Earth/Environmental Science Grades 9-12

COMPETENCY GOAL 5: The learner will build an understanding of the dynamics and composition of the atmosphere and its local and global processes influencing climate and air quality.

Objectives

5.01 Analyze air masses and the life cycle of weather systems:
- Planetary wind belts.
- Air masses.
- Frontal systems.
- Cyclonic systems.

5.02 Evaluate meteorological observing, analysis, and prediction:
- Worldwide observing systems.
- Meteorological data depiction.

5.03 Analyze global atmospheric changes including changes in **CO_2**, **CH_4**, and stratospheric **O_3** and the consequences of these changes:
- Climate change.
- Changes in weather patterns.
- Increasing ultraviolet radiation.
- Sea level changes.

View of Craggy Mountains

THE CLIMATES OF WESTERN NORTH CAROLINA

Western North Carolina Climates is characterized by four distinct seasons. The mountains of the Blue Ridge to the southeast and the Great Smokies to the northwest temper the day by day effects of migratory storms moving eastward from the Great Plains or northward from the Gulf of Mexico. The sequence of several fair days interrupted by a day of rain provides adequate moisture for crops and landscaping. Spring, summer, and fall temperatures invite outdoor activity. Spring and Summer thunderstorms feed the myriad mountain waterfalls. Tornadoes are quite rare compared to nearby lower regions. A very few tropical storms, "worn out" before entering the mountains, (rarely) create torrential rain.

Four Seasons: Moderate summers and winters separated by long spectacular springs and falls favor the breathtaking beauty of the native vegetation. Rhododendron, azalea, laurel and dogwood bathe the mountains in spring bloom. The blaze of fall color of the deciduous forests attracts tourists from all parts of the nation.

Climates within a climate: Discriminating newcomers may select Boone for its cool summers, Tryon for its mild winters, or Asheville for a happy balance. Sites above 2,000 feet are cooler. Southeast slopes are sheltered from cold winds. Frosts and fog are reduced on all slopes several hundred feet above the valley floors.

Summer: There is no finer summer climate than that at Boone, Blowing Rock, Banner Elk, and Crossnore. Highlands and Cashiers are famous for cool summers. Heavier rains make their forests and waterfalls scenic. Hot days and pleasant nights occur at the lower lying towns of Tryon and Murphy.

Winter: Upslope winds on the northwest higher mountains create excellent winter sport conditions. Natural snowfall is the greatest there. The "Thermal Belt" on the lower southeast slopes makes Tryon — protected from cold winds — the mildest spot in the region.

Rain and Moisture: The mountain ridges of the Blue Ridge and the Smokies have the most rain. Over 80 inches at Highlands and 93 inches at Coweeta contrast with the driest section of the State, in the French Broad River Valley near Asheville, where the "rain shadow" drops precipitation to less than 40 inches per year.

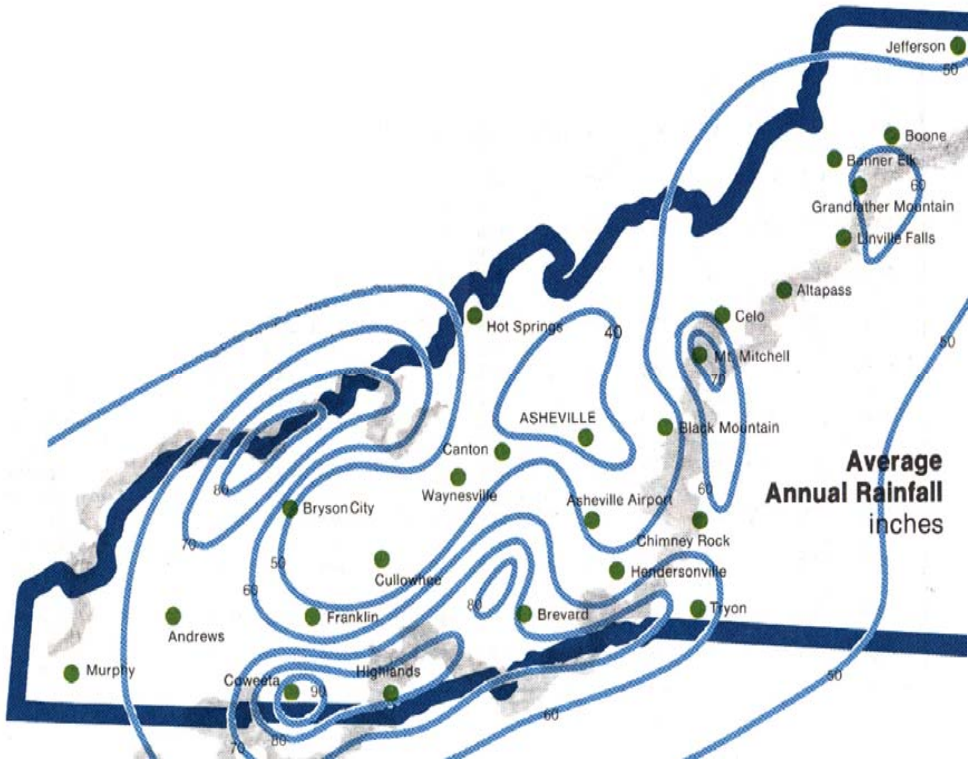
The climate of Western North Carolina has many contrasts. Terrain, particularly height, slope, exposure, orientation and relation to major features creates the sharp variations in climate. Temperature is basically determined by elevation and exposure. Slope affects rain, wind, temperature and visibility. Nature provides clues to the climate of each locale. Flora and fauna differ in each regime. Species found in close proximity here are characteristic of the contrasts between lower Piedmont types and those found elsewhere no further south than Canada or northern New England. Southern Pine and Canadian Balsam thrive within a distance of a few miles, each living in its own natural climatic zone.

North facing slopes near the main ridge lines are cool, shaded and exposed to cold winter winds from the northwest. Natural snow is enhanced by the upslope effect and man-made snow, producing excellent skiing.

South facing slopes in the lee of these mountains, sheltered from the winds and more exposed to the direct rays of the sun, offer fine locations for homesites, gardening, camping, golfing and year-around outdoor activity. The climate produces ample moisture for crops and lush grass on fairways and greens of some of the finest golf courses of the South.

Winds at Asheville are calm one third of the time. Two thirds of the remainder are from the north-northwest or northwest. In other areas, winds depend on the shape and orientation of the local topography.

Rainfall is amplified on the windward sides of the mountains and decreases on the lee slopes. Franklin, with annual precipitation of 51.25 inches is only 15 miles from Coweeta, where annual rainfall exceeds 93 inches in this temperate zone rainforest climate — the wettest in the eastern United States. The annual rainfall map shows how lines of heaviest rain hug the Blue Ridge divide from Boone to Highlands. Another band of maximum rainfall runs northeast — southwest along the Great Smokies ridges, with over 80 inches at Clingmans Dome.



Map of Western North Carolina

Flash flooding occurs on most streams at infrequent intervals. Altapass at 2,740 feet in the Blue Ridge had 35.40 inches of rain in July 1916 from “decayed” tropical storms. Rains of 5 inches in 24 hours occur in the headwaters of the French Broad River at sites like Rosman and Brevard with winter storms, while Asheville in the “rain shadow” of the Blue Ridge — may experience less than 1 inch.

Air pollution is largely continued to industrialized valleys where it is under control of an effective Air Pollution Control Agency. The basin-like topography, frequent temperature inversions and relatively light winds contribute to the problem where it exists.

Shallow radiation fogs are frequent in summer and fall in creek and river bottoms. They are confined to the first several hundred feet up the valley slope. Travelers should be aware of these and the thick fog and low cloud which may enshroud the Blue Ridge Parkway during periods of rain with southeast winds at any time of the year.

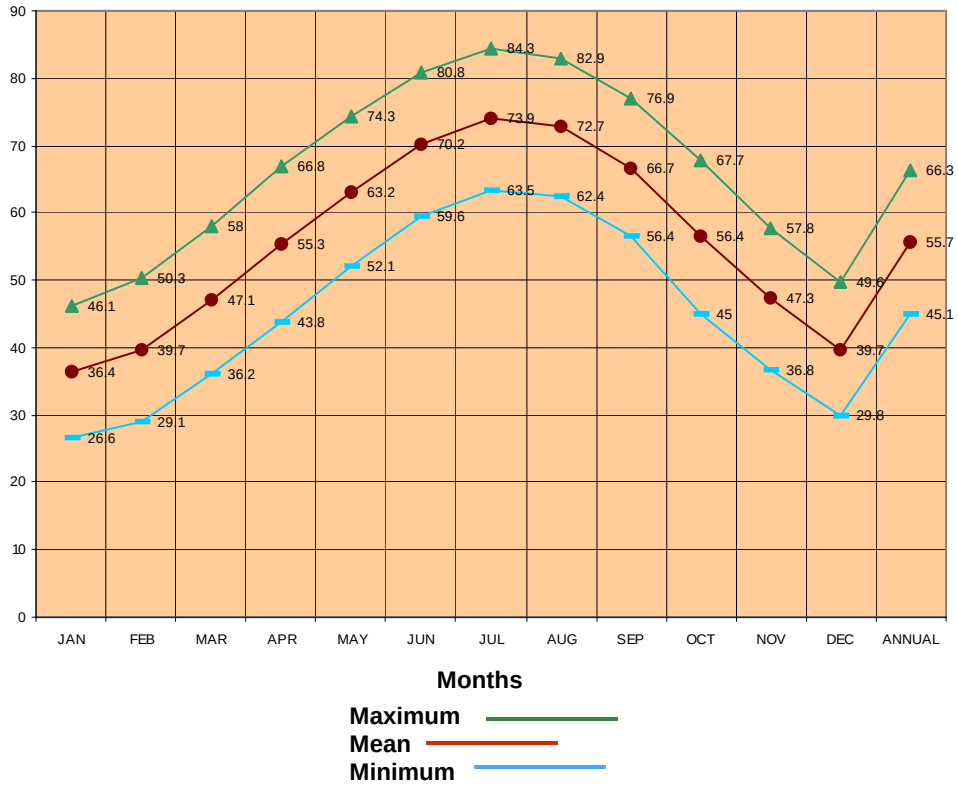
Fog Scene

Computational Procedures:

A climate normal is defined, by convention, as the arithmetic means of a climatological element computed over three consecutive decades (WMO, 1989). Ideally, the data record for such a 30-year period should be free of any inconsistencies in observational practices (e.g., changes in station location, instrumentation, time of observation, etc.) and be serially complete (i.e. no missing values). When present, inconsistencies can lead to a non-climatic bias in one period of a station’s record relative to another, yielding an “inhomogeneous” data record. Adjustments and estimations can make a climate record “homogeneous” and serially complete, and allow a climate normal to be calculated simply as the average of the 30 monthly values.

The monthly normals for maximum and minimum temperature and precipitation are computed simply by averaging the appropriate 30 values from the 1971-2000 record. The monthly average temperature normals are computed by averaging the corresponding monthly maximum and minimum normals. The annual temperature normals are calculated by taking the average of the 12 monthly normals. The annual precipitation and degree day normals are the sum of the 12 monthly normals.

Asheville Temperature By Months 1971 - 2000
Degrees Fahrenheit



Average Surface Windspeed By Months (mph)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Asheville AP	9.2	9.1	9.1	8.6	6.8	5.9	5.8	5.3	5.6	6.7	8.0	8.8	7.4
Asheville	9.4	9.9	10.0	9.2	7.4	6.1	5.6	5.6	6.4	6.9	8.7	8.7	7.8

Prevailing Wind Direction By Months

Asheville	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW

Average Relative Humidity At 7 a.m. And 1 p.m. By Months

Asheville AP 7a	84%	84%	84%	84%	91%	93%	95%	97%	96%	93%	87%	85%	89%
Asheville AP 1p	59%	56%	53%	49%	56%	60%	62%	62%	62%	55%	56%	58%	57%
Asheville 7a	81%	78%	78%	76%	81%	85%	89%	92%	91%	89%	79%	81%	84%
Asheville 1p	59%	55%	53%	47%	49%	53%	57%	57%	55%	50%	52%	58%	54%

Average Percentage Of Possible Sunshine By Months

Asheville	48%	52%	56%	63%	66%	65%	60%	60%	63%	65%	57%	47%	61%

Average Precipitation By Months In Inches 1971 - 2000

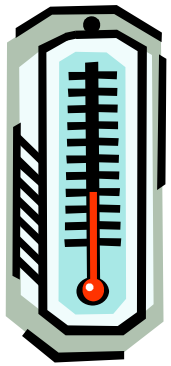
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Andrews	7.17	6.09	6.97	5.18	5.37	5.54	5.00	5.50	4.45	3.51	5.33	6.02	66.13
Asheville RGNL AP	4.06	3.83	4.59	3.50	4.42	4.38	3.87	4.30	3.72	3.18	3.82	3.40	47.07
Asheville	3.07	.139	3.89	3.16	3.53	3.24	2.97	3.34	3.01	2.40	2.93	2.59	37.32
Banner Elk	4.22	3.81	4.88	4.16	4.73	4.60	4.36	4.32	4.07	3.57	3.73	3.17	49.62
Bent Creek	4.02	3.91	5.17	3.82	4.39	3.81	3.93	3.92	4.12	3.26	4.11	3.31	47.77
Black Mountain 2 W	4.04	3.76	4.89	3.96	4.94	4.29	3.82	3.96	3.86	3.50	4.04	3.38	48.44
Blowing Rock 1 NW	5.56	4.72	6.67	5.87	6.48	6.48	5.87	5.75	5.52	4.78	5.82	4.43	67.95
Boone 1 SE	3.97	4.14	5.18	4.70	4.87	4.58	4.69	4.83	3.81	3.17	4.38	3.21	51.53
Brevard	5.93	5.23	6.50	4.69	5.92	5.75	5.11	5.40	5.12	4.85	5.69	6.01	66.2
Canton 1 SW	3.39	3.60	4.50	3.57	4.08	3.02	4.17	3.85	3.19	2.52	3.12	2.96	41.97
Celo 2 S	5.58	5.07	6.30	4.60	5.32	4.54	4.43	5.02	4.55	4.18	5.05	4.19	58.83
Coweeta EXP Stn.	7.47	6.95	8.03	5.67	6.20	5.44	4.45	4.88	5.30	4.58	6.43	6.49	71.89
Cullowhee	4.92	4.69	5.43	3.91	4.86	4.34	4.27	3.91	3.57	3.20	4.28	4.33	51.71
Enka	3.22	3.55	4.35	3.29	3.93	3.12	3.18	3.54	3.54	2.43	3.05	2.63	39.83
Fletcher 2 NE	3.87	3.62	4.59	3.47	4.21	3.95	3.59	4.21	3.63	3.25	3.75	3.10	45.24
Fletcher 3 W	4.55	4.09	5.13	3.75	4.79	4.81	4.35	4.98	4.05	3.47	4.08	3.84	51.89
Franklin 3 W	5.39	4.89	5.76	4.09	4.90	4.49	4.09	4.48	3.94	3.29	4.58	4.57	54.47
Grandfather Mtn.	4.77	4.79	5.78	5.06	6.03	6.57	5.40	5.44	5.68	4.55	4.65	4.04	62.76
Hendersonville 1 NE	5.20	4.58	5.94	4.16	4.88	4.76	4.53	5.41	4.29	3.97	4.64	4.26	56.62
Highlands	8.06	7.05	8.98	6.47	7.90	7.12	6.61	6.59	6.76	6.05	8.24	7.74	87.57
Hot Springs	3.63	3.37	3.96	3.80	4.48	3.88	4.63	3.36	3.30	2.15	2.90	3.13	42.59
Hot Springs 2	3.38	3.28	4.44	3.56	3.93	3.90	4.80	4.24	3.45	2.54	3.10	3.15	43.77
Jefferson 2 E	4.02	3.73	4.61	3.93	4.89	4.39	4.40	4.31	3.93	3.35	3.84	3.28	48.68
Lake Lure 2	4.78	4.72	5.49	4.21	4.69	4.84	4.82	5.96	4.73	4.64	4.77	4.03	57.68
Lake Toxaway 2 SW	8.16	7.16	9.27	6.99	8.54	6.73	7.83	7.74	7.02	6.29	8.63	7.36	91.72
Marion 2 NW	4.18	4.36	5.59	4.43	5.34	4.68	4.25	4.33	4.44	4.13	4.35	3.93	54.01
Marshall	3.39	3.38	4.05	3.31	3.89	3.58	3.76	3.85	2.94	2.37	2.97	2.77	40.26
Mount Mitchell	7.00	5.41	7.93	5.34	5.93	5.57	6.70	7.39	4.87	5.10	6.36	6.90	74.50
Murphy 2 NE	5.81	5.07	5.86	4.58	4.85	4.76	4.94	4.66	3.92	3.13	4.57	4.91	57.06
Pisgah Forest 1 N	6.26	5.34	6.54	4.59	5.83	5.15	5.31	5.53	5.08	4.53	5.47	5.21	64.84
Rosman	7.73	6.36	8.09	5.64	6.80	6.43	6.92	6.53	5.86	5.24	6.73	6.73	79.06
Swannanoa 2 E	3.56	3.49	4.43	3.35	4.39	3.83	3.57	3.28	3.63	3.10	3.60	2.92	43.15
Swannanoa 2 SSE	4.70	4.17	5.38	4.33	4.87	4.30	4.38	4.47	4.10	3.51	4.31	3.92	52.44
Tryon	5.81	5.11	6.66	4.75	5.77	5.62	5.26	6.18	5.56	4.95	4.91	4.85	65.43
Waynesville 1 E	4.62	4.54	5.24	3.84	4.43	4.03	3.59	4.11	3.60	2.92	3.81	4.04	48.77

Product Description:

This Climatography includes 1971-2000 normals of monthly and annual monthly and annual total precipitation (inches). Normals stations include both National Weather Service Cooperative Network and Principal Observation (First-Order) locations in the 50 states, Puerto Rico, the Virgin Islands, and Pacific Islands.

Average Daily Maximum Temperature By Months 1971 - 2000

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Andrews	48.6	52.7	60.6	68.8	76.0	82.5	85.7	85.0	80.0	70.7	60.6	51.8	68.6
Asheville RGNL AP	45.9	50.0	57.7	66.5	73.5	80.0	83.3	81.7	76.0	67.1	57.4	49.3	65.7
Asheville	46.1	50.3	58.0	66.8	74.3	80.8	84.3	82.9	76.9	67.7	57.8	49.6	66.3
Banner Elk	40.5	43.4	51.0	58.8	66.9	73.1	76.8	75.6	70.5	62.0	52.9	44.5	59.7
Bent Creek	47.2	51.7	59.7	69.0	75.5	81.1	84.2	82.7	77.5	68.6	59.0	50.2	67.2
Black Mountain 2 W	46.5	50.1	57.9	66.0	73.1	79.4	83.1	81.6	76.1	67.7	58.4	49.8	65.8
Blowing Rock 1 NW	38.7	42.2	50.0	58.9	66.4	72.6	76.4	75.1	69.2	60.1	51.4	42.6	58.6
Boone 1 SE	39.3	42.5	50.0	58.7	66.8	72.9	76.4	75.4	70.3	61.6	52.0	43.6	59.1
Brevard	47.2	51.5	59.4	67.2	74.0	79.2	81.8	80.1	75.3	67.5	58.4	49.9	66.0
Canton 1 SW	45.8	49.6	57.5	65.9	72.7	78.9	82.0	80.5	75.2	66.2	57.1	49.0	65.0
Celo 2 S	46.1	49.3	57.1	65.8	72.8	78.5	82.0	81.0	76.3	68.4	59.2	50.2	65.6
Coweeta EXP Stn.	48.9	53.0	60.3	68.3	74.8	80.7	83.9	82.5	77.5	69.4	60.3	51.9	67.6
Cullowhee	47.4	52.0	60.2	68.3	75.5	81.2	84.3	82.8	77.7	69.0	59.1	50.3	67.3
Fletcher 2 NE	48.7	52.7	60.0	69.0	75.2	81.0	84.1	83.2	78.0	69.4	60.3	52.0	67.8
Fletcher 3 W	46.0	50.1	57.9	66.6	73.9	80.3	84.0	82.5	77.1	68.0	58.2	49.4	66.2
Franklin 3 W	47.7	52.5	60.3	68.5	75.6	81.3	84.5	83.2	77.9	69.4	59.5	50.4	67.6
Grandfather Mtn.	33.7	36.1	42.9	51.0	58.7	65.0	68.8	67.2	61.8	53.5	45.0	37.7	51.8
Hendersonville 1 NE	46.7	50.7	58.5	67.0	74.3	80.6	84.3	82.5	76.9	67.8	58.4	49.7	66.5
Highlands	41.9	46.0	54.3	62.4	69.5	75.1	78.0	76.3	70.9	61.7	52.0	44.0	61.0
Hot Springs	46.5	51.4	59.9	68.8	76.2	83.1	86.7	85.9	80.8	71.0	60.5	50.5	68.4
Hot Springs 2	47.6	51.8	60.1	69.9	77.2	84.0	87.6	87.1	81.2	71.3	61.0	51.2	69.2
Jefferson 2 E	42.8	45.7	53.7	62.3	70.4	77.2	81.3	80.4	74.7	65.2	55.9	46.9	63.0
Marion 2 NW	47.7	52.2	60.9	69.3	76.9	83.1	86.7	84.7	78.7	69.4	59.9	50.5	68.3
Marshall	45.5	49.9	58.3	66.8	74.6	81.3	84.9	83.8	78.3	68.6	58.2	49.1	66.6
Mount Mitchell	34.2	36.2	42.6	50.6	58.0	64.9	67.9	67.6	62.8	56.0	46.7	39.2	52.2
Murphy 2 NE	48.0	52.4	60.5	69.6	76.4	82.8	86.1	85.5	80.2	71.0	60.6	51.4	68.7
Pisgah Forest 1 N	48.2	51.9	59.4	68.0	74.6	80.8	84.1	82.7	77.5	69.3	60.0	51.3	67.3
Swannanoa 2 SSE	39.7	43.3	51.0	59.8	67.1	72.2	75.3	74.1	68.6	60.5	51.1	43.2	58.8
Tryon	51.9	56.9	65.2	73.9	80.3	86.0	89.1	87.3	81.6	73.0	63.0	54.5	71.9
Waynesville 1 E	47.0	50.5	58.4	65.9	73.3	79.6	82.8	81.5	76.2	67.5	58.3	50.1	65.9



Average Daily Mean Temperature By Months 1971 - 2000

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Andrews	37.0	40.0	47.4	54.5	62.7	70.0	73.8	72.8	67.1	56.1	47.2	39.8	55.7
Asheville RGNL AP	35.8	39.0	46.3	54.1	62.0	69.2	73.0	71.8	65.7	55.2	46.4	39.0	54.8
Asheville	36.4	39.7	47.1	55.3	63.2	70.2	73.9	72.7	66.7	56.4	47.3	39.7	55.7
Banner Elk	29.7	32.4	39.6	47.5	56.2	62.8	66.7	65.4	60.1	50.1	41.3	33.6	48.8
Bent Creek	36.8	39.9	47.1	54.9	62.7	69.4	73.1	71.9	66.2	55.9	47.2	39.5	55.4
Black Mountain 2 W	35.0	37.6	44.9	52.7	60.8	67.9	72.0	70.6	64.7	54.3	45.4	37.9	53.7
Blowing Rock 1 NW	30.0	32.7	40.2	48.6	56.7	63.5	67.5	66.2	60.4	50.3	42.2	33.8	49.3
Boone 1 SE	29.5	32.1	39.7	48.2	56.9	63.7	67.6	66.0	60.2	49.7	40.8	33.0	49.0
Brevard	35.5	38.4	45.7	53.2	61.3	67.9	71.6	70.1	64.7	54.1	45.5	38.1	53.8
Canton 1 SW	34.4	37.2	44.5	52.1	60.3	67.1	71.1	69.8	64.3	53.5	44.8	37.5	53.1
Celo 2 S	33.9	36.3	43.8	51.4	59.2	65.9	69.9	68.8	63.2	53.1	44.8	37.1	52.3
Coweeta EXP Stn.	36.8	39.8	47.0	54.4	61.8	68.2	71.8	70.7	65.5	55.4	46.8	39.4	54.8
Cullowhee	36.2	39.7	47.0	54.7	63.1	69.6	73.4	72.2	66.8	56.0	46.7	38.9	55.4
Fletcher 2 NE	37.3	40.4	47.2	54.6	61.8	68.8	72.3	71.4	65.7	55.7	47.4	40.2	55.2
Fletcher 3 W	34.5	37.7	45.1	52.8	61.1	68.2	72.2	70.8	64.8	53.5	44.9	37.3	53.6
Franklin 3 W	35.9	39.1	46.4	53.7	62.3	69.2	73.1	72.2	66.5	55.5	46.1	38.3	54.9
Grandfather Mtn.	25.7	28.2	34.8	43.3	52.1	58.9	62.8	61.6	56.1	46.5	37.7	29.9	44.8
Hendersonville 1 NE	36.0	38.8	46.2	54.0	62.8	69.8	74.0	72.4	66.3	55.5	46.5	38.8	55.1
Highlands	32.7	35.6	42.9	50.0	57.8	64.0	67.6	66.4	60.8	50.7	42.0	35.1	50.5
Hot Springs	36.9	40.5	48.0	56.0	64.4	71.7	75.8	74.8	69.2	58.0	48.6	40.2	57.0
Hot Springs 2	37.9	41.3	48.7	56.7	64.6	71.9	75.9	75.2	69.4	58.8	49.4	41.1	57.6
Jefferson 2 E	31.6	33.9	41.2	48.9	57.7	65.2	69.7	68.3	62.2	51.1	42.7	34.9	50.6
Marion 2 NW	36.6	40.2	48.3	56.7	64.9	72.1	76.1	74.5	68.5	57.5	48.0	39.3	56.9
Marshall	33.3	36.1	43.5	51.2	59.9	67.8	72.2	71.0	65.1	53.6	44.3	36.7	52.9
Mount Mitchell	25.8	27.5	33.6	42.0	50.0	57.0	60.4	59.6	55.0	46.9	37.7	30.2	43.8
Murphy 2 NE	36.9	40.0	47.2	55.1	63.1	70.5	74.5	73.8	68.1	56.9	47.5	39.7	56.1
Pisgah Forest 1 N	35.9	38.6	45.4	53.1	60.9	68.0	71.9	70.8	65.2	54.9	46.0	38.6	54.1
Swannanoa 2 SSE	31.4	34.5	41.7	49.9	57.8	64.0	67.6	66.3	60.8	51.7	42.8	35.2	50.3
Tryon	41.1	44.6	52.1	59.7	67.3	74.0	78.0	76.6	70.7	60.6	51.3	43.5	60.0
Waynesville 1 E	34.3	37.3	44.6	51.7	59.7	66.5	70.1	68.9	63.2	52.5	44.1	37.1	52.5

Average Daily Minimum Temperature By Months 1971 - 2000

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Andrews	25.3	27.3	34.2	40.1	49.4	57.5	61.8	60.5	54.2	41.5	33.8	27.7	42.8
Asheville RGNL AP	25.8	28.0	34.9	41.8	50.6	58.3	62.7	61.8	55.4	43.3	35.3	28.8	43.9
Asheville	26.6	29.1	36.2	43.8	52.1	59.6	63.5	62.4	56.4	45.0	36.8	29.8	45.1
Banner Elk	18.9	21.4	28.2	36.2	45.4	52.5	56.5	55.2	49.7	38.1	29.7	22.6	37.9
Bent Creek	26.3	28.0	34.5	40.8	49.9	57.6	62.0	61.1	54.9	43.1	35.3	28.8	43.5
Black Mountain 2 W	23.5	25.1	31.9	39.3	48.5	56.4	60.8	59.5	53.3	40.9	32.4	26.0	41.5
Blowing Rock 1 NW	21.3	23.2	30.4	38.3	47.0	54.4	58.6	57.3	51.6	40.5	32.9	24.9	40.0
Boone 1 SE	19.6	21.6	29.3	37.7	46.9	54.5	58.8	56.6	50.0	37.7	29.5	22.4	38.7
Brevard	23.7	25.3	31.9	39.2	48.6	56.6	61.4	60.1	54.0	40.7	32.5	26.2	41.7
Canton 1 SW	23.0	24.7	31.4	38.2	47.8	55.3	60.1	59.0	53.3	40.7	32.4	26.0	41.0
Celo 2 S	21.7	23.2	30.5	37.0	45.6	53.2	57.8	56.5	50.0	37.7	30.4	24.0	39.0
Coweeta EXP Stn.	24.6	26.6	33.7	40.5	48.7	55.6	59.6	58.8	53.4	41.3	33.3	26.9	41.9
Cullowhee	24.9	27.4	33.7	41.0	50.7	58.0	62.5	61.5	55.9	43.0	34.3	27.5	43.4
Fletcher 2 NE	25.9	28.0	34.4	40.1	48.4	56.6	60.5	59.6	53.4	42.0	34.4	28.3	42.6
Fletcher 3 W	23.0	25.3	32.3	39.0	48.2	56.0	60.3	59.0	52.4	39.0	31.6	25.1	40.9
Franklin 3 W	24.0	25.6	32.5	38.9	49.0	57.0	61.7	61.2	55.0	41.5	32.6	26.2	42.1
Grandfather Mtn.	17.7	20.2	26.7	35.6	45.4	52.7	56.8	55.9	50.3	39.5	30.3	22.1	37.8
Hendersonville 1 NE	25.2	26.9	33.9	40.9	51.3	59.0	63.7	62.2	55.7	43.1	34.5	27.8	43.7
Highlands	23.4	25.1	31.5	37.5	46.0	52.9	57.2	56.4	50.7	39.7	31.9	26.2	39.9
Hot Springs	27.3	29.5	36.1	43.2	52.5	60.2	64.8	63.7	57.5	45.0	36.6	29.9	45.5
Hot Springs 2	28.2	30.8	37.2	43.4	52.0	59.8	64.1	63.3	57.6	46.3	37.7	30.9	45.9
Jefferson 2 E	20.4	22.1	28.6	35.5	44.9	53.2	58.0	56.2	49.6	36.9	29.5	22.9	38.2
Marion 2 NW	25.5	28.2	35.6	44.0	52.9	61.1	65.5	64.3	58.3	45.5	36.1	28.0	45.4
Marshall	21.0	22.3	28.7	35.5	45.2	54.2	59.4	58.1	51.8	38.6	30.4	24.2	39.1
Mount Mitchell	17.3	18.7	24.6	33.4	41.9	49.0	52.8	51.6	47.2	37.8	28.7	21.1	35.3
Murphy 2 NE	25.7	27.6	33.8	40.6	49.8	58.1	62.8	62.0	56.0	42.8	34.3	27.9	43.5
Pisgah Forest 1 N	23.6	25.2	31.4	38.2	47.1	55.2	59.7	58.8	52.9	40.4	31.9	25.8	40.9
Swannanoa 2 SSE	23.1	25.6	32.4	40.0	48.5	55.8	59.9	58.4	52.9	42.8	34.4	27.1	41.7
Tryon	30.3	32.3	39.0	45.5	54.2	62.0	66.8	65.8	59.8	48.1	39.6	32.5	48.0
Waynesville 1 E	21.6	24.1	30.7	37.4	46.0	53.4	57.3	56.2	50.1	37.4	29.8	24.0	39.0

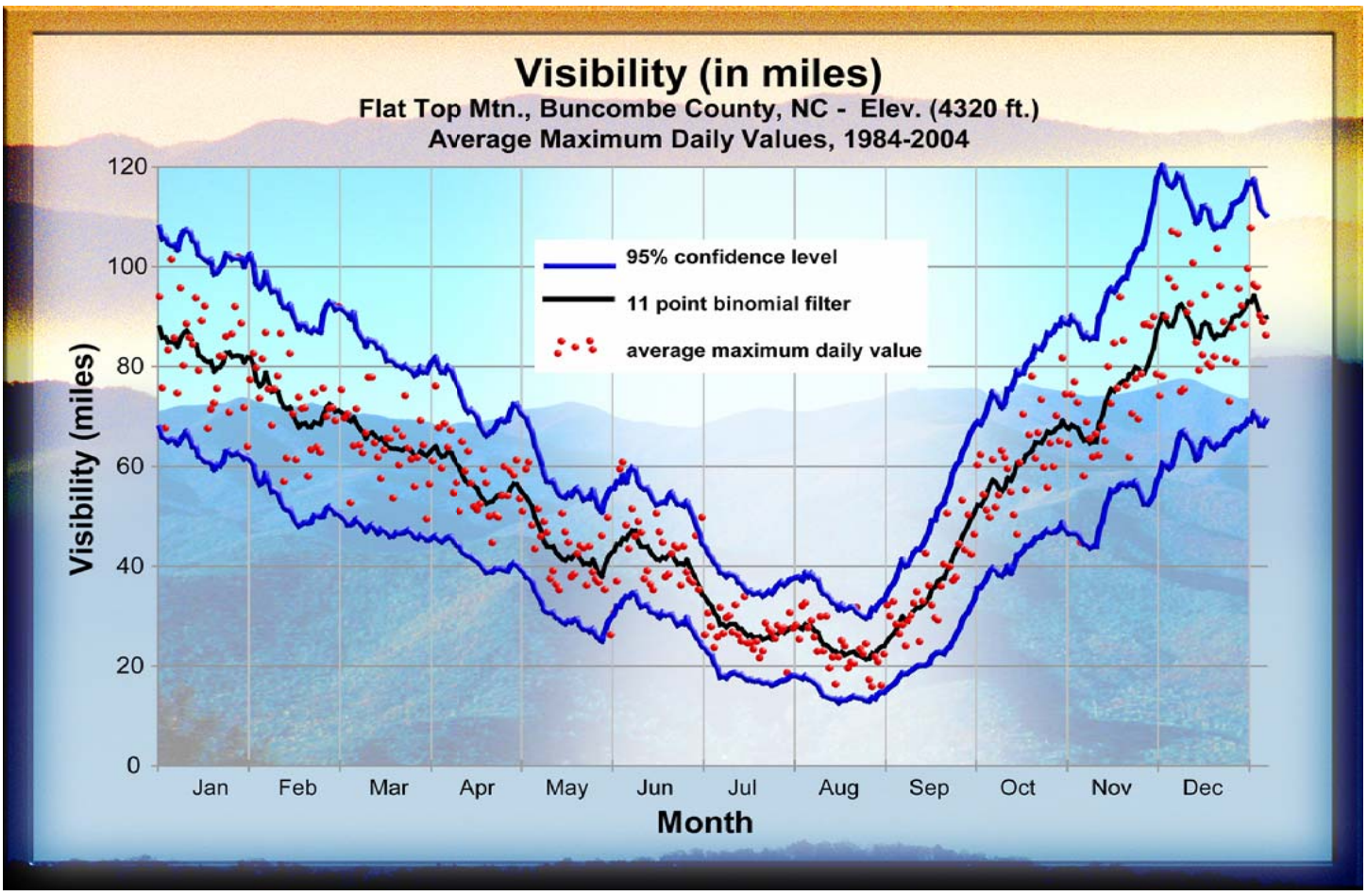
Some Annual Comparisons 1971 - 2000

Station:	Elevation (Ft)	Av. Temp.	Highest Temp.	Date	Lowest Temp.	Date	Av. Temp. ≥ 90°	Av. Temp. ≤ 32°	Av. Precip. (In)	Av. Precip. .01 in	Av. Snowfall
Andrews	1,749	55.7	99	7/18/1980	-19	1/21/1985	15.9	112.8	66.13	130.7	5.8
Asheville RGNL AP	2,140	54.8	100	8/21/1983	-16	1/21/1985	9.6	94.4	47.07	125.7	13.2
Asheville	2,240	55.7	99	8/20/1983	-17	1/21/1985	11.3	81.2	37.32	122.4	13.3
Banner Elk	3,748	48.8	92	8/18/1988	-31	1/21/1985	0.1	128.4	49.62	131.3	43.1
Black Mountain 2 W	2,290	53.7	99+	7/21/1980	-14	1/21/1985	8.8	99.9	48.44	122.5	7.1
Blowing Rock 1 NW	3,850	49.3	92+	7/22/1993	-24	1/21/1985	0.2	120.9	67.95	148	34.7
Brevard	2,212	53.8	97+	6/19/1984	-20	2/17/1958	7	102.2	66.2	123.1	7.5
Celo 2 S	2,680	52.3	97+	6/28/1952	-16	1/21/1985	1.9	131.8	58.83	142.4	16.8
Coweeta EXP Stn.	2,249	54.8	98	7/29/1952	-18	1/21/1985	7.1	112.4	71.89	136.2	8.7
Cullowhee	2,192	55.4	99	7/28/1952	-19	1/21/1985	9.4	99.4	51.71	131.5	8.7
Enka	2,050	0	99+	8/13/1975	-8	1/24/1963	6.4	108.7	39.83	103	1.6
Fletcher 3 W	2,070	53.6	99	8/22/1983	-16	1/21/1985	9.8	109	51.89	133.5	10.3
Franklin 3 W	2,170	54.9	101	7/29/1952	-15	1/21/1985	13.2	105.7	54.47	123.8	6.9
Grandfather Mtn.	5,300	44.8	91	8/27/1968	-32	1/21/1985	0	124.7	62.76	166.6	52.7
Hendersonville 1 NE	2,160	55.1	101	8/23/1983	-14	1/21/1985	11.9	88.5	56.62	130.2	9.4
Highlands	3,840	50.5	93	7/29/1952	-19	1/21/1985	0.2	114.4	87.57	155.2	15.7
Jefferson 2 E	2,770	50.6	96	8/17/1988	-15	1/27/1987	1.3	127.6	48.68	112.1	22.4
Mount Mitchell*	6,525	N/A	81	7/31/1999	-34	1/21/1985	N/A	N/A	N/A	N/A	N/A
Murphy 2 NE	1,640	56.1	99	8/23/1983	-16	1/22/1985	17.7	110.5	57.06	121.4	5.2
Pisgah Forest 1 N	2,110	54.1	98	6/23/1964	-15	1/22/1985	8.8	123.5	64.84	139.1	9.2
Tryon	1,080	60	105	6/22/1964	-8	1/21/1985	38.3	62.5	65.43	126.3	8.2
Waynesville 1 E	2,658	52.5	96	8/8/1930	-22	1/21/1985	4.3	116	48.77	139.1	13.8

* Station at Mount Mitchell was closed between 1965 and 1988.

National Comparisons 1971 - 2000

Station:	Av. Max. Temp. January	Av. Mean Temp. January	Av. Min. Temp. January	Av. Max. Temp. July	Av. Mean Temp. July	Av. Min. Temp. July	Annual Pcp. Normals	Annual Heat Degree Days	Annual Cool Degree Days
Asheville RGNL AP, NC	45.9	35.8	25.8	83.3	73	62.7	47.07	4326	818
Atlanta Hartsfield AP, GA	51.9	42.7	33.5	89.4	80	70.6	50.2	2827	1810
Boston Logan Intl AP, MA	36.5	29.3	22.1	82.2	73.9	65.5	42.53	5630	777
Charleston Intl AP, SC	58.9	47.9	36.9	90.9	81.7	72.5	51.53	2005	2306
Chicago Ohare Intl AP, IL	29.6	22	14.3	83.5	73.3	63.2	36.27	6498	830
Denver Intl AP, CO	43.2	29.2	15.2	88	73.4	58.7	15.81	6128	696
Detroit Metro AP, MI	31.1	24.5	17.8	83.4	73.5	63.6	32.89	6422	736
Galveston, TX	61.9	55.8	49.7	88.7	84.3	79.8	43.84	1008	3268
Great Falls Intl AP, MT	32.1	21.7	11.3	82	66.2	50.4	14.89	7828	288
Hartford Bradley Intl AP, CT	34.1	25.7	17.2	84.9	73.7	62.4	46.16	6104	759
Los Angeles Intl Ap, CA	65.6	57.1	48.6	75.3	69.3	63.3	13.15	1274	679
Miami Intl AP, FL	76.5	68.1	59.6	90.9	83.7	76.5	58.53	149	4361
Minneapolis Intl AP, MN	21.9	13.1	4.3	83.3	73.2	63	29.41	7876	699
New Orleans Intl AP, LA	61.8	52.6	43.4	91.1	82.7	74.2	64.16	1417	2773
New York JFK Intel AP, NY	38.8	31.8	24.7	82.9	74.8	66.7	42.46	4947	949
Omaha Eppley AP, NE	31.7	21.7	11.6	87.4	76.7	65.9	30.22	6311	1095
Pittsburgh Intl AP, PA	35.1	27.5	19.9	82.7	72.6	62.4	37.85	5829	726
Portland Intl AP, ME	30.9	21.7	12.5	78.8	68.7	58.6	45.83	7318	347
Richmond Byrd Intl AP, VA	45.3	36.4	27.6	87.5	77.9	68.3	43.91	3919	1435
Saint Louis Intl AP, MO	37.9	29.6	21.2	89.8	80.2	70.6	38.75	4758	1561
Seattle Tacoma AP, WA	45.8	40.9	35.9	75.3	65.3	55.3	37.07	4797	173
Tucson Intl AP, AZ	64.5	51.7	38.9	99.6	86.5	73.4	12.17	1578	3017



Tornadoes were reported in each county in Western N.C. between 1950 and 2000

Locations	No.	Years and Fujita Tornado Scale	Deaths	Injuries
Ashe County	0			
Buncombe County	6	(2)1976 (F1), (2)1977 (F1), 1993 (F0), and 1999 (F1)	0	0
Cherokee County	7	1974 (F1), (2)1974 (F1)* & (F4)*, 1974 (F0)*, 1979 (F0), 1991 (F0), and 1998 (F1)	4	26
Graham County	1	1974 (F2)*	2	11
Haywood County	1	1976 (F1)	0	0
Henderson County	3	1975 (F1), 1976 (F1), and 1977 (F1)	0	0
Jackson County	2	1975 (F0), and 1976 (F2)	0	0
Macon County	2	02/18/1976 (F1) and 07/29/1976 (F1)	0	0
Madison County	4	(3)1977 (F1) and 1998 (F1)	0	5
McDowell County	3	1996 (F0), 1998 (F2), and 2000 (F0)	0	0
Mitchell County	0			
Polk County	1	1977 (F1)	0	0
Rutherford County	5	1973 (F0), (2)1975 (F2) & (F1), 1989 (F4), and 2000 (F0)	0	0
Swain County	2	1974 (F2)* and 1976 (F1)	0	0
Transylvania County	3	1974 (F1)*, 1975 (F2), and 1984 (F0)	0	0
Watauga County	2	1996 (F1) and 1998 (F0)	0	2
Yancey County	2	1956 (F1) and 1977 (F1)	0	0
Totals:	44		6	44

(2) indicate 2 tornadoes in same day
(3) indicate 3 tornadoes in same day
April 3, 1974 *
April 4, 1974 *

The Tornado Outbreak of 1974 was the worst in U.S. history with 148 twisters touching down in 13 states: Alabama, Georgia, Illinios, Indiana, Kentucky, Michigan, Mississippi, North Carolina, South Carolina, Ohio, Tennessee, Virginia, and West Virginia in April 3-4, 1974. 330 people were killed and 5,484 were injured.*

Weather Records History

- Mean, in Coweeta, adjusted to 40-year record at Mooney Gap.
- A phenomenal rainfall of 22.22 inches fell at Altapass in 24 hours on July 15 and 16, 1916 as a large tropical storm moved westward across South Carolina and Georgia. Weather Station in Altapass was closed.
- 35.49 inches fell at Highlands in July 1916.
- Most rainfall recorded in any month in North Carolina was at Mount Mitchell with 46.17 inches in September 2004.
- Most snowfall in one storm at Mount Mitchell was 50 inches in March 12-14,1993. The currently accepted greatest snowfall in one event is 60 inches in April 1987 at Newfound Gap TN/NC line in the Great Smoky Mountains National Park.
- Historical records reveal that destructive floods have occurred along the French Broad River many times in the past. Significant flooding has occurred in April 1791; August 1796; August 1810; May 1845; August 1850; August 1852; February 1875; June 1876; May 1901; February 1902; August 1910; July 1916; August 1928; August 1940; October 1964; May 1973; November 1977; and September 2004. The two largest floods of record occurred in April 1791 and July 1916.
- Hottest temperature in Tryon was 105° on June 22, 1964.
- Coldest temperature at Mount Mitchell was –34° on January 21, 1985.
- Lowest temperature at Mount Mitchell during any summer night was 27° on June 3, 1955.
- Coolest maximum temperature at Mount Mitchell during any summer day was 43° on June 6, 1997.
- Notable blizzards/snowstorms hit Western North Carolina 3 times in December 4-7, 1886, March 17, 1936, and March 12-14, 1993.
- One record of hailstorm was heavy damaged property in Asheville area on June 18, 1936.
- Tornadoes occurred in Western North Carolina in 5 consecutive years from 1973-1977 (one in 1973, seven in 1974, five in 1975, and eight each in 1976 and 1977). Four tornadoes struck Cherokee County on April 2-4, 1974 during the "Super Outbreak" that affected the Eastern United States. Six people were killed and 37 were injured in Cherokee and Graham Counties during this event. Tornadoes were also reported four times in the mountains in 1998.