



2008 Meteorology Summary

New Jersey Department of Environmental Protection

AIR POLLUTION AND METEOROLOGY

Meteorology plays an important role in the distribution of pollution throughout the troposphere, the layer of the atmosphere closest to the earth's surface. Atmospheric processes such as wind speed and wind direction affect the transport and dispersion of air pollution. Weather phenomena, such as precipitation and solar radiation, influence chemical reactions and transformations in the atmosphere that affect air pollutants. By studying meteorological and air pollution data together, scientists and mathematicians have developed reasonably accurate models for predicting the fate of pollutants as they go through the stages of transport, dispersion, transformation and removal.

Scientists, engineers, and policy makers can use results of the air pollution models as a screening tool for comparison to the National Ambient Air Quality Standards (NAAQS), to determine the impacts of new and existing air pollution sources, and to design ambient air monitoring networks. The meteorological data collected by the New Jersey Department of Environmental Protection (NJDEP) can assist planners in preparing State Implementation Plans (SIPs), engineers in designing or evaluating air pollution permit applications and planners in locating air monitoring stations.

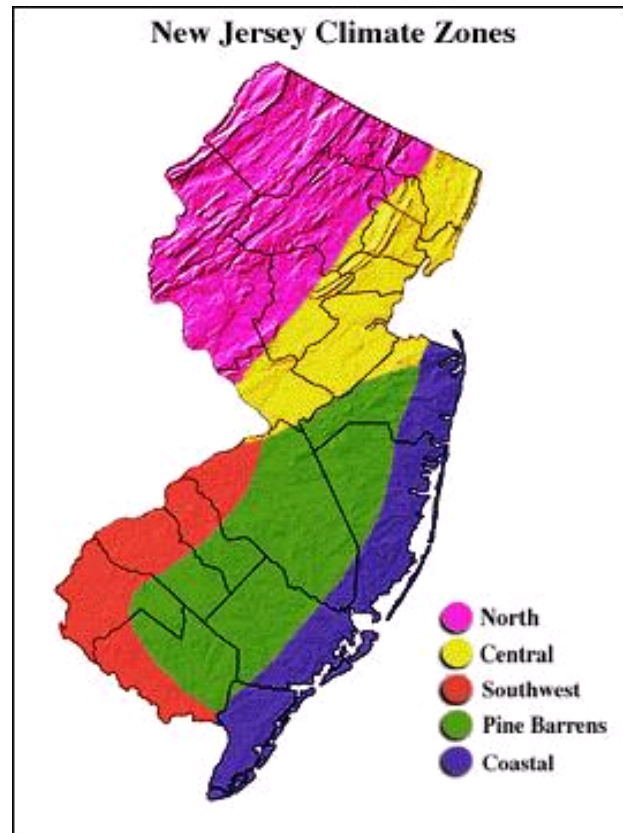
CLIMATOLOGY IN NEW JERSEY

New Jersey is located about halfway between the Equator and the North Pole, on the eastern coast of the United States. Its geographic location results in the State being influenced by wet, dry, hot, and cold airstreams, making for daily weather that is highly variable.

Although New Jersey is one of the smallest states in the Union, with a land area of 7,836 square miles, it has five distinct climate zones, which are classified as the Northern, Central, Pine Barrens, Southwest, and Coastal zones. The topography of the zones, their distance from the Atlantic Ocean, and the prevailing atmospheric flow patterns affecting those zones produce distinct variations in the daily weather

between each of the zones. These climate zones are shown in Figure 1.

Figure 1



Source: Office of the New Jersey State Climatologist

MONITORING LOCATIONS

The NJDEP maintains a network of six meteorological monitoring locations. Not all meteorological parameters are measured at each site. These parameters are measured at Elizabeth Lab, East Orange, Chester, Flemington, Rider University, and Camden. Figure 2 provides a map of the monitoring stations. In addition, total weekly precipitation is measured in Washington Crossing and Ancora State Hospital.

NORTHERN METEOROLOGICAL STATIONS

The Elizabeth Lab meteorological station monitors wind speed and wind direction. The East Orange meteorological station monitors temperature and relative humidity. The Chester meteorological station monitors solar radiation. In Table 1, the 2008 meteorological data are combined in East Orange, Elizabeth Lab, and Chester, are presented. Figure 3 shows the monthly maximum, mean and minimum temperatures in East Orange, and Figure 4 compares the monthly mean temperature with the 30-year mean temperatures measured at Newark airport. The Flemington meteorological station monitors barometric pressure, temperature, relative humidity, wind speed, wind direction, and solar radiation. This data is summarized in Table 1. Figure 5 shows the monthly maximum, mean and minimum temperatures at Flemington, and Figure 6 compares the monthly mean temperature with the 30-year mean temperatures measured at the Lehigh Valley International Airport in Allentown, PA.

CENTRAL AND SOUTHERN METEOROLOGICAL STATIONS

The Rider University and Camden Lab (The Camden Lab station was shut down on September 29, 2008 because the NJDEP lost access to the station. The NJDEP is actively pursuing the establishment of a new monitoring station in Camden) meteorological stations monitor barometric pressure, temperature, relative humidity, wind speed, wind direction, and solar radiation. This data is summarized in Table 2. Figure 7 shows the monthly maximum, mean and minimum temperatures at Rider University, and Figure 8 compares the monthly mean temperature with the 30-year mean temperatures measured at Philadelphia International airport.

Figure 2
2008 Meteorological Monitoring Network

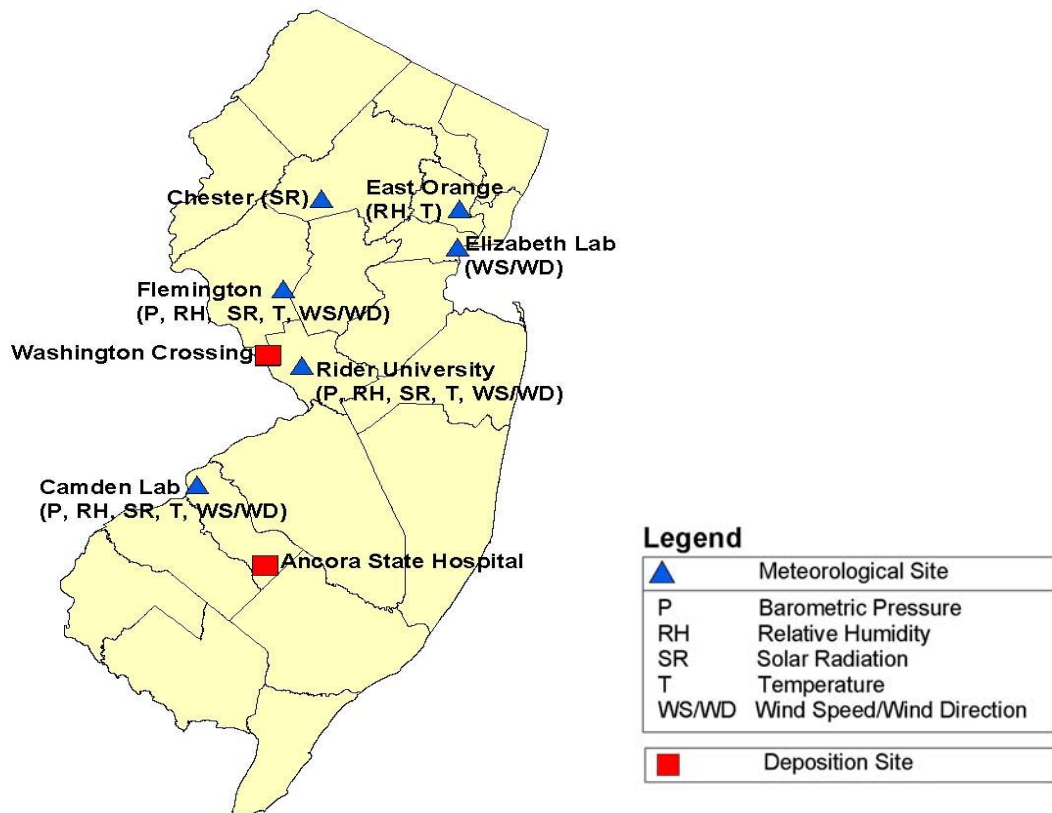


TABLE 1

SUMMARY OF METEOROLOGICAL MONITORING DATA - 2008
NORTHERN NEW JERSEYMONITORING SITESEast Orange and Chester

		<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>YEAR</u>
Temperature: (°F)	Mean ¹	36/31	34/34	41/42	53/52	59/63	74/72	77/77	72/75	69/68	54/56	44/46	36/36	54/54
	Min	13	9	27	32	38	57	65	56	50	35	23	11	9
	Max	64	65	70	81	84	97	94	87	91	76	74	65	97
Relative Humidity: (%)	Mean	64.7	71.4	62.6	64.4	68.2	73.8	74.0	72.1	78.1	72.1	72.8	73.7	70.7
	Min	29.2	32.5	16.4	19.8	24.0	36.4	37.6	35.3	41.6	28.1	33.9	33.4	16.4
	Max	97.2	97.5	97.7	97.8	97.7	98.1	98.3	98.2	98.4	98.2	98.1	97.6	98.4
Solar Radiation: (Langleys)	Mean	0.106	0.132	0.232	0.307	0.327	0.385	0.369	0.347	0.242	0.202	0.096	0.068	0.236
	Max	0.922	1.206	1.402	1.564	1.647	1.532	1.530	1.440	1.368	1.174	1.003	0.739	1.647
Precipitation (inches)	Historical ²	3.98	2.96	4.21	3.92	4.46	3.40	4.68	4.02	4.01	3.16	3.88	3.57	46.25
	Observed ³	2.71	5.23	4.75	2.41	4.94	5.25	5.33	1.56	6.23	2.03	3.64	6.60	50.68

Flemington

Temperature: (°F)	Mean ⁴	32/27	32/30	40/39	53/49	57/60	73/69	76/73	70/71	66/63	50/52	41/42	33/32	52/51
	Min	7	8	20	19	28	48	55	47	39	24	15	11	7
	Max	65	68	64	87	87	101	99	92	96	82	71	65	101
Relative Humidity: (%)	Mean	73.9	79.2	70.4	73.5	79.5	81.8	83.0	81.5	86.3	82.2	81.9	82.9	79.7
	Min	31.1	37.9	23.2	25.3	37.5	44.9	39.0	42.5	46.0	40.1	41.6	39.2	23.2
	Max	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Solar Radiation: (Langleys)	Mean	0.126	0.147	0.221	0.291	0.317	0.381	0.354	0.345	0.250	0.206	0.105	0.088	0.236
	Max	0.833	1.062	1.278	1.362	1.460	1.368	1.372	1.306	1.220	1.049	0.845	0.708	1.460
Barometric Pressure (in of Hg)	Mean	30.19	30.08	30.12	30.16	29.93	30.02	30.04	30.04	30.19	30.22	30.13	30.19	30.11
	Min	29.51	29.34	29.26	29.54	29.41	29.79	29.70	29.75	29.61	29.47	29.43	29.42	29.26
	Max	30.84	30.65	30.79	30.65	30.33	30.38	30.27	30.46	30.59	30.75	30.64	30.77	30.84

1) Newark Airport 30-year mean shown to the right of the slash.

2) Historical monthly precipitation data for Newark Airport

3) Observed monthly precipitation collected by NJDEP at Washington's Crossing state park.

4) Lehigh Valley International Airport (Allentown, PA) 30-year mean shown to the right of the slash.

Figure 3
2008 Maximum, Mean and Minimum Temperatures, East Orange

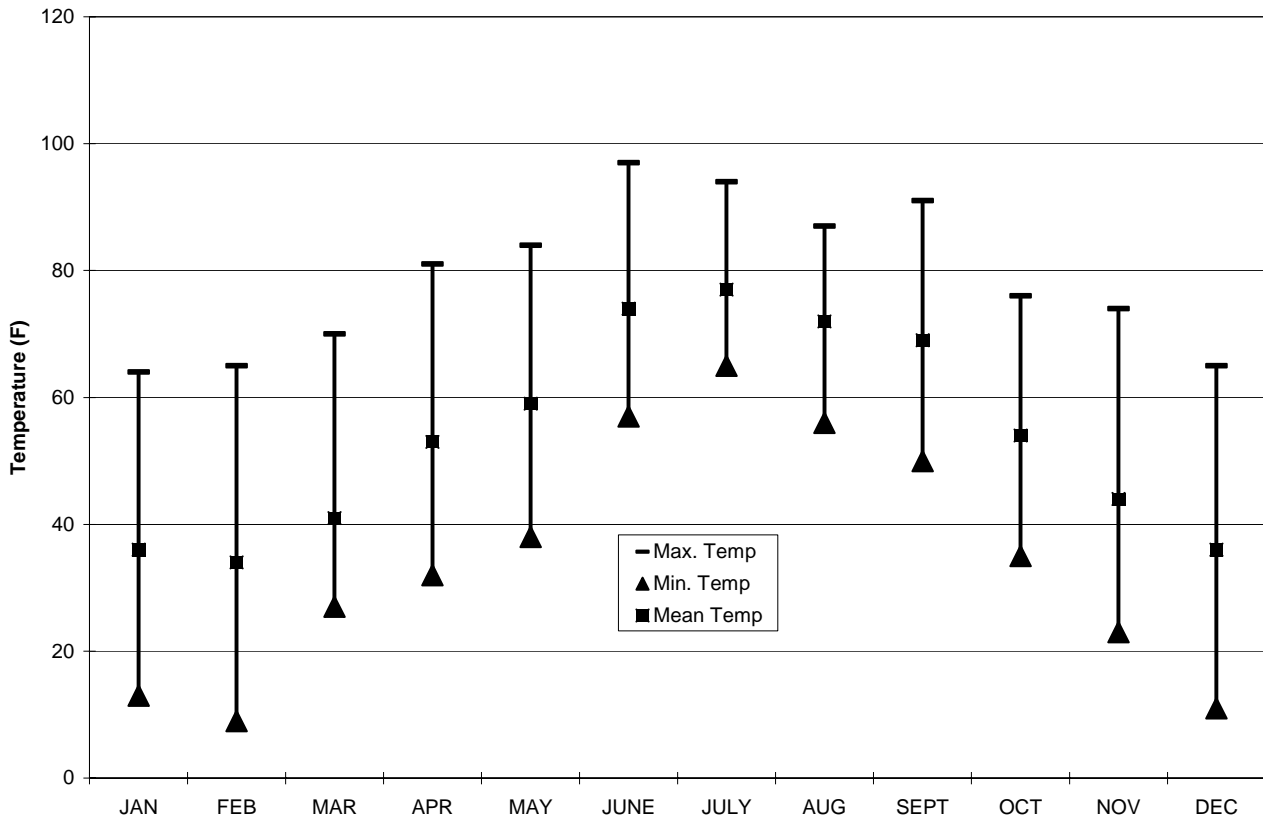


Figure 4
2008 Observed vs. 30-Year Mean Temperatures, East Orange

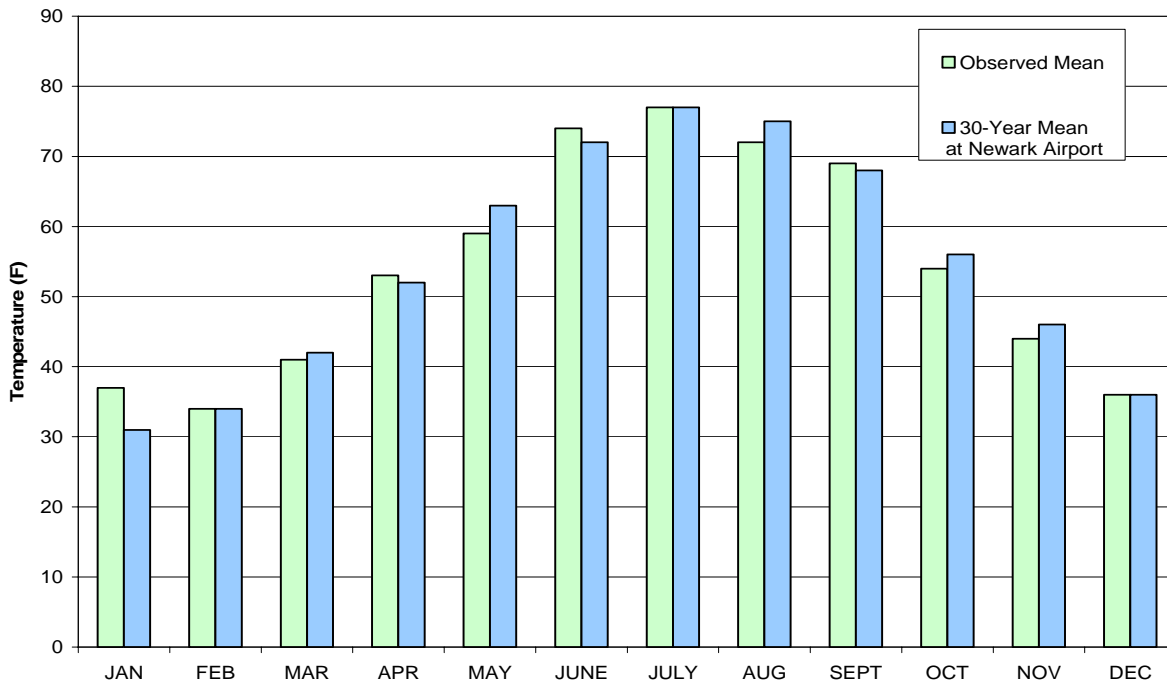


Figure 5
2008 Maximum, Mean, and Minimum Temperatures, Flemington

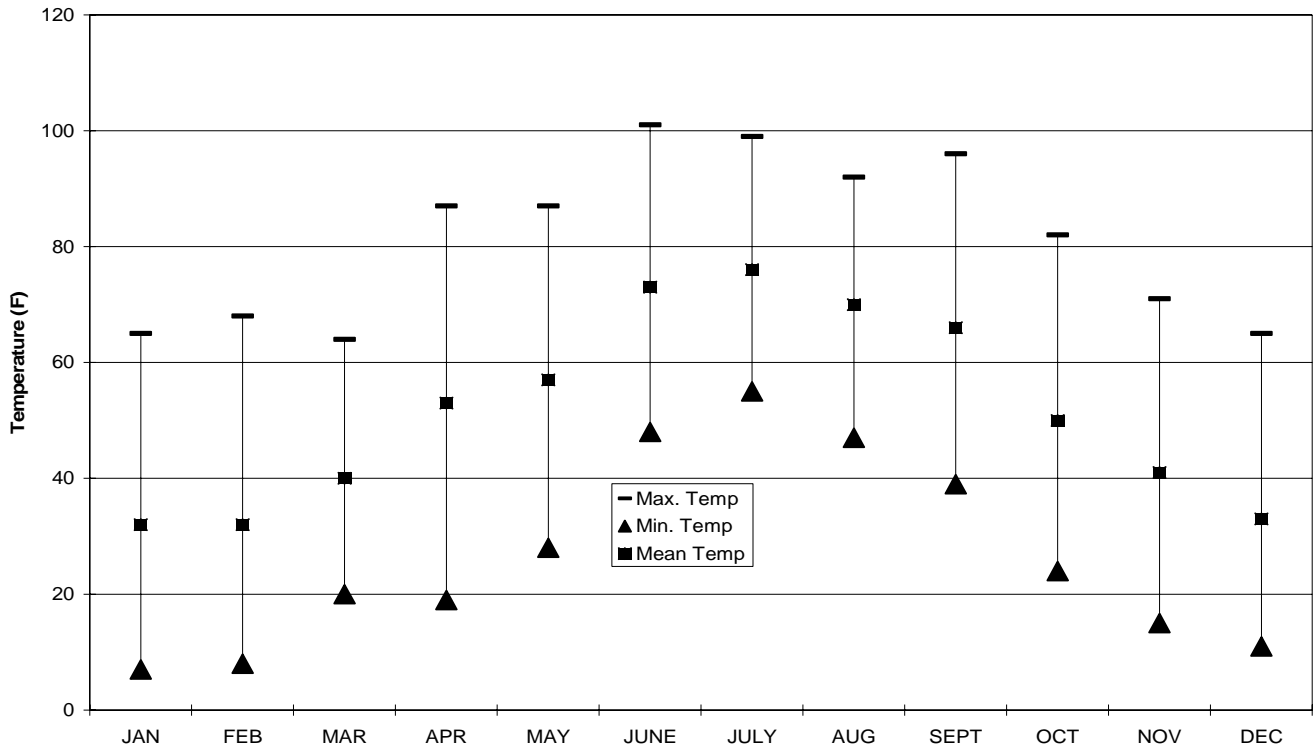


Figure 6
2008 Observed vs. 30-Year Mean Temperatures, Flemington

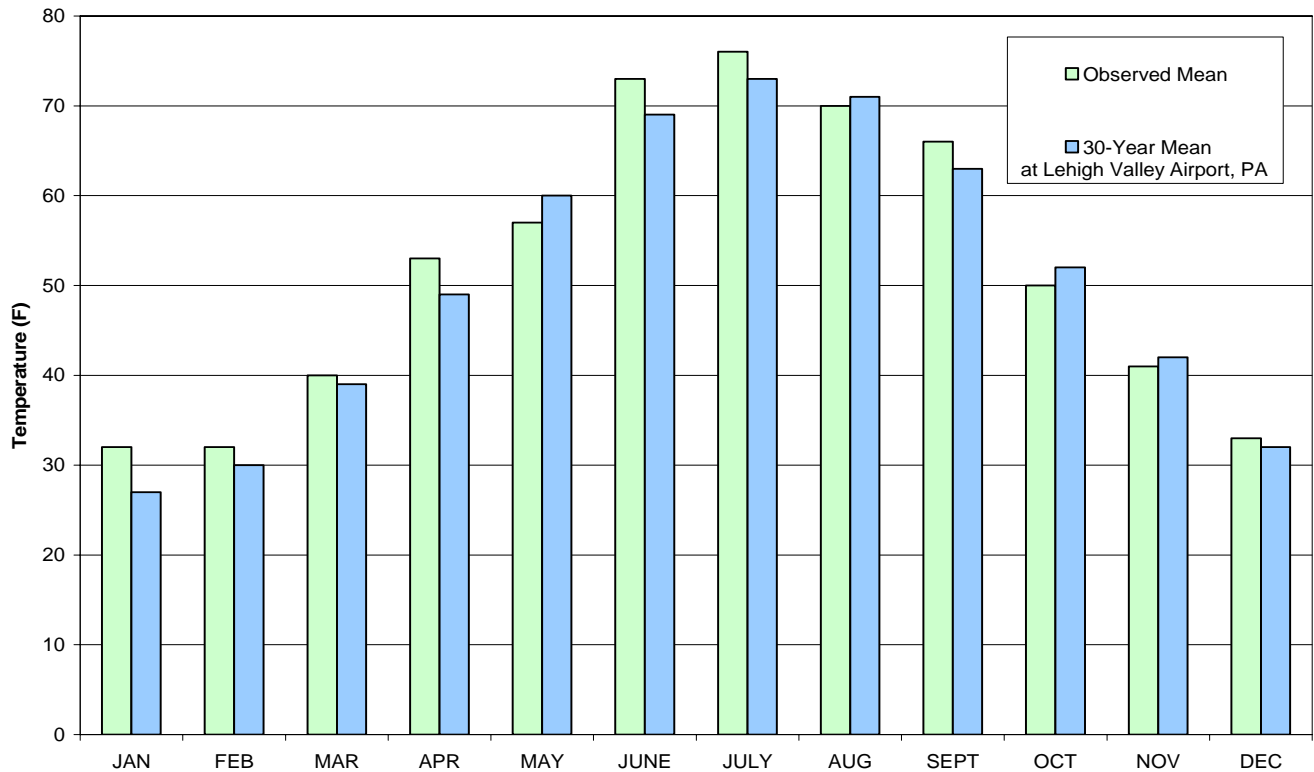


TABLE 2

SUMMARY OF METEOROLOGICAL MONITORING DATA - 2008
CENTRAL NEW JERSEY

<u>Rider University</u>		<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>YEAR</u>
Temperature: (°F)	Mean ⁵	32/32	33/35	41/43	52/53	57/64	71/72	74/78	69/76	65/69	50/57	42/47	35/37	52/55
	Min	10	9	23	23	35	50	57	52	46	26	18	12	9
	Max	64	69	66	82	83	95	93	86	91	78	69	65	95
Relative Humidity: (%)	Mean	63.0	68.7	58.1	60.6	66.8	69.0	70.7	69.5	75.9	72.1	72.3	71.9	68.2
	Min	19.5	27.7	13.5	13.9	21.1	26.9	22.8	25.5	26.1	21.6	30.4	23.9	13.5
	Max	99.2	100.0	99.3	99.2	99.0	98.1	99.1	99.2	99.0	99.9	99.6	100.0	100.0
Barometric Pressure: (in of Hg)	Mean	30.30	30.18	30.23	30.27	30.03	30.11	30.13	30.13	30.28	30.32	30.21	30.29	30.21
	Min	29.60	29.41	29.34	29.63	29.49	29.86	29.78	29.82	29.63	29.52	29.53	29.48	29.34
	Max	30.99	30.78	30.92	30.78	30.44	30.49	30.37	30.57	30.70	30.85	30.76	30.91	30.99
Solar Radiation (Langleys)	Mean	0.111	0.132	0.205	0.258	0.297	0.348	0.328	0.326	0.219	0.183	0.086	0.069	0.211
	Max	0.742	0.963	1.180	1.267	1.336	1.316	1.294	1.262	1.163	0.950	0.756	0.582	1.336
Precipitation (inches)	Historical ⁶	3.52	2.74	3.81	3.49	3.89	3.29	4.39	3.82	3.88	2.75	3.16	3.31	42.05
	Observed ⁷	2.71	5.23	4.75	2.41	4.94	5.25	5.33	1.56	6.23	2.03	3.64	6.60	50.68

SUMMARY OF METEOROLOGICAL MONITORING DATA - 2008
SOUTHERN NEW JERSEYCamden Lab

Temperature: (°F)	Mean ⁵	38/32	38/35	46/43	57/53	62/64	78/72	80/78	73/76	70/69	No Data ⁸	No Data ⁸	No Data ⁸	60/58
	Min	17	12	31	35	44	60	69	59	53	No Data ⁸	No Data ⁸	No Data ⁸	12
	Max	67	70	70	87	85	98	96	87	91	No Data ⁸	No Data ⁸	No Data ⁸	98
Relative Humidity (%)	Mean	55.7	62.4	53.2	58.8	61.3	60.5	62.7	59.2	67.4	No Data ⁸	No Data ⁸	No Data ⁸	60.0
	Min	16.5	26.0	14.6	13.3	18.5	27.7	24.9	22.7	23.9	No Data ⁸	No Data ⁸	No Data ⁸	13.3
	Max	97.8	98.6	99.1	98.8	97.9	98.0	97.5	97.4	98.1	No Data ⁸	No Data ⁸	No Data ⁸	99.1
Barometric Pressure (in of Hg)	Mean	30.41	30.29	30.33	30.34	30.11	30.21	30.23	30.22	30.38	No Data ⁸	No Data ⁸	No Data ⁸	30.28
	Min	29.71	29.53	29.44	29.71	29.56	29.98	29.92	29.94	29.69	No Data ⁸	No Data ⁸	No Data ⁸	29.44
	Max	31.10	30.88	30.99	30.85	30.52	30.56	30.47	30.63	30.77	No Data ⁸	No Data ⁸	No Data ⁸	31.10
Solar Radiation: (Langleys)	Mean	0.095	0.116	0.193	0.250	0.293	0.355	0.331	0.322	0.224	No Data ⁸	No Data ⁸	No Data ⁸	0.241
	Max	0.622	0.823	1.116	1.267	1.366	1.334	1.380	1.270	1.196	No Data ⁸	No Data ⁸	No Data ⁸	1.380
Precipitation (inches)	Historical ⁶	3.52	2.74	3.81	3.49	3.89	3.29	4.39	3.82	3.88	2.75	3.16	3.31	42.05
	Observed ⁹	2.21	2.12	4.19	7.93	1.88	3.15	3.37	3.06	0.39	2.02	2.76	6.29	39.37

5) Philadelphia International Airport 30 year mean shown to the right of the slash.

6) Historical monthly precipitation data for Philadelphia International Airport

7) Observed monthly precipitation collected by NJDEP at Washington Crossing

8) The Camden Lab station was shut down on September 29, 2008 because the NJDEP lost access to the station.

9) Observed monthly precipitation collected by NJDEP at Ancora State Hospital

Figure 7
2008 Maximum, Mean and Minimum Temperatures, Rider University

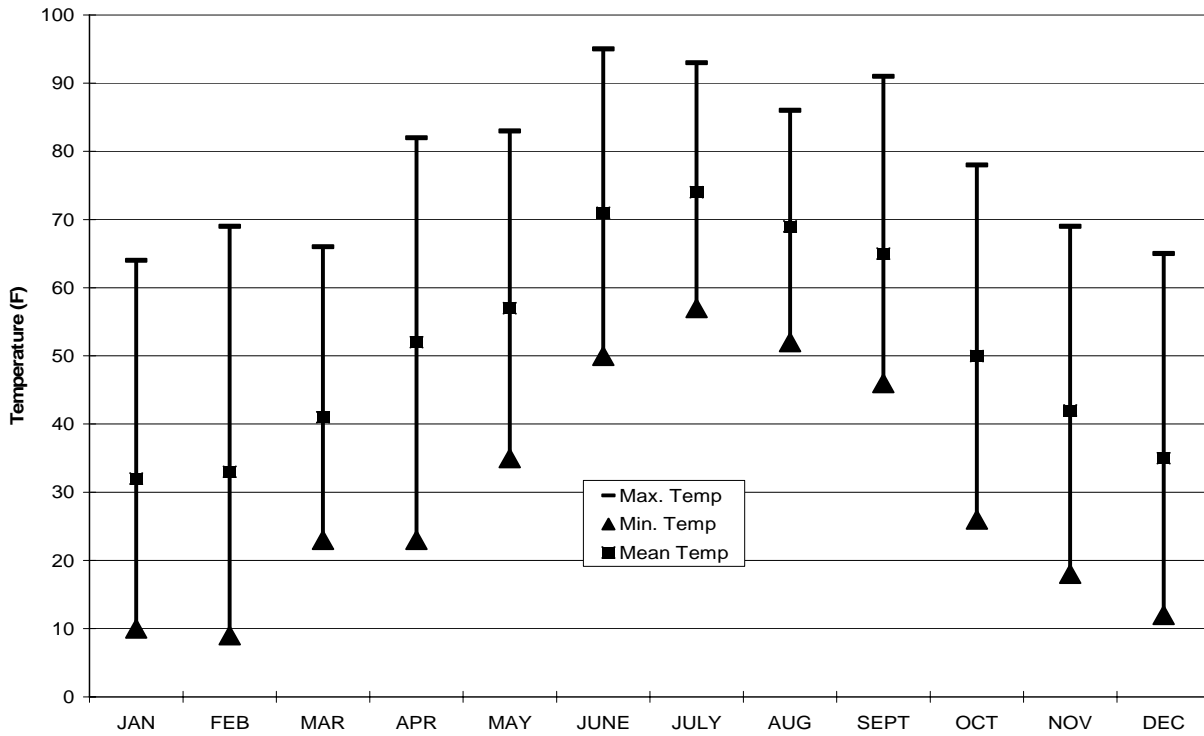
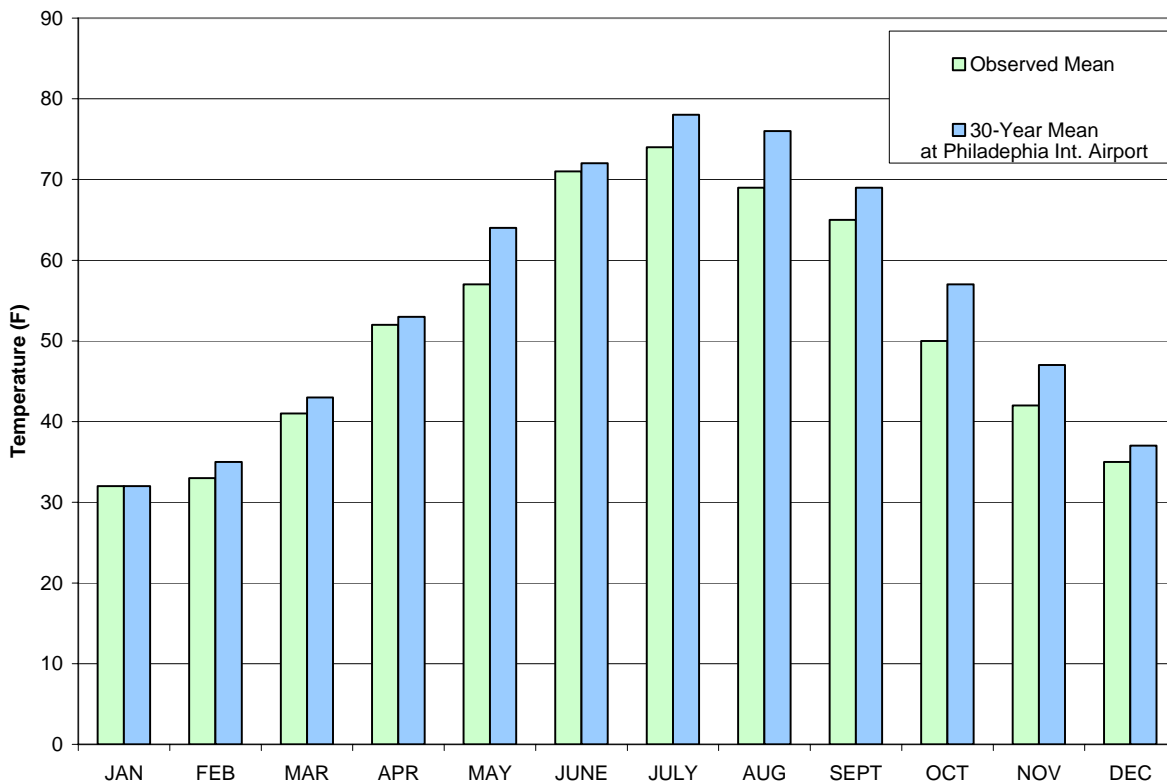


Figure 8
2008 Observed vs. 30-Year Mean Temperatures, Rider University



REFERENCES

The Climate of New Jersey, Office of the New Jersey State Climatologist,
URL:<http://climate.rutgers.edu/stateclim/?section=njcp&target=NJCoverview>

Basic Air Pollution Meteorology, United States Environmental Protection Agency (USEPA),
URL:http://yosemite.epa.gov/oaqps/eogtrain.nsf/DisplayView/SI_409_0-5?OpenDocument