

1999

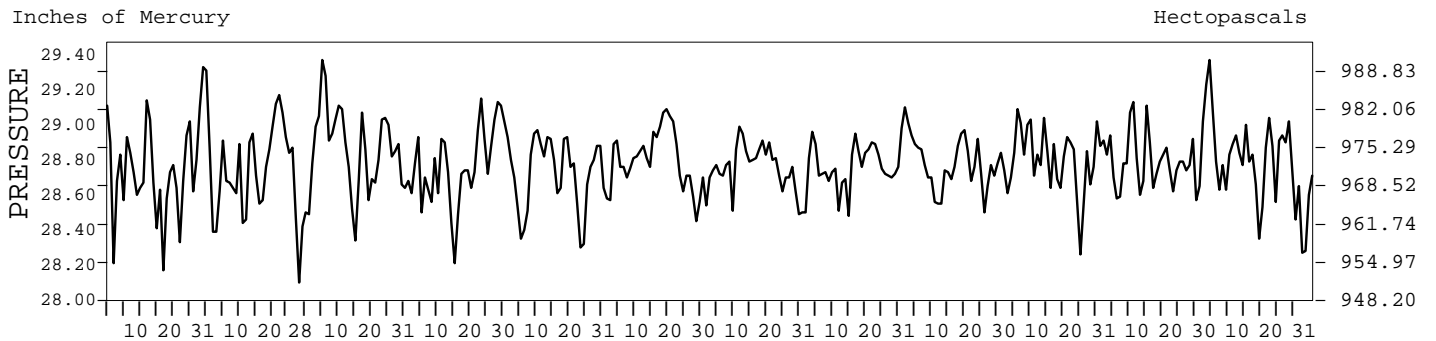
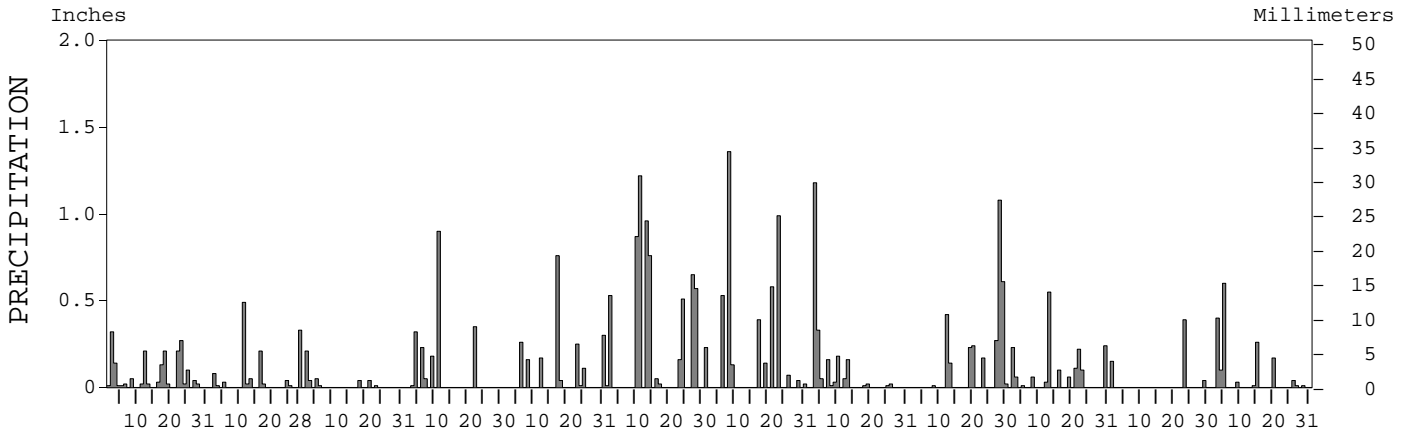
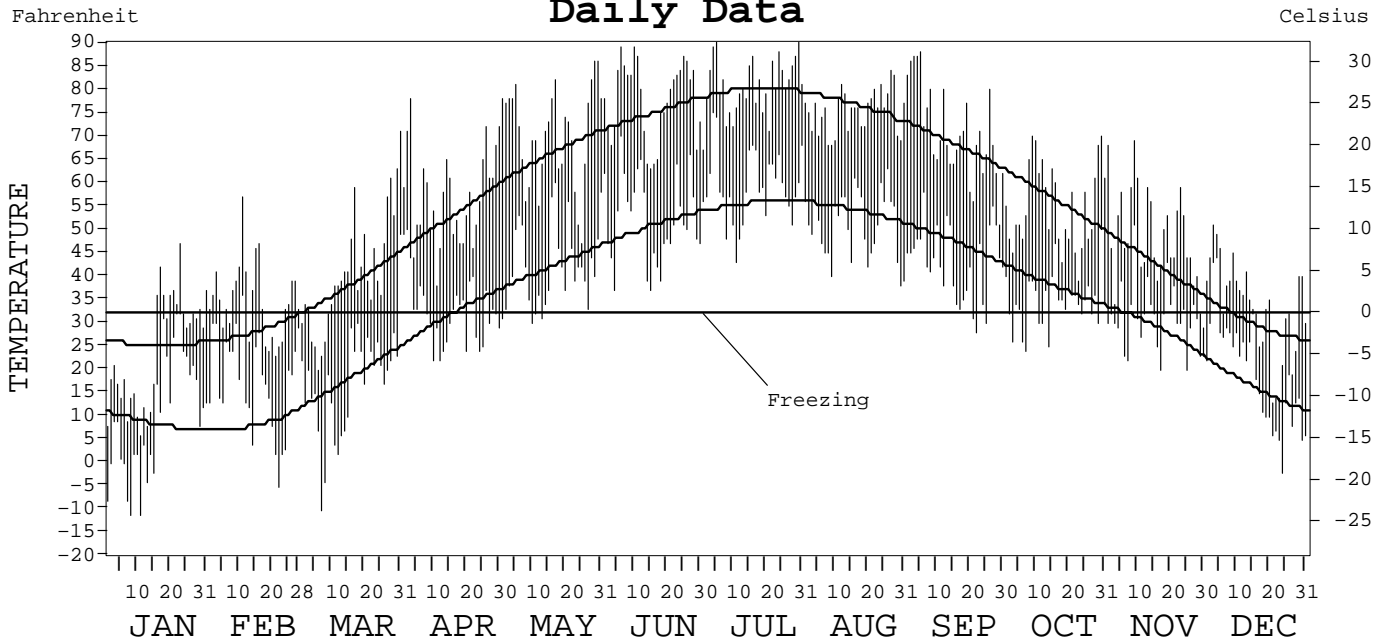
LOCAL CLIMATOLOGICAL DATA  
ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-2591

HOUGHTON LAKE,  
MICHIGAN (HTL)

Daily Data



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 ASHEVILLE, NORTH CAROLINA

# METEOROLOGICAL DATA FOR 1999

## HOUGHTON LAKE, MI (HTL)

LATITUDE: 44° 22' 04" N      LONGITUDE: 84° 41' 27" W      ELEVATION (FT): GRND: 1154      BARO: 1154      TIME ZONE: EASTERN (UTC + 5)      WBAN: 94814

ELEMENT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	24.2	34.6	40.7	56.9	70.2	77.7	80.6	75.4	70.8	55.1	48.3	33.3	55.6	
	HIGHEST DAILY MAXIMUM	47	57	71	78	86	89	90	84	88	70	69	51	90	
	DATE OF OCCURRENCE	23	11	31	03	30+	10+	30+	27	05	30+	09	03	JUL 30+	
	MEAN DAILY MINIMUM	10.0	17.6	17.4	32.5	42.0	52.1	59.0	50.8	42.8	34.6	31.0	19.1	34.1	
	LOWEST DAILY MINIMUM	-11	-5	-10	22	30	37	43	38	28	24	20	-2	-11	
	DATE OF OCCURRENCE	11+	22	07	12+	10	15+	11	30	22	07	25+	24	JAN 11+	
	AVERAGE DRY BULB	17.1	26.1	29.1	44.7	56.1	64.9	69.8	63.1	56.8	44.9	39.7	26.2	44.9	
	MEAN WET BULB	17.1	24.6	25.8	39.4	50.2	60.0	65.5	58.7	52.5	41.9	36.3	25.0	41.4	
	MEAN DEW POINT	13.8	20.6	18.1	31.6	43.7	56.4	62.3	54.9	48.6	37.9	31.5	21.7	36.8	
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	0	2	0	0	0	0	0	2	
	MAXIMUM ≤ 32°	22	9	7	0	0	0	0	0	0	0	2	13	53	
MINIMUM ≤ 32°	31	27	30	15	4	0	0	0	3	10	20	29	169		
MINIMUM ≤ 0°	8	1	2	0	0	0	0	0	0	0	0	1	12		
H/C	HEATING DEGREE DAYS	1477	1083	1105	602	282	100	17	91	249	617	754	1193	7570	
	COOLING DEGREE DAYS	0	0	0	0	15	107	174	41	10	0	0	0	347	
RH	MEAN (PERCENT)	83	80	66	64	66	75	77	76	76	77	75	82	75	
	HOUR 01 LST	86	87	78	74	79	92	91	91	92	86	78	85	85	
	HOUR 07 LST	88	88	83	82	80	88	90	92	95	90	81	86	87	
	HOUR 13 LST	75	69	50	48	50	56	63	56	55	63	64	76	60	
	HOUR 19 LST	81	76	56	54	56	62	66	67	72	72	76	82	68	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	4	4	1	3	1	1	7	8	9	1	3	3	45	
	THUNDERSTORMS	0	1	0	3	4	10	6	2	1	3	0	0	30	
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	MIDNIGHT-MIDNIGHT: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
NUMBER OF DAYS WITH:															
CLEAR															
PARTLY CLOUDY															
CLOUDY															
PR	MEAN STATION PRESS. (IN.)	28.76	28.73	28.84	28.75	28.73	28.80	28.74	28.79	28.75	28.82	28.82	28.75	28.77	
	MEAN SEA-LEVEL PRESS. (IN.)	30.06	30.01		30.01	29.97	30.03	29.96	30.02	29.99	30.08	30.08	30.02		
WINDS	RESULTANT SPEED (MPH)	1.5	2.4	3.3	2.9	1.8	2.0	1.2	1.7	2.7	3.4	4.5	4.2	1.9	
	RES. DIR. (TENS OF DEGS.)	24	23	30	07	21	23	27	30	25	26	27	26	26	
	MEAN SPEED (MPH)	8.9	8.8	9.0	8.9	9.0	7.0	7.2	6.7	6.9	8.2	9.4	9.3	8.3	
	PREVAIL. DIR. (TENS OF DEGS.)	28	28	33	06	31	32	23	32	24	17	32	28	28	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	30	33	32	30	30	51	36	21	26	29	32	33	51	
	DIR. (TENS OF DEGS.)	07	23	30	11	17	19	32	02	28	33	24	32	19	
	DATE OF OCCURRENCE	02	11	18	11+	06	11	23	13	19	23+	24	26	JUN 11	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	37	48	45	39	39	61	44	29	36	37	47	45	61	
DIR. (TENS OF DEGS.)	21	23	30	10	20	19	31	29	25	33	24	31	19		
DATE OF OCCURRENCE	23	11	18	09+	07	11	31+	06	30	23+	24	26	JUN 11		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	1.86	1.29	0.40	2.04	2.06	6.31	4.48	2.21	3.19	1.77	0.58	1.63	27.82	
	GREATEST 24-HOUR (IN.)	0.32	0.49	0.25	0.90	0.76	1.72	1.48	1.51	1.12	0.58	0.39	0.60	1.72	
	DATE OF OCCURRENCE	02	11	02-03	11	17	13-14	08-09	03-04	28-29	12-13	23	05	JUN 13-14	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	20	11	7	7	9	12	11	13	10	12	3	10	125	
PRECIPITATION ≥ 0.10	8	3	1	5	7	9	8	5	8	7	2	5	68		
PRECIPITATION ≥ 1.00	0	0	0	0	0	1	1	1	1	0	0	0	4		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)											1.6	3.7		
	GREATEST 24-HOUR (IN.)											1.6	1.7		
	DATE OF OCCURRENCE											29	26		
	MAXIMUM SNOW DEPTH (IN.)											2	3		
	DATE OF OCCURRENCE											29	31+		
NUMBER OF DAYS WITH:															
SNOWFALL ≥ 1.0											1	1			

# NORMALS, MEANS, AND EXTREMES

## HOUGHTON LAKE, MI (HTL)

LATITUDE: 44° 22' 04" N      LONGITUDE: 84° 41' 27" W      ELEVATION (FT): GRND: 1154      BARO: 1154      TIME ZONE: EASTERN (UTC + 5)      WBAN: 94814

		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	25.3	28.1	38.2	52.7	66.1	74.8	79.6	76.4	67.8	55.8	42.0	29.5	53.0
	MEAN DAILY MAXIMUM	35	25.6	28.8	38.7	52.8	66.3	75.3	79.5	76.7	68.1	55.6	41.6	30.6	53.3
	HIGHEST DAILY MAXIMUM	35	54	59	76	86	90	103	98	94	92	85	70	63	103
	YEAR OF OCCURRENCE		1996	1984	1990	1980	1998	1995	1995	1988	1985	1971	1990	1982	JUN 1995
	MEAN OF EXTREME MAXS.	35	42.3	45.2	59.9	74.4	83.0	88.0	90.0	87.7	82.7	73.7	60.3	46.7	69.5
	NORMAL DAILY MINIMUM	30	8.4	8.2	18.2	31.6	42.0	50.6	55.4	53.8	46.9	37.5	28.4	15.7	33.1
	MEAN DAILY MINIMUM	35	9.2	9.5	18.5	31.4	42.0	51.0	55.6	54.0	46.8	37.2	28.1	17.2	33.4
	LOWEST DAILY MINIMUM	35	-26	-34	-23	3	21	29	33	29	21	16	-5	-21	-34
	YEAR OF OCCURRENCE		1981	1979	1967	1982	1966	1998	1965	1982	1989	1969	1995	1976	FEB 1979
	MEAN OF EXTREME MINS.	35	-14.7	-16.0	-6.4	15.6	28.3	36.1	41.2	39.2	29.7	22.9	11.8	-5.3	15.2
	NORMAL DRY BULB	30	16.9	18.2	28.2	42.2	54.1	62.7	67.5	65.1	57.3	46.7	35.2	22.6	43.1
	MEAN DRY BULB	35	17.5	19.1	28.7	42.1	54.4	63.2	67.6	65.2	57.4	46.5	34.9	23.7	43.4
	MEAN WET BULB	16	19.1	20.9	28.1	39.0	49.5	58.8	59.3	62.0	54.7	41.2	32.8	24.2	40.8
	MEAN DEW POINT	16	14.3	14.8	20.0	30.6	38.7	52.7	54.3	57.8	50.4	36.7	28.6	20.5	35.0
	NORMAL NO. DAYS WITH:														
MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.0	*	0.8	1.9	0.5	*	0.0	0.0	0.0	3.2	
MAXIMUM ≤ 32°	30	23.6	18.5	9.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	19.3	77.0	
MINIMUM ≤ 32°	30	30.8	27.6	27.5	17.2	5.1	0.3	0.0	*	1.7	9.8	21.9	29.6	171.5	
MINIMUM ≤ 0°	30	8.8	8.1	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.3	23.5	
H/C	NORMAL HEATING DEG. DAYS	30	1491	1310	1141	684	358	120	35	70	234	567	894	1314	8218
	NORMAL COOLING DEG. DAYS	30	0	0	0	0	20	51	112	73	0	0	0	0	256
RH	NORMAL (PERCENT)	30	80	76	74	68	65	70	71	76	78	77	82	83	75
	HOUR 01 LST	30	83	81	80	77	78	84	85	88	88	85	85	85	83
	HOUR 07 LST	30	82	82	83	80	78	81	85	90	92	88	87	85	84
	HOUR 13 LST	30	72	69	64	55	50	55	54	60	63	65	73	77	63
	HOUR 19 LST	30	77	72	67	58	53	57	58	66	73	74	79	81	68
S	PERCENT POSSIBLE SUNSHINE														
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	36	2.2	1.8	2.7	1.5	1.5	1.4	2.4	3.8	3.6	2.5	2.6	2.5	28.5
	THUNDERSTORMS	36	0.2	0.1	0.8	2.0	3.8	5.3	5.4	5.5	3.6	1.4	0.5	0.2	28.8
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	31	6.4	5.9	5.6	5.5	5.1	4.8	4.5	4.6	5.0	5.6	6.5	6.4	5.5
	MIDNIGHT-MIDNIGHT (OKTAS)	16	5.9	5.2	5.1	4.7	4.4	4.4	3.9	3.9	4.7	5.0	6.1	6.2	5.0
	MEAN NO. DAYS WITH:														
	CLEAR	31	2.9	4.2	5.9	6.2	7.0	7.0	7.3	7.8	6.3	5.3	2.4	2.4	64.7
PARTLY CLOUDY	31	6.3	6.7	7.2	7.2	9.3	11.2	13.2	11.1	9.3	7.7	5.0	5.9	100.1	
CLOUDY	31	21.8	17.4	17.8	16.6	14.1	11.8	10.1	12.1	14.4	18.0	22.6	22.8	199.5	
PR	MEAN STATION PRESSURE (IN)	10	28.71	28.72	28.72	28.71	28.70	28.70	28.79	28.81	28.78	28.80	28.73	28.70	28.74
	MEAN SEA-LEVEL PRES. (IN)	16	30.02	30.06	30.04	29.95	29.98	30.01	29.99	30.04	30.03	30.04	30.02	30.03	30.02
WINDS	MEAN SPEED (MPH)	8	9.8	8.9	9.7	9.4	8.7	7.8	7.4	7.0	7.5	8.5	9.4	9.1	8.6
	PREVAIL. DIR (TENS OF DEGS)	10	27	27	32	32	27	27	23	23	23	27	27	27	27
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	3	30	33	32	37	40	51	36	24	30	29	39	33	51
	DIR. (TENS OF DEGS)		07	23	30	24	26	19	32	29	29	33	22	32	19
	YEAR OF OCCURRENCE		1999	1999	1999	1997	1998	1999	1999	1997	1998	1999	1998	1999	JUN 1999
	MAXIMUM 5-SECOND:														
SPEED (MPH)	3	39	48	45	52	54	61	44	40	39	37	51	45	61	
DIR. (TENS OF DEGS)		31	23	30	22	23	19	31	29	29	33	21	31	19	
YEAR OF OCCURRENCE		1997	1999	1999	1997	1998	1999	1999	1997	1998	1999	1998	1999	JUN 1999	
PRECIPITATION	NORMAL (IN)	30	1.50	1.16	2.02	2.22	2.57	3.02	2.58	3.37	3.41	2.18	2.27	1.95	28.25
	MAXIMUM MONTHLY (IN)	35	3.13	3.36	5.67	4.73	5.99	6.67	5.33	7.18	9.49	8.08	5.10	4.48	9.49
	YEAR OF OCCURRENCE		1974	1971	1976	1991	1983	1969	1994	1975	1986	1991	1988	1971	SEP 1986
	MINIMUM MONTHLY (IN)	35	0.60	0.29	0.40	0.86	0.40	0.85	0.55	0.85	0.01	0.47	0.45	0.34	0.01
	YEAR OF OCCURRENCE		1977	1982	1999	1998	1966	1988	1989	1969	1979	1971	1986	1997	SEP 1979
	MAXIMUM IN 24 HOURS (IN)	35	1.39	1.52	2.18	1.81	1.94	3.28	3.83	3.12	2.55	3.47	1.82	1.70	3.83
	YEAR OF OCCURRENCE		1974	1997	1976	1991	1973	1996	1984	1981	1985	1998	1988	1971	JUL 1984
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	14.9	11.3	12.2	11.7	10.3	10.7	9.0	10.0	11.6	11.9	13.2	15.7	142.5	
PRECIPITATION ≥ 1.00	30	0.0	*	0.1	0.3	0.3	0.7	0.5	0.7	0.8	0.1	0.1	0.2	3.8	
SNOWFALL	NORMAL (IN)	30	19.3	12.9	12.0	4.2	0.3	0.0	0.0	0.0	0.0	0.9	9.7	16.9	76.2
	MAXIMUM MONTHLY (IN)	32	38.0	23.6	28.7	11.6	2.3	0.0	T	T	0.1	4.4	41.9	30.4	41.9
	YEAR OF OCCURRENCE		1982	1971	1971	1979	1979		1996	1993	1967	1980	1995	1968	NOV 1995
	MAXIMUM IN 24 HOURS (IN)	32	15.4	8.5	11.7	7.6	3.2	0.0	T	T	0.1	3.5	14.4	13.2	15.4
	YEAR OF OCCURRENCE		1978	1974	1970	1979	1994		1970	1993	1967	1980	1981	1980	JAN 1978
	MAXIMUM SNOW DEPTH (IN)	31	24	21	22	7	3	0	0	0	0	1	17	14	24
	YEAR OF OCCURRENCE		1979	1979	1978	1973	1994					1992	1995	1972	JAN 1979
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	6.3	4.7	3.5	1.4	0.1	0.0	0.0	0.0	0.0	0.3	3.0	5.6	24.9	

PRECIPITATION (inches) 1999 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	1.16	0.70	1.86	1.50	2.67	4.15	3.93	1.26	5.85	2.75	3.79	2.00	31.62
1971	1.30	3.36	1.79	2.19	1.52	2.84	3.14	1.76	1.20	0.47	1.96	4.48	26.01
1972	0.82	0.99	2.36	1.40	1.79	2.00	2.52	4.63	2.67	2.50	0.99	3.48	26.15
1973	1.22	1.33	1.95	1.66	4.88	2.84	2.34	2.29	1.95	3.11	1.34	1.81	26.72
1974	3.13	1.14	1.44	3.47	2.92	4.60	4.70	2.78	2.53	1.40	1.41	1.43	30.95
1975	1.97	1.14	1.50	2.63	2.79	3.79	4.96	7.18	1.52	0.85	2.20	1.33	31.86
1976	1.77	2.49	5.67	1.86	2.86	2.77	1.22	1.07	0.99	1.31	0.75	0.65	23.41
1977	0.60	1.46	2.40	2.29	1.39	0.94	1.72	5.70	4.19	1.89	2.14	2.20	26.92
1978	1.93	0.55	1.20	1.35	2.42	2.38	0.91	4.10	6.70	1.43	1.28	2.08	26.33
1979	1.51	0.63	3.05	3.18	1.85	4.46	0.87	3.90	0.01	2.43	2.47	1.71	26.07
1980	1.61	0.69	1.10	3.30	1.55	3.44	2.29	2.01	3.75	1.91	1.55	1.95	25.15
1981	0.79	2.10	0.88	3.88	1.73	4.02	1.89	7.06	1.89	2.61	2.07	1.08	30.00
1982	2.43	0.29	2.41	2.46	2.98	3.21	3.31	3.25	3.58	1.86	2.52	3.47	31.77
1983	1.20	0.79	3.11	1.86	5.99	0.95	1.40	3.89	4.63	3.66	1.60	1.69	30.77
1984	1.06	0.88	2.28	1.96	2.60	3.01	4.30	2.95	2.74	2.17	1.99	2.93	28.87
1985	1.64	1.99	3.55	2.42	1.87	1.71	2.28	4.76	6.14	1.63	3.56	2.14	33.69
1986	1.06	1.73	2.20	1.73	3.20	5.43	4.38	1.76	9.49	1.75	0.45	0.85	34.03
1987	1.06	0.61	0.78	0.97	1.56	1.04	1.62	6.69	4.35	2.21	2.63	2.45	25.97
1988	2.09	0.75	2.39	2.37	0.56	0.85	2.49	4.50	3.63	3.38	5.10	1.86	29.97
1989	0.97	0.70	2.99	0.98	3.19	2.90	0.55	2.62	1.03	1.30	2.08	0.92	20.23
1990	2.43	1.09	1.47	1.77	4.15	2.57	3.82	3.28	3.00	2.94	2.90	1.55	30.97
1991	1.22	0.62	3.02	4.73	5.03	1.48	4.43	2.36	3.05	8.08	1.88	1.76	37.66
1992	1.29	1.35	1.84	3.13	0.49	1.91	2.86	3.45	3.63	2.75	4.65	1.98	29.33
1993	1.73	0.89	0.62	2.96	2.50	4.84	1.28	5.67	2.10	1.78	1.58	0.74	26.69
1994	1.88	1.44	1.57	2.72	1.45	1.72	5.33	5.52	1.56	1.04	2.86	0.53	27.62
1995	2.10	0.65	1.61	2.96	1.51	3.83	2.52	5.64	1.67	2.20	4.82	1.38	30.89
1996	1.71	1.46	0.96	2.99	1.59	5.84	2.76	3.56	4.41	2.84	0.72	2.29	31.13
1997	2.46	2.60	1.51	1.30	3.33	1.26	2.63	3.58	3.45	1.85	1.40	0.34	25.71
1998	2.12	0.89	4.40	0.86	2.31	2.24	0.65	1.30	2.10	4.00	2.53	1.04	24.44
1999	1.86	1.29	0.40	2.04	2.06	6.31	4.48	2.21	3.19	1.77	0.58	1.63	27.82
POR= 82 YRS	1.49	1.25	1.91	2.41	2.72	3.07	2.69	2.99	3.11	2.50	2.35	1.68	28.17

WBAN : 94814

AVERAGE TEMPERATURE (°F) 1999 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	12.5	15.8	22.9	42.2	53.9	63.2	69.2	66.1	58.1	49.5	35.5	21.9	42.6
1971	14.7	18.7	23.4	38.8	51.6	67.0	64.7	63.4	60.8	54.7	34.4	26.2	43.2
1972	16.3	16.4	22.3	36.6	56.9	59.1	66.5	64.4	56.8	41.7	33.6	22.0	41.1
1973	22.1	18.1	38.1	43.1	50.6	64.9	67.7	68.9	57.4	51.3	35.8	22.9	45.1
1974	20.3	14.4	27.0	43.2	50.0	61.6	67.8	65.0	53.9	44.3	36.3	26.1	42.5
1975	22.0	20.7	24.3	37.0	59.7	64.1	68.1	65.0	53.7	49.6	40.8	23.8	44.1
1976	14.0	24.1	30.8	45.5	50.8	66.1	67.0	64.6	55.6	42.3	28.3	13.8	41.9
1977	8.7	17.8	34.8	46.6	60.3	61.0	70.1	62.1	58.3	45.1	35.8	21.4	43.5
1978	14.5	10.8	23.6	39.1	56.9	61.6	65.1	66.4	58.6	44.3	35.9	21.8	41.6
1979	11.5	10.4	30.9	40.0	52.6	62.3	66.9	62.7	59.2	45.7	35.0	27.6	42.1
1980	19.1	15.7	25.0	41.9	56.0	59.2	67.4	68.0	56.7	41.6	33.9	18.9	42.0
1981	14.8	24.0	32.5	44.3	53.0	63.6	66.8	65.6	55.9	42.9	35.6	25.3	43.7
1982	11.4	17.9	25.8	37.3	60.9	57.4	68.6	61.9	57.2	48.9	36.2	31.2	42.9
1983	21.8	25.9	32.4	40.3	48.5	63.3	71.5	68.6	59.7	46.4	36.6	16.8	44.3
1984	12.4	28.2	24.1	44.8	50.1	65.2	66.4	68.8	56.1	49.2	35.4	27.0	44.0
1985	14.9	17.9	30.3	46.5	57.0	59.5	66.1	63.9	59.8	47.5	34.5	18.0	43.0
1986	17.3	18.4	30.9	47.3	56.9	60.5	69.7	62.8	58.1	46.8	32.3	26.8	44.0
1987	21.6	23.4	33.6	47.3	58.1	67.1	71.4	65.6	59.5	43.9	37.7	28.7	46.5
1988	17.3	16.3	28.0	43.7	58.6	64.8	71.4	68.8	57.9	42.4	36.6	23.7	44.1
1989	24.9	15.5	25.0	41.1	54.5	62.2	69.5	64.8	56.2	47.9	30.7	12.9	42.1
1990	26.2	21.3	32.1	44.9	51.9	63.4	66.8	65.0	57.9	45.3	38.9	25.8	45.0
1991	16.1	24.5	33.1	46.9	61.1	67.7	68.6	68.0	55.8	47.9	33.4	25.4	45.7
1992	22.8	24.1	28.6	39.4	54.3	60.4	63.0	62.0	56.8	44.8	33.6	26.1	43.0
1993	21.0	16.2	28.7	40.2	54.6	61.9	70.2	68.8	52.9	44.6	34.7	25.9	43.3
1994	9.3	12.9	30.1	43.2	55.0	65.3	68.1	64.4	61.9	50.9	39.3	30.7	44.3
1995	23.1	18.2	34.3	40.1	54.5	68.9	70.7	72.3	56.9	50.1	29.1	19.5	44.8
1996	15.9	19.8	25.7	36.8	50.8	64.0	64.0	66.3	58.6	47.0	30.6	24.8	42.0
1997	17.0	20.4	27.2	40.3	46.6	64.8	65.8	61.6	57.0	46.0	32.3	28.2	42.3
1998	24.1	30.2	31.2	45.2	60.3	63.0	66.7	66.7	60.4	48.8	37.9	28.7	46.9
1999	17.1	26.1	29.1	44.7	56.1	64.9	69.8	63.1	56.8	44.9	39.7	26.2	44.9
POR= 81 YRS	18.7	19.6	28.5	42.3	54.5	63.6	67.6	65.6	58.0	47.6	35.2	24.0	43.8

HEATING DEGREE DAYS (base 65°F) 1999 HOUGHTON LAKE, MI (HTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	30	54	225	478	878	1330	1556	1289	1282	781	415	65	8383
1971-72	70	95	183	327	912	1197	1502	1401	1320	847	254	191	8299
1972-73	77	92	242	716	933	1326	1324	1307	829	653	442	54	7995
1973-74	26	25	280	420	871	1298	1380	1411	1171	649	463	135	8129
1974-75	27	56	337	633	856	1197	1327	1234	1254	836	215	101	8073
1975-76	44	68	333	472	720	1272	1575	1180	1054	590	434	53	7795
1976-77	24	92	296	698	1094	1582	1743	1315	932	544	199	159	8678
1977-78	29	134	200	610	869	1347	1556	1513	1276	769	289	144	8736
1978-79	79	46	220	636	869	1333	1655	1530	1053	742	396	135	8694
1979-80	48	109	196	597	893	1153	1416	1424	1233	690	286	209	8254
1980-81	18	27	258	716	928	1423	1553	1143	1001	613	368	80	8128
1981-82	50	44	280	676	872	1222	1658	1315	1209	824	148	224	8522
1982-83	12	139	255	494	855	1040	1331	1087	1003	733	505	116	7570
1983-84	25	29	209	569	846	1487	1628	1062	1262	599	458	53	8227
1984-85	42	28	270	481	881	1168	1547	1313	1071	571	248	172	7792
1985-86	46	88	209	535	908	1451	1474	1297	1048	532	274	148	8010
1986-87	23	109	212	557	975	1179	1335	1159	963	523	271	57	7363
1987-88	41	60	169	649	813	1117	1473	1406	1140	636	225	106	7835
1988-89	7	75	218	692	847	1276	1236	1381	1234	711	333	126	8136
1989-90	19	79	277	520	1025	1607	1196	1217	1009	627	398	97	8071
1990-91	32	51	248	604	773	1208	1509	1127	985	540	219	33	7329
1991-92	37	30	295	525	939	1219	1298	1178	1123	763	341	161	7909
1992-93	83	132	257	619	934	1196	1359	1358	1119	737	331	123	8248
1993-94	4	37	358	627	904	1205	1722	1457	1073	649	320	79	8435
1994-95	26	75	132	431	763	1059	1293	1307	947	741	320	35	7129
1995-96	22	2	260	461	1072	1403	1515	1307	1214	840	440	91	8627
1996-97	65	37	212	552	1021	1240	1481	1246	1162	737	561	64	8378
1997-98	79	134	239	582	972	1135	1260	968	1041	592	175	146	7323
1998-99	34	48	176	499	805	1118	1477	1083	1105	602	282	100	7329
1999-	17	91	249	617	754	1193							

WBAN : 94814

COOLING DEGREE DAYS (base 65°F) 1999 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	0	0	0	6	15	74	167	95	24	1	0	0	382
1971	0	0	0	0	5	131	68	50	62	17	0	0	333
1972	0	0	0	0	11	19	131	78	4	0	0	0	243
1973	0	0	0	1	0	58	119	155	60	2	0	0	395
1974	0	0	0	1	6	41	120	62	11	0	0	0	241
1975	0	0	0	0	58	83	146	78	2	2	0	0	369
1976	0	0	0	13	0	92	93	86	24	0	0	0	308
1977	0	0	0	0	61	46	192	50	5	0	0	0	354
1978	0	0	0	0	44	49	85	96	34	0	0	0	308
1979	0	0	0	0	18	58	112	45	31	7	0	0	271
1980	0	0	0	2	17	43	98	124	16	0	0	0	300
1981	0	0	0	0	3	47	114	70	13	0	0	0	247
1982	0	0	0	0	27	3	132	52	29	3	0	0	246
1983	0	0	0	0	0	73	235	148	56	0	0	0	512
1984	0	0	0	1	2	65	90	151	11	0	0	0	320
1985	0	0	0	22	8	11	86	61	60	0	0	0	248
1986	0	0	0	8	29	22	175	46	15	0	0	0	295
1987	0	0	0	1	64	125	250	86	12	0	0	0	538
1988	0	0	0	0	35	108	213	199	11	0	0	0	566
1989	0	0	0	0	10	49	164	83	19	0	0	0	325
1990	0	0	0	29	0	55	94	56	41	0	0	0	275
1991	0	0	0	2	104	120	157	130	26	0	0	0	539
1992	0	0	0	0	15	31	28	46	19	0	0	0	139
1993	0	0	0	0	16	34	175	161	4	0	0	0	390
1994	0	0	0	0	19	97	130	64	45	0	0	0	355
1995	0	0	0	0	4	160	202	233	24	5	0	0	628
1996	0	0	0	0	10	67	41	85	25	0	0	0	228
1997	0	0	0	0	0	63	112	39	7	0	0	0	221
1998	0	0	0	0	34	93	98	110	45	0	0	0	380
1999	0	0	0	0	15	107	174	41	10	0	0	0	347

SNOWFALL (inches) 1999 HOUGHTON LAKE, MI (HTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	T	0.0	0.0	T	17.7	23.1	27.5	23.6	28.7	3.5	T	0.0	124.1
1971-72	0.0	0.0	0.0	T	16.7	16.7	15.0	18.7	26.8	2.9	0.0	0.0	96.8
1972-73	0.0	0.0	0.0	0.6	4.1	29.2	8.3	15.2	5.3	7.9	0.8	0.0	71.4
1973-74	0.0	0.0	0.0	T	4.8	13.0	11.2	17.5	12.3	3.1	1.0	0.0	62.9
1974-75	0.0	0.0	T	T	6.0	18.0	11.8	12.4	14.0	4.5	0.0	0.0	66.7
1975-76	0.0	0.0	T	T	5.9	14.6	29.6	20.8	17.6	6.0	0.6	0.0	95.1
1976-77	0.0	0.0	0.0	0.7	13.6	18.6	16.3	11.4	3.9	2.7	0.0	0.0	67.2
1977-78	0.0	0.0	0.0	T	16.0	14.0	33.3	13.1	12.5	0.3	0.0	0.0	89.2
1978-79	0.0	0.0	0.0	T	10.5	29.0	21.8	8.3	5.7	11.6	2.3	0.0	89.2
1979-80	0.0	0.0	0.0	0.7	5.0	7.1	14.4	12.3	12.1	7.7	0.0	0.0	59.3
1980-81	0.0	0.0	0.0	4.4	3.2	25.6	19.3	16.3	5.4	0.2	0.0	0.0	74.4
1981-82	0.0	0.0	0.0	3.0	16.1	15.7	38.0	6.1	14.3	5.5	0.0	0.0	98.7
1982-83	0.0	0.0	0.0	0.2	7.7	4.8	15.4	6.4	13.3	2.7	1.0	0.0	51.5
1983-84	0.0	0.0	0.0	0.0	5.0	19.8	17.0	6.3	6.5	5.1	0.4	0.0	60.1
1984-85	0.0	0.0	0.0	0.0	0.6	11.7	25.3	18.7	14.1	10.0	0.0	0.0	80.4
1985-86	0.0	0.0	0.0	0.0	12.6	23.1	12.7	14.0	8.9	0.3	0.0	0.0	71.6
1986-87	0.0	0.0	0.0	T	3.4	10.3	14.1	6.4	2.3	2.0	0.0	0.0	38.5
1987-88	0.0	0.0	0.0	2.4	8.7	18.6	13.4	12.9	10.3	1.4	0.0	0.0	67.7
1988-89	0.0	0.0	0.0		7.8	12.3	9.3	13.5	18.7	3.1	T	0.0	
1989-90	0.0	0.0	T	0.6	12.2	15.0	21.7	11.0	2.4	2.1	0.9	0.0	65.9
1990-91	0.0	0.0	0.0	T	9.1	15.3	22.6	8.5	4.5	1.8	0.0	0.0	61.8
1991-92	0.0	0.0	T	T	4.9	17.5	15.0	15.8	9.5	3.6	0.0	0.0	66.3
1992-93	0.0	0.0	0.0	3.2	11.8	14.3	14.7	13.1	8.1	2.9	0.0	0.0	68.1
1993-94	0.0	T	0.0	0.1	2.3	9.0	26.2	12.7	9.0	3.9	0.1	0.0	63.3
1994-95	0.0	0.0	0.0	0.0	6.6	7.6	12.2	10.2	7.4	1.9	0.0	0.0	45.9
1995-96	0.0	0.0	T	T	41.9	16.4	26.0	8.7	13.4	10.6		0.0	
1996-97	T	0.0	T	T	8.9								
1997-98													
1998-99													
1999-					1.6	3.7							
POR= 31 YRS	T	T	0.0	0.7	10.2	16.0	19.3	12.3	11.3	4.2	0.5	0.0	74.5

WBAN : 94814

REFERENCE NOTES:

<p>PAGE 1: THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).</p> <p>PAGE 2 AND 3: H/C INDICATES HEATING AND COOLING DEGREE DAYS. RH INDICATES RELATIVE HUMIDITY W/O INDICATES WEATHER AND OBSTRUCTIONS S INDICATES SUNSHINE. PR INDICATES PRESSURE. CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS(OKTAS).</p> <p>GENERAL: T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE. + INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES. BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA. NORMALS ARE 30-YEAR AVERAGES (1961 - 1990). ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM. PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH. POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING. WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED. 0.* OR * INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05. CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET. THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD.</p>	<p>GENERAL CONTINUED: CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED. WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65° F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY.</p> <p>ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTHS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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1999  
HOUGHTON LAKE,  
MICHIGAN (HTL)

Houghton Lake is located in north-central lower Michigan. The present station is on the northeast shore of Houghton Lake, the largest inland lake in Michigan, with a circumference of about 32 miles. The Muskegon River source is Higgins Lake, 8 miles to the north. It flows through Houghton Lake, then southwestward to Lake Michigan. The station lies within an elongated bowl shaped 1,000-foot plateau, which extends roughly 50 miles north, 75 miles southwest, and about 20 miles southeast of Houghton Lake. In the immediate area, the land is level to rolling, but there are hills and ridges from 100 to 300 feet higher in elevation surrounding the station. Soils are generally sand, or sandy loam supporting little agricultural production, but the area is rich in natural resources of forests, lakes, and streams.

The interior location diminishes the influence of the larger Great Lakes, which lie 70 to 80 miles east and west of Houghton Lake. Hence, the daily temperature range is larger, especially in summer, and temperature extremes are greater than are found nearer the shores of either Lake Michigan or Lake Huron. Temperatures reach the 100 degree mark about one summer out of ten, and at the other extreme, fall below zero an average of twenty-two times during the winter season.

Precipitation is normally a little heavier during the summer season. About 60 percent of the annual total falls in the six-month period from April through September. The heaviest precipitation occurs with summertime thunderstorms.

Snowfall averages above 80 inches per year at Houghton Lake, with considerable variation from year to year. Much heavier snows, averaging over 100 inches a season, fall within a 30- to 60-mile radius to the north and west of Houghton Lake. Seasonal totals have ranged from 24 inches to over 124 inches. Measurable amounts of snow have occurred in nine of the twelve months, and the average number of months with measurable snowfall is six.

Cloudiness is greatest in the late fall and early winter, while sunshine percentage is highest in the spring and summer. Cloudiness is increased in the late fall due to the moisture and warmth picked up by the westerly and northwesterly winds while crossing Lake Michigan.

The growing season is normally quite short, averaging about 90 days between spring and fall freezes.

# STATION LOCATION

HOUGHTON LAKE, MICHIGAN

LOCATION	OCCUPIED FROM	OCCUPIED TO	AIRLINE DISTANCES AND DIRECTIONS FROM PREVIOUS LOCATION	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE											REMARKS	
						SEA LEVEL	GROUND											AUGUST 1964
							WIND	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY	EMERGENCY		
<u>COOPERATIVE</u>																		
James H. Ostrander 5 miles NE of Houghton Lake P. O.	12/01/12	10/01/16		44° 22'	84° 41'	1150		a									Broken record. Coordinates and elevation are approximate.	
Houghton Lake State Forest	10/01/16	1/01/52	7 mi. SSW	44° 16'	84° 44'	1200		a										
Houghton Lake Wildlife Experiment Station	1/01/52	Present	6 miles NW	44° 20'	84° 48'	1136		a									a - Ground exposures.	
<u>AIRPORT</u>																		
Hangar Building Roscommon County AP	4/20/64	1/21/65		44° 22'	84° 41'	1149	42	5	5			5	4				First Order Weather Bureau. 24-hour operation beginning November 1964.	
Weather Bureau and Administration Building Roscommon County AP	1/21/65	04/01/96	100 feet S	44° 22'	84° 41'	1149	b50	5 c5	5 c5	NA	NA	5 c5	4 c5	d5	NA		b - 42 feet to 4/23/68. c - Minor relocation 10/1/76. d - 10/1/85.	
Roscommon County AP	04/01/96	Present	NA	44°22'	84°41'	1154									S		ASOS Commissioned 04/01/96	

SUBSCRIPTION: Price and ordering information available through: National Climatic Data Center, Federal Building, Asheville, North Carolina 28801.  
 INQUIRIES/COMMENTS CALL: (828) 271-4800

National Climatic Data Center  
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