are classified as "severe." Although thunderstorms generally affect a small area when they occur, they are very dangerous because of their ability to generate tornadoes, hailstorms, strong winds, flash flooding, and damaging lightning. While thunderstorms can occur in all regions of the United States, they are most common in the central and southern states because atmospheric conditions in those regions are most ideal for generating these powerful storms.

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.

Hail is a product of thunderstorms or intense showers. Hail is generally white and translucent, consisting of liquid or snow particles encased with layers of ice. Hail is formed within the high portion of a well-organized thunderstorm. When hailstones become too heavy to be caught in an updraft and carried back into the clouds of a thunderstorm (hailstones can be caught in numerous updrafts, adding a coating of ice to the original frozen droplets each time), they then fall as hail, and a hailstorm occurs.

Thunderstorm, Lightning, and Hail Hazard Analysis

Thunderstorms are common throughout the state of North Carolina, and have been known to occur during all calendar months.

Location Within the Planning Area
Thunderstorms, including lightning and hail, are widespread atmospheric disturbances that are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to these hazards. However, it is possible to map historic average annual cloud-to-ground lightning strikes and historic hail reporting by diameter as an indication of where in the Unifour Region these hazards have previously been observed and to what degree (**Figure 4.39**).

Extent (Magnitude and Severity)
Thunderstorms, lightning, and hail are known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries. There is currently no specific overall scale to rank the potential severity of severe events of this type but it is assumed that the magnitude and severity of future occurrences will be similar to that of historical occurrences.

The highest recorded thunderstorm winds in the planning area (according to NCDC) were 75 knots reported in Rutherford College in Burke County in 1997. The largest recorded size of a hailstone in the planning area (according to NCDC) is 4.5 inches reported in Morganton in Burke County (in 2000) and in Newton in Catawba County (in 1998).

There are some national studies that suggest that the risk of severe thunderstorms that produce torrential rain, damaging winds, large hail, and tornadoes may increase due to changes in the climate. However, there is currently no evidence to suggest at what rate this may occur within the Unifour Region.

Historical Occurrences
The following historical occurrences ranging from 1996 to the present have been identified based on the NCDC Storm Events database (**Table 4.24**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

Table 4.24: Summary of Historical Thunderstorm, Lightning, and Hail Occurrences by Participating Jurisdiction (January 1996 through April 2013)

Jurisdiction	Number of Thunder-storm High Wind Events	Number of Lightning Events	Number of Hail Events	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Alexander County (Unincorporated Area)	43	3	16	0	2	$243,000	$0
Taylorsville	23	3	20	0	0	$1,100,000	$0
Subtotal Alexander	66	6	36	0	2	$1,343,000	$0
Burke County (Unincorporated Area)	40	2	23	0	1	$1,040,000	$0
Connelly Springs	3	0	1	0	0	$0	$0
Drexel	2	0	5	0	0	$0	$0
Glen Alpine	6	2	14	0	1	$50,000	$0
Hildebran	1	1	4	0	1	$0	$0
Morganton	42	8	62	0	11	$183,000	$0

Jurisdiction	Number of Thunder-storm High Wind Events	Number of Lightning Events	Number of Hail Events	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Valdese	4	0	3	0	0	$0	$0
Rutherford College	3	1	2	0	1	$25,000	$0
Subtotal Burke	101	14	114	0	15	$1,298,000	$0
Caldwell County (Unincorporated Area)	32	2	41	0	0	$100,000	$0
Cajah's Mountain	0	0	0	0	0	$0	$0
Cedar Rock	0	0	0	0	0	$0	$0
Gamewell	1	0	3	0	0	$0	$0
Granite Falls	6	1	7	0	0	$20,000	$0
Hudson	2	1	0	0	0	$100,000	$0
Lenoir	29	4	27	0	0	$137,000	$0
Rhodhiss	1	0	0	0	0	$0	$0
Sawmills	3	0	0	0	0	$3,000	$0
Subtotal Caldwell	74	8	78	0	0	$260,000	$0
Catawba County (Unincorporated Area)	35	4	17	0	0	$115,000	$0
Brookford	0	0	3	0	0	$0	$0
Catawba	8	0	6	0	0	$20,000	$0
Claremont	13	2	8	0	1	$85,000	$0
Conover	8	2	9	0	0	$11,000	$0
Hickory	45	10	29	0	1	$449,000	$0
Long View	4	0	5	0	0	$10,000	$0
Maiden	8	0	14	0	0	$1,000	$0
Newton	19	2	16	0	0	$10,057,000	$0
Subtotal Catawba	140	20	107	0	2	$10,748,000	$0
TOTAL UNIFOUR	**381**	**48**	**335**	**0**	**19**	**$13,649,000**	**$0**

Source: National Climatic Data Center Storm Events Database

According to NCDC, 764 recorded instances of thunderstorm, lightning, and hail conditions have affected the planning area since 1996, causing an estimated $13,649,000 in property damages, $0 in crop damages, 0 deaths, and 19 reported injuries.

Probability of Future Occurrences

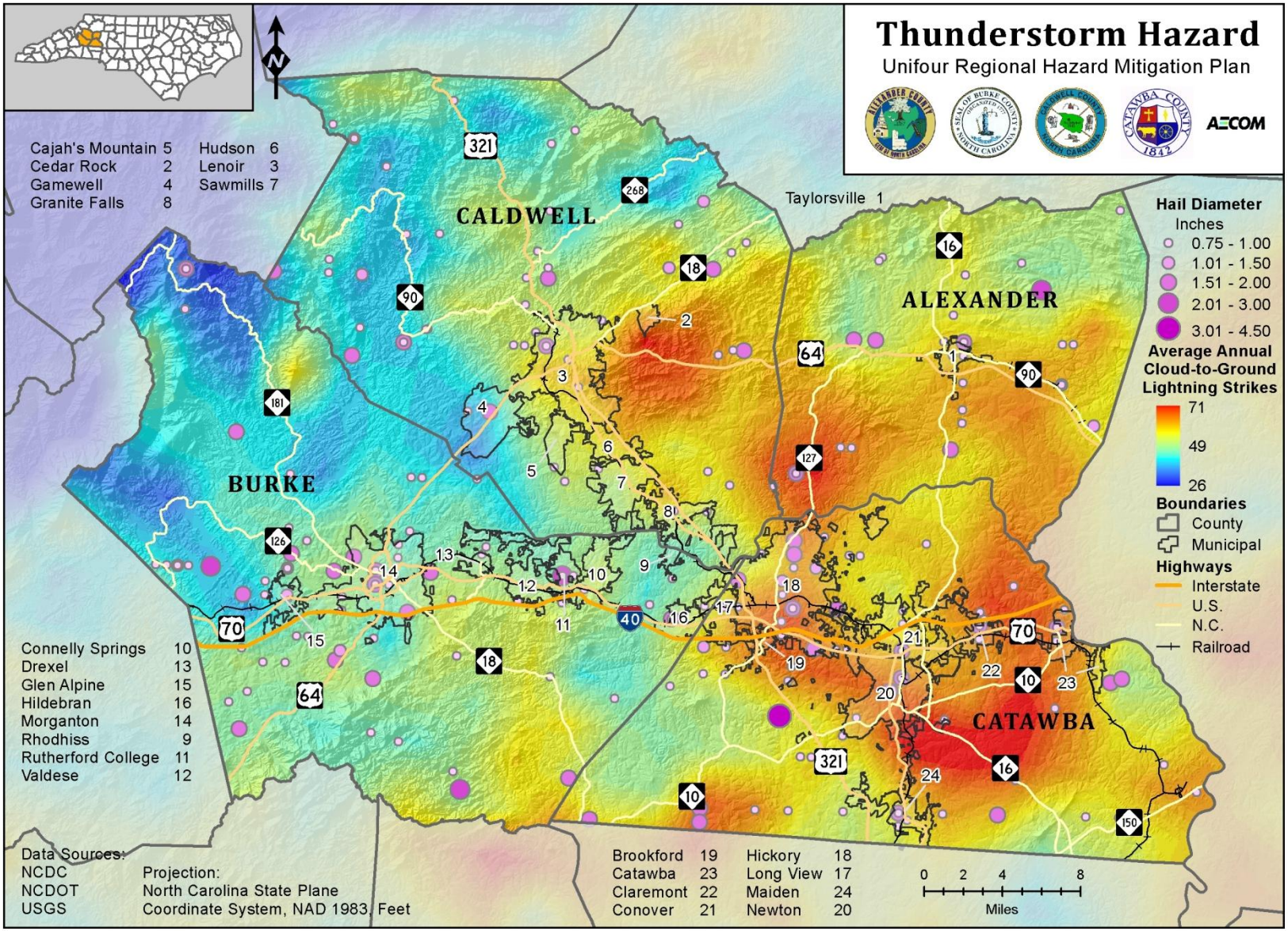
The probability of future occurrences of thunderstorm, lightning, and hail events is considered to be highly likely based on historical occurrences.

There are some national studies that suggest that the frequency of severe thunderstorms that produce torrential rain, damaging winds, large hail, and tornadoes may increase due to changes in the climate. However, there is currently no evidence to suggest at what rate this may occur within the Unifour Region.

Thunderstorm, Lightning, and Hail Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to thunderstorm, lightning, and hail. Any specific vulnerability of individual assets depends greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

Figure 4.39: Historic Lightning and Hail Observations in the Unifour Region



4.5.2.2 Tornado

Tornado Hazard Description

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 to more than 300 mph. The most violent tornadoes have rotating winds of 250 mph or more, and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

The damage caused by tornadoes ranges from gale force to "incredible," depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction such as residential homes (particularly mobile homes). **Table 4.25** shows the Enhanced Fujita Scale for Tornado Damage[11] which was implemented in 2007 to replace the original Fujita Scale and to more accurately measure tornado strength and associated damages.

Table 4.25: Enhanced Fujita Scale for Tornado Damage

Storm Category	Damage Level	3 Second Gust (mph)	Description of Damages
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	Weak	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages might be destroyed.
EF2	Strong	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	Severe	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	Devastating	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
EF5	Incredible	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Source: National Oceanic and Atmospheric Administration, Federal Emergency Management Agency

[11] The Enhanced Fujita Scale for Tornado Damage can be accessed online at http://www.spc.noaa.gov/faq/tornado/ef-scale.html.

The original Fujita Tornado Damage Scale[12] is not shown here in order to avoid confusion. However, it is worth noting that tornado events that occurred prior to 2007 may be referenced by the original F-Scale numbers and associated damages may differ from those presented above.

Each year, an average of more than 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries. They are more likely to occur during the months of March through May and can occur at any time of day, but are likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes might carve out a path over a mile wide and several miles long.

The tornadoes associated with tropical cyclones are most frequent in September and October when the incidence of tropical storm systems is greatest. This type of tornado usually occurs around the perimeter of the storm, and most often to the right and ahead of the storm path or the storm center as it comes ashore. These tornadoes commonly occur as part of large outbreaks and generally move in an easterly direction.

Tornado Hazard Analysis

When compared with other states, North Carolina ranks #22 in number of tornado events, #20 in tornado deaths, #17 in tornado injuries, and #21 in damages. These rankings are based upon data collected for all states and territories for tornado events between 1950 and 1994 (SPC, 2003). According to the State Climate Office of North Carolina, most (43%) of tornado occurrences in North Carolina are minimal (EF0) in intensity, followed by EF1 (37%).

Location Within the Planning Area

Tornadoes are unpredictable manifestations and are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to this hazard. However, it is possible to map historic tornado point locations and damage paths as an indicator of where tornadoes are known to have occurred throughout the planning area (**Figure 4.40**).

Extent (Magnitude and Severity)

Tornadoes of any magnitude and severity are possible within the planning area. Since 1951, the highest magnitude tornado to impact the Unifour Region has been an F4 on the Fujita Scale for Tornado Damage which has occurred on two separate occasions in two different counties in the planning area (see *Historical Occurrences* subsection below).

Historical Occurrences

The following historical occurrences ranging from 1950 to the present have been identified based on the NCDC Storm Events database (**Table 4.26**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

[12] The original Fujita Tornado Damage Scale can be accessed online at http://www.spc.noaa.gov/faq/tornado/f-scale.html.

Table 4.26: Historical Occurrences of Tornadoes

Location	Date	Magnitude	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
ALEXANDER COUNTY						
Alexander County	03/10/92	N/A	N/A	N/A	N/A	N/A
Hiddenite	05/07/98	F0	0	0	$425,000	$0
Bethlehem	05/07/98	F1	0	0	$450,000	$0
Taylorsville	07/07/05	F2	0	0	$150,000	$0
All Healing Springs	04/28/11	EF1	0	0	$0	$0
Paynes Store Road	08/18/11	EF0	0	0	$500,000	$0
Subtotal Alexander	6 Events		0	0	$1,525,000	$0
BURKE COUNTY						
Burke County	04/03/74	F1	N/A	N/A	$25,000	$0
Burke County	05/24/79	F2	N/A	N/A	$250,000	$0
Bridgewater	05/24/00	F0	0	0	$50,000	$0
Morganton	05/24/00	F0	0	0	$0	$0
Morganton	05/11/08	EF0	0	0	$0	$0
Brindletown	09/27/10	EF1	0	0	$400,000	$0
Burke Chapel	01/11/12	EF2	0	8	$13,400,000	$0
Subtotal Burke	7 Events		0	8	$14,125,000	$0
CALDWELL COUNTY						
Caldwell County	05/27/73	F1	0	0	$25,000	$0
Caldwell County	04/04/74	F2	0	0	$250,000	$0
Caldwell County	07/09/77	F0	0	0	$25,000	$0
Caldwell County	05/05/89	F2	0	0	$250,000	$0
Dudley Shoals	08/16/94	F0	0	0	$50,000	$0
Dudley Shoals	05/07/98	F4	0	2	$1,100,000	$0
Sawmills	04/28/11	EF1	0	1	$0	$0
Rhodhiss	01/11/12	EF0	0	0	$0	$0
Subtotal Caldwell	8 Events		0	3	$1,700,000	$0
CATAWBA COUNTY						
Catawba County	08/09/51	F2	0	0	$25,000	$0
Catawba County	08/18/54	F2	0	0	$25,000	$0
Catawba County	05/23/73	F1	0	2	$25,000	$0
Catawba County	05/27/73	F1	0	0	$250,000	$0
Catawba County	03/14/75	F1	0	0	$3,000	$0
Catawba County	05/25/75	F1	0	0	$3,000	$0
Catawba County	09/18/82	F1	0	0	$25,000	$0
Catawba County	05/05/89	F4	0	3	$25,000,000	$0
Catawba County	03/07/92	F0	0	0	$3,000	$0
Catawba County	11/22/92	F1	0	0	$250,000	$0
Northeast Hickory	08/16/94	F2	0	1	$500,000	$0
Hickory	09/28/98	F0	0	0	$20,000	$0

Location	Date	Magnitude	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Plateau	10/26/10	EF0	0	0	$0	$0
Claremont	10/26/10	EF2	0	0	$6,610,000	$0
Terrell	10/26/10	EF0	0	0	$0	$0
Subtotal Catawba	15 Events		0	6	$32,739,000	$0
TOTAL UNIFOUR	**36 Events**		**0**	**17**	**$50,089,000**	**$0**

Source: National Climatic Data Center Storm Events Database

According to the information provided in the preceding table, 36 recorded instances of tornadoes have affected the planning area since 1950, causing an estimated $50,089,000 in property damage, $0 in crop damages, 0 deaths, and 17 injuries. The highest magnitude tornado on record is an F4. The lowest magnitude tornado on record is an F0.

Table 4.27 provides a summary of this historical information by participating jurisdiction.

Table 4.27: Summary of Historical Tornado Occurrences by Jurisdiction

Jurisdiction	Number of Occurrences	Maximum Magnitude	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Alexander County (Unincorporated Area)	5	F1	0	0	$1,375,000	$0
Taylorsville	1	F2	0	0	$150,000	$0
Subtotal Alexander	6	F2	0	0	$1,525,000	$0
Burke County (Unincorporated Area)	5	EF2	0	8	$14,125,000	$0
Connelly Springs	0	N/A	0	0	$0	$0
Drexel	0	N/A	0	0	$0	$0
Glen Alpine	0	N/A	0	0	$0	$0
Hildebran	0	N/A	0	0	$0	$0
Morganton	2	EF0	0	0	$0	$0
Valdese	0	N/A	0	0	$0	$0
Rutherford College	0	N/A	0	0	$0	$0
Subtotal Burke	7	EF2	0	8	$14,125,000	$0
Caldwell County (Unincorporated Area)	6	F4	0	2	$1,700,000	
Cajah's Mountain	0	N/A	0	0	$0	$0
Cedar Rock	0	N/A	0	0	$0	$0
Gamewell	0	N/A	0	0	$0	$0
Granite Falls	0	N/A	0	0	$0	$0
Hudson	0	N/A	0	0	$0	$0
Lenoir	0	N/A	0	0	$0	$0
Rhodhiss	1	EF0	0	0	$0	$0
Sawmills	1	EF1	0	1	$0	$0
Subtotal Caldwell	8	F4	0	3	$1,700,000	$0

Jurisdiction	Number of Occurrences	Maximum Magnitude	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Catawba County (Unincorporated Area)	13	F4	0	6	$26,109,000	$0
Brookford	0	N/A	0	0	$0	$0
Catawba	0	N/A	0	0	$0	$0
Claremont	1	EF2	0	0	$6,610,000	$0
Conover	0	N/A	0	0	$0	$0
Hickory	1	F0	0	0	$20,000	$0
Long View	0	N/A	0	0	$0	$0
Maiden	0	N/A	0	0	$0	$0
Newton	0	N/A	0	0	$0	$0
Subtotal Catawba	15	F4	0	6	$32,739,000	$0
TOTAL UNIFOUR	**36**	**F4**	**0**	**17**	**$50,089,000**	**$0**

Source: National Climatic Data Center Storm Events Database

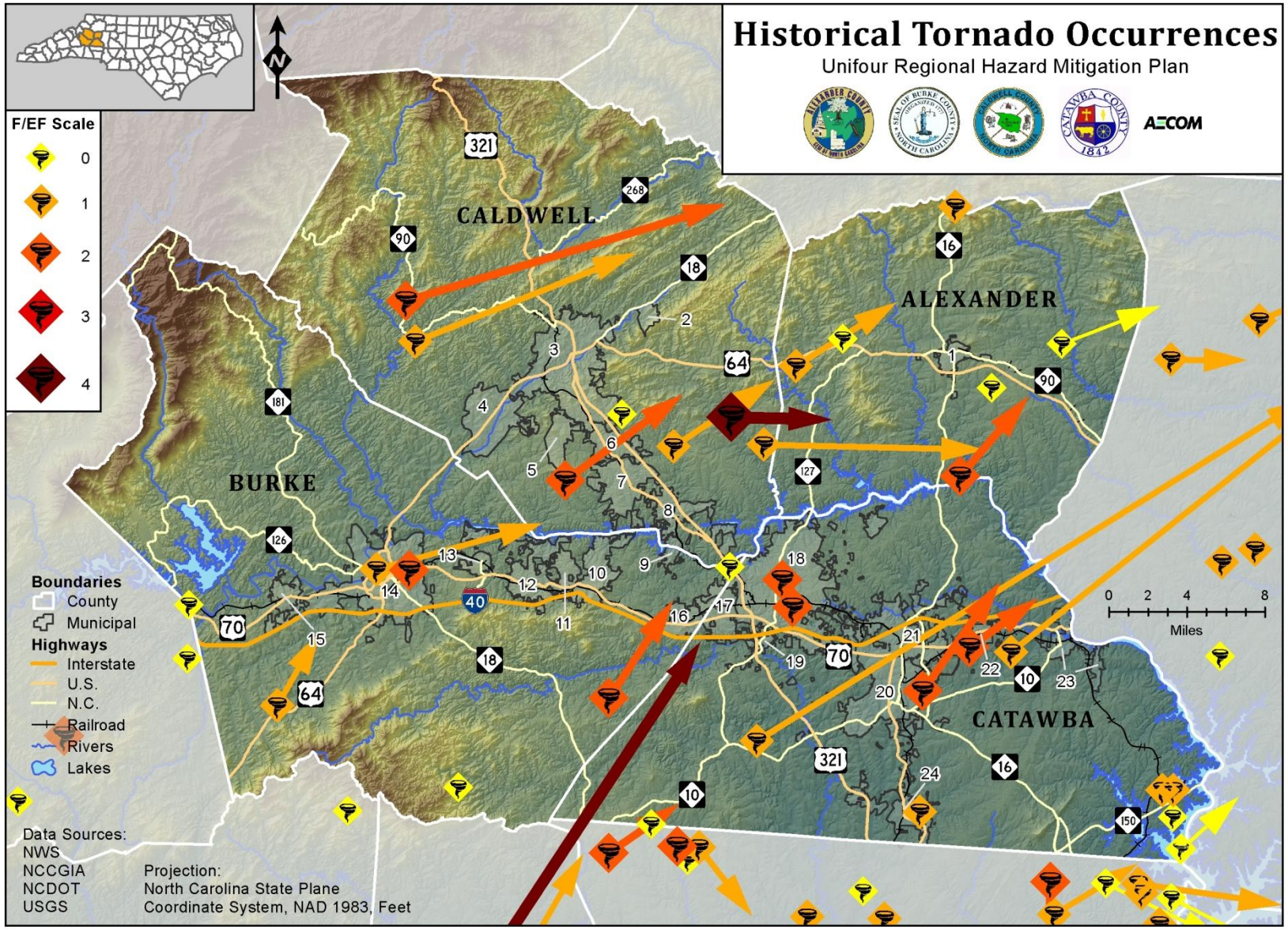
Probability of Future Occurrences

Future occurrences of potentially damaging tornadoes in the planning area are considered to be highly likely.

Tornado Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to potential tornado activity. Any specific vulnerability of individual assets would depend greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

Figure 4.40: Historic Tornado Point Locations and Damage Paths in the Unifour Region



4.5.2.3 Winter Weather

Winter Weather Hazard Description

In general, winter weather events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation, all of which may create locally hazardous conditions regardless of the magnitude of the overall event. Blizzards, the most dangerous of all winter storms, combine heavy snowfall, low temperatures, and winds of at least 35 mph, reducing visibility to only a few yards. Blizzards have been reported in a number of counties in western North Carolina. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.

Winter Weather Hazard Analysis

Nearly the entire continental United States is susceptible to severe winter weather events. Some winter storms may be large enough to affect several states, while others might affect limited, more localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Unifour Region is accustomed to severe winter weather conditions, and frequently receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

Location Within the Planning Area

Winter weather, including blizzards, frosts/freezes, heavy snow and sleet, are widespread atmospheric conditions that are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to this hazard. However, it is possible to map average annual snowfall and greatest one-day snowfall as an indicator of where severe conditions have been observed historically in the Unifour Region (**Figure 5.41** and **5.42**).

Extent (Magnitude and Severity)

There is currently no overall scale to rank the potential severity of severe winter weather events of this type but it is assumed that the magnitude and severity of future occurrences will be similar to that of historical occurrences.

Historical Occurrences

The following historical occurrences ranging from 1996 to the present have been identified based on the NCDC Storm Events database. NCDC presents winter weather hazards under multiple subcategories. **Table 4.28** shows occurrences of winter weather, blizzards, frost/freezes, heavy snow, and sleet. Because winter weather affects a large geographic area, this information is processed by NCDC in forecast "zones," and therefore a municipal-level breakdown is not provided. Similarly, it is important to note that many of the events shown for one county are the same events that are counted for one of the other four counties in the planning area. For these reasons, totals are not provided in the table for the Unifour area as a whole as some double-counting would be inherent in the numbers. Also, only those historical occurrences listed in the NCDC database are shown here and other smaller, unrecorded, or unreported events may have occurred within the planning area during this timeframe.

Figure 4.40: Average Annual Snowfall in the Unifour Region

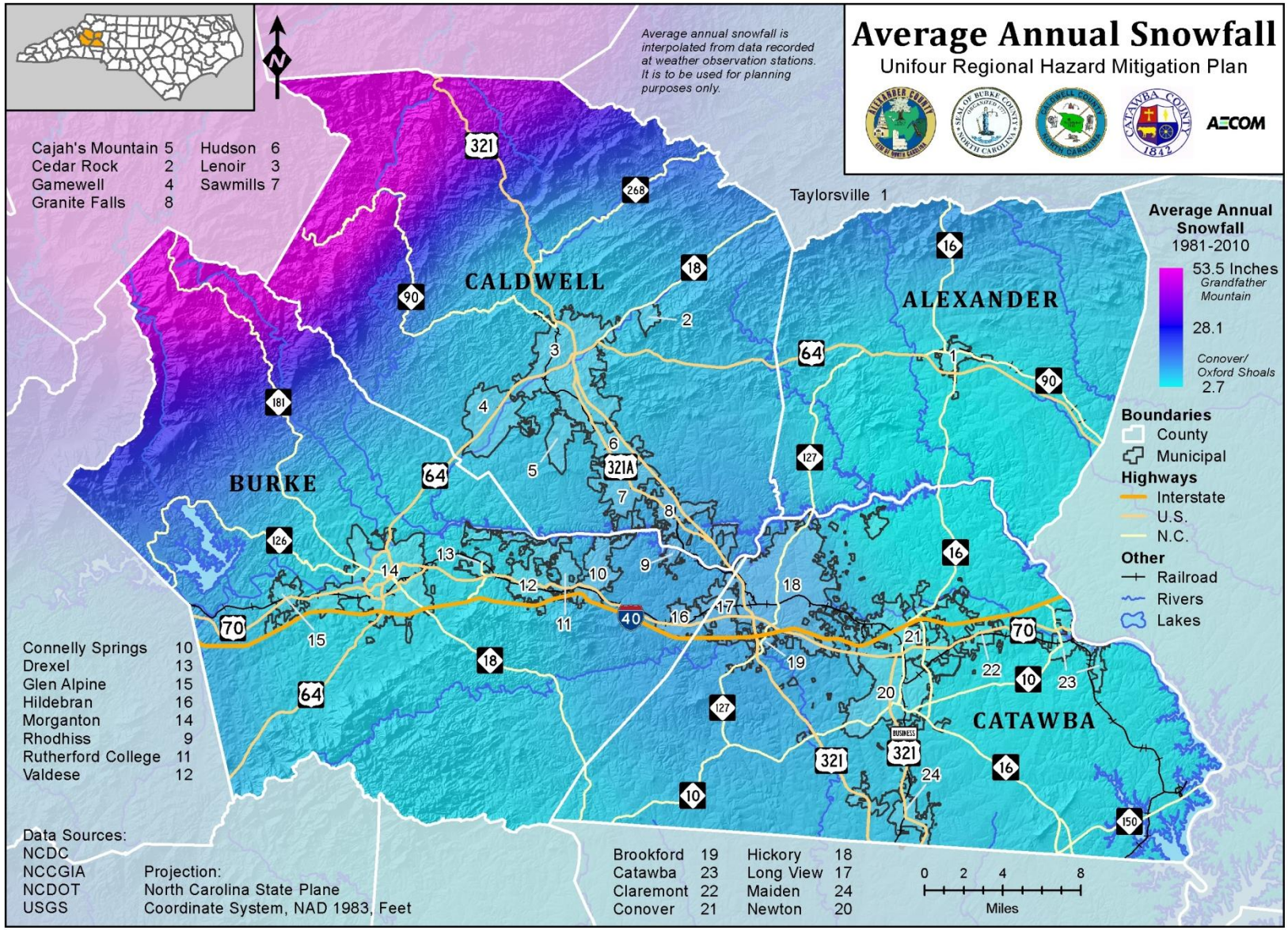


Figure 4.41: Greatest One-Day Snowfall in the Unifour Region

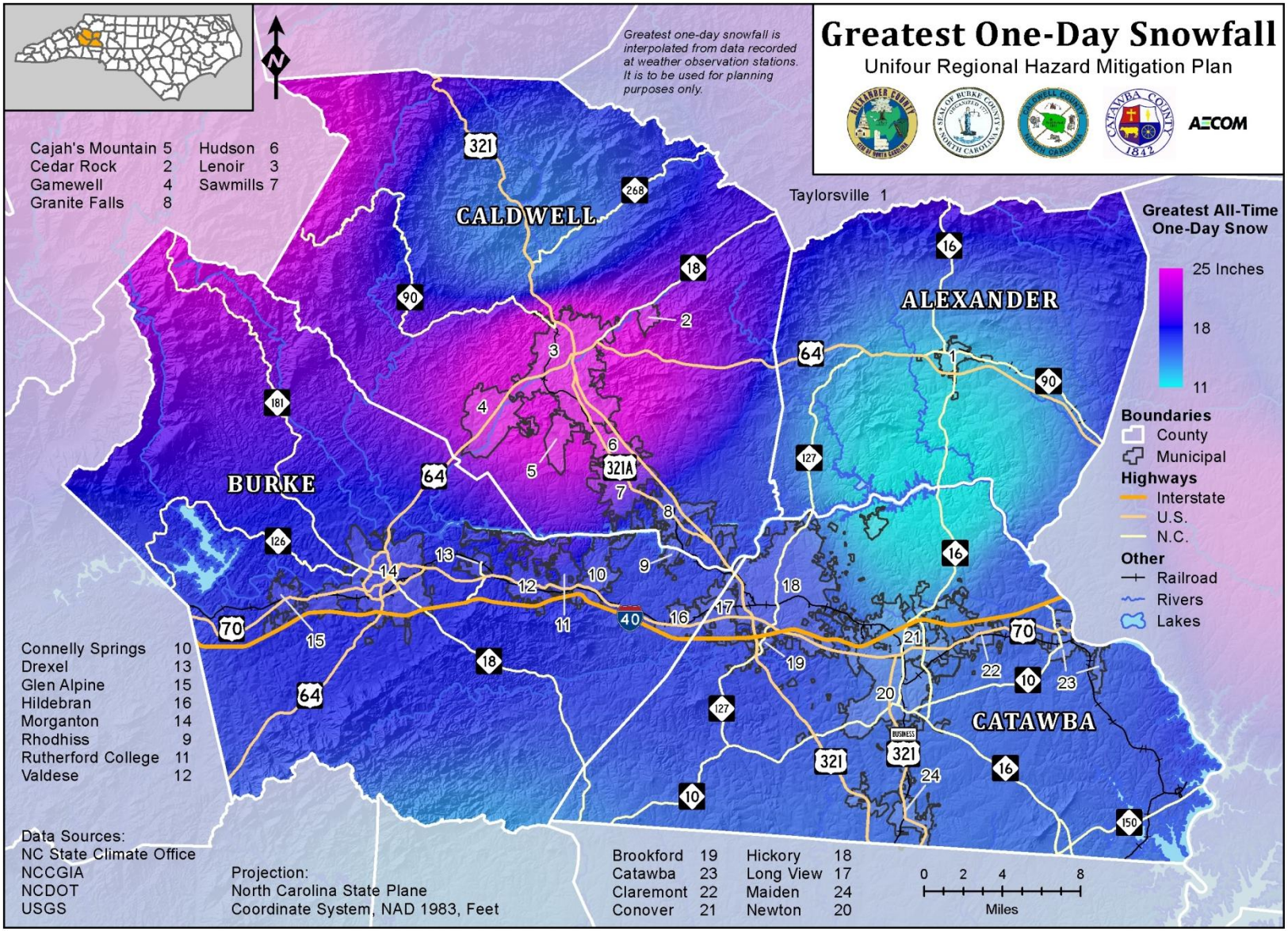


Table 4.28: Summary of Winter Weather Occurrences by Participating Jurisdiction (January 1996 through April 2013)

Jurisdiction	Number of Winter Weather Events	Number of Blizzard Events	Number of Frost/ Freeze Events	Number of Heavy Snow Events	Number of Sleet Events	Deaths	Injuries	Reported Property Damage	Reported Crop Damage
Alexander County	31	0	3	19	7	0	0	$0	$1,000,000
Burke County	26	0	1	23	6	0	0	$2,000	$0
Caldwell County	22	0	1	18	5	0	0	$0	$0
Catawba County	31	0	3	18	5	0	0	$2,000	$1,000,000

Source: National Climatic Data Center Storm Events Database

In summary, a total of at least 31 separate winter weather events, three frost/freeze events, 23 heavy snow events, and seven sleet events have affected the planning area since 1996, causing less than $5,000 in property damages and at least $1 million in crop damages (due to freezes). No deaths or injuries from winter weather have been reported.

Probability of Future Occurrences

It is assumed that the probably of future occurrences of winter weather events in the Unifour Region is highly likely and is anticipated to be similar in nature to known historical occurrences.

Winter Weather Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to potential winter weather. Any specific vulnerabilities of individual assets would depend greatly on individual design, building characteristics (such as a flat roof), and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

4.5.2.4 Hurricane and Tropical Storm

Hurricane/Tropical Storm Hazard Description

Hurricanes and tropical storms are classified as cyclones and are defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation that causes inland flooding, and tornadoes. While mentioned here, each of these individual forces are more thoroughly addressed as separate hazards within this risk assessment (e.g., flood and tornado).

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in this basin is six.

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 mph, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 mph the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (**Table 4.29**), which rates hurricane intensity in categories on a scale of 1 to 5, with category 5 being the most intense.

Table 4.29: Saffir-Simpson Scale for Hurricanes

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
1	74–95	Greater than 980	3–5
2	96–110	979–965	6–8
3	111–130	964–945	9–12
4	131–155	944–920	13–18
5	155 +	Less than 920	19+

Source: National Oceanic and Atmospheric Administration

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes, and while hurricanes within this range comprise only 20% of total tropical cyclone landfalls, they account for over 70% of the damage in the United States. **Table 4.30** describes the damage that could be expected for each

category of hurricane. Damage during hurricanes might also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

Table 4.30: Hurricane Damage Classification

Category	Damage Level	Description of Damages
1	Minimal	No real damage to buildings. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.
2	Moderate	Some roofing material, door and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings might break their moorings.
3	Extensive	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 might be flooded well inland.
4	Extreme	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain might be flooded well inland.
5	Catastrophic	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas might be required.

Source: National Oceanic and Atmospheric Administration, Federal Emergency Management Agency

Hurricane/Tropical Storm Hazard Analysis

On average, North Carolina experiences a hurricane approximately once every two years. Substantial hurricane damage is typically most likely to be expected in the easternmost counties of the state; however, hurricane and tropical storm-force winds have significantly impacted areas far inland, including Alexander, Burke, Caldwell, and Catawba counties. In fact, 33 such storms have passed within 75 miles of the planning area since 1859, 10 of which crossed directly through the planning area (see **Figure 4.42** and **Table 4.31**). The total number of 33 includes two Category 1 hurricanes, 12 tropical storms, 12 tropical depressions, and 7 extra-tropical storms. Extra-tropical storms were included in the analysis due to the comparable wind speeds present with those events.

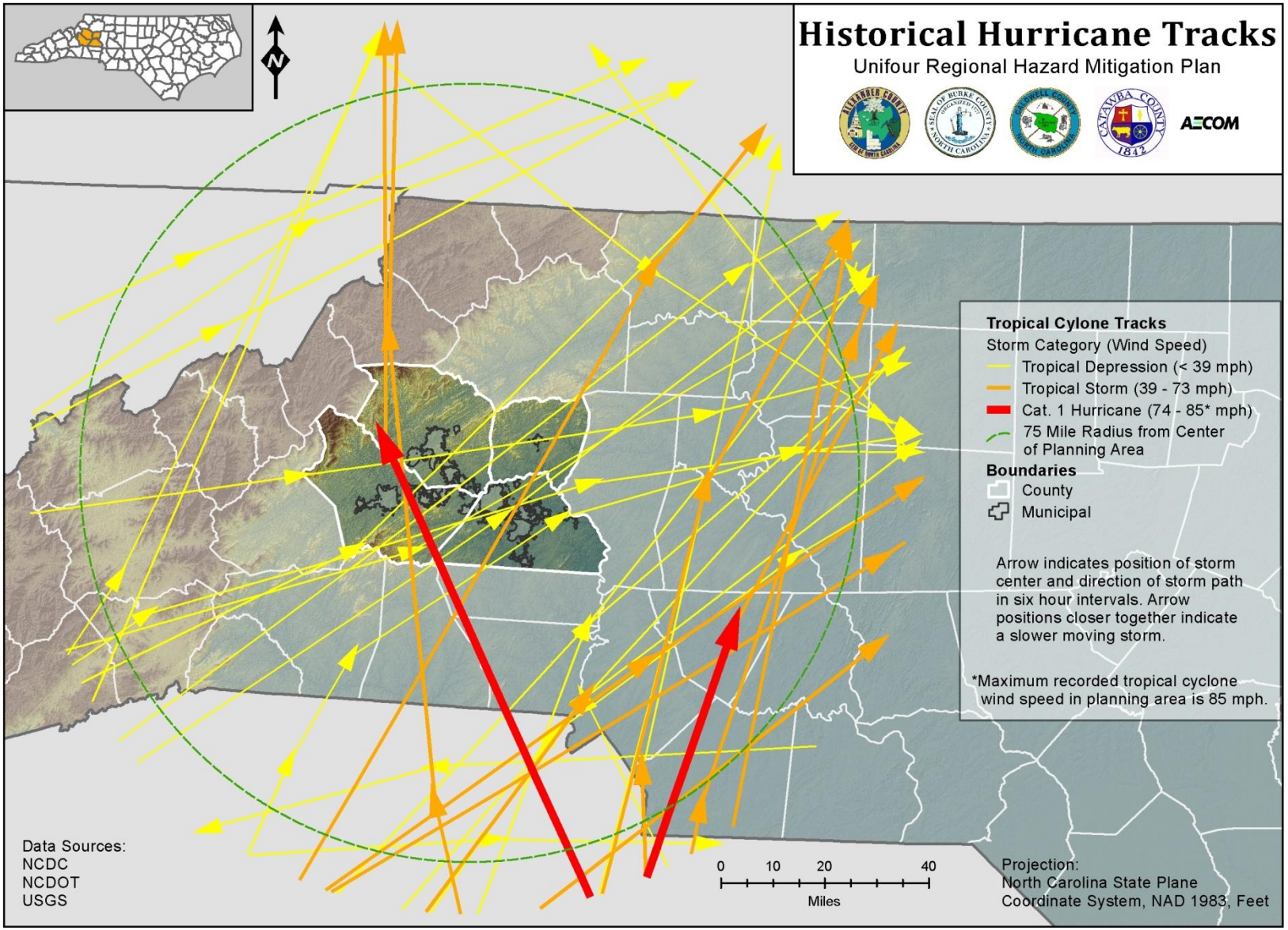
Location Within the Planning Area

Hurricanes and tropical storms are widespread atmospheric disturbances that are not isolated to a specific geographic location within the planning area. Therefore it is assumed that the entire planning area is exposed to this hazard.

Extent (Magnitude and Severity)

Hurricanes and tropical storms of any magnitude and severity are theoretically possible within the planning area, however major hurricanes (Category 3 and greater) are less likely to retain that classification as far inland as the Unifour Region. Since the 1850s, the greatest magnitude hurricane to impact the planning area has been a Category 1 hurricane in 1989 (Hurricane Hugo) (see *Historical Occurrences* section below). A Category 1 hurricane typically results in minimal damages, including damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage, etc. that is not applicable to the planning area.

Figure 4.42: Historical Hurricane and Tropical Storm Tracks in the Unifour Region



Historical Occurrences

Table 4.31 lists the 34 hurricane and tropical storm paths that have crossed within a 75 statute mile radius of the mean center of the planning area from 1859 to 2011 (the data from the National Hurricane Center is only current through 2011).

Table 4.31: Historical Occurrences of Hurricane Storm Paths Crossing within 75 Miles of the Planning Area

Name	Date	Magnitude	Maximum Recorded Wind Speed (mph)
Unnamed	09/17/1859	Tropical Storm	45
Unnamed	09/11/1882	Tropical Storm	45
Unnamed	06/22/1886	Tropical Storm	45
Unnamed	09/24/1889	Tropical Storm	50
Unnamed	08/28/1893	Category 1 Hurricane	85
Unnamed	07/19/1901	Tropical Depression	35
Unnamed	10/11/1902	Extra-tropical Storm	35
Unnamed	10/11/1905	Extra-tropical Storm	25
Unnamed	09/23/1907	Extra-tropical Storm	35
Unnamed	08/30/1911	Extra-tropical Storm	30
Unnamed	09/04/1913	Tropical Storm	45
Unnamed	08/03/1915	Tropical Depression	35
Unnamed	09/23/1920	Tropical Storm	65
Unnamed	10/03/1927	Tropical Storm	45
Unnamed	08/11/1928	Extra-tropical Storm	30
Unnamed	08/18/1939	Tropical Depression	30
Unnamed	08/14/1940	Extra-tropical Storm	35
Unnamed	08/28/1949	Tropical Storm	45
Able	08/31/1952	Tropical Storm	50
Gracie	09/30/1959	Tropical Storm	70
Cleo	08/30/1964	Tropical Depression	30
Abby	06/08/1968	Tropical Depression	30
Babe	09/08/1977	Tropical Depression	30
David	09/05/1979	Tropical Storm	65
Bob	07/25/1985	Tropical Storm	65
Danny	08/18/1985	Tropical Depression	30
Chris	08/29/1988	Tropical Depression	30
Hugo	09/22/1989	Category 1 Hurricane	85
Beryl	08/17/1994	Tropical Depression	15
Bill	07/02/2003	Tropical Depression	25
Ivan	09/09/2004	Tropical Depression	25
Jeanne	09/13/2004	Tropical Depression	25
Cindy	07/03/2005	Extra-tropical Storm	20

Source: NOAA National Hurricane Center

Figure 4.42 is based on the mapped paths of the storm systems shown in Table 4.31.

Probability of Future Occurrences
Future occurrences of hurricanes and tropical storms are considered to be likely.

Hurricane/Tropical Storm Hazard Vulnerability
All of the inventoried assets in the Unifour Region are exposed to potential hurricane and tropical storm events. Any specific vulnerability of individual assets would depend greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

4.5.3 Geologic Hazards

Geologic hazards include landslides, earthquakes, and sinkholes. As with the other hazard types discussed in this risk assessment, geologic hazards may occur as a result of or in combination with other hazards. For example, excessive rainfall can contribute to landslide occurrences, etc.

4.5.3.1 Landslide

Landslide Hazard Description
A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels. Landslides occur when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place.

There are several types of landslides: rock falls, rock topple, slides, slumps, and debris flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Slumps are landslides that typically occur on smaller slopes when loosely consolidated materials or rock layers move a short distance down a slope, typically in a rotational fashion. Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet.

In the United States, it is estimated that landslides cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

Landslide Hazard Analysis

Location Within the Planning Area

Figure 4.43 shows information developed by the United States Geological Survey (USGS) which depicts areas of landslide incidence and susceptibility. This information suggests that there is some significant potential risk that is not supported by any historical data or detailed landslide hazard mapping presently available for the planning area. In addition, **Figure 4.44** shows slope and average annual precipitation data for the Unifour Region.

Figure 4.43: Landslide Susceptibility and Incidence Data for the Unifour Region

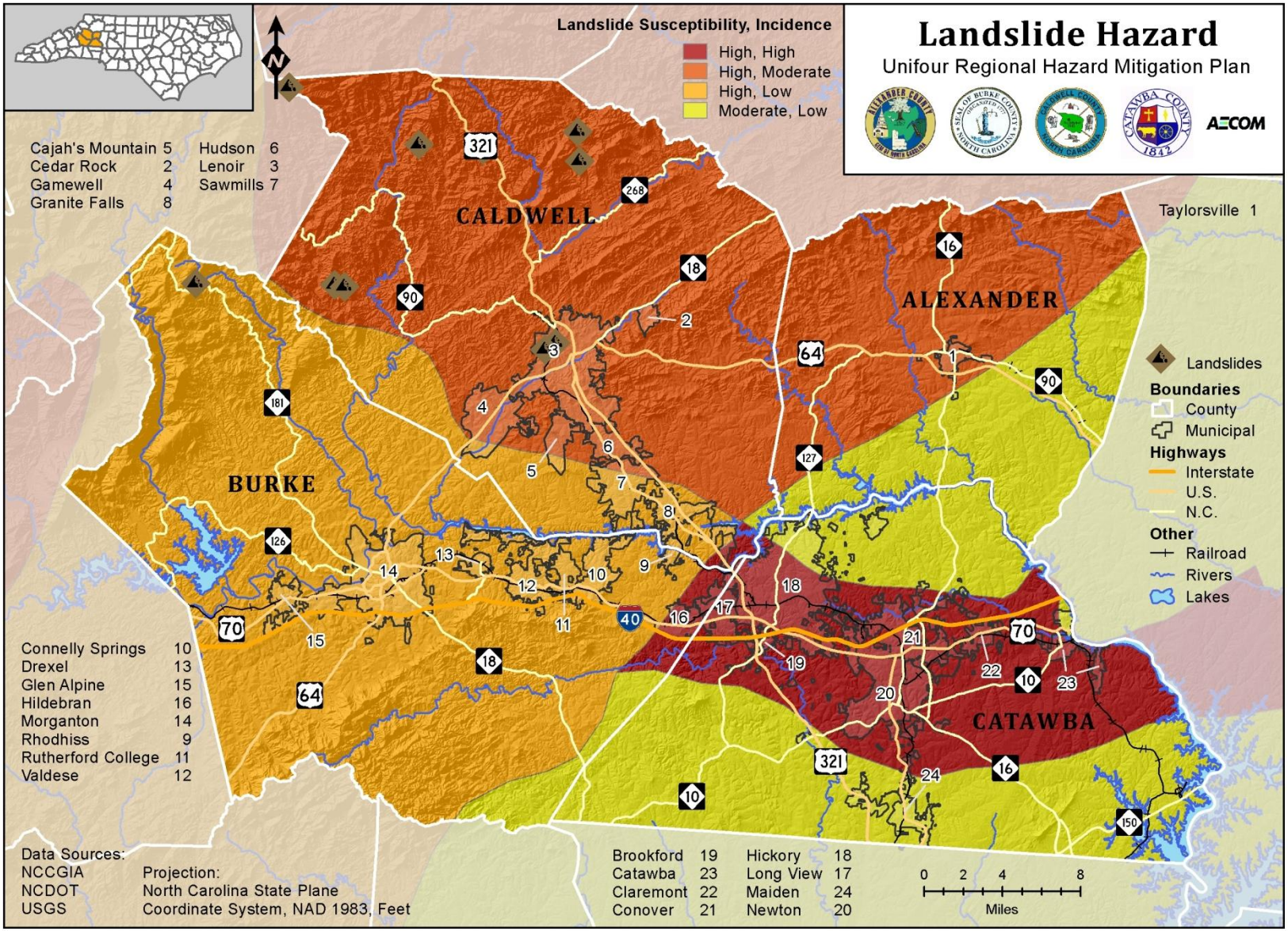
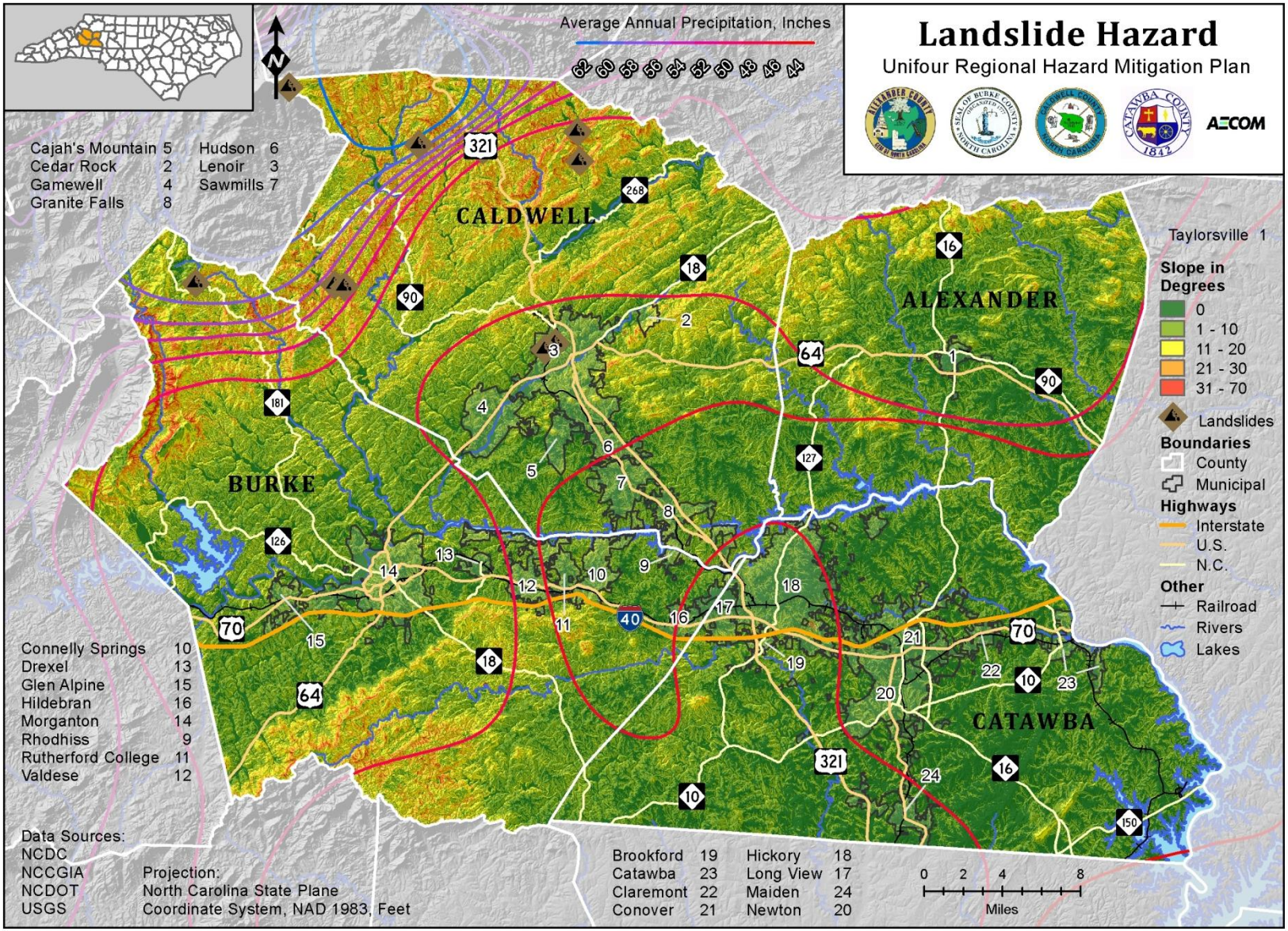


Figure 4.43: Slope and Average Annual Precipitation Data for the Unifour Region



Extent (Magnitude and Severity)
The magnitude and severity of landslides can vary greatly depending on terrain and other highly localized factors. In addition, there is no overall severity rating scale for landslides that can be applied to the Unifour Region.

Historical Occurrences
Table 4.32 shows historical occurrences of landslides in the planning area.

Table 4.32: Historical Occurrences of Landslides

Location	Date	Cause
ALEXANDER COUNTY		
N/A	N/A	N/A
Subtotal Alexander	0 Events	
BURKE COUNTY		
N/A	N/A	N/A
Subtotal Burke	0 Events	
CALDWELL COUNTY		
U.S. Highway 321 6 miles south of Blowing Rock	04/11/03	Landslide carried away earth beneath about 8 feet of the highway's northbound shoulder
-	09/04	Result of heavy rains/flooding
-	06/05	Result of heavy rains/flooding
-	07/13	-
Subtotal Caldwell	4 Events	
CATAWBA COUNTY		
N/A	N/A	N/A
Subtotal Catawba	0 Events	
TOTAL UNIFOUR	**4 Events**	

Landslide Hazard Vulnerability
Sufficient hazard information is not currently available with which to conduct a detailed vulnerability assessment. In addition, any specific vulnerability of individual assets would depend on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

4.5.3.2 Earthquake

Earthquake Hazard Description

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength, a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 4.33**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, with an "I" corresponding to imperceptible (instrumental) events, "IV" corresponding to moderate (felt by people awake) events, to "XII" for catastrophic (total destruction) events. A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 4.34**.

Table 4.33: Richter Scale

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally not felt but recorded.
3.5 to 5.4	Often felt but rarely causes damage.
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 to 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 to 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: Federal Emergency Management Agency.

Table 4.34: Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	<4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	>8.1

Source: Federal Emergency Management Agency.

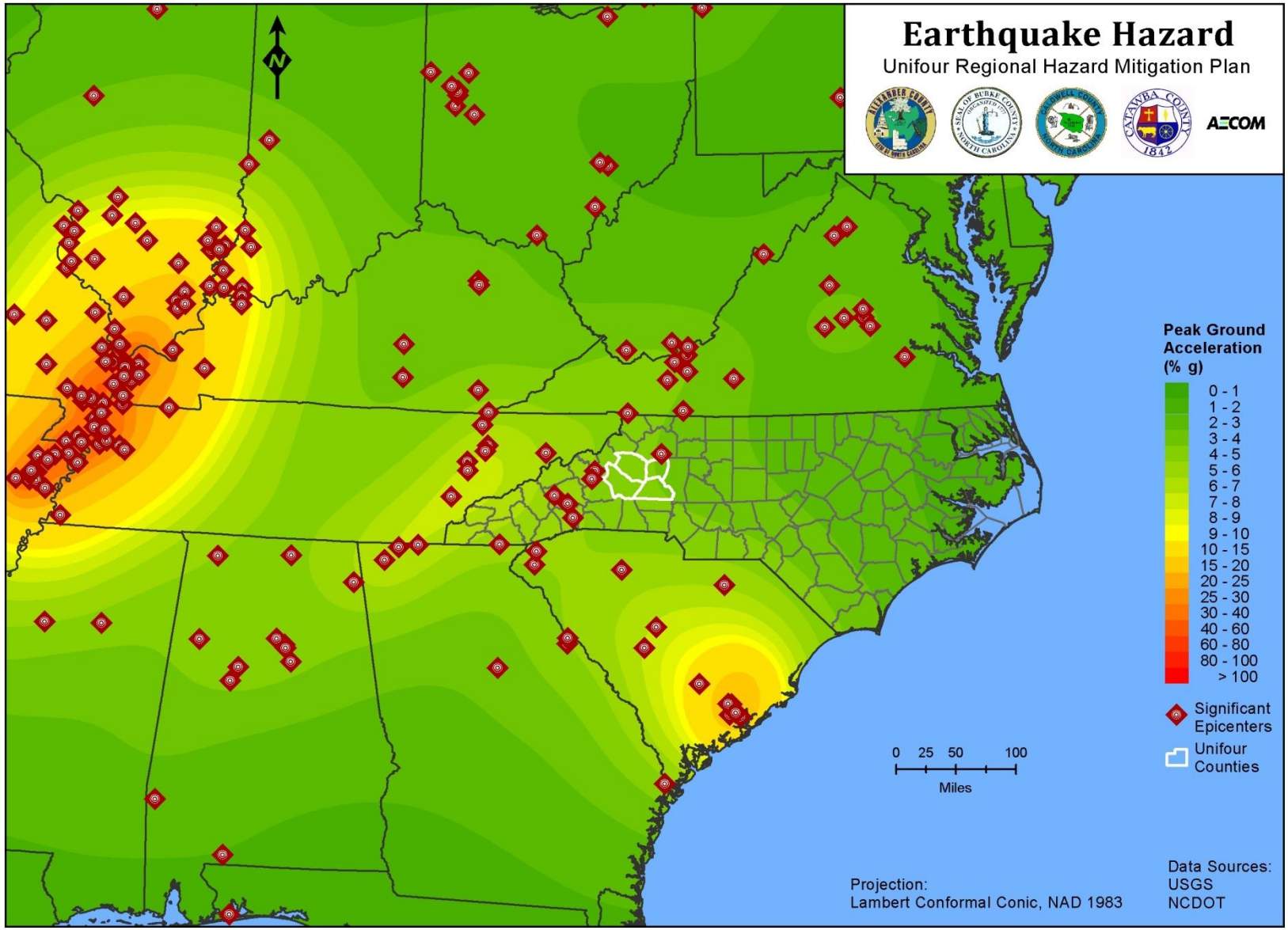
Earthquake Hazard Analysis

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and the New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina.

Location Within the Planning Area

Figure 4.44 shows peak ground acceleration and historic earthquake epicenters for the state of North Carolina and relevant surrounding areas.

Figure 4.44: Peak Ground Acceleration and Historic Epicenters Relevant to the Unifour Region



Extent (Magnitude and Severity)
The most severe earthquake felt in the Unifour Region since the mid-1800s was a six (VI) on the Modified Mercalli Intensity Scale. This event occurred in 1886, the effects of which were reported specifically in the City of Hickory which was 337 miles from the epicenter of the earthquake. The affects of this magnitude earthquake typically include trees swaying, suspended objects swinging, and objects falling off of shelves. Earthquakes of greater magnitude may be possible within the region, however this is known to be the greatest severity currently on record.

Historical Occurrences
The following 10 historical occurrences ranging from 1886 to 2013 have been identified based on the National Geophysical Data Center (NGDC) Earthquake Intensity Database (**Table 4.35**). It should be noted that only those historical occurrences listed in the NGDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

Table 4.35: Historical Occurrences of Earthquake

Date	Location	Intensity (MMI)	Details
09/01/1886	Hickory	VI	337 miles from epicenter
02/21/1916	Hickory	V	107 miles from epicenter
08/26/1916	Newton	IV	42 miles from epicenter
11/03/1928	Newton	III	130 miles from epicenter
05/13/1957	Claremont	IV	76 miles from epicenter
05/13/1957	Conover	IV	70 miles from epicenter
05/13/1957	Hickory	V	59 miles from epicenter
05/13/1957	Maiden	IV	73 miles from epicenter
05/13/1957	Newton	IV	71 miles from epicenter
09/13/1976	Long View	II	109 miles from epicenter

Source: National Geophysical Data Center/World Data Service (NGDC/WDS) Significant Earthquake Database.

Probability of Future Occurrences
The probability of significant, damaging earthquake events affecting the Unifour Region is considered to be unlikely. However, it is likely that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light may affect the region.

Earthquake Hazard Vulnerability
Due to the relatively low probability of an earthquake occurrence producing significant damages in the participating jurisdictions, a detailed vulnerability assessment was not conducted for this hazard.

4.5.3.3 Sinkhole

Sinkhole Hazard Description

There are three general types of sinkholes known to occur in North Carolina: geologic, debris-related, and infrastructure failure-related. Typical geologic sinkholes are directly related to the dissolving of limestone or other carbonate rocks by rain water which has become slightly acidic from contact with either tannic acid from leaf litter or acids emitted from the burning of fossil fuels. This is the process of how caverns are formed. The surface water melts the carbonate as the water percolates downward. When a cavern is created, the thickness of the remaining carbonate continues to diminish until the weight of the cover rock exceeds the strength of the cover rock. The hole which is created can be circular or elongated.

The second type of sinkhole is one that is debris-related and is caused by the decomposition of building materials such as buried wood. Many times a circular sinkhole develops along a newly paved or widened road, where a tree was cut down but the root ball was never removed. When the root ball rots, the pavement collapses.

The final type of sinkhole is one associated with the failure of buried infrastructure, such as pipes, culverts, or the settling of soil used to cover buried power lines, cables, water lines, or sewer lines. In most cases, sinkholes associated with settling are from recently buried pipes or utility lines, where the cover material was not completely compacted and settled naturally over time. Significant infrastructure failure-related sinkholes are also caused by water (stormwater, potable water, or sewer) which carries soil and sediment from a crack, hole, or other point of failure in a pipe. The failure of a stormwater pipe can be dramatic because, during storm events when there are high water flows, there can be very rapid erosion of the soil and fill material used to cover buried pipes.

In addition to the sinkhole causes explained above, there is a fourth potential cause of ground collapse in North Carolina and that is mine collapse. While not specifically considered a sinkhole occurrence, the effects are similar.

Sinkhole Hazard Analysis

Location Within the Planning Area

The geologic formations under Alexander, Burke, Caldwell, and Catawba counties are composed of igneous and metamorphic granitic rocks, which are not the types of rocks which can be dissolved by acidic water. Therefore, geologic sinkholes are not a significant concern for the planning area.

Debris and infrastructure-related sinkholes are largely dependant upon undocumented human activity, construction practices, and natural course of events and therefore no portions of the planning area can be specifically mapped as known sinkhole hazard areas.

Extent (Magnitude and Severity)

Sinkholes are typically small, highly localized events that can have a varied magnitude and severity based on a wide range of site-specific variables.

Historical Occurrences

There is limited historical information available on previous sinkhole occurrences in the planning area, however **Table 4.36** shows four events that have occurred in Catawba County (specifically in the City of Hickory) since 2002. Each event was the result of collapse of buried infrastructure.

Table 4.36: Historical Occurrences of Sinkhole

Date	Location	Details
08/17/2002	1100 Hwy 70 SE, Hickory	Known for having swallowed a Corvette and being in litigation for years. Hole was closed and filled in and reappeared in July 2005.
07/2005	1340 Hwy 321 NW, Hickory	Parking lot/foundation of building collapsing into sinkhole.
05/19/2011	1975 Hwy 70 SE, Hickory	Opened on one lane of five-lane road.
07/30/2013	3200 20th Avenue SE, Hickory	Sinkhole in road post-flood.

Source: Catawba County Emergency Management.

Probability of Future Occurrences

Due to the multiple potential causes of sinkholes and a lack of historical and risk assessment data from which to prepare calculations, it is unknown what the probability of future occurrences within the planning area is likely to be.

Sinkhole Hazard Vulnerability

Due to what is assumed to be a relatively low probability of a sinkhole occurrence producing significant damages in the participating jurisdictions, as well as insufficient data and methodology to produce a region-wide assessment, a detailed vulnerability analysis was not conducted for this hazard.

4.5.4 Other Hazards

The wildfire hazard does not fit into any of the hazard classifications described above (hydrologic, atmospheric, and geologic). Therefore, wildfire is presented here under the category of "Other Hazards."

4.5.4.1 Wildfire

Wildfire Hazard Description

A wildfire is any fire occurring in a wildland area (e.g., grassland, forest, brush land) except for fire under prescription. Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors. Nationally, over 80% of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Forest damage from hurricanes and tornadoes may also block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities.

Wildfires can cause significant damage to property and threatens the lives of people who are unable to evacuate wildfire-prone areas. Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Further, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic losses. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices, and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns, such as reduced air quality by means of wildfire smoke and ash.

Wildfire Hazard Analysis

The entire region is at risk to a wildfire occurrence. However, drought conditions may make a fire more likely in certain locations under certain conditions. Further, areas in the urban-wildland interface are particularly susceptible to fire hazards as populations inhabit formerly undeveloped areas.

Location Within the Planning Area
In an effort to identify specific potential wildfire hazard areas within the planning area, a GIS-based data layer called the Wildland Fire Susceptibility Index (WFSI) was obtained from the North Carolina Division of Forest Resources (NCDFR). The WFSI is a component layer derived from the Southern Wildfire Risk Assessment (SWRA), a multi-year project to assess and quantify wildfire risk for the 13 Southern states. The WFSI is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the planning area have this value determined consistently, it allows for comparison and ordination of areas as to the likelihood of an acre burning.

Figures 4.45 through **4.49** illustrates the level of wildfire potential for the planning area based on the WFSI data provided by NCDFR. Areas with a WFSI value of 0.01–0.05 were considered to be at moderate risk to the wildfire hazard. Areas with a WFSI value greater than 0.05 were considered to be at high risk to the wildfire hazard. Areas with a WFSI value less than 0.01 were considered to not be at risk to the wildfire hazard.

Extent (Magnitude and Severity)
The average size of wildfires in the Unifour Region is typically small.

Historical Occurrences
According to statistics provided by NCDFR, the 5-year average number of fires for the Unifour area was 1,197. The 5-year average number of acres burned was 1,082.4. Based on these statistics, it can be estimated that the Unifour Region experiences an average of 239 wildfire events per year. The leading cause of fires in Alexander County is debris burning (49%). The leading cause in Burke County is "miscellaneous" (e.g., downed power lines, an electric fence, stove ashes, or structure fires) (27%). The leading cause in Caldwell County is miscellaneous as well (36%). The leading cause in Catawba County is debris burning (55%). Other causes of fires in the planning area include children and incendiary. There are no known records of any deaths, injuries, or significant property damage attributed to a wildfire event in the planning area. **Table 4.37** shows a breakdown of averages by participating county area.

Table 4.37: Historical Occurrences of Wildfire

County	5-Year Average Number of Fires	5-Year Average Number of Acres Burned
Alexander	163	133.5
Burke	286	221.2
Caldwell	472	614.8
Catawba	276	112.9
TOTAL UNIFOUR	**1,197**	**1,082.4**

Source: North Carolina Division of Forest Resources.

Probability of Future Occurrences
It is assumed that wildfire occurrences of these types and magnitudes will continue to be likely in the planning area.

Figure 4.45: Wildfire Hazard Areas in the Unifour Region

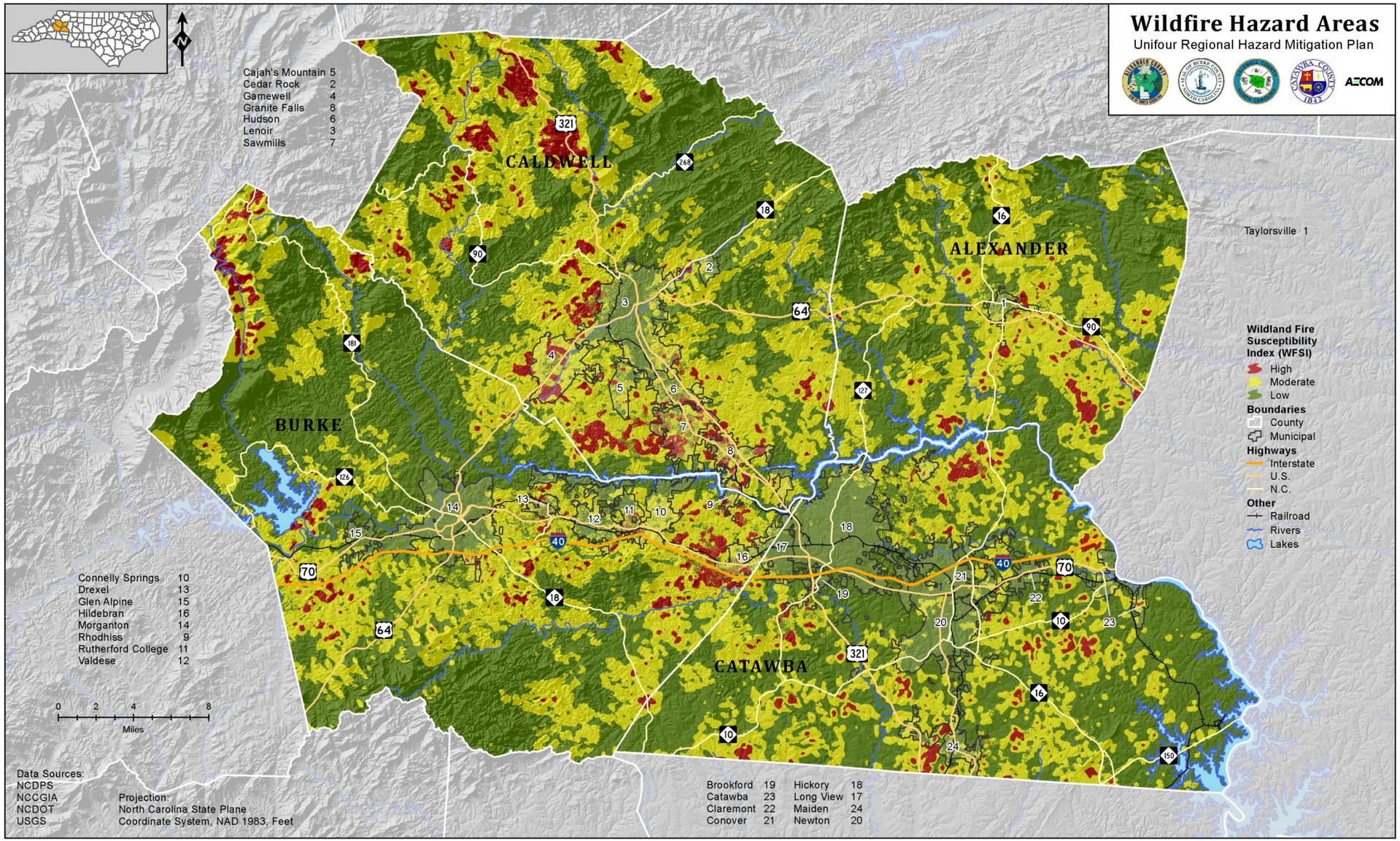


Figure 4.45: Wildfire Hazard Areas in Alexander County

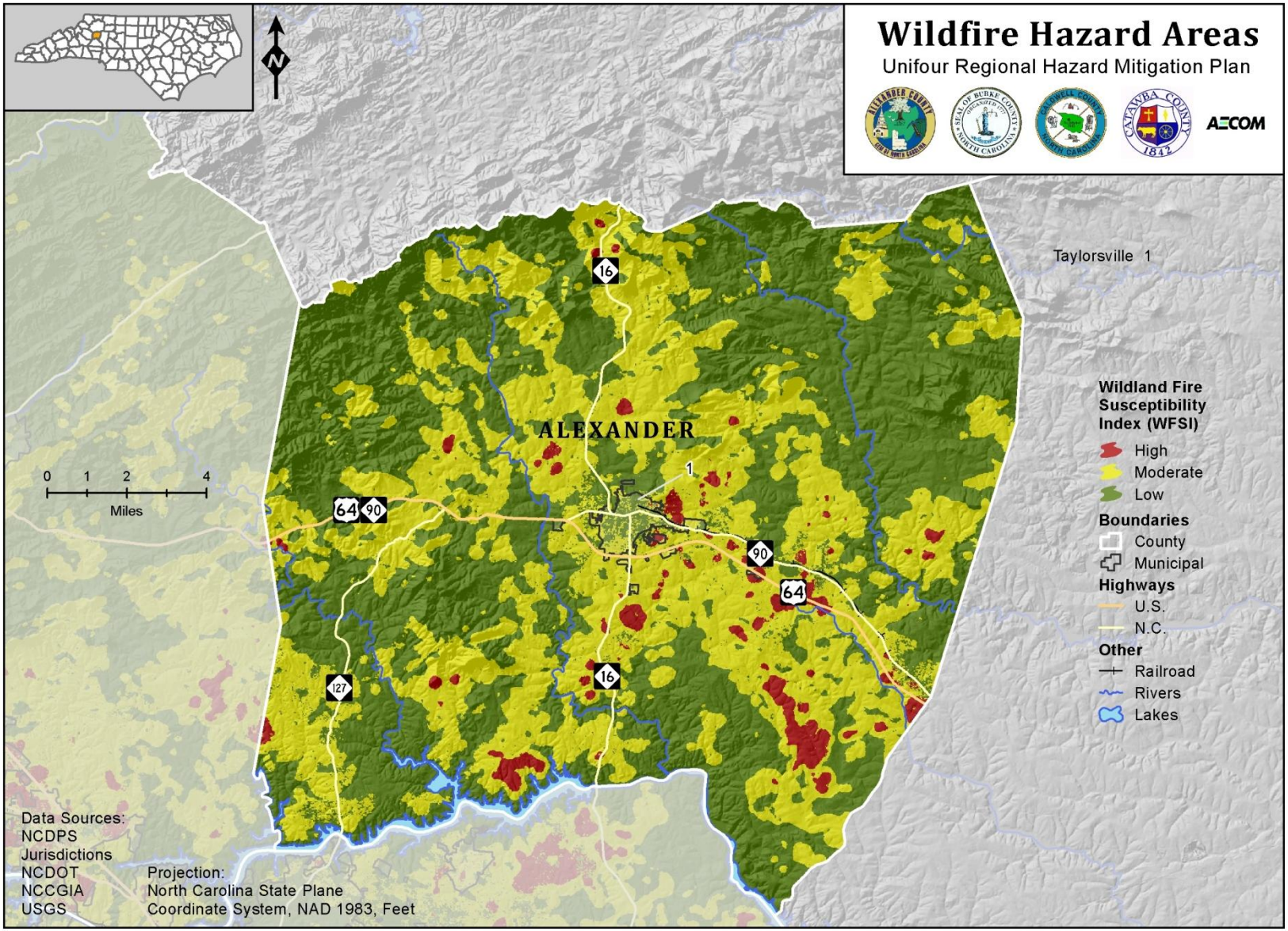


Figure 4.46: Wildfire Hazard Areas in Burke County

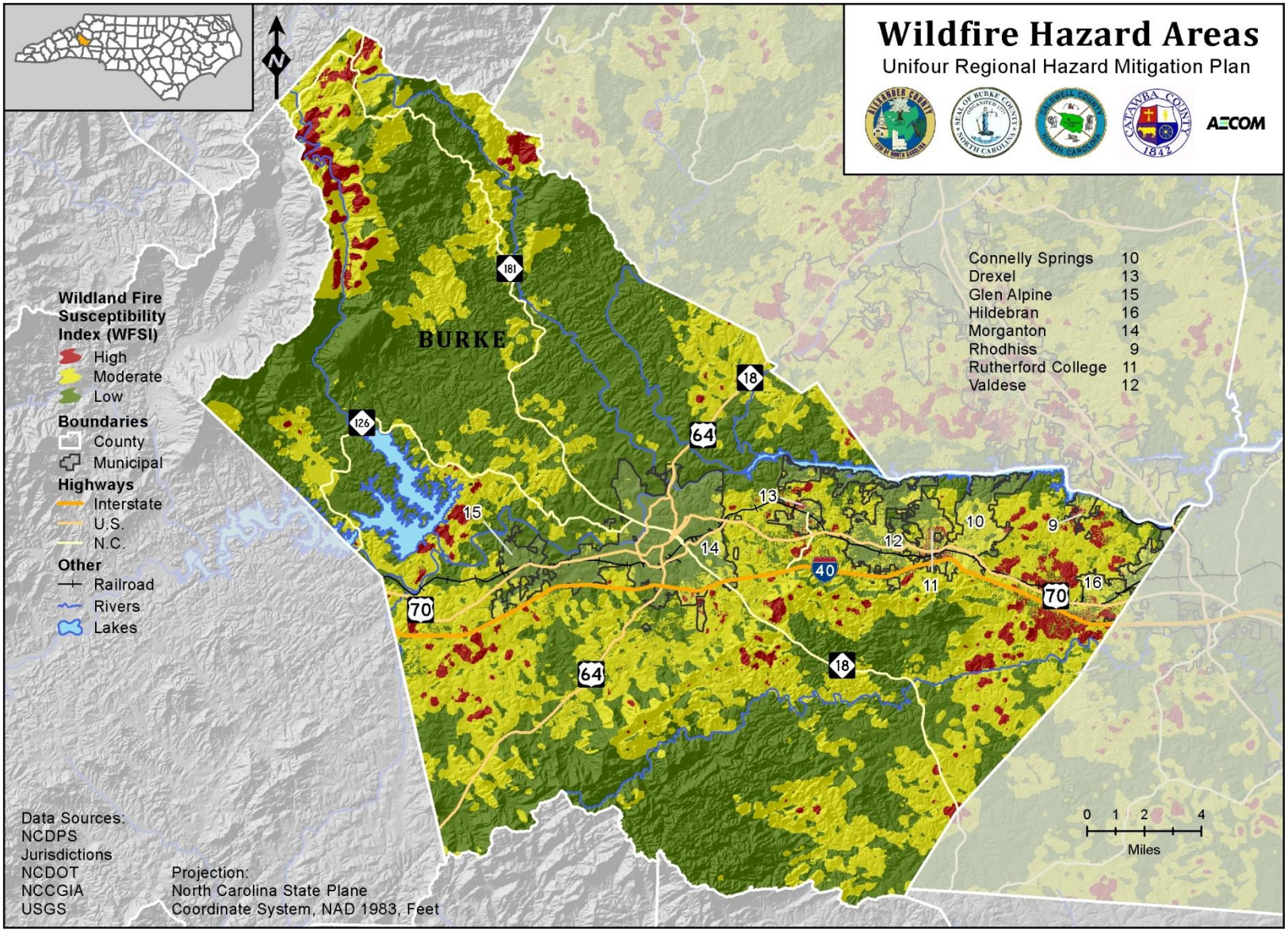


Figure 4.47: Wildfire Hazard Areas in Caldwell County

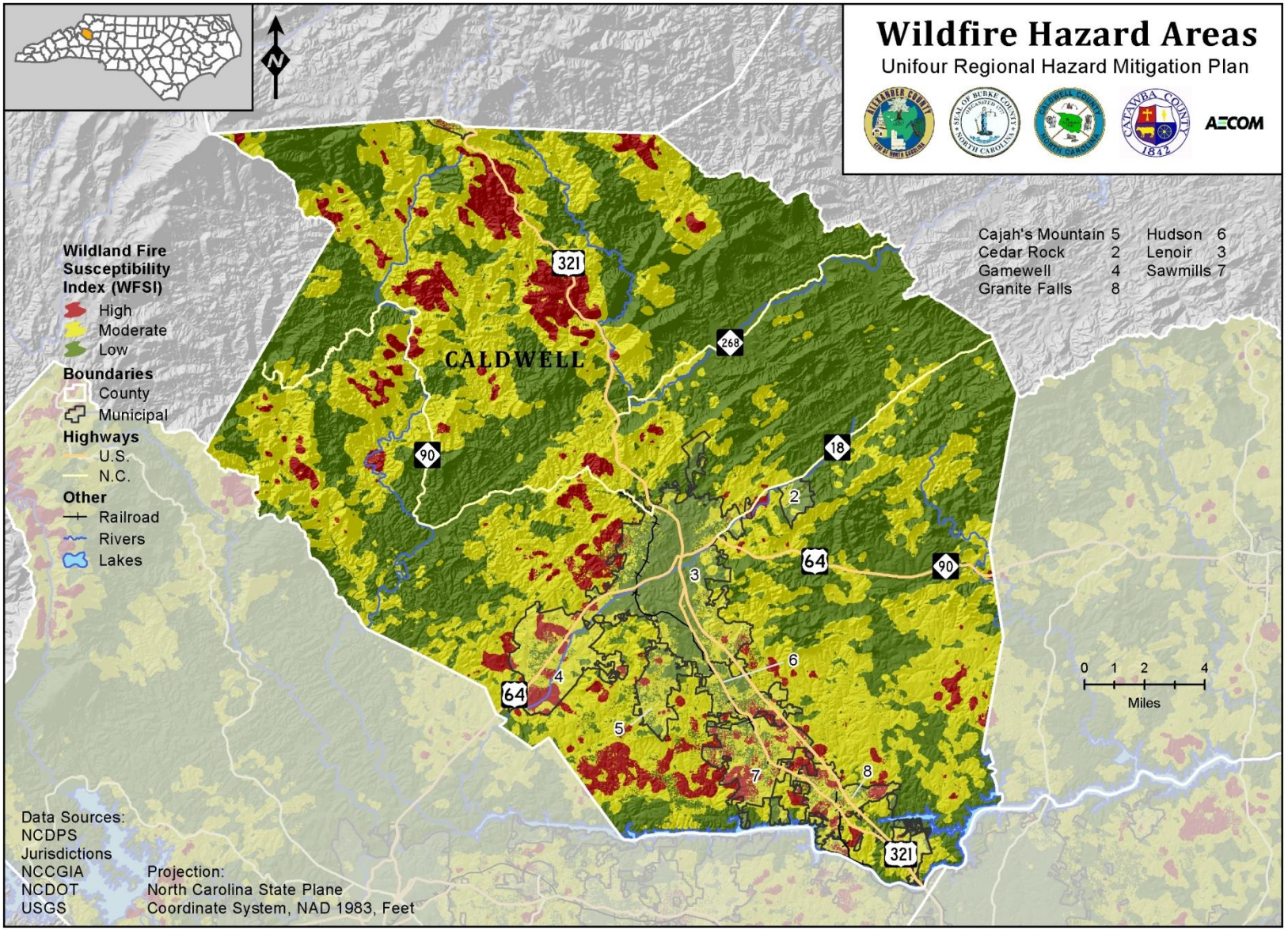
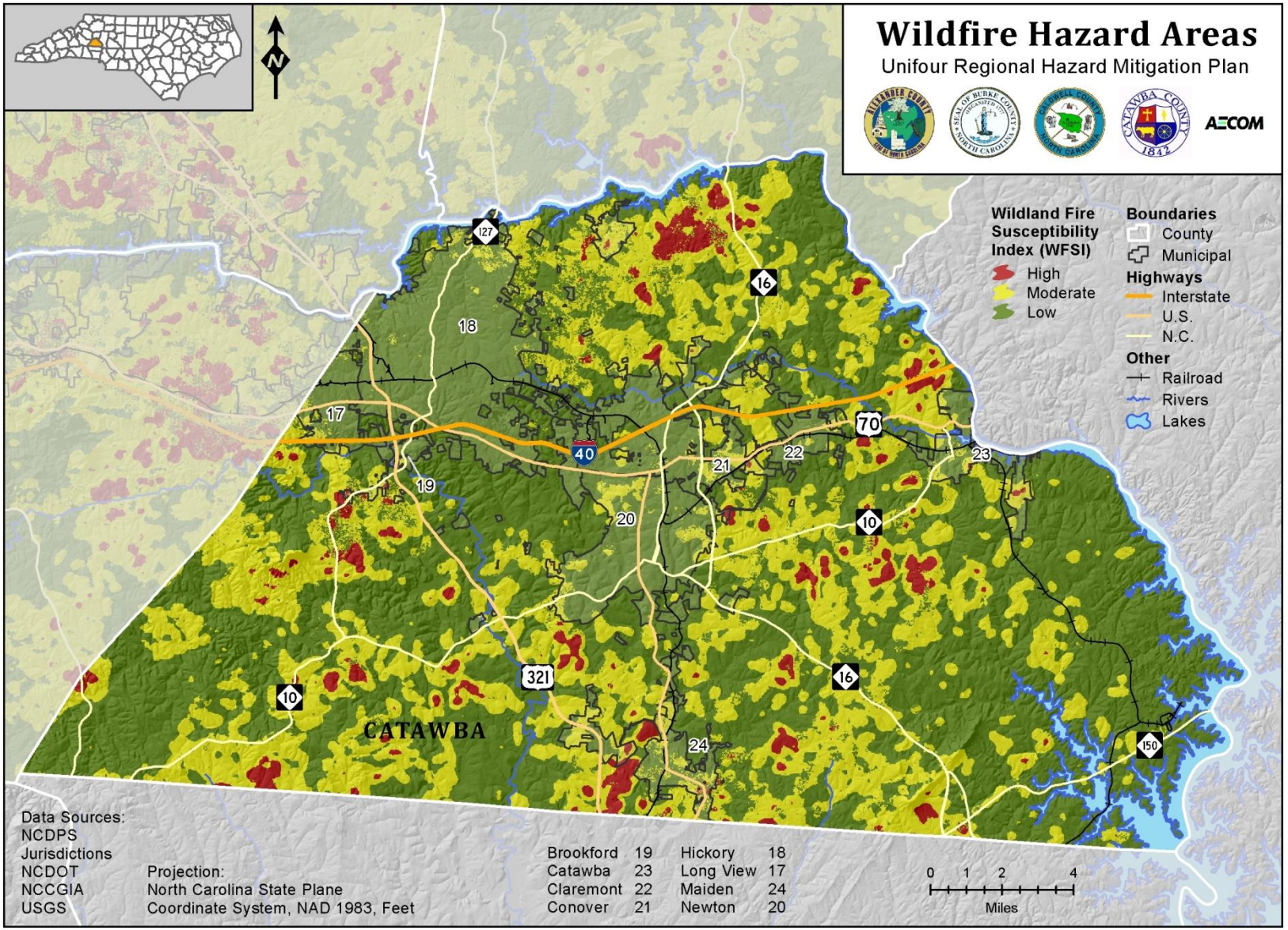


Figure 4.48: Wildfire Hazard Areas in Catawba County



Wildfire Hazard Vulnerability

The following tables provide counts and values by jurisdiction relevant to wildfire hazard vulnerability in the Unifour Region.

Table 4.38: Exposure to Wildfire High Hazard Areas

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per
Alexander County (Unincorporated Area)	**985**	**6.03%**	**337**	**5.29%**	**1,018**	**3.89%**	**$101,165,250**	**1,787**	**5.09%**	**188**	**3.68%**	**100**	**4.87%**
Taylorsville	32	3.05%	9	3.98%	23	1.74%	$1,864,360	20	0.95%	1	0.19%	3	1.95%
Subtotal Alexander	*1,017*	*5.85%*	*346*	*5.24%*	*1,041*	*3.78%*	*$103,029,610*	*1,807*	*4.86%*	*189*	*3.36%*	*103*	*4.66%*
Burke County (Unincorporated Area)	**2,913**	**12.31%**	**1,529**	**8.91%**	**2,763**	**8.51%**	**$175,033,270**	**4,238**	**7.11%**	**600**	**6.77%**	**218**	**7.07%**
Connelly Springs	60	8.89%	28	4.97%	39	4.54%	$7,015,756	65	3.89%	18	6.23%	3	3.49%
Drexel	167	24.67%	43	22.75%	83	10.84%	$11,887,524	194	10.44%	24	6.03%	8	8.51%
Glen Alpine	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%
Hildebran	293	36.35%	88	33.46%	222	21.02%	$23,620,954	232	11.47%	32	8.04%	8	6.78%
Morganton	2	0.03%	2	0.11%	12	0.17%	$0	72	0.43%	3	0.10%	0	0.00%
Valdese	20	1.10%	7	0.71%	10	0.48%	$18,607,576	34	0.76%	24	2.67%	0	0.00%
Rutherford College	183	32.39%	70	30.30%	117	16.43%	$10,506,245	129	9.62%	17	7.26%	4	5.13%
Subtotal Burke	*3,638*	*10.44%*	*1,767*	*8.21%*	*3,246*	*7.07%*	*$246,671,325*	*4,964*	*5.46%*	*718*	*4.98%*	*241*	*4.84%*
Caldwell County (Unincorporated Area)	**2,970**	**15.07%**	**1,320**	**12.41%**	**2,857**	**10.94%**	**$196,778,600**	**4,172**	**9.59%**	**633**	**10.31%**	**204**	**9.01%**
Cajah's Mountain	62	5.55%	19	7.85%	51	3.83%	$3,545,600	80	2.83%	15	2.89%	4	2.17%
Cedar Rock	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%
Gamewell	441	28.38%	90	21.33%	435	21.25%	$35,040,700	927	22.88%	122	19.52%	47	21.86%
Granite Falls	629	32.93%	184	26.32%	484	24.26%	$84,303,500	1,064	22.53%	169	25.34%	55	16.57%

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per
Hudson	222	14.61%	64	15.09%	149	8.95%	$17,241,100	276	7.31%	39	5.95%	8	3.92%
Lenoir	348	4.49%	96	4.28%	273	3.17%	$23,813,200	617	3.38%	106	3.14%	39	3.52%
Rhodhiss	166	37.90%	50	26.88%	143	29.67%	$5,864,762	243	22.71%	32	21.48%	13	19.40%
Sawmills	866	46.11%	204	36.11%	758	29.08%	$53,176,800	1,229	23.45%	152	21.81%	56	18.54%
Subtotal Caldwell	*5,704*	*15.83%*	*2,027*	*13.07%*	*5,150*	*11.45%*	*$419,764,262*	*8,608*	*10.37%*	*1,268*	*9.89%*	*426*	*9.17%*
Catawba County (Unincorporated Area)	**2,320**	**6.06%**	**552**	**4.13%**	**2,454**	**4.45%**	**$196,264,900**	**3,059**	**3.66%**	**366**	**3.29%**	**185**	**3.85%**
Brookford	0	0.00%	0	0.00%	0	0.00%	$0	0	0.00%	0	0.00%	0	0.00%
Catawba	8	2.04%	9	5.08%	2	0.43%	$3,698,700	4	0.66%	1	0.77%	0	0.00%
Claremont	1	0.13%	1	0.46%	3	0.37%	$17,100	0	0.00%	0	0.00%	0	0.00%
Conover	21	0.61%	6	0.65%	17	0.43%	$1,782,900	44	0.54%	2	0.14%	5	0.89%
Hickory	68	0.46%	33	0.97%	43	0.26%	$21,495,700	90	0.22%	9	0.16%	4	0.15%
Long View	19	0.85%	9	1.94%	13	0.50%	$807,905	14	0.29%	1	0.13%	1	0.29%
Maiden	92	5.77%	28	6.29%	61	3.14%	$7,287,200	50	1.51%	5	1.10%	2	0.96%
Newton	52	0.99%	16	1.33%	47	0.74%	$5,665,100	151	1.16%	11	0.54%	14	1.47%
Subtotal Catawba	*2,581*	*3.86%*	*654*	*3.23%*	*2,640*	*3.00%*	*$237,019,505*	*3,412*	*2.21%*	*395*	*1.81%*	*211*	*2.18%*
TOTAL UNIFOUR	**12,940**	**8.34%**	**4,794**	**7.51%**	**12,077**	**5.85%**	**$1,006,484,702**	**18,791**	**5.14%**	**2,570**	**4.70%**	**981**	**4.56%**

Source: GIS analysis.

Table 4.39: Exposure to Wildfire Moderate Hazard Areas

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per
Alexander County (Unincorporated Area)	**9,582**	**58.69%**	**3,574**	**56.07%**	**13,420**	**51.24%**	**$642,579,255**	**16,710**	**47.61%**	**2,378**	**46.61%**	**941**	**45.79%**
Taylorsville	697	66.38%	151	66.81%	598	45.17%	$77,454,849	788	37.56%	206	39.24%	51	33.12%
Subtotal Alexander	*10,279*	*59.16%*	*3,725*	*56.44%*	*14,018*	*50.94%*	*$720,034,104*	*17,498*	*47.04%*	*2,584*	*45.92%*	*992*	*44.91%*
Burke County (Unincorporated Area)	**15,603**	**65.94%**	**10,100**	**58.87%**	**19,227**	**59.19%**	**$1,119,818,508**	**33,332**	**55.95%**	**4,766**	**53.76%**	**1,724**	**55.88%**
Connelly Springs	576	85.33%	257	45.65%	726	84.52%	$34,883,060	1,212	72.62%	203	70.24%	58	67.44%
Drexel	394	58.20%	113	59.79%	370	48.30%	$42,133,302	829	44.62%	180	45.23%	27	28.72%
Glen Alpine	90	14.11%	28	9.12%	60	8.30%	$3,319,141	107	7.05%	25	9.80%	6	5.77%
Hildebran	458	56.82%	162	61.60%	602	57.01%	$58,047,893	1,150	56.85%	222	55.78%	57	48.31%
Morganton	680	11.34%	283	15.54%	681	9.37%	$190,080,202	1,494	8.83%	284	9.22%	79	6.87%
Valdese	1,075	58.87%	505	51.53%	838	40.46%	$118,424,350	1,598	35.59%	308	34.22%	78	29.43%
Rutherford College	292	51.68%	129	55.84%	342	48.03%	$28,697,776	588	43.85%	93	39.74%	33	42.31%
Subtotal Burke	*19,168*	*55.01%*	*11,577*	*53.82%*	*22,846*	*49.74%*	*$1,595,404,232*	*40,310*	*44.34%*	*6,081*	*42.18%*	*2,062*	*41.41%*
Caldwell County (Unincorporated Area)	**11,904**	**60.41%**	**5,641**	**53.02%**	**14,707**	**56.31%**	**$868,803,200**	**23,873**	**54.88%**	**3,218**	**52.40%**	**1,240**	**54.77%**
Cajah's Mountain	890	79.68%	179	73.97%	875	65.79%	$82,280,600	1,667	59.05%	283	54.53%	111	60.33%
Cedar Rock	85	57.82%	43	51.81%	71	50.71%	$18,860,400	127	42.33%	40	43.01%	1	14.29%
Gamewell	1,079	69.43%	327	77.49%	1,444	70.54%	$83,773,700	2,549	62.92%	388	62.08%	131	60.93%
Granite Falls	1,091	57.12%	357	51.07%	1,168	58.55%	$136,654,850	2,569	54.40%	341	51.12%	176	53.01%
Hudson	930	61.22%	298	70.28%	867	52.10%	$170,287,500	1,748	46.29%	288	43.97%	94	46.08%
Lenoir	2,954	38.09%	845	37.64%	2,537	29.49%	$323,470,600	4,387	24.07%	787	23.33%	190	17.13%
Rhodhiss	193	44.06%	95	51.08%	219	45.44%	$15,882,660	571	53.36%	75	50.34%	38	56.72%
Sawmills	811	43.18%	270	47.79%	1,246	47.79%	$72,909,600	2,416	46.11%	301	43.19%	114	37.75%

Jurisdiction	Number of Developed Parcels At Risk		Number of Undeveloped Parcels At Risk		Number of Buildings At Risk		Value of Buildings At Risk	Population At Risk		Elderly Population At Risk		Children At Risk	
	Num	Per	Num	Per	Num	Per		Num	Per	Num	Per	Num	Per
Subtotal Caldwell	*19,937*	*55.34%*	*8,055*	*51.95%*	*23,134*	*51.42%*	*$1,772,923,110*	*39,907*	*48.06%*	*5,721*	*44.64%*	*2,095*	*45.10%*
Catawba County (Unincorporated Area)	**18,934**	**49.42%**	**5,661**	**42.39%**	**23,420**	**42.43%**	**$1,946,856,500**	**31,030**	**37.15%**	**3,943**	**35.45%**	**1,726**	**35.89%**
Brookford	16	6.75%	4	7.84%	20	6.78%	$950,400	31	8.12%	8	11.11%	2	11.11%
Catawba	165	42.09%	56	31.64%	152	32.83%	$14,758,300	162	26.87%	31	23.85%	7	25.93%
Claremont	115	15.39%	43	19.82%	89	10.87%	$27,295,600	99	7.32%	8	4.08%	3	3.90%
Conover	701	20.28%	241	26.03%	644	16.32%	$127,067,800	1,025	12.55%	119	8.57%	73	12.97%
Hickory	1,811	12.36%	502	14.79%	1,411	8.69%	$439,071,050	2,926	7.31%	280	4.88%	156	5.74%
Long View	373	16.69%	126	27.10%	280	10.71%	$25,450,483	482	9.90%	51	6.62%	31	9.04%
Maiden	887	55.61%	275	61.80%	783	40.28%	$95,862,700	1,031	31.15%	119	26.10%	54	25.96%
Newton	769	14.59%	197	16.40%	743	11.69%	$170,120,500	1,274	9.82%	310	15.08%	81	8.48%
Subtotal Catawba	*23,771*	*35.53%*	*7,105*	*35.12%*	*27,542*	*31.34%*	*$2,847,433,333*	*38,060*	*24.66%*	*4,869*	*22.36%*	*2,133*	*22.06%*
TOTAL UNIFOUR	**73,155**	**47.15%**	**30,462**	**47.71%**	**87,540**	**42.43%**	**$6,935,794,779**	**135,775**	**37.15%**	**19,255**	**35.24%**	**7,282**	**33.86%**

Source: GIS analysis.

Table 4.40: Numbers of Critical Facilities Exposed to Wildfire High Hazard Areas

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Police Stations	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Taylorsville	0	0	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**1**
Connelly Springs	0	0	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0	0	1
Glen Alpine	0	0	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0	0	0
Morganton	0	0	0	0	0	0	0	1	0	0
Valdese	0	0	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*2*	*1*	*2*
Caldwell County (Unincorporated Area)	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**
Cajah's Mountain	0	0	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	0	0	0	1	1	0	0	0	0	0
Granite Falls	2	0	0	0	0	0	0	1	0	1
Hudson	1	0	0	0	0	0	0	0	0	0
Lenoir	1	0	0	0	1	0	0	0	0	0
Rhodhiss	0	0	0	0	0	0	0	0	0	0
Sawmills	1	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*8*	*0*	*0*	*1*	*2*	*0*	*0*	*2*	*0*	*3*
Catawba County (Unincorporated Area)	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**1**
Brookford	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0
Long View	0	0	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	0	0	0	0	0
Newton	0	0	0	0	0	0	0	0	0	0
Subtotal Catawba	*3*	*0*	*0*	*1*	*0*	*0*	*0*	*3*	*0*	*1*
TOTAL UNIFOUR	**11**	**0**	**0**	**3**	**2**	**0**	**0**	**7**	**2**	**6**

Source: Critical facilities supplied by participating jurisdictions.

Table 4.41: Numbers of Critical Facilities Exposed to Wildfire Moderate Hazard Areas

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Police Stations	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**8**	**2**	**0**	**4**	**2**	**0**	**0**	**3**	**1**	**2**
Taylorsville	0	0	0	0	1	0	2	1	0	0
Subtotal Alexander	*8*	*2*	*0*	*4*	*3*	*0*	*2*	*4*	*1*	*2*
Burke County (Unincorporated Area)	**0**	**1**	**0**	**7**	**0**	**0**	**0**	**5**	**4**	**9**
Connelly Springs	0	0	0	1	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	1	0	1
Glen Alpine	0	0	0	0	0	0	0	0	0	0
Hildebran	0	1	0	0	0	0	0	1	1	1
Morganton	0	1	0	0	0	1	1	3	1	1
Valdese	0	0	0	0	0	1	0	2	0	1
Rutherford College	0	0	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*3*	*0*	*8*	*0*	*2*	*1*	*12*	*6*	*13*
Caldwell County (Unincorporated Area)	**16**	**0**	**0**	**1**	**0**	**0**	**0**	**6**	**0**	**7**
Cajah's Mountain	0	1	0	0	0	0	0	0	1	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	7	1	0	0	0	0	0	1	0	1
Granite Falls	3	0	0	0	1	0	1	1	2	1
Hudson	2	1	0	0	0	0	0	2	0	1
Lenoir	5	0	1	0	2	0	1	1	0	1
Rhodhiss	0	0	0	1	0	0	0	0	0	0
Sawmills	4	0	0	0	0	0	0	0	0	0
Subtotal Caldwell	*37*	*3*	*1*	*2*	*3*	*0*	*2*	*11*	*3*	*11*
Catawba County (Unincorporated Area)	**27**	**1**	**0**	**2**	**0**	**0**	**0**	**7**	**0**	**8**
Brookford	0	0	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0	0	1
Hickory	2	0	0	0	0	0	0	1	1	0
Long View	0	0	0	0	0	0	0	0	0	0
Maiden	2	0	0	0	0	0	0	0	0	0
Newton	3	0	0	1	0	0	0	1	1	1
Subtotal Catawba	*34*	*1*	*0*	*3*	*0*	*0*	*0*	*9*	*2*	*10*
TOTAL UNIFOUR	**79**	**9**	**1**	**17**	**6**	**2**	**5**	**36**	**12**	**36**

Source: Critical facilities supplied by participating jurisdictions.

Table 4.42: Numbers of High Potential Loss Properties Exposed to Wildfire Hazard

Jurisdiction	Airports		Military Facilities		Hazardous Materials Sites		Other	
	High	Mod.	High	Mod.	High	Mod.	High	Mod.
Alexander County (Unincorporated Area)	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**0**
Taylorsville	0	0	0	0	0	0	0	0
Subtotal Alexander	*0*	*3*	*0*	*0*	*0*	*1*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Connelly Springs	0	0	0	0	0	0	0	0
Drexel	0	0	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0	0	0
Morganton	0	2	0	0	0	1	0	0
Valdese	0	0	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0	0	0
Subtotal Burke	*0*	*2*	*0*	*0*	*0*	*2*	*0*	*0*
Caldwell County (Unincorporated Area)	**0**	**2**	**0**	**1**	**0**	**1**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0	0	1
Hudson	0	0	0	0	0	1	0	0
Lenoir	0	0	0	0	0	0	1	0
Rhodhiss	0	0	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0	0	0
Subtotal Caldwell	*0*	*2*	*0*	*1*	*0*	*2*	*0*	*0*
Catawba County (Unincorporated Area)	**0**	**2**	**0**	**0**	**0**	**6**	**0**	**0**
Brookford	0	0	0	0	0	0	0	0
Catawba	0	0	0	0	0	0	0	0
Claremont	0	0	0	0	0	0	0	0
Conover	0	0	0	0	0	0	0	0
Hickory	0	1	0	0	0	0	0	1
Long View	0	0	0	0	0	0	0	0
Maiden	0	0	0	0	0	1	0	0
Newton	0	0	0	1	0	0	0	0
Subtotal Catawba	*0*	*3*	*0*	*1*	*0*	*7*	*0*	*0*
TOTAL UNIFOUR	**0**	**10**	**0**	**2**	**0**	**12**	**0**	**0**

Source: GIS analysis.

Table 4.43: Numbers of Historic Properties Exposed to the Wildfire Hazard Areas

Jurisdiction	Districts		Buildings		Other	
	Mod	High	Mod	High	Mod	High
Alexander County (Unincorporated Area)	**0**	**0**	**0**	**0**	**0**	**0**
Taylorsville	0	0	0	0	0	0
Subtotal Alexander	*0*	*0*	*0*	*0*	*0*	*0*
Burke County (Unincorporated Area)	**0**	**0**	**3**	**0**	**0**	**0**
Connelly Springs	0	0	0	0	0	0
Drexel	0	0	0	0	0	0
Glen Alpine	0	0	0	0	0	0
Hildebran	0	0	0	0	0	0
Morganton	1	0	0	0	0	0
Valdese	0	0	0	0	0	0
Rutherford College	0	0	0	0	0	0
Subtotal Burke	*1*	*0*	*3*	*0*	*0*	*0*
Caldwell County (Unincorporated Area)	**2**	**0**	**2**	**0**	**0**	**0**
Cajah's Mountain	0	0	0	0	0	0
Cedar Rock	0	0	0	0	0	0
Gamewell	0	0	0	0	0	0
Granite Falls	0	0	0	0	0	0
Hudson	0	0	0	0	0	0
Lenoir	0	0	1	0	0	0
Rhodhiss	0	0	0	0	0	0
Sawmills	0	0	0	0	0	0
Subtotal Caldwell	*2*	*0*	*3*	*0*	*0*	*0*
Catawba County (Unincorporated Area)	**8**	**0**	**6**	**0**	**0**	**0**
Brookford	0	0	0	0	0	0
Catawba	0	0	0	0	0	0
Claremont	0	0	0	0	0	0
Conover	0	0	0	0	0	0
Hickory	0	0	0	0	0	0
Long View	0	0	0	0	0	0
Maiden	0	0	0	0	0	0
Newton	0	0	1	0	0	0
Subtotal Catawba	*8*	*0*	*7*	*0*	*0*	*0*
TOTAL UNIFOUR	**11**	**0**	**13**	**0**	**0**	**0**

Source: GIS analysis.

4.6 Conclusions on Hazard Risk

Based on consensus of the Hazard Mitigation Planning Committee, primarily at the third HMPC meeting, in addition to the results presented in this *Risk Assessment*, the hazards addressed in this plan have been ranked according to the following prioritized list:

High Risk Hazards

- Flood
- Tornado
- Winter Weather
- Thunderstorm, Lightning, and Hail

Moderate Risk Hazards

- Wildfire
- Sinkhole
- Dam/Levee Failure
- Drought/Extreme Heat

Low Risk Hazards

- Erosion
- Landslide
- Hurricane and Tropical Storm

The HMPC has agreed to focus on the high risk hazards identified above for purposes of mitigation strategy development. The list above is also consistent with Annualized Loss Estimates (ALEs) calculated for the planning area which point to the same four high risk hazards, although in a slightly different order:

- Tornado
- Flood
- Thunderstorm, Lightning, and Hail
- Winter Weather

In addition to the results presented throughout this *Risk Assessment*, the annualized losses presented in **Table 4.44** and summarized above further help substantiate the priority ranking stated here in these conclusions on hazard risk.

Table 4.44: Annualized Loss Estimates (ALEs) by Hazard by Jurisdiction

Jurisdiction	Flood	Erosion	Dam/Levee Failure	Drought/ Extreme Heat	Thunderstorm	Tornado	Winter Weather	Hurricane and Tropical Storm	Landslide	Earthquake	Sinkholes	Wildfire
Alexander County (Unincorporated Area)	**$5,000**	**Neg***	**Neg**	**Neg**	**$12,150**	**$68,750**	**NA****	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Taylorsville	$0	Neg	Neg	Neg	$55,000	$7,500	NA	Neg	Neg	Neg	Neg	Neg
Subtotal Alexander	*$5,000*	*Neg*	*Neg*	*Neg*	*$67,150*	*$76,250*	*$50,000*	*Neg*	*Neg*	*Neg*	*Neg*	*Neg*
Burke County (Unincorporated Area)	**$450,100**	**Neg**	**Neg**	**Neg**	**$52,000**	**$706,250**	**NA**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Connelly Springs	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Drexel	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Glen Alpine	$0	Neg	Neg	Neg	$2,500	$0	NA	Neg	Neg	Neg	Neg	Neg
Hildebran	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Morganton	$215	Neg	Neg	Neg	$9,150	$0	NA	Neg	Neg	Neg	Neg	Neg
Valdese	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Rutherford College	$0	Neg	Neg	Neg	$1,250	$0	NA	Neg	Neg	Neg	Neg	Neg
Subtotal Burke	*$450,315*	*Neg*	*Neg*	*Neg*	*$64,900*	*$706,250*	*$100*	*Neg*	*Neg*	*Neg*	*Neg*	*Neg*
Caldwell County (Unincorporated Area)	**$131,500**	**Neg**	**Neg**	**Neg**	**$5,000**	**$85,000**	**NA**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Cajah's Mountain	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Cedar Rock	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Gamewell	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Granite Falls	$0	Neg	Neg	Neg	$1,000	$0	NA	Neg	Neg	Neg	Neg	Neg
Hudson	$0	Neg	Neg	Neg	$5,000	$0	NA	Neg	Neg	Neg	Neg	Neg
Lenoir	$6,500	Neg	Neg	Neg	$6,850	$0	NA	Neg	Neg	Neg	Neg	Neg

Jurisdiction	Flood	Erosion	Dam/Levee Failure	Drought/ Extreme Heat	Thunderstorm	Tornado	Winter Weather	Hurricane and Tropical Storm	Landslide	Earthquake	Sinkholes	Wildfire
Rhodhiss	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Sawmills	$0	Neg	Neg	Neg	$150	$0	NA	Neg	Neg	Neg	Neg	Neg
Subtotal Caldwell	*$138,000*	*Neg*	*Neg*	*Neg*	*$13,000*	*$85,000*	*$0*	*Neg*	*Neg*	*Neg*	*Neg*	*Neg*
Catawba County (Unincorporated Area)	**$8,000**	**Neg**	**Neg**	**Neg**	**$5,750**	**$1,305,450**	**NA**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Brookford	$0	Neg	Neg	Neg	$0	$0	NA	Neg	Neg	Neg	Neg	Neg
Catawba	$0	Neg	Neg	Neg	$1,000	$0	NA	Neg	Neg	Neg	Neg	Neg
Claremont	$1,000	Neg	Neg	Neg	$4,250	$330,500	NA	Neg	Neg	Neg	Neg	Neg
Conover	$0	Neg	Neg	Neg	$550	$0	NA	Neg	Neg	Neg	Neg	Neg
Hickory	$153,000	Neg	Neg	Neg	$22,450	$1,000	NA	Neg	Neg	Neg	Neg	Neg
Long View	$550	Neg	Neg	Neg	$500	$0	NA	Neg	Neg	Neg	Neg	Neg
Maiden	$2,500	Neg	Neg	Neg	$50	$0	NA	Neg	Neg	Neg	Neg	Neg
Newton	$0	Neg	Neg	Neg	$502,850	$0	NA	Neg	Neg	Neg	Neg	Neg
Subtotal Catawba	*$165,050*	*Neg*	*Neg*	*Neg*	*$537,400*	*$1,636,950*	*$50,100*	*Neg*	*Neg*	*Neg*	*Neg*	*Neg*
TOTAL UNIFOUR	**$758,365**	**Neg**	**Neg**	**Neg**	**$682,450**	**$2,504,450**	**$100,200**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**

**"Neg" = "Negligible" which indicates that sufficient historical losses in dollar values were not available to produce an Annualized Loss Estimate (ALE).*
**"NA" = "Not Applicable" which indicates that an ALE is only applicable at the county level.*

Section 5: Capability Assessment

This section discusses the capability of the Unifour Region to implement hazard mitigation activities. It consists of the following four subsections:

5.1 Overview
5.2 Conducting the Capability Assessment
5.3 Capability Assessment Findings
5.4 Conclusions on Local Capability

5.1 Overview

The purpose of conducting a *Capability Assessment* is to determine the ability of a local jurisdiction to implement a comprehensive *Mitigation Strategy*, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. As in any planning process, it is important to try to establish which goals, objectives, and actions are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A *Capability Assessment* helps to determine which mitigation actions are practical and likely to be implemented over time given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A *Capability Assessment* has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, and programs already in place; and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A *Capability Assessment* also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The *Capability Assessment* completed for the Unifour Region serves as a critical planning step and an integral part of the foundation for designing an effective *Mitigation Strategy*. Coupled with the *Risk Assessment*, the *Capability Assessment* helps identify and target meaningful mitigation actions for incorporation into the *Mitigation Strategy* portion of the Plan. It not only helps establish the goals and objectives for the Region to pursue under this Plan, but also ensures that those goals and objectives are realistically achievable under given local conditions.

5.2 Conducting the Capability Assessment

In order to facilitate the inventory and analysis of local government capabilities within the Unifour counties, a detailed *Local Capability Assessment Survey* was distributed to members of the Unifour Hazard Mitigation Planning Committee (HMPC) at the second planning committee meeting. The survey questionnaire requested information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the Region's ability to implement hazard mitigation actions. Other indicators included information related to the Region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, as well as any existing education and outreach programs that can be used to promote mitigation. Survey respondents were also asked to comment

on the current political climate with respect to hazard mitigation, an important consideration for any local planning or decision making process.

At a minimum, the survey results provide an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development, in addition to their overall effect on hazard loss reduction. In completing the survey, local officials were also required to conduct a self assessment of their jurisdiction's specific capabilities. The survey instrument thereby not only helps accurately assess the degree of local capability, but it also serves as a good source of introspection for counties and local jurisdictions that want to improve their capabilities as identified gaps, weaknesses, or conflicts can be recast as opportunities for specific actions to be proposed as part of the *Mitigation Strategy*.

The information provided in response to the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction's overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation. Additional points were added based on the jurisdiction's self assessment of their own planning and regulatory capability, administrative and technical capability, fiscal capability, education and outreach capability, and political capability.

Using this scoring methodology, a total score and an overall capability rating of "High," "Moderate," or "Limited" could be determined according to the total number of points received. These classifications are designed to provide nothing more than a general assessment of local government capability. In combination with the narrative responses provided by local officials, the results of this *Capability Assessment* provide critical information for developing an effective and meaningful mitigation strategy.

5.3 Capability Assessment Findings

The findings of the *Capability Assessment* are summarized in this Plan to provide insight into the relevant capacity of the Unifour Region to implement hazard mitigation activities. All information is based upon the input provided by local government officials through the *Local Capability Assessment Survey* and during meetings of the HMPC.

5.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning, in addition to the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built, as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development for the Unifour Region, along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps,

weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

Table 5.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Unifour Region. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Unifour Regional Hazard Mitigation Plan.

Table 5.1: Relevant Plans, Ordinances, and Programs

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Alexander County	✓	✓	✓	✓		✓	✓		✓	✓	✓				✓	✓	✓	✓				✓	✓		✓	
Taylorsville	✓	✓													✓	✓	✓	✓	✓			✓	✓		✓	
Burke County	✓	✓	✓			✓	✓		✓	✓		✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	✓	
Connelly Springs	✓	✓	✓		✓											✓	✓	✓							✓	
Drexel	✓	✓										✓					✓	✓							✓	
Glen Alpine	✓	*	✓	✓	✓	✓	✓	✓	✓	*	*	*	*	*	*	✓	✓	✓	✓	*	*	✓	✓	✓	✓	*
Hildebran	✓	✓													✓	✓	✓	✓	✓			✓	✓		✓	
Morganton	✓	✓	✓	✓	✓	✓	✓					✓	✓	*	✓	✓	✓	✓	✓			✓	✓		✓	
Rutherford College	✓	✓													✓	✓	✓	✓	✓			✓	✓		✓	
Valdese	✓	✓	✓	*	✓	✓	✓		✓	✓	*	*	*			✓	✓	✓	✓			✓	✓	✓	✓	
Caldwell County	✓	✓	✓	✓	✓	✓	✓	*	✓	*	*		✓			✓	✓	✓	✓	✓	*	✓	✓		✓	✓
Cajah's Mountain	✓	✓			✓	✓						✓			✓	✓	✓	✓				✓	✓		✓	
Cedar Rock	✓														✓	✓	✓	✓	✓			✓	✓			
Gamewell	✓	✓			✓										✓	✓	✓	✓	✓			✓	✓		✓	
Granite Falls	✓	✓			✓							✓				✓	✓	✓	✓							
Hudson	✓	✓			✓										✓	✓	✓	✓	✓			✓	✓		✓	
Lenoir	✓	✓			✓	✓	✓					✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Rhodhiss	✓		✓	*		✓		✓	✓			✓		*		✓		✓				✓	✓	✓	✓	
Sawmills	✓	✓			✓										✓	✓	✓	✓	✓			✓	✓		✓	
Catawba County	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	
Brookford	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Catawba	✓	✓										✓	✓		✓	✓	✓	✓	✓						✓	
Claremont	✓	✓		✓	✓	✓						✓	✓		✓	✓	✓	✓	*			✓	✓		✓	
Conover	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	✓	
Hickory	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Long View	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓			✓	✓		✓	
Maiden	✓	✓	✓	✓	✓	✓	✓	*	✓	✓	*	✓	*	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	✓	
Newton	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓			✓	✓		✓	

Source: Local Capability Assessment Survey.

A more detailed discussion on the Region's planning and regulatory capability follows, along with the incorporation of additional information based on the narrative comments provided by local officials in response to the survey questionnaire.

5.3.1.1 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases are preparedness, response, and recovery. In reality each phase is interconnected with hazard mitigation, as **Figure 5.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as elevation of flood-prone structures or through the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards because of its location, design, or other characteristics. Mitigation opportunities can also be identified during immediate preparedness or response activities (such as installing storm shutters in advance of a hurricane), and in many instances during the long-term recovery and redevelopment process following a disaster event.

Figure 5.1: The Four Phases of Emergency Management

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the *Local Capability Assessment Survey* asked several questions across a range of emergency management plans in order to assess the Unifour Region's willingness to plan and their level of technical planning proficiency.

Hazard Mitigation Plan
A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural, and in some cases human-caused, hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

- All of the jurisdictions participating in this regional planning effort have previously been covered by their county's multi-jurisdictional hazard mitigation plan.

Disaster Recovery Plan
A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster event. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- Nine of the 28 participating jurisdictions have a disaster recovery plan either in place or under development. (Five jurisdictions have one in place; four have one under development.)

Emergency Operations Plan
An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

- Seventeen of the 28 participating jurisdictions have an emergency operations plan either in place or are covered under a county plan. (Sixteen have one in place; one is covered under a county plan.)

Continuity of Operations Plan
A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

- Twelve of the 28 participating jurisdictions have a continuity of operations plan in place.

5.3.1.2 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. Therefore, the *Local Capability Assessment Survey* also asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other ongoing planning efforts in the Unifour Region.

Comprehensive/General Plan
A comprehensive land use plan, or general plan, establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

- Twenty-six of the 28 participating jurisdictions have a comprehensive land use plan either in place or under development (Twenty-four have one in place; two have one under development.)

Capital Improvements Plan
A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- Seventeen of the 28 participating jurisdictions have a capital improvements plan in place or under development.

Historic Preservation Plan
A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards, and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards, or are within a historic district that cannot easily be relocated out of harm's way.

- Seven of the 28 participating jurisdictions have an historic preservation plan in place or under development.

Zoning Ordinance
Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- Twenty-seven of the 28 participating jurisdictions have a zoning ordinance in place or under development.

Subdivision Ordinance
A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

- All 28 participating jurisdictions have a subdivision ordinance in place or under development.

Building Codes, Permitting, and Inspections
Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- Twenty-three of the 28 participating jurisdictions have building codes in place.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program, developed by the Insurance

Services Office, Inc. (ISO). In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses, and as a result should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education, as well as number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10, with a BCEGS grade of 1 representing exemplary commitment to building code enforcement, and a grade of 10 indicating less than minimum recognized protection.

5.3.1.3 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. It is therefore used as part of this *Capability Assessment* as a key indicator for measuring local capability.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event, and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 5.2 provides NFIP policy and claim information for each participating jurisdiction in the Unifour Region.

Table 5.2: NFIP Policy and Claim Information

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force	Closed Losses	Total Payments
Alexander County	02/01/91	07/07/09	29	$7,876,800	$18,344	2	$4,911
Taylorsville	12/18/07	07/07/09	4	$1,545,000	$4,602	0	$0
Subtotal Alexander	-	-	*33*	*$9,421,800*	*$22,946*	*2*	*$4,911*
Burke County	06/17/91	07/07/09	66	$14,562,400	$48,902	21	$738,944
Connelly Springs	09/05/07	07/07/09	2	$600,000	$798	0	$0
Drexel	08/19/86	07/07/09	3	$630,000	$1,125	0	$0
Glen Alpine	09/05/07	07/07/09	0	$0	$0	0	$0
Hildebran	09/05/07	07/07/09	0	$0	$0	0	$0
Morganton	02/19/87	07/07/09	58	$17,388,000	$92,940	19	$1,200,374
Rutherford College	09/05/07	07/07/09	1	$238,700	$349	0	$0
Valdese	07/03/86	07/07/09	2	$590,000	$2,153	0	$0
Subtotal Burke	-	-	*132*	*$34,009,100*	*$146,267*	*40*	*$1,939,318*
Caldwell County	08/16/88	07/07/09	87	$17,888,500	$70,819	14	$233,721
Cajah's Mountain	08/16/88	07/07/09	0	$0	$0	0	$0
Cedar Rock	07/07/09	07/07/09	0	$0	$0	0	$0
Gamewell	08/16/88	07/07/09	3	$300,000	$1,487	0	$0
Granite Falls	08/16/88	07/07/09	7	$1,574,500	$6,819	0	$0
Hudson	08/16/88	07/07/09	3	$791,000	$2,410	0	$0
Lenoir	08/16/88	07/07/09	107	$23,292,800	$131,732	18	$176,689
Rhodhiss	07/03/86	07/07/09	6	$1,527,100	$4,299	2	$12,587
Sawmills	07/07/09	07/07/09	0	$0	$0	0	$0
Subtotal Caldwell	-	-	*213*	*$45,373,900*	*$217,566*	*34*	*$422,997*
Catawba County	09/03/80	07/07/09	116	$26,334,000	$71,102	61	$942,174
Brookford	12/18/79	07/07/09	1	$105,000	$904	0	$0
Catawba	09/03/80	07/07/09	3	$805,000	$1,355	0	$0
Claremont	09/05/07	07/07/09	5	$976,000	$3,109	0	$0
Conover	09/03/80	07/07/09	15	$3,179,800	$10,965	2	$5,105
Hickory	08/03/81	07/07/09	72	$17,371,200	$42,678	10	$139,162
Long View	09/03/80	07/07/09	5	$1,055,000	$5,732	0	$0
Maiden	09/03/80	07/07/09	7	$1,186,000	$2,860	1	$2,379
Newton	09/03/80	07/07/09	14	$3,479,100	$8,075	2	$38,624
Subtotal Catawba	-	-	*238*	*$54,491,100*	*$146,780*	*76*	*$1,127,444*
TOTAL UNIFOUR	**-**	**-**	**616**	**$143,295,900**	**$533,559**	**152**	**$3,494,670**

Source: FEMA NFIP Policy Statistics (08/31/2013).

All jurisdictions listed above participate in the National Flood Insurance Program and will continue to comply with all required provisions of the program and work to adequately comply in the future utilizing a number of strategies. Floodplain management in all four counties is managed at the county level through zoning ordinances, building code restrictions, and the county building inspection program. The jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and,

through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property. Each county and its municipalities while participating in the National Flood Insurance Program comply with regulations as demonstrated in regular Community Assessment Visits (see attached spreadsheet).

Community Rating System
An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP, adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 5.3**. As class ratings improve (the lower the number, the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

Table 5.3: CRS Premium Discounts, By Class

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0%

Source: NFIP Community Rating System.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

- Caldwell County participates in the CRS with a class of 9.

Floodplain Management Plan
A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- 15 of the 28 participating jurisdictions have a floodplain management plan in place.

Open Space Management Plan
An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state, and to expand or connect areas in the public domain such as parks,

greenways, and other outdoor recreation areas. In many instances open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

- 13 of the 28 participating jurisdictions have an open space management plan in place or under development.

Stormwater Management Plan
A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- 18 of the 28 participating jurisdictions have a stormwater management plan in place.

All jurisdictions listed above participate in the National Flood Insurance Program and will continue to comply with all required provisions of the program and work to adequately comply in the future utilizing a number of strategies. Floodplain management in all four counties is managed at the county level through zoning ordinances, building code restrictions, and the county building inspection program. The jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property. Each county and its municipalities while participating in the National Flood Insurance Program comply with regulations as demonstrated in regular Community Assessment Visits (see attached spreadsheet).

5.3.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using geographic information systems (GIS) to analyze and assess community hazard vulnerability. The *Local Capability Assessment Survey* was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 5.4 provides a summary of the *Local Capability Assessment Survey* results for the Unifour Region with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

Table 5.4: Relevant Staff/Personnel Resources

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Alexander County	✓			✓	✓	✓				✓	✓	✓		✓
Taylorsville	✓	✓	✓		✓	✓							✓	✓
Burke County	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
Connelly Springs	✓			✓		✓								✓
Drexel												✓		✓
Glen Alpine	✓		✓		✓	✓			✓	✓	✓	✓	✓	✓
Hildebran	✓	✓	✓	✓	✓	✓				✓	✓		✓	
Morganton	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Rutherford College	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓
Valdese	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓
Caldwell County	✓		✓	✓	✓	✓			✓	✓	✓		✓	✓
Cajah's Mountain	✓	✓	✓	✓	✓	✓					✓			
Cedar Rock	✓	✓	✓	✓	✓					✓	✓		✓	✓
Gamewell	✓	✓	✓	✓	✓					✓	✓		✓	✓
Granite Falls	✓		✓			✓				✓	✓	✓	✓	✓
Hudson	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓
Lenoir	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓
Rhodhiss					✓	✓			✓			✓	✓	✓
Sawmills	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓
Catawba County	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Brookford					✓	✓						✓		✓
Catawba	✓			✓		✓				✓	✓	✓		
Claremont	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Conover	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓
Hickory	✓	✓	✓			✓	✓		✓	✓	✓	✓		
Long View	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	
Maiden	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Newton	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓

Source: Local Capability Assessment Survey.

5.3.3 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone houses, which can require a substantial commitment from local, state, and federal funding sources.

The *Local Capability Assessment Survey* was used to capture information on the Region's fiscal capability through the identification of locally available financial resources.

Table 5.5 provides a summary of the results for the Unifour Region with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

Table 5.5: Relevant Fiscal Resources

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Alexander County		✓			✓			✓	✓		✓
Taylorsville		✓									
Burke County	✓	✓	✓		✓			✓	✓	✓	
Connelly Springs		✓			✓						
Drexel				✓	✓						
Glen Alpine		✓									
Hildebran											
Morganton	✓			✓	✓						
Rutherford College	✓	✓									
Valdese	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Caldwell County		✓	✓	✓	✓			✓			
Cajah's Mountain					✓						
Cedar Rock	✓	✓									
Gamewell	✓	✓									
Granite Falls	✓	✓									
Hudson	✓	✓									
Lenoir	✓	✓			✓						
Rhodhiss	✓	✓			✓						
Sawmills	✓	✓									

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Catawba County	✓	✓			✓						
Brookford		✓									
Catawba	✓	✓			✓			✓	✓	✓	
Claremont		✓			✓						
Conover	✓	✓			✓		✓	✓			
Hickory	✓	✓			✓			✓			
Long View	✓	✓			✓			✓	✓		
Maiden	✓	✓		✓	✓			✓	✓		
Newton	✓	✓		✓	✓			✓			

Source: Local Capability Assessment Survey.

5.3.4 Education and Outreach Capability

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. Examples include natural disaster or safety related school programs; participation in community programs such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns such as a Tornado Awareness Month.

Table 5.6 provides a summary of the results for the Unifour Region with regard to relevant education and outreach resources. A checkmark (✓) indicates that the given resource is locally available for hazard mitigation purposes.

Table 5.6: Education and Outreach Resources

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Alexander County	✓	✓				✓	
Taylorsville							
Burke County	✓	✓	✓				
Connelly Springs							
Drexel		✓					
Glen Alpine		✓					
Hildebran							
Morganton		✓					
Rutherford College							
Valdese		✓	✓	✓	✓	✓	✓
Caldwell County	✓	✓				✓	
Cajah's Mountain		✓					
Cedar Rock							
Gamewell							
Granite Falls		✓	✓				
Hudson							
Lenoir		✓					
Rhodhiss		✓	✓				
Sawmills							
Catawba County	✓	✓	✓	✓		✓	
Brookford		✓				✓	
Catawba							
Claremont		✓					
Conover							
Hickory	✓	✓					
Long View	✓	✓		✓			
Maiden	✓	✓	✓				
Newton		✓					

Source: Local Capability Assessment Survey.

5.3.5 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority, or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore the local political climate must be considered in designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The *Local Capability Assessment Survey* was used to capture information on political capability of the Unifour Region. Survey respondents were asked to identify some general examples of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (e.g., building codes, floodplain management, etc.). The comments provided by the participating jurisdictions are listed below:

- Elected officials and senior management are always willing to do whatever is necessary to protect the health, safety, and welfare of all citizens. Example: Lake James Environmental Standards (buffers, erosion, and setbacks) all exceed state and federal requirements.
- The Board of Alderman has shown their commitment to hazard mitigation by adopting and maintaining many of the recommended ordinances.
- Typically, the Town Council is willing to adopt regulations that set minimum standards for watershed protection and flood damage protection.
- Floodplain management ordinance, flood damage prevention ordinance, building codes with Burke and Caldwell counties.
- The Catawba County Board of Commissioners supports policies and ordinances which address hazard mitigation; however, the County is fiscally constrained to fund infrastructure without assistance from federal or state grants. The County's Unified Development Ordinance, adopted by the Board of Commissioners in 2007, incorporated many of the action strategies from the 2004 Hazard Mitigation Plan. These included mandatory open space requirements, a mountain protection overlay district addressing Firewise communities, and a cluster subdivision option which protects environmentally sensitive areas. The County evaluated the Community Rating System, which was a mitigation action from the 2009 Hazard Mitigation Plan; however, with the very few number of residents that would receive minimal benefits it was determined to not be economically viable.
- Check ordinances on http://www.townofcatawba.org: Town Code of Ordinances, Zoning Ordinance, Subdivision Regulations, Flood Damage Prevention Ordinance.
- City Council has been open to enacting policies that reduce hazard vulnerabilities. They did adopt new FIRM maps and flood protection ordinance that exceed the minimum standard (requires 2 feet of freeboard). In the land development plan adopted by the City Council, greenways have been designated along creeks in the flood hazard areas. The City Council has also adopted a conservation subdivision where at least 40% of the area should be held as open/green space.
- Elected officials will, within reason, support programs to mitigate hazards.

- The Board of Aldermen of the Town of Long View is willing to enact policies and programs that reduce hazard vulnerabilities. Development outside of a floodplain is always encouraged but development within the floodplain is not completely prohibited. The Town has adopted a flood damage prevention ordinance that adds regulations and costs to developing in a floodplain. No developer has proposed to build in a floodplain in the last eight years. Other than designated floodplain areas, the Town of Long View does not have any other identified hazard areas.
- Our local political leadership has displayed a willingness to enact policies above the established minimum baseline. For example, our floodplain protection ordinance requires 2 feet of freeboard for floodplain development.
- The City of Newton is committed to implementing policies and regulations that reduce potential hazard vulnerabilities. Zoning, Subdivision, Erosion Control, Stormwater, Floodplain, and Wetland regulations are in place. Floodplain regulations require all structural development within the floodplain to be constructed 2 feet above the base flood elevation (BFE). Several plans have also been created to assist in hazard mitigation efforts, which include: Land Development Plan, Eastside Area Plan, Southeast Area Plan, St. Paul's Area Plan, Core Area Plan, Southwest Area Plan, Multi-Hazard Plan, Parks & Recreation Master Plan, and Greenway Plan. In addition, elected officials and key staff have received National Incident Management System (NIMS) certification.

5.3.6 Local Self Assessment

In addition to the inventory and analysis of specific local capabilities, the *Local Capability Assessment Survey* asked counties and local jurisdictions within the Unifour Region to conduct a self assessment of their perceived capability to implement hazard mitigation activities. As part of this process, local officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, county officials classified each of the aforementioned capabilities as either “limited,” “moderate,” or “high.”

Table 5.7 summarizes the results of the self assessment for the Unifour Region.

Table 5.7: Self Assessment of Capability

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Political Capability	OVERALL CAPABILITY
Alexander County	MODERATE	LOW	MODERATE	MODERATE	LOW	LOW
Taylorsville	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Burke County	MODERATE	MODERATE	LOW	LOW	HIGH	MODERATE
Connelly Springs	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Drexel	LOW	LOW	LOW	LOW	LOW	LOW
Glen Alpine	LOW	LOW	LOW	LOW	LOW	LOW
Hildebran	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Morganton	MODERATE	MODERATE	MODERATE	LOW	MODERATE	MODERATE
Rutherford College	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Valdese	HIGH	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Caldwell County	LOW	HIGH	LOW	MODERATE	LOW	LOW
Cajah's Mountain	MODERATE	MODERATE	LOW	LOW	LOW	MODERATE
Cedar Rock	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Gamewell	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Granite Falls	MODERATE	LOW	LOW	MODERATE	MODERATE	MODERATE
Hudson	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Lenoir	HIGH	HIGH	MODERATE	HIGH	MODERATE	HIGH
Rhodhiss	LOW	LOW	LOW	LOW	MODERATE	LOW
Sawmills	MODERATE	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Catawba County	HIGH	HIGH	MODERATE	MODERATE	MODERATE	MODERATE
Brookford	MODERATE	LOW	LOW	LOW	MODERATE	LOW
Catawba	HIGH	MODERATE	LOW	LOW	MODERATE	HIGH
Claremont	MODERATE	MODERATE	MODERATE	MODERATE	HIGH	MODERATE
Conover	HIGH	LOW	LOW	LOW	LOW	LOW
Hickory	HIGH	HIGH	MODERATE	MODERATE	MODERATE	MODERATE
Long View	MODERATE	MODERATE	LOW	MODERATE	HIGH	MODERATE
Maiden	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Newton	HIGH	MODERATE	LOW	MODERATE	HIGH	MODERATE

Source: Local Capability Assessment Survey.

5.4 Conclusions on Local Capability

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to results of the *Local Capability Assessment Survey*. This methodology attempts to assess the overall level of capability of the Unifour Region to implement hazard mitigation actions.

Table 5.8 shows the results of the *Capability Assessment* using the designed scoring methodology. The capability score is based solely on the information provided by local officials in response to the *Local Capability Assessment Survey*. According to the assessment, the average local capability score for all responding jurisdictions is 48, which falls into the moderate capability ranking.

Table 5.8: Capability Assessment Results

Jurisdiction	Overall Capability Score	Overall Capability Rating
Alexander County	54	HIGH
Taylorsville	33	MODERATE
Burke County	64	HIGH
Connelly Springs	34	MODERATE
Drexel	15	LIMITED
Glen Alpine	54	HIGH
Hildebran	35	MODERATE
Morganton	55	HIGH
Rutherford College	35	MODERATE
Valdese	67	HIGH
Caldwell County	64	HIGH
Cajah's Mountain	37	MODERATE
Cedar Rock	30	MODERATE
Gamewell	38	MODERATE
Granite Falls	29	MODERATE
Hudson	40	MODERATE
Lenoir	57	HIGH
Rhodhiss	38	MODERATE
Sawmills	38	MODERATE
Catawba County	69	HIGH
Brookford	56	HIGH
Catawba	36	MODERATE
Claremont	51	HIGH
Conover	61	HIGH
Hickory	58	HIGH
Long View	62	HIGH
Maiden	80	HIGH
Newton	63	HIGH

Source: Local Capability Assessment Survey.

As previously discussed, one of the reasons for conducting a *Capability Assessment* is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified, for each jurisdiction, in the tables found throughout this section. The participating jurisdictions used the *Capability Assessment* as part of the basis for the mitigation actions that are identified in Section 7; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their mitigation actions.

Section 6: Mitigation Strategy

The *Mitigation Strategy* section provides the blueprint for the participating jurisdictions in the Unifour Region to follow to become less vulnerable to the negative effects of the natural hazards identified and addressed in this Plan. It is based on the general consensus of the Unifour Hazard Mitigation Planning Committee (HMPC) and the findings and conclusions of the *Risk Assessment* and *Capability Assessment*. It consists of the following five subsections:

6.1 Overview

The intent of the *Mitigation Strategy* is to provide the Unifour Region with overall goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques deemed available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

- In being comprehensive, the development of the *Mitigation Strategy* included a thorough review of all natural hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the Unifour Region achieve compatible economic, environmental, and social goals.
- In being strategic, the development of the *Mitigation Strategy* ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being functional, each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the *Mitigation Strategy* included the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance), as well as hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration, and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as the Plan is maintained over time.

The third and last step in designing the *Mitigation Strategy* is the selection and prioritization of specific mitigation actions for the Unifour Region (found in Section 7: *Mitigation Action Plans*). Each County and participating jurisdiction has its own *Mitigation Action Plan* (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process. A significant amount of time and effort was applied to this step in the process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the Unifour counties and incorporated municipalities to complete. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides the departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Unifour Regional Hazard Mitigation Plan.

In preparing each *Mitigation Action Plan* for the Unifour Region, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mitigation goals and unique needs of the planning area. Prioritization of the proposed mitigation actions was based on the factors outlined in subsection 6.1.1.

6.1.1 Mitigation Action Prioritization

The priority for each mitigation action was determined by the participating jurisdiction by identifying each action as high, moderate, or low priority. In order to make this decision, local government officials reviewed and considered the findings of the *Risk Assessment* and *Capability Assessment*. Other considerations included each individual mitigation action's effect on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

6.2 Mitigation Goals

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, the Unifour counties and participating municipalities have developed seven goal statements for local hazard mitigation planning in the Unifour Region. In developing these goals, the previous four county hazard mitigation plans were reviewed to determine areas of consistency. The project consultant reviewed the wide range of strategies, goals, objectives, actions, and implementation plans from each of the four previous county plans and a determination was made to review and discuss previous goals but to move forward with a newly crafted set of goals to better reflect the current needs and concerns of the Unifour Region as a whole. These regional goals are presented in **Table 6.1**.

These regional goals were developed by the HMPC at the third planning committee meeting. Each goal, purposefully broad in nature, serves to establish the parameters that were used to review and update existing mitigation actions and to aid in formulating new ones. The consistent implementation of mitigation actions over time will ensure that these mitigation goals are achieved.

Table 6.1: Regional Mitigation Goals

Goal #1	Evaluate and revise as needed local plans, policies, procedures, regulations, and ordinances to support effective mitigation.
Goal #2	Maintain and/or upgrade existing infrastructure to minimize system failures due to natural hazards.
Goal #3	Implement a public outreach campaign to heighten awareness of natural hazard risks where we live, work, and play.
Goal #4	Support coordination of greenway plans and linkages to parks and open space networks to mitigate flooding at the regional level.
Goal #5	Pursue mitigation of repetitive flood loss properties.
Goal #6	Investigate, seek funding for, and implement structural mitigation projects that will reduce the damaging effects of natural hazards.
Goal #7	Investigate, seek funding for, and implement other unspecified special projects and planning efforts that will reduce the damaging effects of natural hazards.

6.3 Identification and Analysis of Mitigation Techniques

In formulating the *Mitigation Strategy* for the Unifour Region, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the HMPC meetings. In general, all activities considered by the planning committee can be classified under one of the following four broad categories of mitigation techniques: local plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness programs. These are described in detail below.

6.3.1 Local Plans and Regulations

Mitigation actions that fall under this category include government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples of these types of actions include:

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- NFIP Community Rating System
- Capital improvement programs
- Open space preservation
- Stormwater management regulations and master plans

6.3.2 Structure and Infrastructure Projects

Mitigation actions that fall under this category involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance (HMA) program. Examples of these types of actions include:

- Acquisitions and elevations of structures in flood-prone areas
- Utility undergrounding
- Structural retrofits
- Floodwalls and retaining walls
- Detention and retention structures
- Culverts
- Safe rooms

6.3.3 Natural Systems Protection

Mitigation actions that fall under this category minimize damage and losses and also preserve or restore the functions of natural systems. Examples of these types of actions include:

- Sediment and erosion control
- Stream corridor restoration
- Forest management
- Conservation easements
- Wetland restoration and preservation

6.3.4 Education and Awareness Programs

Mitigation actions that fall under this category inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions. Examples of these types of actions include:

- Radio or television spots
- Websites with maps and information
- Real estate disclosure
- Presentations to school groups or neighborhood organizations
- Mailings to residents in hazard-prone areas
- StormReady
- Firewise

6.3.5 Other Types of Actions

Participating jurisdictions may wish to include other types of actions in their *Mitigation Action Plans* that do not fit into one of the categories listed above. In some cases, these may not be viewed as pure examples of mitigation, but they may be related in ways that make sense to the local government adopting the actions. Examples of these types of actions include:

- Warning systems
- Communications enhancements
- Emergency response training and exercises
- Evacuation management
- Sandbagging for flood protection
- Installing temporary shutters for immediate wind protection
- Other forms of emergency services

6.4 Selection of Mitigation Techniques for the Unifour Region

To determine the most appropriate mitigation techniques for the jurisdictions in the Unifour Region, the HMPC thoroughly reviewed and considered the findings of the *Risk Assessment* and *Capability Assessment* to determine the best activities for their respective communities.

Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

6.5 Plan Update Requirement

In keeping with FEMA requirements for plan updates, the mitigation actions identified in the previous Unifour Region county plans were evaluated to determine their current implementation status. Updates on the implementation status of each existing mitigation action are provided as part of the *Mitigation Action Plans* found in Section 7.

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Section 7: Mitigation Action Plans

The *Mitigation Action Plan* section includes a *Mitigation Action Plan* (MAP) for each participating jurisdiction, plus a separate MAP for the Unifour Region as a whole. As stated in Section 6, each County and participating jurisdiction has its own MAP that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

The participating jurisdictions are listed below in the order that the MAPs are included in this section.

- **Unifour Regional Actions**

- **Alexander County**
- Town of Taylorsville

- **Burke County**
- Town of Connelly Springs
- Town of Drexel
- Town of Glen Alpine
- Town of Hildebran
- City of Morganton
- Town of Rutherford College
  Town of Valdese

- **Caldwell County**
- Town of Cajah's Mountain
- Village of Cedar Rock
- Town of Gamewell
- Town of Granite Falls
- Town of Hudson
- City of Lenoir
- Town of Rhodhiss
- Town of Sawmills

- **Catawba County**
- Town of Brookford
- Town of Catawba
- City of Claremont
- City of Conover
- City of Hickory
- Town of Long View
- Town of Maiden
- City of Newton

Mitigation Action Plan—Alexander County

2014 Mitigation Actions

Mitigation Action 1	Conduct outreach to the public regarding Alexander County's Community Alert System to educate them on how to obtain information both pre- and post- disaster event.
Category:	Education and Awareness Programs
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Alexander County Emergency Services Department
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	1-2 years
Priority (High, Moderate, Low):	High

Mitigation Action 2	Improve information sharing with Duke Energy regarding its operational procedures for the movement of water through its hydro-electric systems on the Catawba River. This can be achieved by meeting formally at least once a year, when significant weather events are anticipated and when upgrades or improvements to the system are scheduled.
Category:	Education and Awareness Programs
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Emergency Services Department
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	Ongoing
Priority (High, Moderate, Low):	High

Mitigation Action 3	Establish a protocol for monitoring the tail race areas below the Catawba River dams during high water events to ensure security of the area and limiting public access.
Category:	Local Plans and Regulations; Education and Awareness Programs
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Emergency Services Department; Sheriff's Office
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	Ongoing
Priority (High, Moderate, Low):	High

Mitigation Action 4	Install generator transfer switch connections during the construction of new public facilities (schools, fire stations, County buildings, etc.).
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Alexander County Finance Department; Alexander County Emergency Services Department
Estimated Cost:	To be determined
Potential Funding Sources:	Alexander County General Fund; Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program
Implementation Schedule:	Ongoing
Priority (High, Moderate, Low):	High

Mitigation Action 5	Integration of a cooperative hazard mitigation program into new development, commercial districts, infrastructure, and land use planning.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Emergency Services Department; Alexander County Planning Department
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	3-5 years
Priority (High, Moderate, Low):	High

Mitigation Action 6	Promote a standard hookup for emergency generators such that any portable generator can be simply connected to it for supply of power to vital circuits in homes and/or public buildings. Priority locations are nursing homes, schools, and government buildings.
Category:	Other
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Alexander County Emergency Services Department; American Red Cross
Estimated Cost:	To be determined
Potential Funding Sources:	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.
Implementation Schedule:	1-2 years
Priority (High, Moderate, Low):	Moderate to High

Mitigation Action 7	To establish, where feasible, additional emergency response forces, by at least 10%, that are trained, equipped and prepared to respond to a variety of emergency and disaster situations. This concept is concurred by Alexander County and the Town of Taylorsville.
Category:	Other
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning and Hail; Tornado; Wildfire; Drought; Winter Weather
Lead Agency/Department Responsible:	Alexander County Manager and Commissioners
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	3-5 years
Priority (High, Moderate, Low):	Low

Mitigation Action 8	Retrofit or relocate residential structures in 100-year floodplain. Recent count of structures inside the 100-year floodplain indicates that flooding could occur of such magnitude to cause a significant impact on citizens. This action will depend upon state and federal assistance through the "buy-out" program for floodplains and flood-prone areas. Zero tolerance for persons building in floodplain or flood-prone areas will be incorporated.
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Planning Department; Alexander County Emergency Services Department
Estimated Cost:	To be determined during the feasibility phase
Potential Funding Sources:	Alexander County; State of North Carolina; Federal Government
Implementation Schedule:	5-10 years
Priority (High, Moderate, Low):	Moderate

Mitigation Action 9	Retrofit critical facilities to reduce collapsing materials. Funding is the most important issue for this action. Public education and awareness must be accomplished prior to implementations.
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	Multiple Hazards
Lead Agency/Department Responsible:	Alexander County Building Inspection Department; Alexander County Emergency Services Department
Estimated Cost:	To be determined during the feasibility phase
Potential Funding Sources:	Alexander County and Hazard Mitigation Grant monies
Implementation Schedule:	5-10 years
Priority (High, Moderate, Low):	Low

Status of Previously Adopted Mitigation Actions

Mitigation Action 1	To establish, where feasible, additional emergency response forces, by at least 10%, that are trained, equipped and prepared to respond to a variety of emergency and disaster situations. This concept is concurred by Alexander County and the Town of Taylorsville.
Category:	Emergency Services
Hazard(s) Addressed:	Floods; Hurricanes and Tropical Storms; Severe Thunderstorms and Tornadoes; Wildfire; Drought; Winter Storms
Lead Agency/Department Responsible:	Alexander County Manager and Commissioners
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	3-5 years
Priority (High, Moderate, Low):	Low
2014 Status:	**Ongoing. Additional funding has been secured for Rescue. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 7 above.)**

Mitigation Action 2	Integration of a cooperative hazard mitigation program into new development, commercial districts, infrastructure, and land use planning.
Category:	Property Protection; Prevention
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Emergency Services Department; Alexander County Planning Department
Estimated Cost:	Minimal (staff time only)
Potential Funding Sources:	Alexander County General Fund
Implementation Schedule:	3-5 years
Priority (High, Moderate, Low):	High
2014 Status:	**No changes or updates have been made to local ordinances or zoning regulations since the last plan update. Changes and updates are anticipated when funding and staff time allow. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 5 above.)**

Mitigation Action 3	Retrofit or relocate residential structures in 100-year floodplain. Recent count of structures inside the 100-year floodplain indicates that flooding could occur of such magnitude to cause a significant impact on citizens. This action will depend upon state and federal assistance through the "buy-out" program for floodplains and flood-prone areas. Zero tolerance for persons building in floodplain or flood-prone areas will be incorporated.
Category:	Property Protection
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Alexander County Planning Department; Alexander County Emergency Services Department
Estimated Cost:	To be determined during the feasibility phase
Potential Funding Sources:	Alexander County; State of North Carolina; Federal Government
Implementation Schedule:	5-10 years
Priority (High, Moderate, Low):	Moderate
2014 Status:	**To date only one structure has sustained damage and no funds were available for buyout. We continually monitor this. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 8 above.)**

Mitigation Action 4	Retrofit critical facilities to reduce collapsing materials. Funding is the most important issue for this action. Public education and awareness must be accomplished prior to implementations.
Category:	Property Protection
Hazard(s) Addressed:	Multiple Hazards
Lead Agency/Department Responsible:	Alexander County Building Inspection Department; Alexander County Emergency Services Department
Estimated Cost:	To be determined during the feasibility phase
Potential Funding Sources:	Alexander County and Hazard Mitigation Grant monies
Implementation Schedule:	5-10 years
Priority (High, Moderate, Low):	Low
2014 Status:	**The new Alexander County Law Enforcement/Detention Center has been completed. Progressing with plans to renovate the old Law Enforcement Center. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 9 above.)**

Mitigation Action 5	Audible and visual warning devices to be installed by Duke Energy at Oxford Dam for warnings when flood gate(s) are opened to warn boaters, other users of the waterway, and residents in an attempt to save lives when flood gate(s) are opened.
Category:	Emergency Services
Hazard(s) Addressed:	Dam Failure
Lead Agency/Department Responsible:	Alexander County Emergency Services Department
Estimated Cost:	To be determined during the feasibility phase
Potential Funding Sources:	Duke Energy
Implementation Schedule:	3-5 years
Priority (High, Moderate, Low):	High
2014 Status:	**Duke Energy sirens sound each time gates are opened or power production begins. This has proven to be sufficient notice of rising water levels just below the dam.**

Mitigation Action Plan—Town of Brookford

2014 Mitigation Actions

Mitigation Action 1	Develop a debris management plan.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Wildfire; Winter Weather
Lead Agency/Department Responsible:	Town of Brookford Administration Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	1-2 years
Priority (High, Moderate, Low):	Moderate

Mitigation Action 2	Develop a post-disaster reconstruction plan to facilitate decision-making following a hazard event.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam/Levee Failure; Earthquake; Sinkhole; Landslide
Lead Agency/Department Responsible:	Town of Brookford Administration Department; Town of Brookford Police Department; Town of Brookford Public Works Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	Moderate

Mitigation Action 3	Implement moderate to major repairs to stormwater drains.
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Town of Brookford Public Works Department
Estimated Cost:	Moderate to High
Potential Funding Sources:	Local
Implementation Schedule:	1-2 years
Priority (High, Moderate, Low):	High

Mitigation Action 4	Identify and strengthen facilities to function as public shelters.
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam/Levee Failure; Earthquake; Sinkhole; Landslide
Lead Agency/Department Responsible:	Town of Brookford Administration Department
Estimated Cost:	To be determined
Potential Funding Sources:	Grants; local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	Low

Mitigation Action 5	Continue routinely pruning and clearing limbs on the Town's rights of way.
Category:	Prevention
Hazard(s) Addressed:	Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Winter Weather
Lead Agency/Department Responsible:	Town of Brookford Public Works Department
Estimated Cost:	Moderate
Potential Funding Sources:	Local
Implementation Schedule:	5 years
Priority (High, Moderate, Low):	Moderate

Mitigation Action 6	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.
Category:	Education and Awareness Programs
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Town of Brookford; Catawba County Emergency Services Department
Estimated Cost:	Staff time
Potential Funding Sources:	General Fund
Implementation Schedule:	1-2 years
Priority (High, Moderate, Low):	High

Status of Previously Adopted Mitigation Actions

Mitigation Action 1	Maintain continued compliance with the National Flood Insurance Program (NFIP).
Category:	Prevention
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Town of Brookford Administration Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	High
2014 Status:	**The Town adopted a Flood Damage Prevention Ordinance based on the model provided by the State of North Carolina. The Town Manager will plan to attend training with regard to floodplain management. There are no inspectors within the Town, other than those that inspect through the County.**

Mitigation Action 2	Develop mutual aid agreement with other jurisdictions to augment local inspection personnel after major disasters.
Category:	Emergency Services
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam/Levee Failure; Earthquake; Sinkhole; Landslide
Lead Agency/Department Responsible:	Town of Brookford Administration Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	Moderate
2014 Status:	**Completed. The Town has signed a mutual aid agreement with the City of Hickory and works closely with Catawba County.**

Mitigation Action 3	Prepare a Local Evacuation Plan to ensure the safety of Town residents in advance of anticipated hazard events, particularly wildfires and flooding.
Category:	Emergency Services
Hazard(s) Addressed:	Wildfire; Flood
Lead Agency/Department Responsible:	Town of Brookford Police Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	Moderate
2014 Status:	**Completed. The Town of Brookford Police Department has worked closely with local municipalities, Catawba County, the Town's chemical plant, and Town residents to prepare an evacuation plan.**

Mitigation Action 4	Enhance local citizens' disaster preparedness through continuous outreach and education efforts in coordination with Catawba County, the American Red Cross, and other support organizations.
Category:	Preparedness
Hazard(s) Addressed:	Flood; Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam/Levee Failure; Earthquake; Sinkhole; Landslide
Lead Agency/Department Responsible:	Town of Brookford Administration Department; Town of Brookford Police Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	2-4 years
Priority (High, Moderate, Low):	High
2014 Status:	**Completed. Town citizens have been continuously updated on the evacuation plans and the use of the Community Building as a safe house in the case of extreme situations.**

Mitigation Action 5	Continue routine inspections of the Town's storm drain system.
Category:	Prevention
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Town of Brookford Public Works Department
Estimated Cost:	Low
Potential Funding Sources:	Local
Implementation Schedule:	Continuous implementation (as needed)
Priority (High, Moderate, Low):	Moderate
2014 Status:	**The Town of Brookford Public Works Department does this as an ongoing preventative action. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 3 above.)**

Mitigation Action 6	Continue routinely pruning and clearing limbs on the Town's rights of way.
Category:	Prevention
Hazard(s) Addressed:	Hurricane and Tropical Storm; Thunderstorm, Lightning, and Hail; Tornado; Winter Weather
Lead Agency/Department Responsible:	Town of Brookford Public Works Department
Estimated Cost:	Moderate
Potential Funding Sources:	Local
Implementation Schedule:	Continuous implementation (as needed)
Priority (High, Moderate, Low):	Moderate
2014 Status:	**The Town of Brookford Public Works Department does this as an ongoing preventative action. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 5 above.)**

Mitigation Action Plan—Burke County

2014 Mitigation Actions

Mitigation Action 1	Review/update Flood Damage Prevention Ordinance.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Building Inspections Department; Burke County Emergency Services Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Revision 2014/2015
Priority (High, Moderate, Low):	Moderate

Mitigation Action 2	Revise/update regulatory floodplain maps of any known flood areas.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Land Records/GIS Department
Estimated Cost:	N/A
Potential Funding Sources:	Local; state; federal
Implementation Schedule:	Ongoing
Priority (High, Moderate, Low):	Moderate

Mitigation Action 3	Adopt zoning and subdivision regulations in floodplain, steep slope, and wildfire hazard areas.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Emergency Services Department; Burke County Building Inspections Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Review Yearly
Priority (High, Moderate, Low):	High

Mitigation Action 4	Update Comprehensive Land Use Plan.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	2014/2015
Priority (High, Moderate, Low):	High

Mitigation Action 5	Step up centralized coordinated permitting process, including effective filing/permitting system to ensure compliance with floodplain regulations.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Emergency Services Department; Burke County Planning & Development Department; Burke County Building Inspections Department; Burke County Environmental Health Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	2014/2015
Priority (High, Moderate, Low):	Moderate

Mitigation Action 6	Upgrade and maintain Early Warning System.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Emergency Services Department
Estimated Cost:	N/A
Potential Funding Sources:	Local; state; federal; private (Duke Energy)
Implementation Schedule:	Continuous monitoring and testing
Priority (High, Moderate, Low):	High

Mitigation Action 7	Establish a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Emergency Services Department; Burke County Planning & Development Department; North Carolina Department of Transportation (NCDOT)
Estimated Cost:	N/A
Potential Funding Sources:	Local; state; federal
Implementation Schedule:	Ongoing review
Priority (High, Moderate, Low):	Moderate

Mitigation Action 8	Prepare countywide stormwater management plan covering the Catawba River basin.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	Local; state
Implementation Schedule:	Revise in 2015
Priority (High, Moderate, Low):	Moderate

Mitigation Action 9	Prepare development plan for relocating public infrastructure out of hazardous areas.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Building Inspections Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Ongoing Review
Priority (High, Moderate, Low):	Low

Mitigation Action 10	Improve Hazardous Warning and Response Plan, which outlines warning and evacuation procedures for critical facilities, instructions for getting persons out of flood-prone or isolated areas, and protocols for controlling vehicles on evacuation routes.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Emergency Services Department
Estimated Cost:	N/A
Potential Funding Sources:	Local, State, Federal
Implementation Schedule:	Continuous review
Priority (High, Moderate, Low):	High

Status of Previously Adopted Mitigation Actions

Mitigation Action 1	Review/update Flood Damage Prevention Ordinance.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Building Inspections Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	To be completed by 2007
Priority (High, Moderate, Low):	Moderate
2014 Status:	**Completed in 2007 and reviewed annually. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 1 above.)**

Mitigation Action 2	Adopt zoning and subdivision regulations in floodplain, steep slope, and wildfire areas.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	To be reviewed annually
Priority (High, Moderate, Low):	High
2014 Status:	**Completed and reviewed annually. Floodplain ordinance adopted. All development projects reviewed for floodplain compliance prior to issuance. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 3 above.)**

Mitigation Action 3	Revise/update regulatory floodplain maps.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department; Burke County Land Records/GIS Department
Estimated Cost:	N/A
Potential Funding Sources:	Local; state; federal
Implementation Schedule:	To be done on an ongoing basis
Priority (High, Moderate, Low):	Moderate
2014 Status:	**The County adopts and utilizes current North Carolina Floodplain Mapping Program data. Updates coincide with state map updates. (Ongoing elements of this action are reflected in the 2014 Mitigation Action 2 above.)**

Mitigation Action 4	Acquire federal funds to purchase destroyed or substantially damaged properties and relocate households.
Category:	Structure and Infrastructure Projects
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Emergency Services Department; Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	State; federal
Implementation Schedule:	Ongoing case-by-case basis
Priority (High, Moderate, Low):	High
2014 Status:	**Ongoing on a case-by-case basis. In 2010, CDBG monies were used to repair 22 residential properties. No properties were purchased and no households were relocated.**

Mitigation Action 5	Complete Community Rating System (CRS) application. Ensure participation in the National Flood Insurance Program (NFIP).
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Emergency Services Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Within five years
Priority (High, Moderate, Low):	Moderate
2014 Status:	**Complete; requires continuous monitoring. All development applications reviewed for floodplain compliance prior to issuance. Floodplain areas identified on applicable zoning permits. Burke County does not intend to apply for CRS.**

Mitigation Action 6	Update 1993 Comprehensive Land Use Plan.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Annual Review
Priority (High, Moderate, Low):	High
2014 Status:	**The Comprehensive Land Use Plan is reviewed and updated annually as needed. (Ongoing elements of this action are reflected in 2014 Mitigation Action 4 above.)**

Mitigation Action 7	Step up centralized, coordinated permitting process including effective filing/permitting system to ensure compliance with floodplain regulations.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Building Inspections Department; Burke County Planning & Development Department; Burke County Emergency Services Department; Burke County Environmental Health Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Within five years
Priority (High, Moderate, Low):	High
2014 Status:	**Completed; updating in 2014/2015. (Ongoing elements of this action are reflected in 2014 Mitigation Action 5 above.)**

Mitigation Action 8	Develop a comprehensive Capital Improvement Plan for public facilities that steers capital projects out of hazardous areas.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Management; all departments
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Ongoing
Priority (High, Moderate, Low):	High
2014 Status:	**Ongoing; continuous monitoring. No public facilities have been built since last plan update. All capital improvements made have been on facilities that are out of hazardous area.**

Mitigation Action 9	Maintain library on retrofitting techniques. Publicize through bulletins/newsletters.
Category:	Education and Awareness Programs
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Building Inspections Department; Burke County Emergency Services Department; Burke County Planning & Development Department
Estimated Cost:	N/A
Potential Funding Sources:	Local; state
Implementation Schedule:	Ongoing; continuous monitoring
Priority (High, Moderate, Low):	Moderate
2014 Status:	**Ongoing. Floodplain manager maintains documentation related to suggested retrofitting techniques. There have been no activities related to the website, newsletter, etc. within the past 5 years.**

Mitigation Action 10	Continuation and expansion of E-911 Addressing Program to include all municipalities with goal to cover entire county with one system.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	All Hazards
Lead Agency/Department Responsible:	Burke County Emergency Services Department; 911 Addressing; Burke County Land Records/GIS Department
Estimated Cost:	N/A
Potential Funding Sources:	Local
Implementation Schedule:	Ongoing; requires continuous monitoring
Priority (High, Moderate, Low):	High
2014 Status:	**Completed; requires continuous monitoring. Our addressing office along with the E-911 Center updates the addresses on a continuous basis when new residences and businesses are built. Before building permits are issued, a 911 address must be given for the new construction project.**

Mitigation Action 11	Drainage system management—prepare countywide storm water management plan covering the Catawba River basin.
Category:	Local Plans and Regulations
Hazard(s) Addressed:	Flood
Lead Agency/Department Responsible:	Burke County Planning & Development Department; West Piedmont Council of Governments (WPCOG)
Estimated Cost:	N/A
Potential Funding Sources:	Local; state
Implementation Schedule:	To be updated in 2011
Priority (High, Moderate, Low):	High
2014 Status:	**Updated in 2011.**