

2003

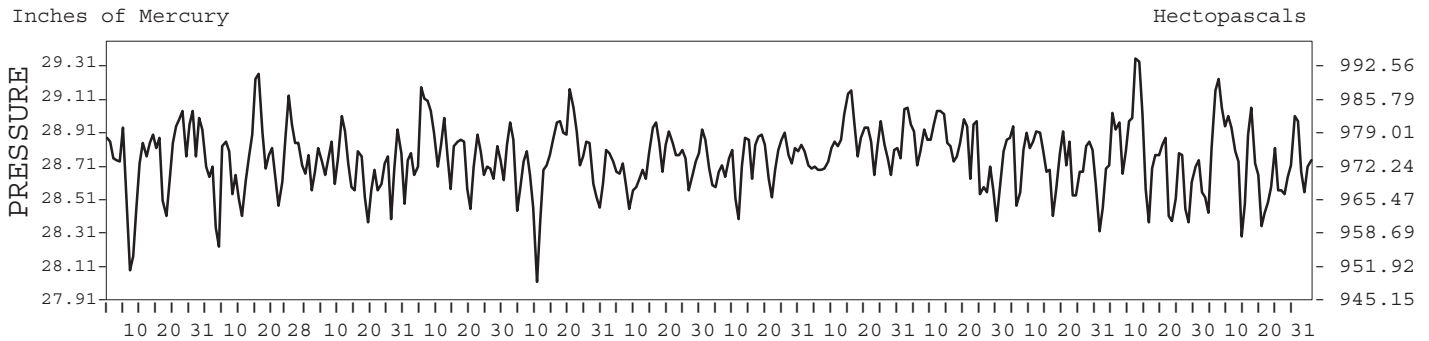
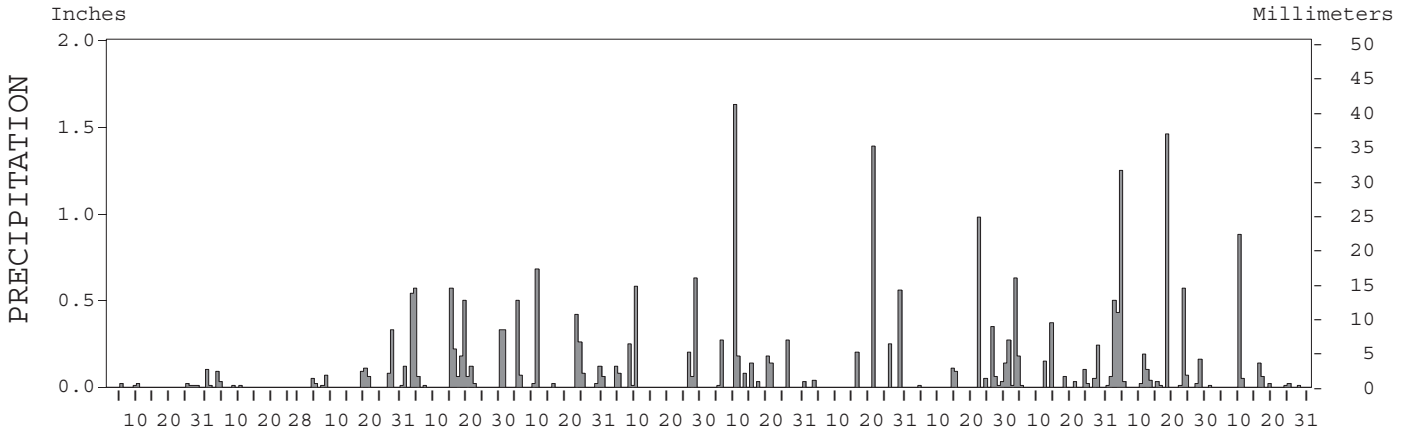
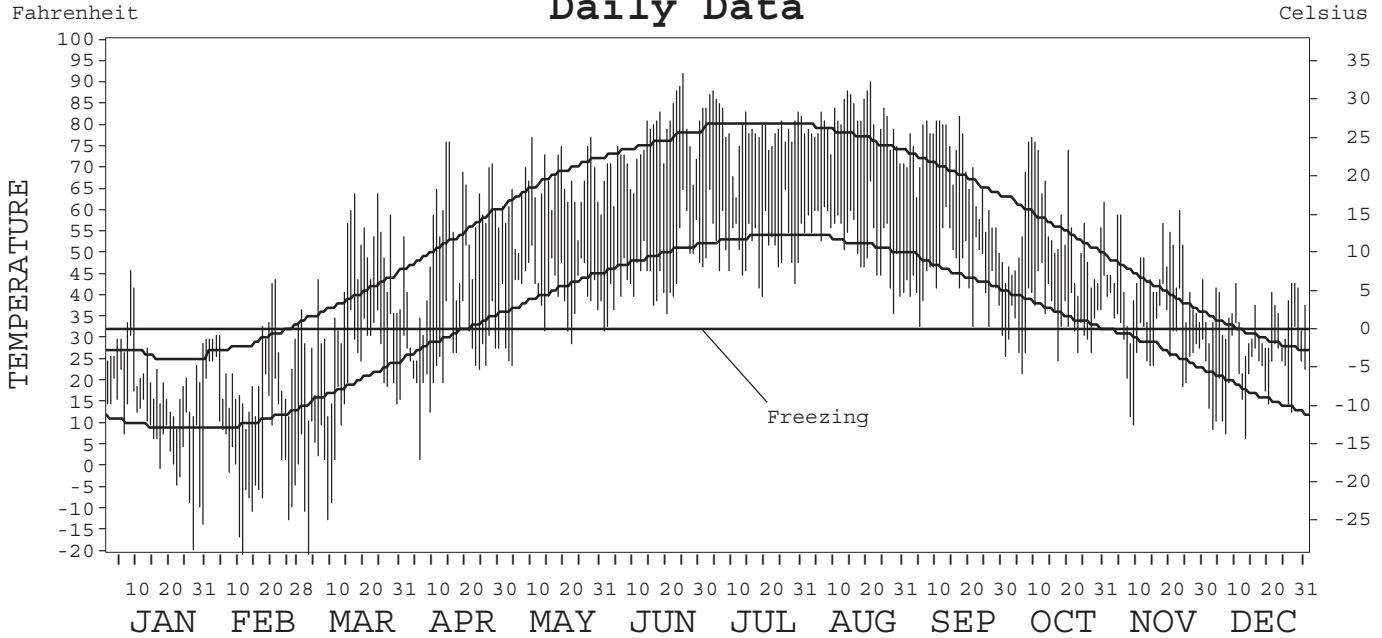
# LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-2591

HOUGHTON LAKE,  
MICHIGAN (HTL)

## Daily Data



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*Thomas R. Karl*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE	NATIONAL CLIMATIC DATA CENTER ASHEVILLE, NORTH CAROLINA	DIRECTOR NATIONAL CLIMATIC DATA CENTER
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# METEOROLOGICAL DATA FOR 2003

## HOUGHTON LAKE, MI (HTL)

LATITUDE: 44° 22' 04" N      LONGITUDE: 84° 41' 27" W      ELEVATION (FT): GRND: 1148      BARO: 1151      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	22.7	23.6	40.2	52.5	64.2	75.7	79.3	80.5	69.4	55.5	44.3	34.2	53.5	
	HIGHEST DAILY MAXIMUM	46	44	64	76	77	92	88	90	82	77	60	43	92	
	DATE OF OCCURRENCE	08	21	24+	15+	28+	25	04	21	17	09	23	28+	JUN 25	
	MEAN DAILY MINIMUM	8.3	3.6	16.1	27.6	40.3	45.3	51.8	53.0	45.0	34.9	29.7	21.1	31.4	
	LOWEST DAILY MINIMUM	-19	-20	-20	2	24	32	40	36	31	22	10	7	-20	
	DATE OF OCCURRENCE	27	11	03	06	04	01	19	28	30	06	09	13	MAR 03	
	AVERAGE DRY BULB	15.5	13.6	28.2	40.1	52.3	60.5	65.6	66.8	57.2	45.2	37.0	27.7	42.5	
	MEAN WET BULB	15.0	13.2	25.5	35.1	46.9	55.2	60.8	62.6		42.0	35.0	26.1		
	MEAN DEW POINT	10.7	8.1	19.1	27.8	40.8	49.9	56.7	59.2		38.5	31.8	22.5		
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	1	0	1	0	0	0	0	0	2
	MAXIMUM ≤ 32°	28	23	10	4	0	0	0	0	0	0	1	14	80	
	MINIMUM ≤ 32°	31	28	26	25	6	1	0	0	1	11	18	29	176	
MINIMUM ≤ 0°	7	12	4	0	0	0	0	0	0	0	0	0	23		
H/C	HEATING DEGREE DAYS	1526	1433	1132	741	387	155	36	42	235	606	834	1150	8277	
	COOLING DEGREE DAYS	0	0	0	0	0	28	60	106	10	0	0	0	204	
RH	MEAN (PERCENT)	78	75	71	66	70	69	72	77	78	79	83	81	75	
	HOUR 01 LST	79	82	78	79	84	89	88	92	92	88	87	85	85	
	HOUR 07 LST	82	84	85	80	83	82	88	92	93	91	88	87	86	
	HOUR 13 LST	71	66	59	52	54	52	56	58	64	65	77	72	62	
	HOUR 19 LST	78	70	63	57	60	54	62	65	71	77	80	79	68	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	1	1	4	3	3	7	6	13	7	4	7	3	59	
	THUNDERSTORMS	0	0	3	1	1	3	11	10	2	0	2	0	33	
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.)	28.74	28.73	28.68	28.77	28.72	28.72	28.73	28.83	28.79	28.70	28.73	28.73	28.74	
	MEAN SEA-LEVEL PRESS. (IN.)	30.04	30.03	29.96	30.04	29.96	29.95	29.95	30.05	30.03	29.95	29.99	30.01	30.00	
WINDS	RESULTANT SPEED (MPH)			1.6	2.3	2.9	1.0	2.3	1.3	3.1		3.5	3.5		
	RES. DIR. (TENS OF DEGS.)			25	08	07	30	28	30	23		26	27		
	MEAN SPEED (MPH)	9.9	8.6	8.2	9.6	8.8	6.7	7.3	6.1	7.7	7.6	9.4	8.6	8.2	
	PREVAIL. DIR. (TENS OF DEGS.)	28	25	19	08	11	28	25	33	24	30	25	31	28	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	28	30	25	35	32	28	28	26	26	26	37	35	37	
	DIR. (TENS OF DEGS.)	24	27	33	09	23	10	29	32	27	26	31	27	31	
	DATE OF OCCURRENCE	19+	19+	02	16	11	12	11	21	15	12	13	31	NOV 13	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	39	44	30	39	41	33	37	33	32	35	52	45	52	
DIR. (TENS OF DEGS.)	33	30	26	08	23	11	23	27	28	22	30	28	30		
DATE OF OCCURRENCE	13	04	28+	16+	11	12	26	29+	30	20+	13	31	NOV 13		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	0.20	0.15	0.83	3.36	2.58	1.93	2.96	2.44	1.83	2.13	4.95	1.20	24.56	
	GREATEST 24-HOUR (IN.)	0.10	0.12	0.35	0.87	0.68	0.69	1.72	1.39	0.98	0.73	1.46	0.88	1.72	
	DATE OF OCCURRENCE	31	03-04	27-28	03-04	23-24	27-28	10-11	21	22	03-04	18	10	JUL 10-11	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	8	5	10	14	12	8	11	5	10	14	17	9	123	
PRECIPITATION ≥ 0.10	1	0	2	9	6	5	7	4	4	7	8	2	55		
PRECIPITATION ≥ 1.00	0	0	0	0	0	0	1	1	0	0	2	0	4		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)														
	GREATEST 24-HOUR (IN.)														
	DATE OF OCCURRENCE														
	MAXIMUM SNOW DEPTH (IN.)														
	DATE OF OCCURRENCE														
NUMBER OF DAYS WITH:															
SNOWFALL ≥ 1.0															

# NORMALS, MEANS, AND EXTREMES

## HOUGHTON LAKE, MI (HTL)

LATITUDE: 44° 22' 04" N      LONGITUDE: 84° 41' 27" W      ELEVATION (FT): GRND: 1148      BARO: 1151      TIME ZONE: EASTERN (UTC + 5)      WBAN: 94814

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	25.9	29.3	39.4	53.0	67.2	75.5	80.0	77.1	68.3	56.0	41.9	30.5	53.7
	MEAN DAILY MAXIMUM	39	25.8	29.0	38.8	52.9	66.1	75.3	79.6	77.0	68.3	55.7	41.8	30.7	53.4
	HIGHEST DAILY MAXIMUM	39	54	59	76	86	90	103	98	96	92	85	70	64	103
	YEAR OF OCCURRENCE		1996	2000	1990	2002	1998	1995	1995	2001	1985	1971	1990	2001	JUN 1995
	MEAN OF EXTREME MAXS.	39	42.6	45.7	59.9	74.8	82.7	88.0	90.0	88.1	83.0	74.1	60.5	46.9	69.7
	NORMAL DAILY MINIMUM	30	9.7	10.5	19.2	30.6	40.7	48.9	53.4	52.2	45.3	36.2	27.6	16.8	32.6
	MEAN DAILY MINIMUM	39	9.7	9.8	18.5	31.4	42.1	51.0	55.4	53.9	46.7	37.0	28.3	17.3	33.4
	LOWEST DAILY MINIMUM	39	-26	-34	-23	2	21	29	33	29	21	16	-5	-21	-34
	YEAR OF OCCURRENCE		1981	1979	1967	2003	1966	1998	1965	1982	1989	1969	1995	1976	FEB 1979
	MEAN OF EXTREME MINS.	39	-14.3	-15.5	-6.1	15.3	28.1	36.2	40.8	39.1	29.6	22.7	12.0	-4.8	15.3
	NORMAL DRY BULB	30	17.8	19.9	29.3	41.8	53.9	62.2	66.7	64.6	56.8	46.1	34.8	23.7	43.1
	MEAN DRY BULB	39	17.7	19.3	28.9	42.1	54.3	63.1	67.5	65.2	57.5	46.5	35.0	23.8	43.4
	MEAN WET BULB	20	19.3	20.8	28.0	38.6	49.2	58.5	59.7	61.8	54.6	41.4	33.2	24.1	40.8
	MEAN DEW POINT	20	14.7	15.0	20.2	30.6	39.5	52.8	54.8	57.8	50.4	37.1	29.1	20.5	35.2
	NORMAL NO. DAYS WITH:														
	MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.0	0.1	0.9	2.0	0.5	*	0.0	0.0	0.0	3.5
MAXIMUM ≤ 32°	30	23.5	17.9	8.3	1.1	0.0	0.0	0.0	0.0	0.0	*	5.2	18.2	74.2	
MINIMUM ≤ 32°	30	30.6	27.5	27.4	16.9	4.3	0.2	0.0	*	1.6	9.2	21.9	29.6	169.2	
MINIMUM ≤ 0°	30	8.0	7.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	20.8	
H/C	NORMAL HEATING DEG. DAYS	30	1468	1278	1115	685	348	131	56	82	254	577	901	1271	8166
	NORMAL COOLING DEG. DAYS	30	0	0	0	3	20	61	124	85	24	1	0	0	318
RH	NORMAL (PERCENT)	30				64		67							
	HOUR 01 LST	30				77		85							
	HOUR 07 LST	30	83	84	84	80	78	82	86	91	92	88	86	85	85
	HOUR 13 LST	30	73	68	62	53	50	54	55	60	62	64	72	76	62
	HOUR 19 LST	30	78	74	66	57	53	57	59	66	73	73	79	81	68
S	PERCENT POSSIBLE SUNSHINE														
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	40	2.2	2.0	2.9	1.7	1.5	2.0	2.7	4.3	3.9	2.6	2.7	2.5	31.0
	THUNDERSTORMS	40	0.2	0.1	0.9	2.1	3.9	5.3	5.5	5.7	3.6	1.4	0.5	0.2	29.4
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)	14	28.71	28.74	28.73	28.73	28.71	28.79	28.81	28.78	28.79	28.73	28.71	28.75	
	MEAN SEA-LEVEL PRES. (IN)	20	30.01	30.06	30.04	29.96	29.97	30.01	29.99	30.04	30.03	30.05	30.02	30.04	
WINDS	MEAN SPEED (MPH)	12	9.4	8.9	9.3	9.3	8.8	7.6	7.3	6.8	7.6	8.3	9.3	8.9	8.5
	PREVAIL. DIR (TENS OF DEGS)	14	27	24	32	32	32	27	27	23	23	27	27	27	27
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	7	31	37	36	37	40	51	37	29	30	35	39	35	51
	DIR. (TENS OF DEGS)		32	24	28	24	26	19	13	25	29	16	22	27	19
	YEAR OF OCCURRENCE		2000	2001	2002	1997	1998	1999	2000	2002	1998	2001	1998	2003	JUN 1999
	MAXIMUM 5-SECOND:														
	SPEED (MPH)	7	44	48	46	52	54	61	46	40	39	46	52	46	61
DIR. (TENS OF DEGS)		33	23	28	22	23	19	13	29	29	16	30	26	19	
YEAR OF OCCURRENCE		2000	1999	2002	1997	1998	1999	2000	1997	1998	2001	2003	2001	JUN 1999	
PRECIPITATION	NORMAL (IN)	30	1.61	1.25	2.05	2.29	2.57	2.93	2.75	3.72	3.11	2.26	2.14	1.75	28.43
	MAXIMUM MONTHLY (IN)	39	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)	39	0.20	0.15	0.19	0.86	0.40	0.85	0.55	0.85	0.01	0.47	0.45	0.34	0.01
	YEAR OF OCCURRENCE		2003	2003	2001	1998	1966	1988	1989	1969	1979	1971	1986	1997	SEP 1979
	MAXIMUM IN 24 HOURS (IN)	39	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	11.2	12.1	11.7	10.1	10.4	9.7	10.4	11.5	11.2	13.0	14.3	140.5	
PRECIPITATION ≥ 1.00	30	0.0	0.1	0.1	0.3	0.3	0.7	0.6	0.9	0.8	0.3	0.1	0.2	4.4	
SNOWFALL	NORMAL (IN)	30	18.3	12.3	10.1	4.3	0.3	0.0	0.0	0.0	0.*	0.6	8.8	15.9	70.6
	MAXIMUM MONTHLY (IN)	33	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)	33	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)	32	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	5.6	4.6	3.3	1.5	0.1	0.0	0.0	0.0	0.0	0.2	2.8	5.0	23.1	

PRECIPITATION (inches) 2003 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2000	1.38	1.45	1.17	1.39	5.15	2.79	4.98	2.15	2.00	0.64	2.32	0.60	26.02
2001	0.59	1.60	0.19	3.22	5.31	2.53	0.81	3.15	3.61	4.61	1.91	0.59	28.12
2002	0.34	1.90	1.99	2.87	2.30	1.93	1.60	1.97	1.91	1.83	0.97	0.41	20.02
2003	0.20	0.15	0.83	3.36	2.58	1.93	2.96	2.44	1.83	2.13	4.95	1.20	24.56
POR= 86 YRS	1.46	1.27	1.89	2.44	2.79	3.05	2.70	2.98	3.09	2.51	2.38	1.65	28.21

WBAN : 94814

AVERAGE TEMPERATURE (°F) 2003 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2000	17.8	25.0	38.1	41.4	55.9	62.7	64.7	64.7	57.6	49.6	35.8	16.0	44.1
2001	22.8	20.1	27.7	46.1	56.8	63.4	67.0	67.0	55.5	46.5	42.2	31.4	45.5
2002	26.5	25.7	25.7	41.6	49.6	64.5	71.3	65.1	61.3	41.4	32.3	24.8	44.2
2003	15.5	13.6	28.2	40.1	52.3	60.5	65.6	66.8	57.2	45.2	37.0	27.7	42.5
POR= 85 YRS	18.9	19.7	28.6	42.4	54.4	63.6	67.6	65.6	58.0	47.5	35.3	24.0	43.8

HEATING DEGREE DAYS (base 65°F) 2003 HOUGHTON LAKE, MI (HTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
1999-00	17	91	249	617	754	1193	1456	1154	826	701	299	114	7471
2000-01	83	69	256	473	867	1512	1303	1250	1149	558	262	127	7909
2001-02	62	62	296	567	677	1032	1188	1094	1213	703	471	112	7477
2002-03	22	65	157	730	973	1238	1526	1433	1132	741	387	155	8559
2003-	36	42	235	606	834	1150							

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COOLING DEGREE DAYS (base 65°F) 2003 HOUGHTON LAKE, MI (HTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2000	0	0	0	0	24	51	79	65	42	1	0	0	262
2001	0	0	0	0	12	87	132	130	19	0	0	0	380
2002	0	0	0	10	4	105	223	73	55	6	0	0	476
2003	0	0	0	0	0	28	60	106	10	0	0	0	204

SNOWFALL (inches) 2003 HOUGHTON LAKE, MI (HTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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													
1999-00					1.6	3.7	16.1	10.4	T				
2000-01													
2001-02													
2002-03													
2003-													
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 (1971 - 2000). 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 EIGHTS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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2003  
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								AUTOMATIC OBSERVING EQUIPMENT *	* TYPE M = AMOS T = AUTOB S = ASOS W = AWOS  REMARKS
						GROUND									
						SEA LEVEL	GROUND	WIND INSTRUMENT	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	TIPPING GAUGE	RAINING GAUGE		
*NOTE:															
<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' S	44°22'	84°41'	1149	b50	5	c5	5	c5	4	d5	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'	e1148							S	ASOS Commissioned 04/01/96 e. Ground elevation.	

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\* NOTES: for earlier station history see previous editions.