Appendix B

CLIMATOLOGICAL TABLES

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

ROCHESTER, NY (43°07'N, 77°40'W) 547 feet (166.7 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1017.7	1018.1	1016.5	1015.2	1015.5	1014.7	1015.5	1016.6	1018.1	1018.4	1017.3	1018.1	1016.8	48
TEMPERATURE (DEGREES F)														
Mean	24.3	25.2	33.8	46.3	57.2	66.8	71.6	69.7	62.0	51.7	40.8	29.5	48.4	48
Mean Daily Maximum	31.3	32.9	41.8	55.9	67.8	77.6	82.2	80.0	72.1	61.2	47.9	35.9	57.4	48
Mean Daily Minimum	16.9	17.1	25.2	36.2	46.1	55.5	60.6	58.9	51.4	41.7	33.1	22.6	38.9	48
Extreme - Highest	74	67	83	93	94	100	98	99	99	91	81	72	100	48
Extreme - Lowest	-17	-19	-6	13	26	35	42	36	30	20	5	-12	-19	48
RELATIVE HUMIDITY														
Average Percentage	52.5	55.7	40.2	27.0	30.3	21.8	30.0	41.2	55.8	59.1	47.5	56.2	43.1	48
CLOUD COVER														
Percent of time Clear	7.1	10.4	15.7	18.8	20.2	20.5	20.7	21.9	21.8	21.2	9.4	6.6	16.2	48
Percent of time Scattered	11.8	13.8	15.2	16.2	19.7	25.1	28.0	24.7	22.0	18.0	13.5	12.5	18.4	48
Percent of time Broken	14.4	16.7	15.6	16.9	20.9	22.5	24.5	22.8	21.2	18.5	17.5	16.3	19.0	48
Percent of time Overcast	66.6	59.1	53.5	48.0	39.1	31.9	26.9	30.6	34.9	42.3	59.6	64.6	46.4	48
PRECIPITATION														
Mean Amount (inches)	2.21	2.23	2.50	2.68	2.66	2.77	2.66	3.23	2.80	2.57	2.86	2.53	31.71	48
Greatest Amount (inches)	5.79	5.07	5.03	4.14	6.62	6.77	6.03	6.00	6.30	7.85	6.99	4.65	40.54	48
Least Amount (inches)	0.72	0.66	0.47	1.18	0.36	0.22	0.61	0.76	0.28	0.23	0.44	0.62	22.45	48
Maximum Amount-24 hrs (inches)	1.26	1.75	1.46	1.79	3.45	2.56	3.25	2.32	3.47	2.94	2.02	1.49	3.47	48
Mean Number of Days with Precipitation	27	23	22	18	16	14	14	14	15	16	21	25	225	48
Snow - Mean Amount (inches)	24.4	22.8	14.5	3.9	0.3	0.0	0.0	0.0	T	0.2	7.3	19.9	93.2	48
Snow - Greatest Amount (inches)	60.4	64.8	40.3	20.2	10.9	0.0	0.0	0.0	T	2.6	23.4	46.1	151.7	48
Snow - Least Snowfall Amount (inches)	8.9	8.0	2.0	T	0.0	0.0	0.0	0.0	0.0	0.0	T	6.0	43.4	48
Snow - Maximum Amount in 24 hours (inches)	18.2	18.4	17.5	10.4	10.7	0.0	0.0	0.0	T	2.6	11.9	18.0	18.4	48
Mean Number of Days with Snow	24	20	16	6	1	0	0	0	Miss	2	10	21	100	48
WIND														
% of Observations with Gales	0.13	0.06	0.13	0.09	0.03	0.01	0.00	0.00	0.00	0.00	0.04	0.01	0.24	48
Mean Wind Speed (knots)	10.4	10.1	9.9	9.7	8.5	7.9	7.3	7.0	7.4	7.9	9.3	9.7	8.8	48
Direction (percentage of observations)														
North	1.8	2.7	2.8	3.5	4.1	3.6	3.6	3.2	3.1	2.6	1.9	1.8	2.9	48
North Northeast	1.4	2.0	2.8	3.7	4.0	3.0	2.5	3.3	2.6	2.2	1.5	1.0	2.5	48
Northeast	1.8	2.1	3.6	4.4	4.2	3.3	2.7	3.3	2.8	2.4	1.8	1.4	2.8	48
East Northeast	2.6	3.5	4.5	3.8	3.7	2.7	2.3	2.8	2.8	2.6	2.3	2.5	3.0	48
East	4.2	4.3	5.0	4.6	3.7	2.8	2.4	2.8	3.7	3.8	4.0	4.5	3.8	48
East Southeast	4.7	4.7	5.1	4.3	3.8	2.9	2.0	2.5	3.2	3.6	4.4	4.5	3.8	48
Southeast	3.8	3.8	3.7	3.6	3.9	3.0	2.4	2.9	3.7	4.1	4.3	4.3	3.6	48
South Southeast	3.7	3.6	3.6	3.4	4.0	3.5	2.9	3.5	4.5	4.9	5.8	4.5	4.0	48
South	7.2	6.2	5.5	6.1	6.9	8.2	8.5	8.4	10.1	9.8	9.1	8.3	7.9	48
South Southwest	8.9	7.4	5.9	6.2	8.4	11.2	12.3	13.1	13.5	12.6	11.2	10.6	10.1	48
Southwest	10.7	9.4	7.5	7.9	10.1	13.7	16.3	15.8	13.7	12.4	11.6	11.3	11.7	48
West Southwest	20.5	19.4	16.2	15.9	14.9	14.5	14.4	13.2	11.9	12.9	15.5	17.7	15.6	48
West	12.4	12.4	12.4	11.4	9.2	9.1	9.5	8.3	7.9	8.8	10.7	11.5	10.3	48
West Northwest	7.8	8.6	10.3	9.8	7.1	7.6	7.0	6.0	5.9	6.6	7.4	7.5	7.6	48
Northwest	4.1	4.6	5.2	5.5	5.3	5.2	5.7	4.9	4.5	4.3	4.4	4.3	4.8	48
North Northwest	2.4	2.7	2.8	3.3	3.4	3.2	2.7	2.9	2.7	2.3	1.8	2.3	2.7	48
Calm	2.0	2.6	3.0	2.7	3.4	3.0	3.0	3.5	3.4	4.5	2.5	2.3	3.0	48
Direction (Mean Speed, knots)														
North	8.5	8.9	8.1	7.8	7.7	7.4	7.2	7.2	7.1	7.8	7.6	9.0	7.8	48
North Northeast	10.7	11.6	10.0	9.7	9.0	8.2	8.5	8.4	8.7	9.6	9.1	10.7	9.3	48
Northeast	10.9	10.5	10.2	9.6	8.8	8.6	7.9	8.1	8.3	8.4	9.3	9.7	9.1	48
East Northeast	9.4	9.0	9.0	8.6	7.6	7.3	7.2	6.8	7.1	6.8	8.1	8.7	8.0	48
East	7.4	7.0	7.5	7.3	6.4	6.0	5.3	5.4	5.7	6.0	7.0	7.2	6.7	48
East Southeast	7.0	7.4	8.3	8.4	6.8	6.2	5.7	5.8	5.9	6.2	6.8	7.6	7.0	48
Southeast	6.9	7.1	8.1	7.8	6.9	6.0	5.7	5.4	5.7	6.4	7.3	7.2	6.8	48
South Southeast	7.9	8.0	8.6	9.2	7.6	6.6	6.0	5.6	6.5	6.9	8.0	7.7	7.4	48
South	8.0	7.9	8.1	7.7	7.0	6.6	6.0	5.8	6.7	7.2	8.0	7.7	7.2	48
South Southwest	9.2	8.5	8.4	8.2	7.7	7.1	6.6	6.5	7.5	7.5	8.4	8.9	7.7	48
Southwest	9.8	8.8	9.0	9.1	7.8	7.4	6.9	6.6	6.9	7.6	9.1	9.2	8.0	48
West Southwest	13.5	12.8	12.6	12.4	10.8	9.9	8.7	8.4	9.0	10.0	12.0	12.2	11.3	48
West	12.9	12.7	12.2	11.7	10.3	9.6	8.7	8.4	8.9	9.8	11.1	11.9	10.9	48
West Northwest	12.4	12.6	12.2	12.4	10.7	9.8	9.6	9.4	9.9	10.4	11.8	11.9	11.2	48
Northwest	11.6	11.3	11.0	10.5	9.8	9.4	9.2	8.9	9.0	10.0	11.0	12.1	10.3	48
North Northwest	9.7	9.9	9.0	9.1	9.0	8.4	8.1	8.3	8.5	8.6	9.5	10.2	9.0	48
VISIBILITY														
Mean Number of Days with Fog	8	9	10	10	10	10	11	13	12	11	11	10	125	48
% Observations with Visibility <= ½ mile	0.86	0.67	0.92	0.54	0.37	0.27	0.18	0.32	0.42	0.93	0.39	0.71	0.55	48

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLES

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

NIAGARA FALLS, NY (43°06'N, 78°57'W) 590 feet (180 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1019.0	1019.5	1017.8	1016.7	1016.6	1016.1	1017.3	1018.5	1019.4	1020.1	1018.7	1018.9	1018.2	34
TEMPERATURE (DEGREES F)														
Mean	25.0	25.8	33.1	46.6	56.3	66.5	71.6	70.2	61.8	51.9	41.0	29.0	48.0	19
Mean Daily Maximum	31.2	32.8	40.4	56.0	66.5	76.6	81.2	79.7	71.4	60.9	47.7	34.9	56.3	19
Mean Daily Minimum	18.3	18.4	25.3	36.6	45.5	55.9	61.4	60.3	51.6	42.4	33.8	22.6	39.2	19
Extreme - Highest	64	61	78	85	88	95	94	93	96	81	79	61	96	19
Extreme - Lowest	-16	-9	-9	12	28	37	46	45	30	23	4	-7	-16	19
RELATIVE HUMIDITY														
Average Percentage	64.9	69.9	53.2	42.4	40.7	35.6	48.3	59.6	68.9	76.4	62.3	64.3	57.2	35
CLOUD COVER														
Percent of time Clear	5.3	6.0	10.9	14.1	13.1	12.0	12.5	13.6	14.5	13.7	5.7	4.2	10.4	35
Percent of time Scattered	14.3	15.7	18.6	21.0	24.3	29.8	35.0	30.2	27.6	22.9	16.1	13.5	22.3	35
Percent of time Broken	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35
Percent of time Overcast	59.5	55.0	48.6	44.5	38.7	30.5	24.3	27.1	31.5	38.4	55.8	61.8	43.2	35
PRECIPITATION														
Mean Amount (inches)	2.80	2.49	2.82	3.06	2.99	2.20	2.68	3.92	2.75	2.75	2.94	2.92	34.33	19
Greatest Amount (inches)	4.62	4.90	5.00	4.80	6.46	4.77	6.16	8.96	4.17	7.18	5.03	6.62	44.41	19
Least Amount (inches)	1.42	0.56	0.75	1.04	0.70	0.23	0.55	0.79	1.06	T	1.12	1.09	25.34	19
Maximum Amount-24 hrs (inches)	1.51	3.13	2.30	1.60	1.86	2.52	1.66	3.24	2.75	2.42	2.25	1.43	3.24	19
Mean Number of Days with Precipitation	28	24	24	21	19	16	16	16	17	18	24	27	250	17
Snow - Mean Amount (inches)	16.2	14.9	11.0	2.3	0.0	0.0	0.0	0.0	T	0.2	4.6	14.9	64.2	19
Snow - Greatest Amount (inches)	30.8	39.0	28.7	9.5	0.4	0.0	0.0	0.0	T	2.5	19.7	27.2	91.9	19
Snow - Least Snowfall Amount (inches)	0.4	0.2	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	5.8	37.6	19
Snow - Maximum Amount in 24 hours (inches)	9.6	9.4	12.0	5.5	0.4	0.0	0.0	0.0	T	2.5	9.6	8.9	12.0	19
Mean Number of Days with Snow	25	21	17	6	Miss	0	0	0	Miss	2	12	23	106	17
WIND														
% of Observations with Gales	0.19	0.05	0.09	0.04	0.07	0.00	0.00	0.00	0.00	0.01	0.04	0.10	0.05	35
Mean Wind Speed (knots)	10.9	10.2	9.7	9.4	8.2	7.8	7.3	7.1	7.4	8.3	9.5	10.1	8.8	35
Direction (percentage of observations)														
North	3.2	4.4	4.1	5.6	4.9	6.0	5.4	5.8	5.3	5.1	3.9	3.3	4.7	35
North Northeast	1.7	2.3	3.1	3.1	3.2	2.6	2.6	3.1	3.0	2.6	2.1	1.7	2.6	35
Northeast	2.2	3.2	4.7	4.2	4.5	3.6	2.9	4.1	3.7	3.7	3.1	2.7	3.5	35
East Northeast	3.7	5.0	6.6	5.7	5.2	4.2	2.9	4.0	4.4	4.5	3.7	4.1	4.5	35
East	7.4	7.6	8.5	7.7	6.4	4.8	4.1	5.0	6.6	7.1	7.1	7.9	6.7	35
East Southeast	2.7	2.1	2.8	2.8	2.8	2.1	2.1	2.8	3.2	3.1	3.4	3.6	2.8	35
Southeast	1.6	1.8	1.6	1.7	1.9	1.9	1.7	2.2	2.7	2.5	2.7	1.8	2.0	35
South Southeast	1.7	2.1	1.8	2.0	2.0	1.7	1.7	1.6	1.7	2.4	2.7	2.5	2.0	35
South	6.7	6.4	6.2	6.9	7.9	8.0	7.7	7.5	9.4	9.6	8.0	6.3	7.6	35
South Southwest	6.7	7.1	6.1	8.1	10.4	10.6	10.3	9.4	9.3	8.4	6.5	5.6	8.2	35
Southwest	11.1	11.6	10.4	12.4	14.0	16.1	17.7	14.7	11.8	10.5	10.0	9.7	12.5	35
West Southwest	15.5	12.6	8.5	8.5	8.0	8.8	8.5	8.5	7.4	8.0	10.9	13.5	9.9	35
West	16.7	11.7	9.8	6.7	5.4	5.5	6.0	6.2	7.2	9.6	15.5	17.2	9.9	35
West Northwest	5.5	6.8	7.9	7.2	5.6	5.5	5.3	5.3	6.4	5.6	6.5	5.7	6.1	35
Northwest	5.1	6.7	7.7	7.3	5.9	6.2	6.9	5.6	5.3	5.1	4.8	4.6	5.9	35
North Northwest	3.8	3.9	4.4	4.5	4.1	4.3	4.9	4.1	3.3	4.0	3.7	4.2	4.1	35
Calm	4.7	4.9	5.6	5.6	7.8	8.1	9.4	10.3	9.4	8.3	5.6	5.4	7.1	35
Direction (Mean Speed, knots)														
North	9.1	9.8	8.4	8.5	8.0	7.5	7.0	7.0	6.9	7.5	8.2	8.3	7.9	35
North Northeast	7.9	8.9	8.1	8.7	7.9	7.2	7.4	7.8	7.0	7.6	8.1	8.6	7.9	35
Northeast	8.6	9.4	9.0	9.2	8.3	8.0	7.0	7.1	7.2	7.9	8.2	8.1	8.2	35
East Northeast	8.7	8.8	9.4	9.5	8.7	7.3	6.6	6.7	6.7	7.1	7.6	8.3	8.1	35
East	8.5	8.5	9.0	8.8	7.6	6.7	6.1	6.0	6.2	6.8	7.3	8.5	7.7	35
East Southeast	6.8	6.5	7.7	7.9	6.6	5.9	6.1	5.8	5.7	6.0	6.7	6.7	6.5	35
Southeast	6.5	6.5	7.1	7.1	6.8	5.9	5.8	5.5	5.5	6.4	6.5	6.1	6.3	35
South Southeast	7.6	8.2	8.0	8.2	6.9	6.1	5.9	5.4	5.9	6.8	8.1	7.8	7.2	35
South	10.0	9.0	9.0	8.1	7.6	7.1	6.9	6.9	7.9	8.6	9.6	9.2	8.3	35
South Southwest	11.7	11.4	10.4	10.0	9.3	9.0	8.9	8.7	9.3	10.2	11.0	11.7	9.9	35
Southwest	14.0	12.3	12.1	11.5	10.3	9.9	9.5	9.3	10.0	11.3	12.0	13.1	11.1	35
West Southwest	14.5	13.4	12.7	12.0	10.2	10.0	9.5	9.5	9.9	11.0	12.3	13.1	11.9	35
West	12.7	11.8	11.6	10.7	9.3	8.8	7.5	7.5	8.6	10.4	11.3	11.9	10.8	35
West Northwest	11.5	10.9	11.0	10.7	9.5	9.4	8.6	8.2	8.8	10.0	10.4	11.3	10.1	35
Northwest	10.7	10.8	10.9	10.5	9.2	8.7	8.4	8.0	8.8	9.3	10.4	11.4	9.8	35
North Northwest	10.6	10.0	9.5	9.6	8.5	8.6	8.2	8.0	8.5	8.8	9.8	10.6	9.2	35
VISIBILITY														
Mean Number of Days with Fog	15	14	16	15	16	15	17	20	18	16	15	16	193	17
% Observations with Visibility <= ½ mile	1.23	1.51	1.37	0.70	0.65	0.32	0.27	0.43	0.52	1.11	0.91	1.39	0.87	35

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

BUFFALO, NY (42°56'N, 78°44'W) 705 feet (215 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1017.6	1017.7	1016.2	1015.2	1015.5	1015.0	1015.8	1016.8	1018.2	1018.4	1017.1	1017.9	1016.8	50
TEMPERATURE (DEGREES F)														
Mean	24.9	25.5	33.9	45.8	56.7	66.4	71.4	69.6	62.2	52.1	40.9	29.7	48.4	50
Mean Daily Maximum	31.2	32.5	41.6	54.8	66.3	76.0	80.6	78.7	71.2	60.5	47.4	35.8	56.5	50
Mean Daily Minimum	18.0	18.1	25.8	36.4	46.6	56.4	61.7	60.0	52.7	43.1	33.8	23.2	39.8	50
Extreme - Highest	72	65	79	94	90	96	97	99	98	87	80	74	99	50
Extreme - Lowest	-16	-20	-7	12	26	36	46	38	23	20	7	-10	-20	50
RELATIVE HUMIDITY														
Average Percentage	50.8	52.1	36.5	27.4	29.6	24.9	32.8	43.1	57.3	59.4	45.5	54.2	42.7	50
CLOUD COVER														
Percent of time Clear	5.4	7.3	13.3	15.0	16.1	15.6	15.6	17.3	18.1	18.5	6.7	5.0	12.9	50
Percent of time Scattered	13.0	15.1	15.9	17.9	22.1	28.2	30.7	26.9	24.8	20.1	14.2	13.1	20.2	50
Percent of time Broken	14.3	16.3	15.9	16.8	19.9	22.9	24.6	24.4	21.9	19.6	17.3	15.1	19.1	50
Percent of time Overcast	67.3	61.3	54.8	50.3	42.0	33.3	29.1	31.3	35.1	41.8	61.8	66.8	47.8	50
PRECIPITATION														
Mean Amount (inches)	2.97	2.49	2.89	3.04	3.12	3.06	3.04	3.84	3.38	3.07	3.92	3.47	38.29	50
Greatest Amount (inches)	6.88	5.90	5.97	5.91	7.22	8.36	8.93	10.67	8.99	9.13	9.75	8.71	53.55	50
Least Amount (inches)	1.03	0.81	1.20	1.27	1.21	0.11	0.93	1.10	0.77	0.30	1.55	1.66	28.55	50
Maximum Amount-24 hrs (inches)	1.83	2.08	2.05	1.66	3.41	5.01	3.38	3.88	4.89	2.55	2.10	1.73	5.01	50
Mean Number of Days with Precipitation	28	23	23	19	18	15	15	15	15	17	22	26	236	50
Snow - Mean Amount (inches)	23.4	17.9	11.7	3.3	0.2	0.0	0.0	0.0	T	0.2	11.3	22.4	90.4	50
Snow - Greatest Amount (inches)	68.3	54.2	29.3	15.0	7.9	0.0	0.0	0.0	T	3.1	31.3	68.4	175.6	50
Snow - Least Snowfall Amount (inches)	5.4	3.1	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	4.3	30.8	50
Snow - Maximum Amount in 24 hours (inches)	18.3	18.4	15.1	6.4	7.9	0.0	0.0	0.0	T	2.8	19.0	33.9	19.0	50
Mean Number of Days with Snow	25	21	17	7	1	0	0	0	Miss	2	11	22	106	50
WIND														
% of Observations with Gales	0.52	0.14	0.35	0.17	0.05	0.03	0.01	0.02	0.01	0.06	0.16	0.17	0.19	50
Mean Wind Speed (knots)	12.1	11.5	11.1	10.7	9.7	9.3	8.9	8.2	8.6	9.4	10.7	11.2	10.1	50
Direction (percentage of observations)														
North	2.8	3.4	3.4	3.8	3.9	3.8	3.6	4.5	4.2	3.8	2.9	2.9	3.6	50
North Northeast	2.6	2.8	3.1	3.1	3.9	3.4	2.8	3.4	3.6	3.2	2.2	2.3	3.0	50
Northeast	4.0	4.5	6.2	5.2	5.9	4.8	3.7	5.0	5.2	4.4	3.8	3.8	4.7	50
East Northeast	4.5	5.7	6.7	6.0	5.4	3.9	2.8	3.6	4.1	4.0	4.3	4.2	4.6	50
East	3.5	4.0	4.8	4.4	4.0	3.0	3.0	3.3	3.5	3.8	3.6	4.2	3.7	50
East Southeast	2.3	2.5	2.9	3.1	3.1	2.2	2.1	3.2	3.3	3.1	3.1	2.9	2.8	50
Southeast	2.9	3.1	3.5	3.7	3.9	4.0	4.0	5.7	6.2	5.8	4.6	3.8	4.3	50
South Southeast	3.7	3.4	4.0	4.2	4.6	5.1	4.9	6.0	7.0	6.2	5.8	5.0	5.0	50
South	6.9	6.1	5.6	6.0	7.8	9.3	9.8	10.1	10.8	10.8	9.4	7.9	8.4	50
South Southwest	9.1	8.4	7.0	8.4	9.4	11.2	10.9	9.9	9.9	9.8	10.0	10.4	9.5	50
Southwest	11.2	13.4	14.5	17.6	18.9	18.6	18.3	14.5	11.2	11.0	9.5	8.3	13.9	50
West Southwest	15.4	15.9	13.3	14.0	13.5	14.6	15.6	12.3	10.4	9.8	11.2	11.4	13.1	50
West	14.7	11.2	8.1	5.8	4.4	4.8	5.1	5.3	5.9	8.2	12.5	14.8	8.4	50
West Northwest	8.0	6.4	6.8	4.8	3.5	3.3	3.6	3.8	4.8	6.5	8.2	8.5	5.7	50
Northwest	4.5	4.4	5.2	4.9	3.4	3.3	4.2	4.1	4.6	4.3	4.7	4.2	4.3	50
North Northwest	2.8	3.5	3.7	3.7	3.3	3.2	3.8	3.6	3.6	3.8	3.3	3.7	3.5	50
Calm	1.1	1.5	1.4	1.5	1.5	1.7	2.1	2.2	1.9	1.6	1.0	1.4	1.6	50
Direction (Mean Speed, knots)														
North	8.3	8.6	7.7	8.0	7.9	7.6	6.8	7.1	7.1	7.4	6.9	7.8	7.6	50
North Northeast	8.6	9.3	8.4	8.9	8.2	7.5	7.9	7.7	7.6	7.5	7.6	8.5	8.1	50
Northeast	9.2	9.3	9.8	9.6	8.9	8.1	8.1	7.5	7.8	7.8	8.2	9.1	8.7	50
East Northeast	9.7	10.0	10.1	9.9	8.8	7.8	7.0	6.8	7.3	7.7	8.6	9.1	8.8	50
East	8.1	7.9	8.7	8.6	7.7	6.4	6.4	5.9	6.2	6.7	7.5	8.0	7.4	50
East Southeast	7.0	7.2	7.8	8.4	7.0	6.4	6.1	5.9	6.1	6.3	6.9	7.0	6.8	50
Southeast	7.7	8.1	8.6	8.6	7.7	7.0	6.3	6.2	6.8	7.1	7.8	7.5	7.3	50
South Southeast	8.6	9.1	9.7	9.4	7.8	7.2	6.4	6.4	7.1	7.7	8.8	8.4	7.9	50
South	10.2	8.7	9.4	8.6	7.9	7.1	6.8	6.6	7.9	8.3	9.7	9.9	8.3	50
South Southwest	12.4	11.1	10.9	10.2	9.1	9.0	8.6	8.2	9.6	10.3	11.9	12.5	10.3	50
Southwest	15.3	13.7	13.5	12.9	11.9	11.7	11.4	10.9	11.0	12.6	13.8	15.1	12.6	50
West Southwest	16.1	15.0	14.2	13.8	12.9	12.4	11.7	11.2	11.9	12.4	14.4	14.4	13.4	50
West	13.9	13.9	12.9	11.2	9.9	9.5	9.3	9.1	9.7	11.1	12.8	13.3	12.1	50
West Northwest	12.4	12.5	12.3	12.0	10.6	9.8	9.2	9.1	9.7	10.2	11.3	12.2	11.3	50
Northwest	11.1	11.0	11.3	11.7	10.6	10.1	9.3	8.9	9.7	10.2	10.6	11.7	10.6	50
North Northwest	9.9	10.1	9.8	9.8	9.2	9.1	8.7	8.0	8.5	9.1	9.7	10.0	9.3	50
VISIBILITY														
Mean Number of Days with Fog	12	12	14	13	14	13	13	15	13	13	13	13	158	50
% Observations with Visibility <= ½ mile	1.39	1.19	1.44	0.87	0.84	0.36	0.20	0.25	0.31	0.52	0.68	0.98	0.75	50

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

ERIE, PA (42°06'N, 80°11'W) 732 feet (223 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.4	1018.2	1016.4	1015.3	1015.6	1014.9	1016.0	1016.9	1018.1	1018.7	1017.2	1018.4	1017.0	48
TEMPERATURE (DEGREES F)														
Mean	26.4	26.7	34.9	45.9	56.3	66.2	70.8	69.5	63.1	52.8	42.3	31.7	49.1	43
Mean Daily Maximum	32.8	33.9	42.6	54.5	65.5	75.1	79.3	77.9	71.3	60.7	48.6	37.3	56.8	43
Mean Daily Minimum	19.6	19.0	26.7	36.8	46.7	56.7	61.8	60.7	54.3	44.5	35.6	25.5	40.8	43
Extreme - Highest	69	66	81	89	90	100	99	94	93	88	81	75	100	43
Extreme - Lowest	-18	-17	-10	12	26	32	44	37	33	24	7	-6	-18	43
RELATIVE HUMIDITY														
Average Percentage	59.0	56.8	38.9	27.9	31.1	24.3	34.7	44.0	56.3	62.0	47.5	59.0	45.1	48
CLOUD COVER														
Percent of time Clear	7.1	10.8	14.9	17.5	20.2	20.7	22.1	22.1	20.0	20.7	9.1	6.6	16.0	48
Percent of time Scattered	8.3	10.9	13.8	15.4	19.7	24.8	27.9	26.1	22.2	17.2	10.9	6.9	17.1	48
Percent of time Broken	12.0	13.9	14.2	17.1	19.8	22.5	23.0	22.1	23.4	19.6	15.5	11.3	17.9	48
Percent of time Overcast	72.6	64.5	57.1	50.0	40.4	32.0	27.0	29.8	34.3	42.5	64.5	75.1	49.0	48
PRECIPITATION														
Mean Amount (inches)	2.47	2.25	3.06	3.34	3.37	3.79	3.33	3.87	4.08	3.62	3.99	3.37	40.52	43
Greatest Amount (inches)	5.48	5.73	6.78	7.11	7.82	7.71	7.70	11.06	10.65	9.87	10.40	6.94	61.70	43
Least Amount (inches)	0.87	0.57	0.63	1.63	1.00	0.75	0.65	1.04	1.33	0.40	1.52	1.38	28.11	43
Maximum Amount-24 hrs (inches)	1.26	2.11	1.92	1.97	2.23	2.68	2.79	3.29	4.66	4.35	2.28	2.09	4.66	43
Mean Number of Days with Precipitation	26	22	22	19	16	15	13	14	14	16	21	25	223	42
Snow - Mean Amount (inches)	22.2	16.1	10.6	2.3	0.0	0.0	0.0	0.0	0.0	0.4	9.7	21.9	83.1	43
Snow - Greatest Amount (inches)	62.4	32.1	27.3	10.2	0.4	0.0	0.0	0.0	0.0	4.0	36.3	66.9	146.7	43
Snow - Least Snowfall Amount (inches)	6.0	4.6	0.7	T	0.0	0.0	0.0	0.0	0.0	0.0	T	1.0	39.2	43
Snow - Maximum Amount in 24 hours (inches)	12.9	12.2	11.5	6.6	0.4	0.0	0.0	0.0	0.0	3.0	17.4	14.3	17.4	43
Mean Number of Days with Snow	22	19	14	5	Miss	0	0	0	0	2	10	19	91	42
WIND														
% of Observations with Gales	0.06	0.07	0.08	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.05	48
Mean Wind Speed (knots)	11.4	10.4	10.4	9.9	8.8	8.3	7.8	7.7	8.6	9.7	11.3	11.5	9.6	48
Direction (percentage of observations)														
North	2.7	3.4	3.5	3.6	4.2	4.2	4.8	5.1	4.8	4.7	2.9	3.1	3.9	48
North Northeast	2.5	3.8	4.7	4.3	4.9	4.0	4.1	4.6	4.7	3.3	2.3	2.1	3.8	48
Northeast	4.0	6.6	8.8	7.3	7.9	5.7	4.0	4.8	4.3	4.1	2.8	2.6	5.2	48
East Northeast	3.7	4.5	5.6	4.8	4.3	2.8	2.5	2.9	3.2	3.2	2.8	3.5	3.6	48
East	1.4	1.9	1.7	2.1	1.8	1.3	1.4	1.7	2.2	2.0	2.0	1.9	1.8	48
East Southeast	1.2	1.1	1.6	1.5	1.2	1.1	1.2	1.6	1.9	1.6	1.5	1.2	1.4	48
Southeast	2.4	2.5	2.7	3.2	2.7	2.2	2.0	2.3	3.2	2.8	3.1	2.8	2.7	48
South Southeast	7.3	6.6	8.1	7.6	7.5	7.4	6.8	7.9	11.2	11.3	10.4	9.5	8.5	48
South	12.0	11.3	9.9	10.6	13.6	16.5	17.9	18.6	19.1	19.2	15.5	14.0	14.9	48
South Southwest	13.5	9.7	7.4	8.1	8.9	11.7	12.3	11.9	12.1	13.1	15.2	15.4	11.6	48
Southwest	11.9	8.7	6.4	6.8	6.2	7.3	7.1	7.0	6.0	7.6	11.1	12.0	8.2	48
West Southwest	11.0	11.5	11.2	11.2	9.5	8.3	7.1	5.4	4.1	4.3	6.3	7.2	8.1	48
West	9.1	9.5	8.9	9.3	8.2	7.6	7.2	5.8	4.6	4.7	5.8	6.6	7.3	48
West Northwest	8.2	7.5	8.0	7.6	5.9	6.7	7.1	6.1	5.7	5.4	6.8	8.1	6.9	48
Northwest	3.8	4.3	4.5	4.7	4.2	4.3	5.1	4.9	4.6	4.2	4.8	4.1	4.5	48
North Northwest	2.9	3.3	3.2	3.5	3.7	3.9	4.4	4.9	3.9	4.7	4.4	3.9	3.9	48
Calm	2.7	3.8	3.8	4.0	5.4	5.2	5.1	4.8	4.5	3.7	2.5	2.0	4.0	48
Direction (Mean Speed, knots)														
North	8.3	8.0	7.9	7.6	7.4	7.1	7.7	7.9	8.3	9.0	8.9	9.7	8.1	48
North Northeast	10.4	9.7	10.4	9.8	9.4	9.0	9.1	9.4	9.5	9.6	9.9	10.1	9.7	48
Northeast	10.7	11.0	11.1	11.1	10.6	10.5	9.6	9.6	10.2	10.2	10.7	10.3	10.6	48
East Northeast	9.5	9.3	8.9	8.7	8.2	8.1	7.7	7.6	7.8	8.4	9.7	9.2	8.6	48
East	5.7	6.0	6.0	6.3	5.3	5.6	5.2	5.0	5.3	5.5	5.8	6.1	5.7	48
East Southeast	6.4	7.0	8.0	7.9	6.8	5.6	5.9	5.5	6.0	5.5	7.3	6.6	6.5	48
Southeast	10.2	11.8	11.8	11.8	9.9	8.2	7.3	7.6	8.0	9.5	10.7	10.2	9.8	48
South Southeast	13.0	12.8	13.4	12.3	10.9	9.3	8.5	8.7	9.8	11.1	12.5	12.7	11.3	48
South	11.5	10.7	10.6	9.5	8.4	8.2	7.2	7.3	8.4	9.4	11.1	11.6	9.3	48
South Southwest	12.3	11.6	11.6	10.4	9.3	8.8	8.1	7.5	8.9	10.5	11.9	12.5	10.3	48
Southwest	12.0	10.7	10.6	9.8	9.1	8.9	8.3	8.3	9.4	10.8	12.1	12.0	10.5	48
West Southwest	12.6	11.8	11.6	11.6	10.6	10.2	9.1	8.6	10.0	11.1	12.2	12.2	11.2	48
West	12.4	11.4	11.4	11.4	10.0	9.4	9.3	9.0	9.7	10.9	12.3	12.7	10.9	48
West Northwest	12.4	11.4	11.2	10.7	9.1	8.8	9.0	9.0	10.0	11.7	13.0	13.1	10.9	48
Northwest	11.8	10.0	10.4	9.9	8.2	8.2	8.4	8.6	9.8	11.7	13.1	12.8	10.2	48
North Northwest	10.5	8.9	9.3	9.0	7.7	7.4	8.2	8.2	9.3	10.7	11.8	11.7	9.4	48
VISIBILITY														
Mean Number of Days with Fog	12	12	14	12	12	11	10	11	11	10	12	13	140	42
% Observations with Visibility <= ½ mile	0.93	1.08	1.68	0.80	0.61	0.30	0.08	0.09	0.11	0.16	0.49	0.82	0.59	48

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

CLEVELAND, OH (41°26'N, 81°52'W) 770 feet (235 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1019.1	1018.8	1016.7	1015.7	1015.9	1015.3	1016.4	1017.3	1018.5	1019.1	1018.1	1019.2	1017.5	48
TEMPERATURE (DEGREES F)														
Mean	26.6	28.5	37.3	48.7	59.1	68.4	72.8	71.2	64.4	53.7	42.5	31.5	50.5	48
Mean Daily Maximum	33.5	36.0	45.6	58.4	69.4	78.7	82.7	81.0	74.1	63.0	49.9	37.9	59.3	48
Mean Daily Minimum	19.1	20.5	28.5	38.5	48.3	57.7	62.3	61.0	54.2	43.9	34.7	24.6	41.2	48
Extreme - Highest	73	69	82	88	92	104	100	102	101	89	82	77	104	48
Extreme - Lowest	-20	-15	-5	10	25	31	41	38	34	19	3	-15	-20	48
RELATIVE HUMIDITY														
Average Percentage	66.1	63.5	41.5	31.6	34.4	28.4	39.0	48.1	60.2	65.7	55.7	67.3	50.1	48
CLOUD COVER														
Percent of time Clear	9.8	12.5	15.0	17.8	19.6	19.3	21.4	21.8	22.7	23.1	11.9	9.8	17.1	48
Percent of time Scattered	9.9	11.0	12.4	15.3	19.7	24.0	27.2	27.2	22.0	16.9	11.7	9.0	17.2	48
Percent of time Broken	12.1	13.6	14.8	16.3	19.5	22.5	23.4	22.1	21.1	18.5	14.0	12.2	17.5	48
Percent of time Overcast	68.3	62.9	57.7	50.6	41.2	34.1	28.0	28.8	34.3	41.5	62.4	68.9	48.1	48
PRECIPITATION														
Mean Amount (inches)	2.57	2.27	3.05	3.41	3.46	3.51	3.57	3.41	3.19	2.58	3.24	2.90	37.16	48
Greatest Amount (inches)	7.01	4.70	6.07	6.61	9.14	9.06	9.12	8.96	7.33	9.50	8.80	8.59	53.83	48
Least Amount (inches)	0.36	0.48	0.78	1.24	1.00	0.65	1.21	0.53	0.74	0.61	0.80	0.71	18.78	48
Maximum Amount-24 hrs (inches)	2.53	2.04	2.76	2.10	3.36	2.97	2.71	3.55	2.30	3.36	2.23	2.39	3.55	48
Mean Number of Days with Precipitation	25	21	22	19	17	15	14	14	14	15	20	24	220	48
Snow - Mean Amount (inches)	13.5	12.2	10.6	2.3	0.1	0.0	0.0	0.0	0.0	0.7	5.3	12.0	56.5	48
Snow - Greatest Amount (inches)	42.8	39.1	26.3	13.2	2.1	0.0	0.0	0.0	0.0	8.0	22.3	30.3	96.5	48
Snow - Least Snowfall Amount (inches)	2.0	3.1	1.2	T	0.0	0.0	0.0	0.0	0.0	0.0	T	1.0	24.5	48
Snow - Maximum Amount in 24 hours (inches)	10.4	13.6	10.8	8.6	2.0	0.0	0.0	0.0	0.0	6.7	12.8	12.0	13.6	48
Mean Number of Days with Snow	21	17	14	5	Miss	0	0	0	0	1	9	17	84	48
WIND														
% of Observations with Gales	0.06	0.01	0.08	0.06	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	48
Mean Wind Speed (knots)	10.7	10.1	10.5	9.9	8.7	8.1	7.5	7.2	7.7	8.7	10.3	10.5	9.1	48
Direction (percentage of observations)														
North	3.7	6.5	7.4	8.7	10.2	9.6	10.0	9.5	7.2	4.9	3.3	3.3	7.0	48
North Northeast	3.3	6.2	8.0	7.5	9.4	8.2	7.0	7.4	5.8	3.8	2.4	2.2	5.9	48
Northeast	2.6	4.3	5.6	4.9	5.7	4.0	3.7	3.8	3.5	3.1	2.0	2.1	3.8	48
East Northeast	2.0	2.0	2.8	2.2	2.4	1.8	1.6	2.2	2.3	2.2	1.8	1.8	2.1	48
East	1.4	1.8	2.1	2.2	1.9	1.7	1.7	1.7	2.5	2.2	1.5	1.7	1.9	48
East Southeast	2.0	2.5	3.0	3.0	2.4	1.9	1.7	1.9	2.6	2.4	2.2	2.5	2.3	48
Southeast	2.6	3.3	3.9	3.8	3.8	3.0	3.0	3.2	4.1	4.2	3.7	3.7	3.5	48
South Southeast	5.5	5.2	5.5	6.2	6.1	6.4	5.8	6.0	7.7	8.3	7.2	6.2	6.4	48
South	11.1	9.6	8.6	10.0	10.1	12.1	11.2	11.5	13.4	13.8	14.1	13.3	11.6	48
South Southwest	12.8	10.1	8.9	9.2	9.8	12.8	13.1	12.7	13.0	14.3	13.9	13.3	12.0	48
Southwest	15.7	12.5	8.9	9.8	10.2	12.8	14.7	14.2	12.7	13.7	15.3	14.7	13.0	48
West Southwest	13.4	10.2	8.2	7.2	6.7	6.2	6.6	6.2	6.0	7.9	13.5	14.2	8.8	48
West	7.0	6.5	6.7	5.4	4.1	3.5	3.5	3.1	3.5	4.0	5.3	6.5	4.9	48
West Northwest	7.1	7.3	7.5	6.6	4.8	4.0	4.3	3.6	4.2	4.6	5.7	6.5	5.5	48
Northwest	5.0	5.6	6.2	5.4	4.1	3.8	3.6	3.9	3.8	4.2	4.5	4.4	4.5	48
North Northwest	3.7	4.6	4.7	5.5	5.2	4.8	4.8	4.6	3.9	3.6	2.8	2.6	4.2	48
Calm	1.4	2.1	1.8	2.6	3.5	3.7	4.1	4.8	4.3	3.3	1.3	1.3	2.8	48
Direction (Mean Speed, knots)														
North	8.3	8.7	8.8	8.6	8.3	8.0	8.0	8.0	8.1	8.4	8.3	8.9	8.3	48
North Northeast	9.2	9.7	9.7	9.2	9.1	8.7	8.3	8.4	8.3	8.6	9.3	9.5	9.0	48
Northeast	10.3	10.0	10.2	9.6	8.7	8.6	7.9	7.9	8.5	8.4	9.5	9.8	9.1	48
East Northeast	8.9	8.4	8.6	8.1	7.3	7.0	7.5	6.8	7.0	8.0	8.6	8.6	7.9	48
East	7.8	7.5	8.2	8.6	6.6	6.3	6.1	5.4	6.5	6.3	7.9	7.7	7.1	48
East Southeast	8.4	8.6	9.5	9.5	7.3	7.0	7.0	6.7	6.9	7.2	8.2	8.9	8.0	48
Southeast	8.5	8.6	9.3	8.8	7.4	6.2	5.8	5.7	6.1	7.0	8.0	8.0	7.5	48
South Southeast	9.1	8.9	9.8	9.1	8.1	6.8	6.2	6.4	6.9	7.9	9.4	9.3	8.1	48
South	10.9	10.2	10.7	10.5	9.3	8.3	7.5	7.1	8.2	9.1	10.9	10.9	9.4	48
South Southwest	11.0	10.7	11.2	10.5	9.5	8.7	8.0	7.2	8.1	9.2	10.4	10.9	9.5	48
Southwest	11.2	10.8	11.6	11.0	9.3	8.7	7.8	7.3	8.1	9.1	10.6	10.7	9.6	48
West Southwest	12.3	11.6	12.7	12.3	10.0	9.0	8.5	8.1	8.4	9.8	11.7	11.7	10.9	48
West	11.7	11.8	12.2	11.6	9.7	9.3	8.2	7.9	8.4	9.6	11.1	11.2	10.6	48
West Northwest	11.6	11.8	11.7	11.5	10.6	9.5	9.3	8.6	9.6	10.2	11.1	11.4	10.8	48
Northwest	11.4	10.8	11.1	10.7	9.5	9.2	8.7	8.5	9.5	10.6	11.2	11.5	10.4	48
North Northwest	10.6	10.3	10.0	9.9	8.5	8.8	8.0	8.1	9.1	9.5	10.4	11.0	9.4	48
VISIBILITY														
Mean Number of Days with Fog	13	12	13	12	13	11	12	14	12	11	12	13	148	48
% Observations with Visibility <= ½ mile	0.76	1.08	1.27	0.42	0.46	0.20	0.15	0.34	0.18	0.28	0.30	0.60	0.50	48

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

TOLEDO, OH (41°35'N, 83°48'W) 669 feet (204 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1019.3	1018.7	1016.6	1015.2	1015.7	1015.1	1016.0	1017.1	1018.4	1018.8	1018.0	1019.4	1017.4	41
TEMPERATURE (DEGREES F)														
Mean	23.3	26.1	36.3	48.3	59.2	68.3	72.7	70.7	63.3	51.8	40.1	28.6	49.2	41
Mean Daily Maximum	30.6	33.9	45.3	59.1	70.8	79.8	83.7	81.9	74.6	62.8	48.3	35.6	59.0	41
Mean Daily Minimum	15.6	17.8	26.7	37.0	47.1	56.3	61.1	59.1	51.5	40.4	31.5	21.1	38.9	41
Extreme - Highest	65	68	80	88	95	104	104	99	98	91	78	68	104	41
Extreme - Lowest	-20	-14	-6	8	25	32	40	34	26	15	2	-19	-20	41
RELATIVE HUMIDITY														
Average Percentage	68.1	61.7	40.7	27.1	31.9	25.7	34.5	45.5	58.9	62.8	55.3	69.1	48.5	41
CLOUD COVER														
Percent of time Clear	16.4	16.5	19.3	20.8	21.4	20.9	23.0	23.1	26.3	27.7	16.7	14.4	20.6	40
Percent of time Scattered	12.6	13.3	13.8	15.9	19.8	25.2	29.7	28.1	22.1	17.5	12.7	11.2	18.5	40
Percent of time Broken	13.4	15.8	15.2	19.0	22.2	25.3	24.3	23.4	21.5	18.4	16.7	13.3	19.1	40
Percent of time Overcast	57.7	54.4	51.7	44.4	36.6	28.6	23.0	25.4	30.1	36.3	54.0	61.1	41.8	40
PRECIPITATION														
Mean Amount (inches)	1.88	1.73	2.51	3.08	2.88	3.62	3.17	3.22	2.65	2.19	2.78	2.65	32.36	41
Greatest Amount (inches)	4.61	5.39	5.70	6.10	5.13	8.48	6.75	8.47	8.10	5.53	6.86	6.81	40.85	41
Least Amount (inches)	0.27	0.27	0.58	0.88	0.96	0.27	0.34	0.40	0.58	0.28	0.55	0.54	22.04	41
Maximum Amount-24 hrs (inches)	1.53	2.59	2.60	2.89	1.69	3.12	4.34	2.42	3.33	2.88	2.71	3.53	4.34	41
Mean Number of Days with Precipitation	23	19	20	18	16	14	14	13	13	14	18	23	205	41
Snow - Mean Amount (inches)	9.6	8.2	6.1	1.6	0.0	0.0	0.0	0.0	T	0.1	2.9	8.2	36.8	41
Snow - Greatest Amount (inches)	30.8	16.6	17.7	12.0	1.3	0.0	0.0	0.0	T	2.0	17.9	24.2	72.3	41
Snow - Least Snowfall Amount (inches)	0.7	0.5	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.9	19.3	41
Snow - Maximum Amount in 24 hours (inches)	10.2	7.7	9.4	6.5	0.8	0.0	0.0	0.0	T	1.8	7.1	13.9	10.2	41
Mean Number of Days with Snow	20	16	12	4	Miss	0	0	0	Miss	1	8	17	78	41
WIND														
% of Observations with Gales	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.30	40
Mean Wind Speed (knots)	9.6	9.3	9.7	9.6	8.4	7.3	6.5	6.2	6.7	7.8	9.0	9.1	8.2	40
Direction (percentage of observations)														
North	3.9	5.0	5.0	4.6	4.9	4.9	5.0	5.9	5.9	4.4	3.6	3.9	4.7	40
North Northeast	2.2	3.0	3.6	2.8	3.4	3.6	3.5	4.2	3.7	2.8	2.1	2.0	3.1	40
Northeast	3.0	4.5	4.4	4.3	4.9	4.5	3.8	3.8	3.5	2.7	2.5	2.7	3.7	40
East Northeast	4.1	7.7	10.7	9.3	9.6	7.3	5.2	4.7	5.2	4.8	3.7	3.8	6.3	40
East	3.5	4.3	6.8	7.0	7.1	5.4	4.5	3.8	4.9	3.9	3.4	4.1	4.9	40
East Southeast	2.5	2.7	3.5	3.7	4.2	3.5	2.9	3.3	3.8	2.8	2.9	3.1	3.2	40
Southeast	2.2	2.3	2.0	3.1	3.1	2.5	2.6	2.6	3.0	3.6	2.8	2.8	2.7	40
South Southeast	3.0	2.6	3.5	4.1	3.5	3.2	3.4	3.6	4.4	5.2	4.6	3.8	3.8	40
South	6.3	5.6	5.8	5.8	5.9	7.3	7.0	6.8	7.7	8.5	8.2	7.0	6.8	40
South Southwest	8.4	7.2	6.2	6.7	6.7	9.5	9.0	8.5	8.0	9.2	10.0	8.9	8.2	40
Southwest	14.0	10.3	7.8	9.0	9.3	11.5	11.9	11.6	10.3	12.0	13.4	14.7	11.3	40
West Southwest	19.2	13.9	9.8	9.7	9.6	9.9	11.2	10.9	8.7	10.4	15.0	15.9	12.0	40
West	9.7	9.0	8.5	7.6	6.1	6.7	6.8	6.3	5.9	6.8	8.6	8.6	7.5	40
West Northwest	6.8	7.5	8.9	7.8	7.0	5.9	6.0	5.5	6.3	6.8	6.6	6.5	6.8	40
Northwest	4.7	6.5	5.6	5.8	4.9	4.2	4.4	4.1	4.4	4.7	5.0	4.9	4.9	40
North Northwest	4.2	5.2	4.8	4.9	4.7	3.9	4.4	4.6	5.2	4.6	3.8	4.2	4.5	40
Calm	2.7	3.3	3.1	3.4	5.2	6.0	8.5	9.6	8.8	6.6	4.2	3.4	5.4	40
Direction (Mean Speed, knots)														
North	8.1	8.4	8.3	8.8	8.1	7.1	6.2	6.6	6.8	7.5	7.4	7.8	7.5	40
North Northeast	8.0	8.7	8.9	8.7	8.3	7.5	6.7	6.5	6.8	7.3	7.9	7.9	7.7	40
Northeast	10.7	10.2	10.0	9.8	8.8	7.6	7.6	7.5	7.6	8.3	8.9	9.1	8.8	40
East Northeast	9.6	9.8	10.3	9.7	8.8	7.8	6.9	7.1	7.3	7.8	7.9	8.5	8.7	40
East	7.6	7.4	8.6	9.0	7.9	7.2	6.6	6.1	6.5	6.8	7.4	7.6	7.5	40
East Southeast	7.3	7.3	7.8	7.8	7.3	6.6	6.2	6.2	6.1	6.4	7.2	7.4	7.0	40
Southeast	8.1	7.9	8.3	8.2	7.6	6.6	5.6	6.0	5.8	6.8	7.7	7.3	7.1	40
South Southeast	8.6	8.4	8.9	8.8	7.9	7.0	5.9	5.7	6.4	7.5	8.4	7.9	7.6	40
South	8.0	7.7	8.4	8.5	7.6	6.7	5.8	6.0	6.4	7.5	8.4	7.4	7.3	40
South Southwest	8.8	8.8	10.0	9.9	8.8	7.4	6.9	6.6	7.5	8.6	9.3	9.2	8.4	40
Southwest	10.1	9.9	11.2	10.9	9.7	8.1	7.4	7.1	8.0	9.1	10.1	9.8	9.2	40
West Southwest	11.3	10.8	10.9	11.0	10.0	8.3	7.6	7.1	7.6	9.3	10.9	11.0	9.9	40
West	11.1	10.5	10.9	11.3	9.7	8.6	7.7	7.0	7.8	9.2	10.4	10.6	9.7	40
West Northwest	10.7	10.8	11.4	11.4	9.8	9.7	8.4	7.9	8.7	9.5	10.3	10.2	10.0	40
Northwest	10.7	10.5	11.1	10.7	9.9	9.7	8.7	8.2	8.8	9.4	10.6	10.2	10.0	40
North Northwest	9.7	9.6	9.9	10.2	8.6	8.3	7.6	7.1	7.8	8.5	9.3	9.7	8.9	40
VISIBILITY														
Mean Number of Days with Fog	13	11	14	12	12	11	14	18	15	13	14	15	162	41
% Observations with Visibility <= ½ mile	1.16	1.22	0.90	0.32	0.22	0.36	0.34	0.59	0.69	0.91	0.85	1.50	0.76	40

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

DETROIT, MI (42°14'N, 83°20'W) 633 feet (193 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.5	1018.4	1016.5	1015.1	1015.1	1014.9	1015.6	1016.7	1017.9	1017.7	1017.5	1018.6	1016.9	37
TEMPERATURE (DEGREES F)														
Mean	23.6	25.9	35.9	47.8	59.0	68.1	72.7	71.1	63.6	51.7	40.3	29.0	49.2	37
Mean Daily Maximum	30.6	33.4	44.4	57.8	69.9	79.1	83.3	81.4	73.9	61.7	47.9	35.3	58.3	37
Mean Daily Minimum	16.1	17.9	26.9	37.2	47.5	56.7	61.6	60.2	52.7	41.3	32.3	22.0	39.5	37
Extreme - Highest	62	65	81	89	93	104	102	100	98	91	77	68	104	37
Extreme - Lowest	-21	-15	-4	10	25	36	41	38	29	17	9	-10	-21	37
RELATIVE HUMIDITY														
Average Percentage	59.8	58.9	40.1	25.6	25.9	24.2	30.8	41.5	53.9	51.9	50.3	61.5	43.7	37
CLOUD COVER														
Percent of time Clear	14.0	17.1	19.0	19.8	20.1	21.8	23.7	23.2	25.9	25.4	15.8	12.8	19.9	37
Percent of time Scattered	12.8	14.1	14.2	15.9	21.1	26.5	30.4	26.0	22.1	18.1	13.2	12.0	18.8	37
Percent of time Broken	14.6	16.7	16.1	17.9	20.8	23.4	23.0	22.9	20.4	18.5	16.6	13.6	18.7	37
Percent of time Overcast	58.6	52.0	50.7	46.4	38.1	28.3	22.9	27.9	31.7	38.0	54.5	61.6	42.6	37
PRECIPITATION														
Mean Amount (inches)	1.91	1.68	2.44	3.04	2.89	3.59	3.12	3.39	2.82	2.23	2.66	2.54	32.32	37
Greatest Amount (inches)	3.92	5.02	4.48	5.40	6.20	7.04	6.02	7.83	7.52	4.87	5.68	6.00	42.64	37
Least Amount (inches)	0.27	0.15	0.82	0.92	0.87	0.97	0.59	0.72	0.43	0.35	0.79	0.46	21.01	37
Maximum Amount-24 hrs (inches)	1.59	2.28	1.69	1.97	2.56	2.24	3.19	3.21	2.73	2.11	1.59	2.67	3.21	37
Mean Number of Days with Precipitation	23	19	20	17	15	14	13	13	13	14	18	22	201	37
Snow - Mean Amount (inches)	10.5	9.2	6.7	1.7	T	0.0	0.0	0.0	0.0	0.2	2.9	9.9	41.0	37
Snow - Greatest Amount (inches)	29.6	20.8	15.7	9.0	T	0.0	0.0	0.0	0.0	2.9	11.8	34.9	75.3	37
Snow - Least Snowfall Amount (inches)	1.5	2.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	1.4	21.1	37
Snow - Maximum Amount in 24 hours (inches)	11.1	8.1	8.4	5.0	T	0.0	0.0	0.0	0.0	2.7	5.6	18.4	11.1	37
Mean Number of Days with Snow	21	17	13	4	Miss	0	0	0	0	1	8	18	82	37
WIND														
% of Observations with Gales	0.03	0.00	0.03	0.08	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.34	37
Mean Wind Speed (knots)	10.5	10.1	10.3	10.2	8.9	8.0	7.4	7.1	7.6	8.6	9.8	9.9	9.0	37
Direction (percentage of observations)														
North	4.0	5.9	5.6	5.5	5.5	5.1	5.6	5.7	6.5	4.5	4.0	4.4	5.2	37
North Northeast	2.7	4.8	5.3	5.5	5.8	6.2	4.7	5.7	5.7	4.0	3.2	3.0	4.7	37
Northeast	3.9	5.4	6.1	6.2	6.6	5.5	4.5	4.7	5.0	3.8	3.4	3.1	4.8	37
East Northeast	3.2	4.6	6.1	5.3	4.8	3.9	2.8	3.3	3.5	3.4	3.2	3.0	3.9	37
East	3.1	4.2	6.1	5.9	5.5	4.0	3.3	3.3	3.5	3.4	2.8	3.4	4.0	37
East Southeast	2.3	3.1	4.4	5.0	5.0	3.9	3.2	3.2	3.4	2.9	2.8	3.0	3.5	37
Southeast	2.6	2.4	4.1	4.5	5.6	5.1	3.9	3.1	4.0	3.7	3.2	2.9	3.8	37
South Southeast	3.2	2.6	3.9	5.0	5.7	5.2	4.7	4.4	4.9	5.4	4.8	3.6	4.5	37
South	6.7	5.6	5.8	6.4	6.4	7.3	8.0	8.0	8.7	9.1	8.3	7.3	7.3	37
South Southwest	7.9	6.8	5.3	5.4	6.2	6.9	8.1	8.3	7.3	8.0	8.4	8.3	7.2	37
Southwest	14.8	11.4	7.3	7.8	7.8	11.4	11.8	11.9	10.4	12.2	13.8	14.5	11.3	37
West Southwest	15.5	10.8	8.3	8.4	8.0	9.7	9.9	8.9	7.6	10.2	12.9	12.8	10.3	37
West	9.1	8.6	7.9	7.6	7.0	6.6	7.4	6.6	6.4	7.2	8.6	9.2	7.7	37
West Northwest	9.7	10.0	9.7	8.1	7.1	6.9	7.6	7.2	7.6	8.3	8.7	8.7	8.3	37
Northwest	6.0	6.9	6.9	5.9	5.1	4.3	5.6	5.7	5.5	5.9	6.2	6.5	5.9	37
North Northwest	3.6	4.4	4.6	4.1	3.5	2.8	3.9	3.9	4.0	4.0	3.7	3.7	3.8	37
Calm	2.2	2.4	2.6	2.9	4.4	5.2	5.1	6.3	6.0	4.1	2.6	2.7	3.9	37
Direction (Mean Speed, knots)														
North	8.5	9.4	9.5	9.7	8.5	7.9	7.3	7.2	7.7	8.4	8.4	8.9	8.4	37
North Northeast	9.4	10.2	10.3	10.4	9.5	8.7	7.7	7.8	8.1	8.4	9.1	10.3	9.1	37
Northeast	10.6	11.0	10.7	10.2	8.9	8.9	8.0	8.4	8.2	8.5	9.0	10.4	9.4	37
East Northeast	10.0	10.1	10.2	9.8	8.5	7.2	7.2	7.0	7.2	7.6	8.8	9.6	8.8	37
East	8.2	7.9	9.2	9.6	8.1	6.9	6.3	6.3	6.3	6.8	7.0	7.8	7.8	37
East Southeast	8.0	7.9	8.0	8.6	8.2	7.2	6.8	6.3	6.7	6.9	7.3	7.3	7.5	37
Southeast	8.6	8.9	8.8	9.0	8.4	7.6	7.3	7.3	7.4	7.9	8.2	8.4	8.1	37
South Southeast	8.7	8.6	8.6	8.7	8.3	7.6	7.4	7.2	7.4	8.0	8.6	8.1	8.1	37
South	8.6	8.0	8.5	8.7	7.8	7.3	6.9	6.8	7.2	8.3	9.0	8.1	7.9	37
South Southwest	10.3	9.9	10.9	10.5	9.4	8.2	7.9	7.4	8.3	9.3	9.8	9.9	9.2	37
Southwest	11.5	11.6	13.1	13.0	11.2	9.3	8.4	8.2	9.1	10.3	11.4	11.4	10.6	37
West Southwest	12.5	11.5	11.9	12.4	10.7	9.1	8.2	8.0	8.6	9.9	11.6	11.1	10.6	37
West	11.6	11.4	11.0	11.9	10.4	9.1	8.0	7.4	8.3	9.3	10.9	11.1	10.2	37
West Northwest	11.5	11.2	11.7	11.7	9.7	9.6	8.3	8.0	8.7	9.6	10.4	10.5	10.2	37
Northwest	11.4	11.1	11.6	11.8	10.2	9.7	8.9	8.2	9.3	9.8	11.2	11.1	10.4	37
North Northwest	10.5	10.4	10.8	10.5	9.4	9.2	8.3	8.3	8.3	9.3	10.2	10.6	9.7	37
VISIBILITY														
Mean Number of Days with Fog	12	11	13	11	12	12	13	17	15	15	14	14	159	37
% Observations with Visibility <= ½ mile	1.57	1.61	1.38	0.40	0.20	0.26	0.16	0.45	0.56	0.83	0.81	1.86	0.84	37

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

MOUNT CLEMENS, MI (42°36'N, 82°50'W) 604 feet (184 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.9	1017.8	1016.2	1016.1	1015.2	1014.5	1015.9	1016.6	1018.0	1018.6	1017.1	1017.8	1016.9	23
TEMPERATURE (DEGREES F)														
Mean	24.5	26.0	33.6	46.5	57.0	67.6	72.1	70.3	63.0	53.0	39.8	28.8	48.6	22
Mean Daily Maximum	30.8	32.9	40.8	55.5	67.0	77.6	81.8	79.8	72.3	62.0	46.5	34.6	56.9	22
Mean Daily Minimum	17.6	18.5	25.8	37.0	46.5	57.1	62.0	60.3	53.1	43.5	32.6	22.6	39.8	22
Extreme - Highest	63	64	73	87	92	98	98	99	100	89	80	64	100	22
Extreme - Lowest	-13	-8	0	14	24	35	40	40	29	17	4	-4	-13	22
RELATIVE HUMIDITY														
Average Percentage	64.1	53.3	37.4	36.2	27.5	20.5	34.5	41.1	54.7	60.7	46.2	53.4	44.0	32
CLOUD COVER														
Percent of time Clear	13.2	16.4	17.1	18.3	16.9	17.7	21.8	24.9	26.0	28.0	13.2	12.3	18.8	25
Percent of time Scattered	14.4	16.4	15.8	17.1	23.0	25.6	29.9	29.1	24.7	21.2	15.2	14.3	20.6	25
Percent of time Broken	15.7	16.8	17.9	19.6	23.3	26.5	25.5	23.9	22.2	19.7	18.9	15.2	20.5	25
Percent of time Overcast	56.7	50.5	49.1	44.9	36.8	30.2	22.7	22.1	27.1	31.1	52.7	58.3	40.1	25
PRECIPITATION														
Mean Amount (inches)	1.73	1.63	2.15	2.87	2.36	3.01	2.24	2.56	2.10	2.16	2.08	2.29	27.18	22
Greatest Amount (inches)	3.19	3.78	4.46	4.76	4.83	7.58	4.38	4.65	5.00	4.46	3.98	5.32	35.89	22
Least Amount (inches)	0.42	0.09	0.53	1.12	0.91	0.22	0.95	0.37	0.37	0.30	0.67	0.13	15.83	22
Maximum Amount-24 hrs (inches)	1.30	1.69	1.85	1.50	1.40	2.88	2.12	1.73	2.06	2.46	1.13	2.31	2.88	22
Mean Number of Days with Precipitation	22	19	20	17	16	14	13	13	13	12	18	22	199	22
Snow - Mean Amount (inches)	7.7	6.6	5.3	0.8	T	0.0	0.0	0.0	0.0	T	3.1	6.7	30.2	22
Snow - Greatest Amount (inches)	15.6	15.1	20.7	3.9	T	0.0	0.0	0.0	0.0	T	11.2	19.7	50.1	22
Snow - Least Snowfall Amount (inches)	0.8	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.1	13.8	22
Snow - Maximum Amount in 24 hours (inches)	6.0	8.3	9.9	2.6	T	0.0	0.0	0.0	0.0	T	5.0	7.8	9.9	22
Mean Number of Days with Snow	19	16	13	5	Miss	0	0	0	0	1	8	17	79	22
WIND														
% of Observations with Gales	0.11	0.11	0.16	0.07	0.00	0.03	0.00	0.00	0.03	0.00	0.08	0.03	0.05	32
Mean Wind Speed (knots)	9.1	9.0	9.2	9.0	7.9	6.9	6.3	6.1	6.8	7.3	9.0	9.0	8.0	32
Direction (percentage of observations)														
North	4.4	5.3	6.6	6.1	6.9	5.4	5.0	5.8	5.7	4.6	4.2	3.8	5.3	32
North Northeast	3.9	4.8	6.2	6.7	7.5	5.3	5.5	4.6	3.8	3.9	3.0	3.0	4.8	32
Northeast	3.1	4.1	5.1	5.6	5.1	5.3	4.7	4.0	3.7	2.7	2.0	2.2	4.0	32
East Northeast	3.2	3.4	4.6	4.8	4.6	4.6	3.9	3.3	3.7	2.4	2.2	1.9	3.5	32
East	2.1	2.0	3.4	3.9	3.5	3.8	3.4	3.4	3.4	2.7	2.1	2.4	3.0	32
East Southeast	2.1	2.2	4.0	3.8	3.4	3.2	2.8	2.8	3.1	2.4	2.1	2.5	2.9	32
Southeast	2.6	3.3	4.5	5.5	6.0	6.2	4.7	4.8	5.3	4.5	2.6	2.2	4.4	32
South Southeast	3.7	3.4	4.5	6.7	7.4	7.3	7.1	6.8	6.9	6.3	4.5	3.8	5.7	32
South	6.8	6.3	6.6	7.2	8.1	8.9	8.6	7.8	9.4	9.6	9.3	7.4	8.0	32
South Southwest	7.2	5.6	3.8	4.5	5.3	6.3	5.6	6.5	6.8	7.8	8.6	8.2	6.4	32
Southwest	10.7	7.4	6.4	5.8	6.6	6.5	6.7	7.0	6.8	8.1	11.5	12.3	8.0	32
West Southwest	9.9	7.7	6.3	6.3	5.6	6.8	6.4	5.7	5.2	7.0	9.7	9.9	7.2	32
West	9.7	9.4	7.9	6.7	6.1	6.1	5.9	5.6	5.8	6.8	9.0	9.9	7.4	32
West Northwest	9.4	10.6	8.6	6.5	5.4	4.9	5.7	5.2	6.3	7.0	8.8	10.3	7.4	32
Northwest	6.8	7.4	6.4	5.4	4.4	3.8	4.5	5.2	5.6	5.9	6.4	6.7	5.7	32
North Northwest	7.2	8.8	7.8	7.2	5.7	5.0	6.2	7.6	6.1	6.6	6.3	6.4	6.7	32
Calm	7.4	7.9	6.9	7.0	7.9	10.4	13.2	13.9	12.5	11.8	7.8	7.1	9.5	32
Direction (Mean Speed, knots)														
North	8.2	9.0	9.2	9.3	8.7	7.3	6.6	6.8	7.1	7.1	8.3	8.6	8.0	32
North Northeast	9.1	9.5	9.7	10.0	8.6	7.4	7.2	7.7	7.5	7.9	8.8	8.7	8.6	32
Northeast	9.7	8.7	8.7	9.1	7.8	7.3	7.4	7.2	7.3	7.7	8.0	9.4	8.1	32
East Northeast	8.8	8.1	8.7	8.1	6.7	6.3	6.1	6.2	6.9	7.1	9.3	9.0	7.5	32
East	7.8	6.9	8.2	7.3	6.3	6.3	5.6	5.6	6.3	6.3	7.9	7.9	6.8	32
East Southeast	9.3	9.3	8.9	8.9	7.1	6.7	6.2	6.5	6.8	7.0	8.7	8.7	7.8	32
Southeast	10.7	9.7	9.6	9.6	8.6	7.6	7.7	7.2	7.7	7.9	9.7	9.2	8.6	32
South Southeast	9.1	9.4	8.7	9.4	8.8	8.1	7.9	8.0	8.4	8.7	10.7	9.5	8.7	32
South	9.1	9.6	9.7	9.0	8.7	8.0	7.5	7.6	8.6	8.7	10.1	9.2	8.8	32
South Southwest	11.0	10.9	10.9	11.5	9.9	8.7	8.0	7.6	9.1	9.2	11.4	10.6	9.9	32
Southwest	11.1	11.3	12.4	11.2	10.1	8.6	8.0	7.7	8.7	9.3	11.1	11.2	10.2	32
West Southwest	10.3	10.4	11.6	10.8	9.8	8.6	7.6	7.1	7.6	8.2	9.9	9.7	9.4	32
West	9.5	9.5	9.9	10.1	8.8	7.9	6.8	6.7	7.3	8.0	9.2	9.3	8.8	32
West Northwest	10.3	10.5	10.6	10.4	8.9	8.3	7.1	6.7	8.0	8.8	9.6	9.5	9.3	32
Northwest	9.8	9.8	10.2	10.1	8.6	7.6	7.7	7.0	7.4	8.2	9.0	9.8	8.9	32
North Northwest	10.0	9.8	9.9	9.7	8.5	7.3	7.1	6.8	7.5	8.2	8.8	9.6	8.7	32
VISIBILITY														
Mean Number of Days with Fog	12	11	12	11	9	11	9	13	13	13	12	12	138	22
% Observations with Visibility <= ½ mile	2.28	2.21	1.82	1.08	0.55	0.38	0.22	0.49	0.83	1.48	1.17	2.20	1.22	32

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

ALPENA, MI (45°04'N, 83°34'W) 689 feet (210 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1016.3	1017.8	1016.8	1015.1	1014.9	1014.2	1014.9	1016.7	1017.2	1017.3	1015.9	1016.9	1016.2	34
TEMPERATURE (DEGREES F)														
Mean	18.1	18.7	28.1	41.1	52.5	61.6	67.1	65.0	57.1	46.8	35.4	24.3	43.1	36
Mean Daily Maximum	26.5	28.3	37.8	51.5	64.9	74.5	79.7	76.9	68.3	56.7	42.7	31.3	53.4	36
Mean Daily Minimum	9.2	8.5	17.8	30.2	39.6	48.2	54.1	52.7	45.5	36.5	27.5	16.8	32.3	36
Extreme - Highest	52	65	76	90	94	103	102	102	94	88	76	65	103	36
Extreme - Lowest	-28	-37	-27	0	20	28	34	30	25	16	-6	-18	-37	36
RELATIVE HUMIDITY														
Average Percentage	38.4	53.3	42.7	25.9	24.0	16.8	23.9	41.9	46.6	48.3	33.9	43.7	36.8	36
CLOUD COVER														
Percent of time Clear	10.1	14.0	21.6	20.1	22.1	22.6	20.5	22.4	20.1	17.0	9.8	7.6	17.3	30
Percent of time Scattered	13.1	14.1	14.3	14.8	19.3	23.9	27.5	25.6	21.5	16.9	11.4	12.3	18.0	30
Percent of time Broken	14.4	15.1	14.2	16.2	19.7	20.8	23.7	20.9	18.6	17.6	14.5	13.4	17.5	30
Percent of time Overcast	62.4	56.8	49.9	48.9	38.9	32.7	28.2	31.1	39.8	48.4	64.3	66.7	47.3	30
PRECIPITATION														
Mean Amount (inches)	1.63	1.24	2.00	2.36	2.76	2.95	3.03	3.45	2.92	2.24	2.31	1.86	28.75	36
Greatest Amount (inches)	3.31	3.17	4.44	4.15	8.29	8.37	7.17	6.26	7.12	6.53	7.45	4.44	35.23	36
Least Amount (inches)	0.16	0.12	0.34	1.18	0.99	0.20	0.22	0.92	0.28	0.61	0.61	0.39	21.41	36
Maximum Amount-24 hrs (inches)	1.83	1.01	1.52	1.12	2.21	2.52	2.80	2.61	3.02	1.76	1.82	1.63	3.02	36
Mean Number of Days with Precipitation	27	22	20	17	16	15	15	15	17	19	22	26	231	31
Snow - Mean Amount (inches)	21.9	15.9	13.1	4.9	0.2	0.0	0.0	0.0	T	0.6	9.1	19.9	85.7	36
Snow - Greatest Amount (inches)	43.5	33.4	35.8	12.7	3.7	0.0	0.0	0.0	T	4.3	34.8	46.3	146.0	36
Snow - Least Snowfall Amount (inches)	5.1	3.6	2.8	T	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8	52.1	36
Snow - Maximum Amount in 24 hours (inches)	16.3	11.4	17.3	10.8	3.7	0.0	0.0	0.0	T	2.4	15.0	16.4	17.3	36
Mean Number of Days with Snow	26	21	16	8	1	0	0	0	Miss	5	15	24	116	31
WIND														
% of Observations with Gales	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	34
Mean Wind Speed (knots)	7.8	7.5	7.8	8.1	7.3	6.7	6.2	5.9	6.3	7.0	7.6	7.4	7.1	34
Direction (percentage of observations)														
North	4.1	6.0	6.3	6.5	6.3	4.7	4.3	3.7	3.9	3.2	3.7	3.7	4.7	34
North Northeast	2.4	3.8	4.0	4.5	4.0	3.7	2.5	2.5	2.6	2.4	2.8	2.4	3.1	34
Northeast	2.1	3.0	3.5	4.7	3.7	3.2	2.7	2.8	2.4	2.4	2.5	2.3	2.9	34
East Northeast	1.3	2.0	3.8	3.8	3.2	2.4	1.9	2.4	2.2	1.6	2.0	1.9	2.4	34
East	1.9	2.9	5.1	5.5	5.7	4.7	3.3	3.0	3.0	2.8	2.4	2.1	3.5	34
East Southeast	2.4	3.0	7.3	9.0	10.9	8.5	7.2	5.9	4.8	4.9	3.6	3.1	5.9	34
Southeast	3.9	4.2	6.7	7.8	9.0	8.7	7.2	6.8	6.3	5.9	5.0	4.4	6.3	34
South Southeast	5.5	4.5	4.5	3.5	4.8	4.8	4.6	5.1	6.3	6.0	6.2	5.9	5.1	34
South	8.0	6.9	5.2	4.2	4.6	6.0	5.6	6.5	8.0	9.1	8.4	8.4	6.7	34
South Southwest	6.7	5.2	4.0	3.6	3.5	4.8	4.9	5.9	6.5	7.5	7.0	7.7	5.6	34
Southwest	11.1	7.0	4.8	5.1	5.3	6.5	8.1	9.3	8.9	9.5	10.4	11.8	8.2	34
West Southwest	11.4	8.6	6.6	5.6	5.9	7.7	9.0	9.2	8.8	9.9	10.4	11.3	8.7	34
West	11.3	10.8	7.7	7.4	7.2	8.1	9.2	9.3	9.1	9.6	9.8	10.2	9.1	34
West Northwest	12.0	13.0	11.0	9.7	8.3	8.6	10.2	9.3	9.0	9.0	10.7	10.8	10.1	34
Northwest	8.6	8.9	8.6	8.6	7.5	7.1	7.7	6.5	6.8	6.9	7.0	7.2	7.6	34
North Northwest	4.1	5.5	5.9	6.5	5.1	4.3	4.7	4.1	3.7	3.5	4.2	3.7	4.6	34
Calm	3.7	4.6	4.9	4.4	5.5	6.1	6.9	7.7	7.1	6.0	3.9	3.4	5.3	34
Direction (Mean Speed, knots)														
North	7.7	7.7	8.3	8.8	8.3	8.0	7.0	6.9	6.8	7.6	7.5	7.0	7.8	34
North Northeast	9.0	8.2	8.3	8.7	8.0	7.4	7.3	7.1	7.3	7.8	8.4	8.3	8.0	34
Northeast	10.5	8.9	8.7	8.4	7.8	7.3	6.6	7.2	7.3	8.0	8.4	8.9	8.1	34
East Northeast	9.2	8.9	8.7	8.3	7.8	6.9	6.7	6.7	6.9	7.9	8.9	9.0	8.0	34
East	8.0	7.3	8.8	8.5	7.7	6.8	6.8	6.3	6.3	6.6	7.9	7.9	7.5	34
East Southeast	9.4	8.1	8.6	9.1	8.2	7.6	7.4	7.3	7.4	8.0	8.8	8.7	8.1	34
Southeast	9.0	8.6	8.7	8.6	7.6	7.2	7.0	6.9	7.2	7.9	8.6	8.5	7.9	34
South Southeast	7.6	7.0	7.2	6.8	6.2	5.9	5.9	5.8	6.1	7.0	7.3	6.9	6.7	34
South	6.9	7.1	6.7	6.8	6.7	6.0	6.0	5.9	6.5	7.1	7.1	6.9	6.7	34
South Southwest	7.0	7.2	7.1	7.6	7.2	6.6	6.6	6.1	6.6	7.1	7.4	6.6	6.9	34
Southwest	7.3	7.5	7.9	8.5	8.0	6.9	6.2	5.8	6.5	7.2	7.6	7.1	7.1	34
West Southwest	7.4	7.1	7.2	8.0	7.3	6.7	6.0	5.8	6.2	6.9	7.6	7.4	6.9	34
West	7.5	6.9	7.3	7.6	7.0	6.5	6.0	5.8	6.2	6.9	7.5	7.3	6.9	34
West Northwest	8.5	8.2	8.5	8.5	7.8	7.5	6.6	6.3	6.7	7.6	8.0	7.8	7.7	34
Northwest	10.2	9.3	9.6	9.6	8.6	8.3	7.7	7.4	8.4	8.6	9.1	9.5	8.9	34
North Northwest	9.3	9.2	9.6	9.8	9.0	9.1	8.3	7.7	8.1	8.8	8.7	9.0	8.9	34
VISIBILITY														
Mean Number of Days with Fog	10	9	13	12	13	14	14	17	16	14	14	12	158	31
% Observations with Visibility <= ½ mile	1.47	1.22	2.62	1.44	1.08	0.74	0.72	1.16	1.23	1.55	1.41	1.37	1.34	34

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

MUSKEGON, MI (43°10'N, 86°14'W) 628 feet (191 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.0	1018.3	1016.3	1014.8	1015.1	1014.3	1015.5	1016.6	1017.6	1017.9	1016.3	1017.9	1016.6	46
TEMPERATURE (DEGREES F)														
Mean	23.8	24.9	33.4	45.4	56.3	65.7	70.6	69.2	61.4	50.9	39.3	28.8	47.6	48
Mean Daily Maximum	29.6	31.4	41.1	54.6	66.8	76.1	80.5	78.7	70.8	59.4	45.6	34.2	55.9	48
Mean Daily Minimum	17.5	17.9	25.2	35.7	45.3	54.8	60.3	59.1	51.5	41.8	32.5	22.9	38.8	48
Extreme - Highest	63	62	80	86	93	98	96	99	95	83	76	64	99	48
Extreme - Lowest	-13	-14	-6	1	23	31	41	36	27	21	-14	-15	-15	48
RELATIVE HUMIDITY														
Average Percentage	55.1	57.9	38.1	22.9	26.0	18.5	30.2	41.1	50.7	54.2	37.8	54.5	40.6	48
CLOUD COVER														
Percent of time Clear	5.9	11.3	17.3	22.2	25.1	25.8	28.2	26.8	26.3	24.2	10.0	6.8	19.2	41
Percent of time Scattered	7.9	10.6	13.1	13.7	18.0	21.4	24.2	24.1	20.0	16.2	9.4	7.1	15.5	41
Percent of time Broken	10.4	12.4	13.8	14.1	15.9	19.0	19.7	18.8	17.2	16.3	12.8	10.0	15.0	41
Percent of time Overcast	75.9	65.7	55.8	50.0	41.0	33.8	27.9	30.3	36.5	43.3	67.8	76.2	50.3	41
PRECIPITATION														
Mean Amount (inches)	2.30	1.65	2.51	3.04	2.62	2.53	2.51	3.29	3.32	2.84	3.24	2.72	32.56	48
Greatest Amount (inches)	4.55	2.85	6.59	6.11	6.48	5.46	6.63	9.88	13.55	7.33	6.61	5.42	42.27	48
Least Amount (inches)	0.45	0.36	0.55	0.72	0.33	0.19	0.47	0.11	0.17	0.51	0.62	0.91	23.12	48
Maximum Amount-24 hrs (inches)	1.56	1.39	2.10	2.12	2.15	2.34	2.54	3.45	4.33	3.21	2.12	2.58	4.33	48
Mean Number of Days with Precipitation	25	20	19	17	15	13	13	13	14	15	20	24	208	48
Snow - Mean Amount (inches)	33.6	18.5	11.9	2.9	0.0	0.0	0.0	0.0	T	0.5	9.3	26.8	103.6	48
Snow - Greatest Amount (inches)	102.4	45.8	35.7	20.4	0.4	0.0	0.0	0.0	T	4.9	25.7	82.6	182.2	48
Snow - Least Snowfall Amount (inches)	6.5	0.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	4.3	43.1	48
Snow - Maximum Amount in 24 hours (inches)	22.0	14.2	9.1	12.0	0.3	0.0	0.0	0.0	T	4.7	8.7	14.8	22.0	48
Mean Number of Days with Snow	23	18	14	5	Miss	0	0	0	Miss	2	11	20	93	48
WIND														
% of Observations with Gales	0.07	0.01	0.09	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.50	45
Mean Wind Speed (knots)	10.6	10.0	10.2	10.1	8.8	8.1	7.7	7.4	8.1	9.2	10.6	10.3	9.2	45
Direction (percentage of observations)														
North	5.9	6.9	6.3	6.3	5.3	4.7	4.5	5.3	5.9	5.3	6.4	6.0	5.7	45
North Northeast	2.7	3.7	3.7	3.5	3.1	2.8	2.8	3.3	3.3	3.4	3.5	2.8	3.2	45
Northeast	3.5	4.2	4.0	3.8	4.0	3.3	3.4	4.2	4.2	3.2	2.8	3.1	3.6	45
East Northeast	4.2	6.3	6.5	4.9	5.1	4.1	3.7	3.9	3.9	3.7	3.4	4.1	4.5	45
East	6.4	8.0	9.3	8.3	7.8	6.2	4.9	5.4	6.0	6.4	5.7	6.4	6.7	45
East Southeast	6.3	5.8	7.3	6.9	6.2	5.0	4.3	5.1	7.1	7.0	5.8	6.8	6.1	45
Southeast	6.3	4.8	5.3	5.1	4.7	4.9	4.6	5.4	7.5	7.4	7.6	7.6	5.9	45
South Southeast	4.0	3.4	3.1	3.2	3.0	3.3	3.2	3.9	5.0	4.9	5.2	4.9	3.9	45
South	4.6	5.2	5.3	5.5	6.2	6.8	6.9	6.7	7.5	7.4	5.8	4.3	6.0	45
South Southwest	4.6	5.2	5.9	7.9	8.4	10.2	10.2	9.4	8.8	8.5	6.9	4.6	7.6	45
Southwest	5.8	5.3	5.3	7.1	8.9	10.8	10.7	9.7	6.6	7.0	7.0	5.9	7.5	45
West Southwest	6.9	5.8	4.7	5.4	6.7	7.6	7.8	6.4	5.0	5.1	7.2	6.9	6.3	45
West	8.6	6.3	5.7	6.4	7.1	7.2	7.7	6.3	5.3	5.9	7.9	8.3	6.9	45
West Northwest	11.4	8.9	8.6	8.5	7.7	7.5	8.2	7.2	6.9	7.3	9.0	10.2	8.5	45
Northwest	9.1	8.6	7.7	7.2	5.8	5.8	5.8	5.7	6.0	6.3	7.4	7.6	6.9	45
North Northwest	6.9	7.6	7.2	6.1	4.4	3.9	3.9	3.9	4.8	5.6	5.7	7.1	5.6	45
Calm	2.6	3.5	3.9	3.6	5.4	5.8	7.5	8.3	6.4	5.6	2.9	3.1	4.9	45
Direction (Mean Speed, knots)														
North	8.6	8.9	8.9	9.0	8.0	7.6	7.1	7.2	7.5	7.9	8.6	8.5	8.2	45
North Northeast	8.2	8.1	8.2	8.6	7.7	7.5	6.8	6.7	7.0	7.7	7.9	8.1	7.7	45
Northeast	7.8	7.8	8.5	8.7	7.2	6.7	6.4	6.1	6.3	6.8	7.4	7.6	7.3	45
East Northeast	8.5	9.4	10.8	10.4	8.4	7.4	7.1	6.5	6.6	7.5	8.8	8.9	8.6	45
East	8.4	9.1	10.4	10.4	8.6	7.4	6.7	6.0	6.7	7.1	8.1	8.6	8.3	45
East Southeast	8.6	8.4	9.3	10.1	8.4	6.9	6.3	5.8	6.3	6.7	8.1	8.2	7.9	45
Southeast	8.5	7.7	8.7	8.8	8.0	7.2	6.1	5.9	6.5	7.0	8.1	8.3	7.6	45
South Southeast	9.0	8.7	9.2	9.8	8.8	7.6	7.1	6.9	7.8	8.8	9.2	9.4	8.6	45
South	10.8	10.8	11.1	11.0	10.0	9.1	8.9	8.3	9.7	11.2	11.3	11.4	10.2	45
South Southwest	14.4	13.5	14.3	13.3	12.2	10.9	10.4	10.3	11.4	13.1	14.0	14.4	12.3	45
Southwest	15.0	13.6	12.5	12.0	10.8	10.2	9.7	10.0	11.1	12.5	14.3	15.1	11.8	45
West Southwest	13.5	12.2	11.8	11.1	9.4	8.9	8.6	8.8	9.7	11.5	13.6	13.0	11.0	45
West	12.3	11.1	10.2	10.0	8.8	8.4	8.0	8.2	9.1	10.4	12.2	11.7	10.1	45
West Northwest	12.0	11.3	11.4	10.9	9.6	8.7	8.8	9.1	9.9	11.1	12.6	11.9	10.7	45
Northwest	11.8	11.3	11.6	10.9	9.6	8.9	8.8	9.2	10.1	11.6	12.2	11.9	10.8	45
North Northwest	11.3	11.3	11.0	11.0	9.4	9.5	8.8	9.0	9.7	10.2	10.9	10.5	10.4	45
VISIBILITY														
Mean Number of Days with Fog	11	10	12	11	11	11	11	14	12	13	12	12	140	48
% Observations with Visibility <= ½ mile	1.59	1.15	1.19	0.88	0.89	0.65	0.48	0.77	0.63	0.93	1.04	1.15	0.95	45

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

CHICAGO, IL (41°59'N, 87°54'W) 674 feet (205 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1019.3	1018.9	1016.4	1015.0	1015.1	1014.6	1015.7	1016.6	1017.6	1017.6	1017.4	1019.1	1017.0	37
TEMPERATURE (DEGREES F)														
Mean	21.6	25.9	37.0	48.8	59.3	68.7	73.5	72.2	64.5	52.9	40.0	27.4	49.4	37
Mean Daily Maximum	29.1	33.6	45.4	58.5	70.2	79.6	83.7	82.1	74.7	63.0	47.9	34.5	58.6	37
Mean Daily Minimum	13.5	17.8	28.1	38.5	48.0	57.3	62.8	61.9	53.9	42.2	31.5	19.8	39.7	37
Extreme - Highest	65	71	88	91	93	104	104	101	99	91	78	71	104	37
Extreme - Lowest	-27	-17	-8	7	24	36	40	41	28	17	1	-25	-27	37
RELATIVE HUMIDITY														
Average Percentage	73.4	72.2	70.2	65.1	64.4	65.6	68.6	71.2	71.0	69.0	72.8	75.6	70.0	37
CLOUD COVER														
Percent of time Clear	23.0	21.8	19.0	19.8	22.4	22.0	23.8	24.3	24.8	27.5	18.7	20.0	22.3	37
Percent of time Scattered	12.4	14.6	15.1	15.4	20.4	25.5	27.1	27.3	23.2	19.2	13.5	12.3	18.8	37
Percent of time Broken	12.6	14.5	15.8	18.9	21.4	24.3	24.2	23.2	22.2	18.1	15.6	12.2	18.6	37
Percent of time Overcast	52.0	49.1	50.0	45.9	35.8	28.3	24.9	25.2	29.8	35.2	52.2	55.5	40.3	37
PRECIPITATION														
Mean Amount (inches)	1.67	1.37	2.66	3.60	3.19	3.76	3.61	4.10	3.55	2.61	2.92	2.23	35.25	37
Greatest Amount (inches)	4.11	3.46	5.91	7.69	7.14	9.96	8.33	17.10	11.44	7.36	8.22	8.56	49.35	37
Least Amount (inches)	0.10	0.12	0.63	0.97	0.30	0.95	1.18	0.51	0.02	0.16	0.65	0.23	21.77	37
Maximum Amount-24 hrs (inches)	2	1.45	1.75	2.36	3.45	3.09	2.9	6.49	2.88	4.25	2.93	4.47	6.49	37
Mean Number of Days with Precipitation	19	16	18	17	16	14	14	13	13	14	17	19	190	37
Snow - Mean Amount (inches)	10.8	8.4	6.7	1.6	0.1	0.0	0.0	0.0	0.0	0.4	1.9	8.3	38.2	37
Snow - Greatest Amount (inches)	34.3	26.2	24.7	11.1	1.6	0.0	0.0	0.0	0.0	6.6	10.4	35.3	75.0	37
Snow - Least Snowfall Amount (inches)	0.4	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.2	21.4	37
Snow - Maximum Amount in 24 hours (inches)	15.3	9.7	8.5	10.7	1.6	0.0	0.0	0.0	0.0	4.0	5.0	10.1	15.3	37
Mean Number of Days with Snow	16	14	11	4	Miss	0	0	0	0	1	7	15	68	37
WIND														
% of Observations with Gales	0.01	0.00	0.00	0.06	0.00	0.00	0.00	0.01	0.01	0.00	0.04	0.01	0.32	37
Mean Wind Speed (knots)	10.2	10.0	10.3	10.5	9.1	8.0	7.2	7.1	7.7	8.8	9.7	9.6	9.0	37
Direction (percentage of observations)														
North	4.7	5.7	6.2	5.6	5.3	4.7	4.9	4.9	5.2	4.1	4.4	4.3	5.0	37
North Northeast	2.2	5.0	7.0	9.2	10.4	9.6	7.9	7.0	6.0	4.3	3.6	2.5	6.2	37
Northeast	2.4	5.3	7.3	8.7	9.6	8.5	6.6	5.9	5.0	3.9	3.2	2.4	5.7	37
East Northeast	2.0	4.5	5.2	5.7	5.7	4.5	3.8	3.6	2.9	2.8	2.0	1.9	3.7	37
East	1.8	3.0	4.4	5.3	4.3	3.7	3.2	2.7	3.2	2.3	1.7	1.8	3.1	37
East Southeast	2.3	2.8	4.2	4.8	4.9	3.9	3.1	3.0	3.2	2.8	1.9	2.6	3.3	37
Southeast	2.4	1.7	2.9	3.2	3.8	3.3	2.7	2.9	3.3	2.7	2.6	2.8	2.9	37
South Southeast	3.7	3.0	4.8	4.4	4.6	4.3	4.5	4.9	6.1	6.3	5.1	4.6	4.7	37
South	7.5	7.1	7.1	8.6	9.0	9.1	8.8	10.2	12.1	12.3	10.8	9.1	9.3	37
South Southwest	9.6	9.0	7.6	7.9	8.1	9.9	9.6	11.3	10.9	11.9	12.6	10.4	9.9	37
Southwest	9.5	7.5	6.5	6.5	7.9	9.4	11.1	11.0	8.9	8.8	10.0	9.9	8.9	37
West Southwest	12.6	9.0	7.1	6.6	6.6	7.6	9.0	7.9	6.3	8.2	9.6	9.7	8.4	37
West	13.9	10.4	8.1	6.9	5.8	6.1	6.6	6.1	6.3	8.3	9.7	11.1	8.3	37
West Northwest	10.4	9.8	8.1	5.9	4.7	4.6	5.5	5.4	6.2	7.4	8.3	11.2	7.3	37
Northwest	7.5	7.1	6.2	4.4	2.9	3.3	3.7	4.0	5.0	5.6	6.7	7.2	5.3	37
North Northwest	6.3	7.4	5.7	4.1	3.0	2.5	3.4	3.5	4.7	5.1	5.9	6.2	4.8	37
Calm	1.7	1.6	1.8	2.1	3.5	4.9	5.8	5.8	5.0	3.4	2.0	2.2	3.3	37
Direction (Mean Speed, knots)														
North	9.3	10.1	10.1	10.1	8.8	7.2	6.8	7.2	8.0	8.5	8.9	8.9	8.7	37
North Northeast	10.7	11.4	10.7	11.4	9.9	9.2	8.5	8.5	9.1	10.1	10.1	10.3	9.9	37
Northeast	12.5	11.9	11.5	11.3	9.9	9.6	9.0	9.2	9.4	9.9	10.9	11.5	10.4	37
East Northeast	12.5	11.3	10.5	10.3	9.0	8.5	8.0	8.2	8.9	9.1	10.8	11.6	9.7	37
East	9.5	9.4	10.2	9.7	8.6	7.8	7.2	6.9	7.4	8.0	9.3	9.1	8.7	37
East Southeast	9.4	8.8	9.6	9.0	8.3	7.8	6.9	6.9	7.6	7.8	9.1	9.5	8.4	37
Southeast	9.4	9.2	9.8	9.2	8.2	7.1	6.9	6.8	7.6	7.8	8.9	9.2	8.3	37
South Southeast	9.1	9.5	9.8	9.9	8.8	7.6	7.4	6.9	7.1	8.2	8.6	8.5	8.4	37
South	9.7	9.3	10.6	10.4	9.7	8.2	7.8	7.3	8.0	9.0	9.6	9.3	9.0	37
South Southwest	10.9	10.5	12.0	11.4	10.7	9.0	8.1	8.0	8.6	9.9	10.7	10.4	9.9	37
Southwest	10.5	10.9	11.5	12.9	10.7	9.0	8.0	7.9	8.6	9.8	10.3	10.4	9.8	37
West Southwest	10.1	9.8	10.4	11.3	9.7	8.3	7.5	7.0	8.0	8.6	10.2	9.6	9.2	37
West	10.3	9.3	9.6	10.1	8.7	7.7	6.9	6.3	6.9	8.3	9.6	9.7	8.9	37
West Northwest	9.9	9.5	9.8	10.0	8.9	8.2	6.9	6.5	7.1	8.5	9.5	9.6	8.9	37
Northwest	10.4	10.7	10.4	11.4	9.0	8.4	7.6	7.4	8.4	9.2	10.4	9.6	9.6	37
North Northwest	11.7	11.2	11.3	11.3	9.9	8.4	7.4	8.2	9.0	10.0	11.0	10.8	10.3	37
VISIBILITY														
Mean Number of Days with Fog	12	11	12	10	10	8	9	12	11	11	12	13	131	37
% Observations with Visibility <= ½ mile	0.94	1.19	1.26	0.50	0.56	0.22	0.16	0.27	0.21	0.31	0.56	0.78	0.58	37

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

GREEN BAY, WI (44°29'N, 88°08'W) 682 feet (208 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.5	1018.7	1016.6	1015.0	1014.9	1014.0	1015.2	1016.1	1016.9	1016.8	1016.3	1018.1	1016.4	46
TEMPERATURE (DEGREES F)														
Mean	15.3	19.1	29.7	43.9	55.7	65.2	70.0	67.9	59.1	48.5	34.3	21.2	44.3	46
Mean Daily Maximum	23.4	27.5	37.9	53.7	67.0	76.4	81.0	78.5	69.6	58.1	41.8	28.5	53.7	46
Mean Daily Minimum	6.5	10.0	21.1	33.7	43.8	53.4	58.5	56.7	48.2	38.3	26.3	13.3	34.3	46
Extreme - Highest	50	55	77	89	91	98	103	99	95	88	72	62	103	46
Extreme - Lowest	-31	-26	-29	7	21	32	40	38	24	15	-9	-27	-31	46
RELATIVE HUMIDITY														
Average Percentage	74.4	73.7	73.1	67.8	66.6	69.8	72.2	75.6	76.1	74.3	76.3	77.1	73.1	46
CLOUD COVER														
Percent of time Clear	25.3	25.8	23.2	21.5	22.2	22.6	23.6	24.8	25.4	24.3	18.2	21.2	23.2	46
Percent of time Scattered	12.4	14.2	15.2	15.3	19.7	22.7	25.6	23.8	20.0	17.2	12.9	12.1	17.6	46
Percent of time Broken	11.2	12.5	13.9	15.8	19.9	22.3	22.9	20.1	18.6	16.4	13.6	11.0	16.5	46
Percent of time Overcast	51.1	47.6	47.7	47.4	38.2	32.4	27.9	31.3	36.0	42.1	55.3	55.6	42.7	46
PRECIPITATION														
Mean Amount (inches)	1.10	1.02	1.91	2.72	2.88	3.17	3.45	3.32	3.21	2.23	2.07	1.40	28.49	46
Greatest Amount (inches)	2.64	3.56	4.68	5.91	8.21	10.29	7.00	9.04	7.80	5.00	5.32	3.15	38.36	46
Least Amount (inches)	0.12	0.04	0.31	0.49	0.06	0.31	0.83	0.90	0.28	T	0.16	0.10	17.85	46
Maximum Amount-24 hrs (inches)	0.98	1.78	1.25	1.86	2.22	4.90	2.95	3.83	2.99	3.44	2.23	1.16	4.90	46
Mean Number of Days with Precipitation	19	16	17	16	15	14	14	15	14	14	16	19	189	46
Snow - Mean Amount (inches)	10.9	8.4	8.9	2.4	0.2	0.0	0.0	0.0	T	0.2	4.9	10.8	46.6	46
Snow - Greatest Amount (inches)	30.0	20.6	24.2	11.8	4.3	0.0	0.0	0.0	T	1.7	17.1	27.0	92.0	46
Snow - Least Snowfall Amount (inches)	1.5	0.5	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	0.7	17.5	46
Snow - Maximum Amount in 24 hours (inches)	8.8	9.0	12.7	9.8	4.3	0.0	0.0	0.0	T	1.3	9.7	14.4	12.7	46
Mean Number of Days with Snow	18	15	12	6	Miss	0	0	0	Miss	2	10	17	80	46
WIND														
% of Observations with Gales	0.07	0.02	0.02	0.03	0.06	0.03	0.01	0.00	0.00	0.02	0.09	0.01	0.35	46
Mean Wind Speed (knots)	9.4	9.1	9.3	9.7	8.7	7.9	7.1	6.8	7.7	8.6	9.4	9.1	8.6	46
Direction (percentage of observations)														
North	5.0	5.6	5.8	5.0	4.2	4.0	4.3	5.4	5.7	5.4	6.0	5.2	5.1	46
North Northeast	4.8	7.2	7.6	8.6	6.4	4.8	4.6	5.1	4.8	5.0	5.4	5.1	5.8	46
Northeast	5.6	9.2	12.1	12.0	10.3	7.2	5.6	5.5	4.1	4.5	3.9	4.5	7.0	46
East Northeast	2.2	3.3	5.5	6.4	6.7	5.0	3.9	4.2	2.8	3.0	2.6	2.1	4.0	46
East	2.0	2.3	4.1	5.5	5.7	4.9	4.2	3.9	3.4	3.4	2.5	2.7	3.7	46
East Southeast	1.3	1.1	2.2	3.0	4.2	3.6	2.8	2.4	2.4	2.0	1.6	1.4	2.3	46
Southeast	1.6	1.3	3.1	3.8	5.0	4.6	3.1	3.2	3.1	3.1	2.4	1.5	3.0	46
South Southeast	1.9	2.1	4.0	4.3	5.5	5.2	4.1	4.6	4.8	4.5	3.5	2.3	3.9	46
South	4.2	3.8	4.6	5.2	5.7	7.0	7.1	7.0	7.4	7.2	5.4	4.8	5.8	46
South Southwest	8.8	9.2	7.3	7.4	8.1	9.8	10.5	10.3	11.4	11.2	9.5	9.1	9.4	46
Southwest	11.8	10.5	7.0	6.9	8.5	10.1	11.9	11.9	11.0	12.0	10.7	11.3	10.3	46
West Southwest	8.5	6.9	4.8	4.2	4.7	6.5	6.8	6.5	6.2	6.4	7.1	8.2	6.4	46
West	15.1	11.0	9.0	7.2	6.5	8.5	9.0	7.4	9.0	9.0	11.8	13.5	9.8	46
West Northwest	10.8	8.4	6.7	6.0	5.4	5.4	5.9	5.5	6.5	7.0	9.8	11.4	7.4	46
Northwest	7.8	7.3	6.4	6.4	4.4	4.7	5.4	5.3	6.3	6.7	8.0	7.8	6.4	46
North Northwest	6.2	7.4	6.6	5.9	4.6	3.9	4.2	5.2	5.5	5.6	7.0	6.2	5.7	46
Calm	3.3	3.9	3.6	2.8	4.8	5.1	6.8	7.3	5.8	4.3	3.5	3.4	4.6	46
Direction (Mean Speed, knots)														
North	8.7	9.1	9.6	9.0	8.0	7.6	6.8	6.9	7.4	8.3	9.2	8.9	8.4	46
North Northeast	9.4	9.8	10.2	10.2	9.4	8.5	7.8	7.8	8.4	8.9	9.8	9.5	9.3	46
Northeast	9.8	10.4	10.4	10.6	10.0	8.8	8.0	7.9	8.1	8.8	9.6	9.4	9.6	46
East Northeast	8.2	8.5	9.3	9.4	8.7	7.3	7.1	6.9	7.7	7.5	9.2	8.5	8.3	46
East	6.4	7.3	8.5	8.5	6.9	6.3	6.1	5.6	6.4	6.3	6.9	7.5	6.9	46
East Southeast	9.1	8.5	8.3	9.2	7.8	7.2	6.8	6.5	6.8	8.0	8.2	8.4	7.8	46
Southeast	8.9	8.7	8.8	9.7	8.7	7.6	7.0	6.9	7.9	8.8	9.1	9.1	8.3	46
South Southeast	9.1	8.4	8.7	9.2	8.8	8.1	7.2	7.3	8.0	8.7	8.9	8.3	8.3	46
South	8.2	7.5	8.1	8.6	8.3	7.5	6.8	6.9	7.6	8.3	8.2	8.0	7.8	46
South Southwest	9.8	9.8	9.4	10.2	9.6	8.9	8.5	8.0	9.0	9.8	9.9	9.8	9.3	46
Southwest	10.1	9.7	9.6	10.9	10.2	9.2	8.2	8.0	9.3	9.6	10.7	9.9	9.5	46
West Southwest	9.1	8.6	9.5	10.2	9.3	8.8	7.6	7.4	8.1	8.8	9.4	9.0	8.8	46
West	9.9	9.1	9.7	9.9	9.2	8.4	7.5	6.8	7.8	8.9	9.7	9.4	8.9	46
West Northwest	10.9	10.4	10.2	11.3	10.8	9.4	8.5	7.7	8.8	9.6	11.0	10.3	10.0	46
Northwest	10.2	10.1	10.6	11.0	9.6	8.6	7.7	7.4	8.3	9.7	10.3	9.5	9.5	46
North Northwest	9.9	9.9	9.9	10.0	8.7	8.2	7.2	6.8	7.9	8.9	9.9	9.3	9.0	46
VISIBILITY														
Mean Number of Days with Fog	9	10	11	10	9	9	11	14	12	11	12	11	129	46
% Observations with Visibility <= ½ mile	1.31	1.51	2.06	1.18	0.53	0.47	0.31	0.94	0.83	1.05	1.18	1.92	1.11	46

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

SAULT STE. MARIE, MI (46°28'N, 84°22'W) 724 feet (222 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1016.7	1017.7	1016.7	1015.1	1015.2	1014.1	1015.0	1016.2	1016.7	1016.9	1014.9	1016.4	1016.0	48
TEMPERATURE (DEGREES F)														
Mean	13.9	15.1	24.3	38.4	50.2	58.5	64.0	63.3	55.0	45.5	32.7	20.2	40.2	49
Mean Daily Maximum	21.8	23.7	32.8	47.4	61.5	70.3	75.5	73.8	64.5	53.7	38.9	26.9	49.4	49
Mean Daily Minimum	5.4	5.8	15.4	28.9	38.4	46.3	51.9	52.4	45.0	36.7	26.0	13.0	30.6	49
Extreme - Highest	45	47	62	85	89	93	97	98	95	80	67	60	98	49
Extreme - Lowest	-36	-35	-22	-2	18	26	36	29	25	16	-10	-31	-36	49
RELATIVE HUMIDITY														
Average Percentage	42.2	52.2	42.2	26.0	27.2	15.8	24.7	37.0	42.5	44.0	23.6	39.4	34.7	48
CLOUD COVER														
Percent of time Clear	11.8	17.1	22.2	21.9	23.1	21.5	22.2	22.7	16.1	15.9	7.9	9.1	17.6	48
Percent of time Scattered	11.3	13.1	14.4	14.8	17.9	20.5	23.8	22.1	18.3	15.3	9.5	10.1	15.9	48
Percent of time Broken	12.3	13.2	12.7	13.9	17.1	19.0	20.7	19.2	20.4	17.3	13.8	12.2	16.0	48
Percent of time Overcast	64.6	56.5	50.7	49.4	41.9	38.9	33.3	36.0	45.1	51.5	68.8	68.5	50.4	48
PRECIPITATION														
Mean Amount (inches)	2.26	1.56	2.08	2.48	2.65	3.17	2.88	3.33	3.75	3.12	3.38	2.70	33.35	49
Greatest Amount (inches)	4.52	3.74	4.97	5.16	5.32	7.35	6.04	9.48	7.78	6.55	7.72	6.24	45.84	49
Least Amount (inches)	0.51	0.21	0.35	0.60	0.80	0.52	0.57	0.50	1.05	0.16	0.87	0.58	25.51	49
Maximum Amount-24 hrs (inches)	1.21	1.00	1.38	2.35	2.34	2.39	2.23	5.92	2.20	1.86	2.33	1.46	5.92	49
Mean Number of Days with Precipitation	26	22	19	16	15	16	15	16	18	19	23	26	231	48
Snow - Mean Amount (inches)	30.2	18.9	14.6	5.7	0.4	0.0	0.0	0.0	0.1	2.3	15.5	31.2	119.1	48
Snow - Greatest Amount (inches)	71.0	39.5	34.7	25.8	4.5	0.0	0.0	0.0	2.7	11.6	46.8	98.7	208.8	48
Snow - Least Snowfall Amount (inches)	8.3	2.8	0.2	T	0.0	0.0	0.0	0.0	0.0	0.0	4.6	5.1	60.4	48
Snow - Maximum Amount in 24 hours (inches)	15.3	12.4	11.8	9.0	2.7	0.0	0.0	0.0	2.7	7.0	10.5	26.6	15.3	48
Mean Number of Days with Snow	26	21	17	9	2	0	0	0	1	6	18	25	125	48
WIND														
% of Observations with Gales	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.01	0.49	48
Mean Wind Speed (knots)	8.2	7.9	8.4	8.7	8.2	7.3	6.6	6.5	7.2	7.8	8.4	8.1	7.8	48
Direction (percentage of observations)														
North	4.9	4.2	3.8	3.7	2.4	1.8	1.8	2.6	3.2	4.2	5.2	5.4	3.6	48
North Northeast	2.8	2.9	2.6	2.7	1.6	1.1	0.9	1.4	2.1	3.1	3.6	3.4	2.4	48
Northeast	3.6	3.5	3.6	3.2	3.0	2.1	2.0	2.7	3.0	3.0	3.6	3.6	3.1	48
East Northeast	5.6	5.5	5.7	5.5	4.9	4.1	3.7	5.2	5.4	5.2	5.6	6.6	5.3	48
East	12.6	10.7	10.5	9.8	8.6	8.8	6.9	8.1	8.6	9.6	9.2	12.2	9.6	48
East Southeast	12.0	11.3	13.0	12.8	12.4	10.3	7.1	8.3	10.1	11.9	11.0	11.1	11.0	48
Southeast	7.1	6.0	6.7	7.2	7.9	8.8	7.1	6.9	9.2	9.9	9.6	7.9	7.9	48
South Southeast	3.2	2.6	2.6	2.3	2.8	3.4	3.3	3.3	3.9	4.0	4.2	4.3	3.3	48
South	3.6	3.2	3.0	2.4	2.6	3.0	3.6	3.6	3.9	4.1	4.3	4.3	3.5	48
South Southwest	2.2	2.5	2.3	2.2	2.4	3.2	3.7	3.0	3.6	3.5	2.8	2.1	2.8	48
Southwest	4.7	4.1	3.1	3.6	4.4	5.5	6.5	6.6	6.3	5.5	5.5	5.7	5.1	48
West Southwest	7.7	4.5	3.1	3.0	3.3	4.0	4.5	4.3	4.0	4.5	6.6	8.0	4.8	48
West	5.5	6.8	5.2	5.7	6.6	6.9	7.7	5.9	4.8	4.5	5.4	5.3	5.8	48
West Northwest	6.7	10.6	12.6	14.2	17.2	16.8	18.4	14.1	10.9	9.5	7.4	5.6	12.0	48
Northwest	9.2	12.9	14.0	15.3	14.6	14.1	14.3	14.3	12.3	10.2	8.3	6.4	12.1	48
North Northwest	5.1	4.3	4.3	3.6	2.4	2.4	2.3	3.2	4.1	4.2	5.3	4.6	3.8	48
Calm	3.7	4.4	4.1	3.2	3.6	4.3	6.4	7.2	5.2	3.8	2.8	3.2	4.3	48
Direction (Mean Speed, knots)														
North	8.1	8.1	8.1	7.8	7.1	6.4	5.2	5.9	6.5	7.8	8.2	8.2	7.6	48
North Northeast	8.3	8.5	9.3	8.5	8.3	7.4	7.1	6.8	7.2	7.4	8.2	8.0	8.1	48
Northeast	6.6	7.6	8.1	8.4	7.5	6.3	5.6	5.9	6.2	6.7	7.5	7.1	7.1	48
East Northeast	6.4	6.8	7.0	7.4	6.7	6.0	5.3	5.2	5.6	5.8	6.8	6.8	6.4	48
East	7.0	6.7	7.5	7.4	6.4	5.7	5.1	5.1	5.7	6.0	6.8	7.1	6.5	48
East Southeast	8.3	8.2	9.6	9.6	8.5	7.3	6.3	6.4	7.2	7.8	8.3	8.3	8.1	48
Southeast	7.4	7.4	8.2	9.2	8.8	7.8	6.8	6.9	7.6	8.1	8.1	7.6	7.8	48
South Southeast	7.5	6.2	6.5	7.4	7.9	7.0	6.6	6.3	6.9	7.4	7.5	7.5	7.1	48
South	6.1	5.5	5.6	6.1	6.4	5.8	6.0	5.4	6.0	6.4	6.5	6.0	6.0	48
South Southwest	7.1	8.0	8.5	8.8	8.7	8.0	7.1	7.1	7.4	8.0	7.3	6.8	7.7	48
Southwest	9.1	8.5	8.6	9.0	9.3	8.5	7.5	7.5	8.5	8.1	8.6	8.6	8.4	48
West Southwest	9.8	8.1	7.4	7.5	6.9	6.7	6.3	6.6	7.2	8.6	9.1	9.3	8.1	48
West	9.5	8.2	7.3	7.1	6.5	6.2	6.1	5.6	6.6	7.9	9.3	9.5	7.4	48
West Northwest	11.7	10.1	10.3	10.2	9.7	8.7	8.3	8.2	9.6	10.5	12.0	12.4	9.8	48
Northwest	11.1	10.5	10.9	11.1	10.7	9.4	8.9	8.9	9.6	10.6	11.5	11.1	10.2	48
North Northwest	9.8	9.5	9.3	9.0	8.5	7.5	7.2	7.2	8.2	8.8	9.9	9.9	8.9	48
VISIBILITY														
Mean Number of Days with Fog	8	7	11	10	10	14	15	18	18	15	12	11	149	48
% Observations with Visibility <= ½ mile	2.12	1.54	2.50	1.95	1.21	1.37	1.80	2.22	2.53	2.45	1.87	2.16	1.98	48

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

CLIMATOLOGICAL TABLE

T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.

DULUTH, MN (46°50'N, 92°11'W) 1,428 feet (435 m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE*														
Mean (Millibars)	1018.6	1019.0	1017.0	1015.5	1015.0	1013.6	1015.0	1015.9	1016.2	1016.1	1015.9	1017.8	1016.3	48
TEMPERATURE (DEGREES F)														
Mean	7.9	13.0	23.9	38.7	51.0	59.8	65.6	63.7	54.4	44.0	28.0	14.0	38.8	48
Mean Daily Maximum	16.5	22.1	32.4	48.0	61.8	70.7	76.3	73.9	63.9	52.5	34.7	21.5	48.0	48
Mean Daily Minimum	-1.9	2.9	14.8	29.0	39.7	48.4	54.4	53.1	44.5	35.0	20.9	5.6	29.0	48
Extreme - Highest	47	55	71	88	90	94	97	95	95	86	70	55	97	48
Extreme - Lowest	-39	-33	-29	-5	17	27	35	32	23	8	-23	-34	-39	48
RELATIVE HUMIDITY														
Average Percentage	72.9	70.9	70.5	64.7	63.5	70.3	72.3	75.4	76.4	72.5	76.0	76.6	71.9	48
CLOUD COVER														
Percent of time Clear	24.7	25.8	22.7	21.0	20.0	16.7	19.9	22.6	21.5	21.8	15.5	20.2	21.0	48
Percent of time Scattered	13.6	14.1	14.7	16.6	19.7	23.3	26.7	24.7	19.4	16.6	11.8	12.0	17.8	48
Percent of time Broken	11.8	11.6	13.2	16.3	18.4	21.2	22.7	19.8	18.2	15.2	12.5	11.6	16.1	48
Percent of time Overcast	49.9	48.5	49.4	46.2	41.9	38.8	30.7	32.9	40.9	46.4	60.1	56.2	45.1	48
PRECIPITATION														
Mean Amount (inches)	1.20	0.82	1.75	2.41	3.23	4.08	3.98	3.95	3.62	2.39	1.89	1.27	30.58	48
Greatest Amount (inches)	4.70	2.37	5.12	5.84	7.67	8.04	8.48	10.31	9.38	7.53	5.01	3.70	43.44	48
Least Amount (inches)	0.14	0.12	0.22	0.24	0.15	0.55	1.09	0.71	0.19	0.35	0.19	0.16	19.84	48
Maximum Amount-24 hrs (inches)	1.18	0.77	2.24	2.61	3.00	3.36	3.40	3.07	3.77	2.81	2.24	1.91	3.77	48
Mean Number of Days with Precipitation	23	19	19	16	17	18	17	16	17	17	21	23	223	48
Snow - Mean Amount (inches)	17.4	11.3	13.9	6.9	0.8	0.0	0.0	0.0	0.1	1.7	12.8	15.9	80.7	48
Snow - Greatest Amount (inches)	46.8	31.5	45.5	31.6	8.1	0.0	0.0	0.0	2.4	9.7	50.1	44.3	168.9	48
Snow - Least Snowfall Amount (inches)	2.8	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.8	41.9	48
Snow - Maximum Amount in 24 hours (inches)	16.3	13.0	17.2	11.6	4.3	0.0	0.0	0.0	2.4	7.9	24.1	23.2	24.1	48
Mean Number of Days with Snow	23	19	17	10	3	0	0	0	Miss	6	18	23	119	48
WIND														
% of Observations with Gales	0.13	0.23	0.29	0.26	0.08	0.03	0.02	0.00	0.00	0.05	0.11	0.11	0.45	48
Mean Wind Speed (knots)	10.2	9.9	10.4	10.9	10.2	9.2	8.4	8.3	9.2	9.9	10.4	10.0	9.7	48
Direction (percentage of observations)														
North	5.3	5.7	5.7	5.5	4.4	3.2	2.9	3.4	3.5	3.7	5.1	4.8	4.4	48
North Northeast	1.3	1.9	2.4	2.6	2.1	1.7	1.5	1.7	1.7	1.9	2.7	1.4	1.9	48
Northeast	0.8	1.4	2.1	2.3	2.0	1.4	1.2	1.5	1.4	1.4	1.5	1.0	1.5	48
East Northeast	1.7	4.0	7.9	10.0	8.8	6.2	3.7	4.6	4.0	3.6	3.2	2.3	5.0	48
East	4.4	7.0	11.8	14.6	15.9	12.6	8.9	9.7	8.5	8.0	5.5	4.1	9.3	48
East Southeast	5.5	6.4	8.8	9.7	13.2	13.3	10.2	10.8	9.0	8.9	5.5	5.3	8.9	48
Southeast	3.5	3.2	4.0	4.1	5.9	6.0	5.4	5.9	5.0	5.0	3.8	4.4	4.7	48
South Southeast	2.8	2.7	2.8	2.5	3.0	4.0	4.6	4.4	4.5	4.4	3.9	3.8	3.6	48
South	3.3	2.9	2.9	3.1	2.9	4.0	5.4	5.1	5.7	5.4	4.8	4.1	4.1	48
South Southwest	4.2	3.9	3.1	2.8	3.4	4.3	5.7	5.9	5.8	6.2	5.2	4.6	4.6	48
Southwest	6.3	6.3	4.9	4.8	4.2	5.0	6.3	6.9	6.9	7.1	6.7	6.9	6.0	48
West Southwest	7.4	7.0	4.5	4.9	5.2	7.2	7.1	6.7	7.4	6.6	6.9	7.3	6.5	48
West	9.0	7.7	6.4	5.2	5.1	7.1	8.6	7.2	8.0	6.8	8.0	8.2	7.3	48
West Northwest	14.8	13.0	10.3	7.8	7.1	8.7	10.6	9.0	10.6	11.2	13.6	14.1	10.9	48
Northwest	16.9	14.2	11.1	9.4	7.8	7.0	8.4	7.7	9.0	11.2	12.9	16.5	11.0	48
North Northwest	10.1	9.8	8.1	7.5	6.0	4.8	5.3	5.1	5.6	6.5	8.2	8.8	7.1	48
Calm	2.9	3.2	3.2	3.1	2.9	3.5	4.5	4.2	3.4	2.5	2.6	2.8	3.2	48
Direction (Mean Speed, knots)														
North	8.1	7.9	9.0	8.7	8.8	7.4	6.7	6.6	7.2	7.7	8.6	8.0	8.0	48
North Northeast	8.7	8.5	9.2	9.5	8.8	7.7	7.4	7.3	8.0	8.7	9.4	8.1	8.6	48
Northeast	10.1	11.0	12.2	11.7	10.2	8.8	8.4	7.8	8.1	9.7	10.2	9.8	10.0	48
East Northeast	12.2	13.7	14.3	14.6	13.1	11.6	11.0	10.9	12.4	12.0	14.0	13.6	13.0	48
East	11.6	11.2	12.5	12.5	11.3	10.3	9.4	9.4	10.6	11.0	11.8	11.2	11.1	48
East Southeast	10.7	9.5	9.3	9.5	9.5	8.9	8.1	8.4	9.1	9.2	10.1	10.7	9.3	48
Southeast	9.4	8.6	8.6	8.5	8.2	8.2	7.3	7.6	8.5	8.8	9.2	9.6	8.5	48
South Southeast	8.3	8.2	8.2	8.7	8.5	8.3	7.9	8.1	8.7	8.9	8.7	8.3	8.4	48
South	8.1	8.5	8.0	9.1	8.8	8.4	8.3	8.2	9.1	9.2	8.6	8.7	8.6	48
South Southwest	10.0	10.2	9.9	10.8	11.0	9.7	9.6	9.2	10.1	10.9	10.3	10.1	10.1	48
Southwest	10.5	10.7	10.8	11.4	11.1	10.5	9.5	9.3	10.5	10.8	10.6	10.3	10.4	48
West Southwest	10.1	10.1	9.9	11.1	11.1	10.1	9.1	8.8	9.7	10.3	10.1	10.0	10.0	48
West	10.2	9.7	9.8	10.9	10.3	9.3	8.8	8.5	9.4	10.0	10.2	10.1	9.7	48
West Northwest	11.2	10.8	11.6	11.7	11.4	10.1	9.4	9.0	10.1	11.2	12.0	11.2	10.8	48
Northwest	11.6	11.0	11.1	11.9	11.1	10.0	8.8	8.7	9.3	10.7	11.4	10.8	10.7	48
North Northwest	10.7	10.1	10.6	11.2	10.5	8.9	7.8	8.2	8.8	10.3	11.2	10.1	10.0	48
VISIBILITY														
Mean Number of Days with Fog	10	9	10	9	10	12	11	14	13	12	10	12	132	48
% Observations with Visibility <= ½ mile	1.93	1.76	3.28	2.63	3.58	4.04	2.81	3.29	3.38	3.15	2.79	2.33	2.92	48

* Sea level pressure is station pressure reduced to sea level.

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA

METEOROLOGICAL TABLE FOR COASTAL AREA LAKE ONTARIO

Boundaries: Between 43.0°N TO 44.2°N FROM 76.0°W TO 79.9°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Wind > 33 Knots (1)	1.8	0.6	0.4	1.0	0.2	0.1	0.1	0.2	0.4	2.0	3.5	6.2	1.2
Wave Height > 9 ft (1)	1.8	0.6	0.5	0.5	0.2	0.1	0.0	0.1	0.3	1.4	2.4	2.7	0.7
Visibility < 2 nm (1)	19.1	11.5	9.5	5.5	11.3	13.0	6.9	5.6	5.5	4.0	4.9	7.8	7.6
Precipitation (1)	16.0	9.4	12.4	13.1	8.8	6.8	5.2	5.9	9.3	11.0	16.8	22.0	10.2
Temperature > 69 F (1)	0.0	0.0	0.0	0.1	1.5	8.7	41.7	47.1	12.9	0.6	0.0	0.0	12.7
Mean Temperature (F)	25.2	27.9	35.3	41.3	49.8	60.1	69.3	69.7	62.7	52.1	42.2	32.9	54.0
Temperature < 33 F (1)	67.5	63.7	26.8	6.1	0.2	0.0	0.0	0.0	0.1	0.5	11.2	44.3	5.9
Mean RH (%)	86	83	83	80	83	85	81	80	80	79	80	85	82
Overcast or Obscured (1)	44.8	38.8	38.9	31.8	29.7	24.1	16.8	19.7	25.0	27.9	44.9	50.3	28.7
Mean Cloud Cover (8ths)	5.7	4.7	5.1	4.7	4.8	4.4	4.0	4.1	4.5	4.9	6.0	6.3	4.8
Mean SLP (mbs)	1017	1020	1017	1015	1015	1014	1014	1016	1017	1017	1016	1018	1016
Ext. Max. SLP (mbs)	1046	1037	1039	1043	1034	1032	1035	1037	1038	1039	1043	1042	1046
Ext. Min. SLP (mbs)	989	988	990	978	977	986	995	992	989	984	983	988	977
Prevailing Wind Direction	W	SW	NW	W	W	SW	SW	SW	SW	W	W	W	W
Thunder and Lightning (1)	0.0	0.0	0.5	0.8	1.0	1.8	2.0	2.0	1.4	0.8	0.2	0.3	1.2

(1) Percentage Frequency

These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA LAKE ERIE

Boundaries: Between 41.3°N TO 43.0°N FROM 79.0°W TO 83.5°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Wind > 33 Knots (1)	5.1	1.6	1.3	1.5	0.6	0.4	0.2	0.3	1.0	3.6	5.9	8.2	2.0
Wave Height > 9 ft (1)	1.2	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.4	1.6	2.1	2.6	0.7
Visibility < 2 nm (1)	10.4	8.0	11.0	7.6	7.3	7.6	5.9	7.2	3.4	2.9	3.7	6.8	5.9
Precipitation (1)	35.4	34.5	20.7	12.1	8.7	6.1	5.4	5.9	7.7	10.1	15.5	21.9	9.9
Temperature > 69 F (1)	0.0	0.1	0.1	0.3	3.7	23.0	62.9	64.3	24.4	0.9	0.0	0.0	22.3
Mean Temperature (F)	23.5	28.2	36.7	43.5	54.2	65.4	72.1	72.1	65.3	54.3	43.5	34.3	57.8
Temperature < 33 F (1)	78.8	61.2	26.8	4.8	0.5	0.0	0.0	0.0	0.0	0.3	8.6	37.2	4.6
Mean RH (%)	81	82	80	81	81	82	80	79	78	77	78	82	80
Overcast or Obscured (1)	52.6	44.6	44.2	32.5	26.4	21.0	18.2	22.0	24.0	29.3	46.6	55.0	28.8
Mean Cloud Cover (8ths)	6.2	5.6	5.5	4.9	4.6	4.2	4.1	4.3	4.5	5.0	6.1	6.5	4.8
Mean SLP (mbs)	1017	1019	1017	1015	1015	1015	1015	1016	1018	1016	1017	1018	1016
Ext. Max. SLP (mbs)	1042	1046	1038	1049	1052	1040	1042	1046	1054	1049	1053	1046	1054
Ext. Min. SLP (mbs)	985	985	984	969	979	980	984	983	981	979	969	968	968
Prevailing Wind Direction	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Thunder and Lightning (1)	0.6	0.6	0.6	1.0	1.5	3.0	3.3	3.0	2.2	1.0	0.5	0.3	1.9

(1) Percentage Frequency

These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA LAKE HURON

Boundaries: Between 43.0°N TO 46.5°N FROM 80.0°W TO 85.0°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Wind > 33 Knots (1)	3.4	0.3	1.4	1.6	0.5	0.2	0.2	0.4	1.2	2.8	5.0	5.6	1.6
Wave Height > 9 ft (1)	2.2	1.0	1.0	0.5	0.3	0.1	0.2	0.2	0.7	1.5	2.4	2.5	0.8
Visibility < 2 nm (1)	10.0	7.7	9.7	7.9	10.8	10.4	6.5	5.3	3.9	3.3	4.5	7.5	6.8
Precipitation (1)	35.2	31.4	16.4	11.5	7.8	6.0	4.8	6.5	8.6	10.7	17.4	23.8	10.2
Temperature > 69 F (1)	0.0	0.1	0.1	0.2	1.3	6.7	21.7	25.6	6.7	0.4	0.0	0.0	7.8
Mean Temperature (F)	22.2	21.6	31.4	39.6	47.3	57.1	65.7	66.8	59.9	49.6	39.2	30.5	52.1
Temperature < 33 F (1)	81.6	80.9	49.3	11.7	0.7	0.1	0.0	0.0	0.0	0.9	20.6	54.8	8.5
Mean RH (%)	81	82	78	81	82	85	84	83	79	80	82	85	82
Overcast or Obscured (1)	56.3	44.9	35.7	32.5	27.2	22.4	18.8	21.9	26.1	32.2	48.4	53.6	29.9
Mean Cloud Cover (8ths)	6.4	5.6	4.9	4.8	4.5	4.3	4.1	4.3	4.7	5.2	6.2	6.5	4.9
Mean SLP (mbs)	1016	1020	1016	1015	1015	1015	1014	1016	1017	1015	1015	1017	1015
Ext. Max. SLP (mbs)	1045	1049	1046	1047	1058	1051	1048	1046	1051	1060	1057	1055	1060
Ext. Min. SLP (mbs)	981	985	979	975	973	973	981	986	978	971	964	965	964
Prevailing Wind Direction	W	NW	NW	NW	NW	S	S	SW	S	S	W	W	S
Thunder and Lightning (1)	0.5	0.4	0.5	0.7	1.1	1.8	2.2	2.3	1.7	0.7	0.3	0.3	1.3

(1) Percentage Frequency

These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA LAKE MICHIGAN

Boundaries: Between 41.5°N TO 46.0°N FROM 85.0°W TO 88.0°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Wind > 33 Knots (1)	5.6	4.5	2.6	1.7	0.8	0.3	0.3	0.5	1.6	3.8	5.1	5.5	2.2
Wave Height > 9 ft (1)	2.8	2.1	1.0	0.9	0.6	0.2	0.2	0.4	1.2	2.5	3.0	3.1	1.4
Visibility < 2 nm (1)	11.4	7.0	8.2	7.4	11.0	11.4	5.7	4.2	2.8	2.0	2.9	6.4	6.1
Precipitation (1)	16.2	9.0	7.8	8.7	5.2	4.1	3.7	5.0	6.1	7.8	12.4	15.7	7.5
Temperature > 69 F (1)	0.0	0.3	0.2	0.0	0.4	4.2	21.5	30.3	8.0	0.3	0.0	0.0	7.1
Mean Temperature (F)	22.9	25.2	33.6	40.0	46.6	55.8	65.5	67.4	60.9	50.0	39.2	29.9	50.2
Temperature < 33 F (1)	78.7	74.3	38.8	8.5	1.0	0.2	0.1	0.1	0.0	1.0	20.2	55.5	11.3
Mean RH (%)	52	79	80	80	77	81	86	83	82	70	65	84	80
Overcast or Obscured (1)	48.4	41.0	34.5	34.2	26.1	23.3	19.3	22.6	24.4	29.8	44.0	48.9	30.0
Mean Cloud Cover (8ths)	6.0	5.6	5.0	4.9	4.4	4.3	4.1	4.3	4.5	4.9	5.9	6.1	4.8
Mean SLP (mbs)	1018	1018	1017	1014	1016	1015	1015	1017	1017	1015	1016	1018	1016
Ext. Max. SLP (mbs)	1041	1040	1050	1056	1053	1047	1046	1046	1050	1053	1059	1058	1059
Ext. Min. SLP (mbs)	980	983	979	975	975	973	983	986	980	976	962	970	962
Prevailing Wind Direction	W	NW	N	N	S	S	S	S	S	S	NW	NW	S
Thunder and Lightning (1)	0.1	0.1	0.4	1.1	1.2	2.0	2.5	2.6	1.8	0.8	0.3	0.2	1.4

(1) Percentage Frequency

These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA LAKE SUPERIOR

Boundaries: Between 46.5°N TO 49.0°N FROM 84.0°W TO 92.0°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Wind > 33 Knots (1)	5.2	0.7	1.6	2.0	1.0	0.4	0.2	0.4	1.7	3.7	5.0	5.5	2.0
Wave Height > 9 ft (1)	6.7	2.7	2.9	1.7	0.9	0.3	0.2	0.3	1.7	3.0	4.5	4.9	1.9
Visibility < 2 nm (1)	13.0	4.5	6.5	5.9	9.1	14.9	16.6	8.7	4.0	3.0	4.3	11.4	8.8
Precipitation (1)	38.5	29.1	16.9	9.7	8.0	5.4	4.1	5.5	8.2	11.7	21.0	34.6	11.3
Temperature > 69 F (1)	0.0	0.1	0.0	0.0	0.3	1.2	4.2	5.8	1.5	0.1	0.0	0.0	1.6
Mean Temperature (F)	15.0	14.0	27.3	37.3	43.2	48.6	55.5	60.1	55.0	45.2	34.5	24.8	45.3
Temperature < 33 F (1)	93.6	90.3	65.4	18.2	2.4	0.2	0.1	0.0	0.1	3.6	39.0	73.2	14.6
Mean RH (%)	75	77	83	82	81	85	88	88	85	81	82	88	84
Overcast or Obscured (1)	55.8	39.3	36.0	28.5	26.1	25.5	22.7	22.1	26.3	34.0	49.0	57.1	31.4
Mean Cloud Cover (8ths)	6.5	5.2	5.0	4.5	4.4	4.5	4.4	4.2	4.7	5.3	6.2	6.7	4.9
Mean SLP (mbs)	1016	1018	1019	1015	1015	1014	1014	1015	1016	1013	1015	1017	1015
Ext. Max. SLP (mbs)	1042	1040	1044	1057	1058	1054	1048	1049	1056	1056	1056	1060	1060
Ext. Min. SLP (mbs)	990	987	980	968	971	976	981	982	975	966	961	976	961
Prevailing Wind Direction	W	W	W	NE	NE	W	SW	SW	SW	NW	NW	NW	NW
Thunder and Lightning (1)	0.3	0.1	0.6	0.7	0.9	1.6	2.0	2.2	1.8	0.6	0.3	0.4	1.2

(1) Percentage Frequency

These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible thus biasing the data toward good weather samples.

ATLANTIC OCEAN DISTANCES: MONTREAL, CANADA to the PANAMA CANAL

(Nautical Miles)

	PANAMA CANAL (Pacific)	Panama Canal (Atlantic)	YUCATAN CHANNEL	San Juan, PR	Corpus Christi, TX	Galveston, TX	Port Arthur, TX	New Orleans (via SW Pass)	Mobile, AL	Pensacola, FL	Tampa, FL	STRAITS OF FLORIDA	Key West, FL	Jacksonville, FL	Savannah, GA	Charleston, SC	Wilmington, NC	Diamond Shoals	Norfolk, VA	Chesapeake Bay Entrance	Baltimore, MD	Philadelphia, PA	New York, NY	Nantucket Shoals	Boston, MA	Portland, ME	Gut of Canso (Lock)	Cabot Strait
MONTREAL, QUE* (St. Lambert Lock)	3249	3203	2730	2445	3347	3242	3240	3080	3011	2977	2772	2540	2479	2172	2088	2014	1948	1729	1716	1689	1838	1682	1534	1311	1318	1276	717	681
Cabot Strait 45°07.0'N., 60°17.0'W.	2568	2522	2049	1764	2666	2561	2559	2399	2330	2296	2091	1859	1798	1491	1407	1333	1267	1048	1035	1008	1157	1001	853	630	637	595	120	-
Gut of Canso (Lock) 45°39.0'N., 61°25.0'W.	2465	2419	1937	1669	2558	2453	2451	2291	2222	2188	1983	1751	1690	1379	1295	1221	1155	936	923	896	1046	890	742	519	526	484	-	
Portland, ME 43°39.4'N., 70°14.7'W.	2235	2189	1629	1531	2255	2150	2148	1988	1919	1885	1680	1448	1387	1071	987	913	847	628	611	584	734	575	426	203	100	-		
Boston, MA 42°22.0'N., 71°03.0'W.	2195	2149	1589	1486	2215	2110	2108	1948	1879	1845	1640	1408	1347	1031	947	873	807	588	571	544	694	535	386	163	-			
NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	2032	1986	1426	1334	2052	1947	1945	1785	1716	1682	1477	1245	1184	868	784	710	644	425	408	381	531	372	223	-				
NEW YORK, NY 40°42.0'N., 74°01.0'W.	2018	1972	1346	1399	1977	1872	1870	1710	1641	1607	1402	1170	1109	788	704	630	564	345	294	267	417	240	-					
Philadelphia, PA 39°56.8'N., 75°08.3'W.	2001	1955	1323	1395	1954	1849	1847	1687	1618	1584	1379	1147	1086	765	681	607	541	322	269	242	392	-						
Baltimore, MD 39°16.0'N., 76°34.5'W.	1950	1904	1268	1375	1899	1794	1792	1632	1563	1529	1324	1092	1031	710	626	552	486	267	173	150	-							
CHESAPEAKE BAY ENTRANCE 36°56.3'N., 75°58.6'W.	1800	1754	1118	1225	1749	1644	1642	1482	1413	1379	1174	942	881	560	476	402	336	117	27	-								
Norfolk, VA 36°50.9'N., 76°17.9'W.	1827	1781	1145	1252	1776	1671	1669	1509	1440	1406	1201	969	908	587	503	429	363	144	-									
Diamond Shoals 35°08.0'N., 75°15.0'W.	1683	1637	1001	1114	1632	1527	1525	1365	1296	1262	1057	825	764	443	359	285	219	-										
Wilmington, NC 34°14.0"N., 77°57.0'W.	1655	1609	904	1153	1535	1430	1428	1268	1199	1165	960	728	667	315	227	151	-											
Charleston, SC 32°47.2'N., 79°55.2'W.	1609	1563	809	1138	1440	1335	1333	1173	1104	1070	865	633	572	197	102	-												
Savannah, GA 32°05.0'N., 81°05.7'W.	1610	1564	780	1156	1411	1306	1304	1144	1075	1041	836	604	543	145	-													
Jacksonville, FL 30°19.2'N., 81°39.0'W	1559	1513	699	1121	1330	1225	1223	1063	994	960	755	523	462	-														
Key West, FL 24°33.7'N., 81°48.5'W.	1106	1060	251	966	880	775	773	613	544	510	305	73	-															
STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.	1047	1001	192	1017	807	702	700	540	471	437	232	-																
Tampa, FL 27°56.5'N., 82°26.7'W.	1259	1213	404	1249	810	703	697	502	389	347	-																	
Pensacola, FL 30°24.0'N., 87°13.0'W.	1388	1342	533	1448	618	509	504	288	89	-																		
Mobile, AL 30°42.5'N., 88°02.5'W.	1417	1371	562	1448	605	496	491	269	-																			
NEW ORLEANS (via SW Pass) 29°57.0'N., 90°03.7'W.	1442	1396	587	1557	555	446	441	-																				
Port Arthur, TX 29°49.5'N., 93°57.6'W.	1533	1487	691	1717	249	89	-																					
Galveston, TX 29°19.0'N., 94°47.0'W.	1539	1493	696	1719	207	-																						
Corpus Christi, TX 27°48.8'N., 97°24.0'W.	1595	1549	769	1824	-																							
San Juan, PR 18°27.8'N., 66°06.7'W.	1036	990	1111	-																								
YUCATAN CHANNEL 21°50.0'N., 85°03.0'W.	855	809	-																									
Panama Canal (Atlantic) 9°23.5'N., 79°55.3'W.	46	-																										
PANAMA CANAL (Pacific) 8°53.0'N., 79°31.0'W.	-																											

All tabular distances are by outside routes which can be used by the deepest-draft vessel that the listed ports can accommodate. Lighter-draft vessels can save considerable mileage by transiting Canso Lock (Canada), the Cape Cod Canal (Massachusetts), and the Chesapeake and Delaware Canal (Delaware-Maryland); see the detailed tables. Gulf of Mexico distances are through the Shipping Safety Fairways.

* For Quebec City, Canada - subtract 139 miles

GREAT LAKES DISTANCES

(Statute Miles)

	Montreal, Quebec	Ogdensburg, NY	Kingston, Ontario	Toronto, Ontario	Oswego, NY	Rochester, NY	Port Colburne, Ontario	Buffalo, NY	Erie, PA	Conneaut, OH	Ashtabula, OH	Fairport, OH	Cleveland, OH	Lorain, OH	Toledo, OH	Detroit, MI	Port Huron, MI	Midland, Ontario	Collingwood, Ontario	Goderich, Ontario	Bay City, MI	Alpena, MI	Ludington, MI	Muskegon, MI	Gary, IN	Chicago, IL	Milwaukee, WI	Green Bay, WI	Escanaba, MI	Sualt Ste. Marie, MI	Marquette, MI	Houghton, MI	Ashland, WI	Duluth, MN	Two Harbors, MN	Thunder Bay, Ontario
Thunder Bay, Ontario	1217	1096	1034	903	1016	965	848	864	795	768	754	729	711	694	658	604	542	539	531	506	505	410	536	587	699	686	621	560	492	273	171	116	164	195	172	-
Two Harbors, MN	1315	1194	1132	1001	1114	1063	946	963	893	866	852	828	809	792	756	702	640	638	630	604	603	508	634	685	797	785	720	659	590	371	239	157	71	26	-	
Duluth, MN	1339	1218	1156	1025	1138	1087	970	986	917	890	876	851	833	816	781	726	664	661	653	628	627	532	657	709	820	808	743	682	614	394	261	179	96	-		
Ashland, WI	1293	1172	1110	979	1092	1041	924	941	871	844	830	806	788	771	734	680	618	616	606	583	581	486	612	663	775	763	698	637	568	349	213	131	-			
Houghton, MI	1165	1044	982	851	964	913	796	813	743	716	702	678	659	643	606	552	490	488	480	455	453	358	484	535	647	635	570	509	440	221	84	-				
Marquette, MI	1104	983	921	790	903	852	735	751	682	655	641	616	598	581	545	491	429	426	418	393	391	297	422	474	585	573	508	447	378	159	-					
Sualt Ste. Marie, MI (a)	944	823	761	630	743	692	575	592	522	495	481	457	438	422	385	331	269	267	259	234	232	137	263	314	426	414	349	288	219	-						
Escanaba, MI	1051	930	868	737	850	799	682	699	629	602	588	564	545	526	492	438	376	384	376	340	339	244	130	181	288	274	201	101	-							
Gren Bay, WI	1120	999	937	806	919	868	751	767	696	671	657	632	614	597	561	507	445	452	444	409	407	313	123	171	272	255	180	-								
Milwaukee, WI	1181	1060	998	867	980	929	812	828	759	732	718	693	675	658	622	568	506	513	505	470	468	374	97	80	103	85	-									
Chicago, IL	1246	1125	1063	932	1045	994	877	893	824	797	783	758	740	723	688	633	571	578	570	535	534	439	156	114	25	-										
Gary, IN	1258	1137	1075	944	1057	1006	889	905	836	809	795	770	752	735	699	645	583	590	582	547	546	451	167	121	-											
Muskegon, MI	1146	1025	963	832	945	894	777	794	724	697	683	659	640	623	587	533	471	479	471	435	434	339	56	-												
LudIngton, MI	1095	974	912	781	894	843	726	742	673	646	632	607	589	572	536	482	420	427	419	384	383	288	-													
Alpena, MI	832	711	649	518	631	580	463	479	410	383	369	344	326	309	273	219	157	193	185	124	116	-														
Bay City, MI	837	716	654	523	638	585	466	484	415	388	374	349	331	314	278	224	162	265	257	137	-															
Goderich, Ontario	740	619	557	426	539	488	371	387	318	291	277	252	234	217	181	127	65	211	207	-																
Collingwood, Ontario	933	812	750	619	732	681	564	580	511	484	470	446	427	410	374	320	258	55	-																	
Midland, Ontario	941	820	758	627	740	689	572	588	519	492	478	453	435	418	382	326	266	-																		
Port Huron, MI (b)	675	554	492	361	474	423	306	322	253	226	213	188	170	152	116	62	-																			
Detroit, MI (c)	613	492	430	299	412	361	244	261	191	164	150	126	108	91	54	-																				
Toledo, OH (river mouth)	606	485	423	292	405	354	237	254	185	157	144	119	96	72	-																					
Lorain, OH	549	428	366	235	348	297	180	197	124	95	80	53	28	-																						
Cleveland, OH (main entrance)	529	408	346	215	326	277	160	176	102	73	59	33	-																							
Fairport, OH	499	378	316	185	298	247	130	146	73	44	30	-																								
Ashtabula, OH	473	352	290	159	272	221	104	119	45	15	-																									
Conneaut, OH	461	340	278	147	260	209	92	107	33	-																										
Erie, PA	434	313	251	120	233	182	65	78	-																											
Buffalo, NY (north entrance)	391	270	208	77	190	139	22	-																												
Port Colburne, Ontario	369	248	186	55	168	117	-																													
Rochester, NY	271	149	89	95	59	-																														
Oswego, NY	232	108	55	145	-																															
Toronto, Ontario	342	223	161	-																																
Kingston, Ontario	185	63	-																																	
Ogdensburg, NY	123	-																																		
Montreal, Quebec (d)	-																																			

(a) From abreast east end of U. S. center pier
(b) From foot of Grand River Ave.
(c) From Woodward Ave.
(d) From St. Lambert Dock

EXPLANATION

Measurements are by the shortest marked or safe direct courses, starting (unless otherwise noted) from the main entrance between pierheads of breakwaters or piers, or from the principal landings of open roadsteads.

Where landings are appreciably remote from protected entrances, the distance from the main entrance to the landing may be ascertained from the harbor description or from nautical charts.

Points in this table are arraigned in the order of their location on the Great Lakes in the following sequence (top to bottom): Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario- St. Lawrence River.

DISTANCES BETWEEN POINTS ON LAKE ONTARIO AND ST. LAWRENCE RIVER

(Statute Miles)

	Quebec City, Quebec	Montreal, Quebec	Cote St. Cath. Lock, Quebec	Beauharnois Lock, Quebec	Colquhoun Island, Ontario	Snell Lock, NY	Eisenhower Lock, NY	Iroquios Lock, Ontario	Ogdensburg, NY	Brockville, Ontario	Alexandria Bay, NY	Thousand Island Park, NY	Clayton, NY	Gananoque, Ontario	Kingston, Ontario	Picton, Ontario	Deseronto, Ontario	Belleville, Ontario	Trenton, Ontario	Cobourg, Ontario	Port Hope, Ontario	Toronto, Ontario	Hamilton, Ontario	Port Weller, NY	Lewiston, NY	Niagara-on-the-Lake,	Olcott, NY	Rochester, NY	Sodus Bay, NY	Little Sodus Bay, NY	Oswego, NY	Sacketts Harbor, NY	Cape Vincent, NY	Port Colborne, Ontario	Port Huron, MI	Old Mackinac Point, MI
OLD MACKINAC POINT, MI (a)	1084	922	914	892	848	841	837	812	799	787	766	760	755	758	739	726	713	69	688	653	648	608	610	580	598	592	608	670	698	712	721	745	740	553	247	-
PORT HURON, MI (b)	837	675	667	645	601	594	590	565	552	540	519	513	508	511	492	479	466	45	441	406	401	361	363	333	351	345	361	423	451	465	474	498	493	306	-	
PORT COLBORNE, ONTARIO	531	369	361	339	295	288	284	259	246	234	213	207	202	205	186	173	160	14	135	100	95	55	57	27	45	39	55	117	145	159	168	192	187	-		
Cape Vincent, NY	344	183	175	153	109	102	98	73	60	48	27	20	16	19	24	45	51	67	78	101	106	160	186	160	160	154	134	89	69	59	49	26	-			
Sacketts Harbor, NY	370	209	201	179	135	128	124	99	86	74	53	46	42	45	36	56	61	78	88	106	112	165	191	165	164	158	138	88	54	52	41	-				
Oswego, NY	391	232	224	202	158	151	147	122	108	97	76	69	65	68	55	66	71	88	82	91	96	145	166	141	139	133	113	59	29	15	-					
Little Sodus Bay, NY	401	241	233	211	167	160	156	131	118	106	85	78	74	77	64	73	78	88	79	85	90	136	157	131	130	124	104	48	18	-						
Sodus Bay, NY	411	251	243	221	177	170	166	141	128	116	95	88	84	87	72	80	86	83	74	77	81	124	145	118	118	112	92	35	-							
Rochester, NY (Charlotte)	432	271	263	241	197	190	186	161	149	136	115	108	104	107	90	98	89	73	64	57	60	96	117	89	89	83	63	-								
Olcott, NY	478	316	308	286	242	235	231	206	193	181	160	153	149	152	134	121	109	92	83	51	47	38	55	28	28	22	-									
Niagara-on-the-Lake, Ontario	500	336	328	306	262	255	251	226	213	201	180	173	169	172	154	141	128	11	102	66	63	30	39	11	6	-										
Lewiston, NY	506	342	334	312	268	261	257	232	219	207	186	179	175	178	160	147	134	11	108	72	69	36	45	17	-											
Port Weller, NY	504	342	334	312	268	261	257	232	219	207	186	179	175	178	159	146	133	11	107	72	68	28	30	-												
Hamilton, Ontario	530	367	359	337	293	286	282	257	244	232	211	205	200	204	185	169	156	14	131	94	88	30	-													
Toronto, Ontario (West Entrance)	506	342	334	312	268	261	257	232	219	207	186	180	175	179	160	142	129	11	103	65	60	-														
Port Hope, Ontaro	449	289	281	259	215	208	204	179	166	154	132	126	121	125	106	85	72	56	47	7	-															
Cobourg, Ontario	444	283	275	253	209	202	196	173	160	148	127	120	116	120	101	79	67	50	41	-																
Trenton, Ontario	417	255	247	225	181	174	170	145	132	120	101	94	90	89	71	40	28	11	-																	
Belleville, Ontario	406	244	236	214	170	163	159	134	121	109	90	84	80	78	60	29	17	-																		
Deseronto, Ontario	390	228	220	198	154	147	143	118	105	93	74	68	63	62	44	13	-																			
Picton, Ontario	383	222	214	192	148	141	137	112	99	87	68	62	57	56	37	-																				
Kingston, Ontario	346	185	177	155	111	104	100	75	62	50	32	25	21	19	-																					
Gananoque, Ontario	327	167	159	137	93	86	82	57	44	32	18	11	10	-																						
Clayton, NY	327	167	159	137	93	86	82	57	44	32	11	4	-																							
Thousand Island Park, NY	326	164	156	134	90	83	79	54	41	29	8	-																								
Alexandria Bay, NY	317	156	148	127	83	76	72	46	33	22	-																									
Brockville, Ontario	295	135	127	105	61	54	50	25	12	-																										
Ogdensburg, NY	283	123	115	93	49	42	38	13	-																											
Iroquois Lock, Ontario	270	110	102	80	36	29	25	-																												
Eisenhower Lock, NY	245	85	77	55	11	4	-																													
Snell Lock, NY	241	81	73	51	7	-																														
Colquhoun, Island, Ontario	233	74	66	44	-																															
Beauharnois Lock, Quebec	190	30	22	-																																
Cote St. Catherine Lock, Quebec	169	8	-																																	
Montreal, St. Lambert Lock, Quebec	160	-																																		
Quebec City, Quebec	-																																			

(a) From sailing course point north of Old Mackinac Point
(b) From foot of Grand River Ave. to Toronto west entrance.

DISTANCES BETWEEN POINTS ON LAKE ERIE AND THE ST. CLAIR, DETROIT AND NIAGARA RIVERS

(Statute Miles)

	Kingsville, Ontario	Rondeau, Ontario	Port Stanley, Ontario	Port Burwell, Ontario	Port Dover, Ontario	Port Maitland, Ontario	Niagara Falls, NY	Tonawanda, NY	Buffalo, NY	Dunkirk, NY	Erie, PA	Conneaut, OH	Ashtabula, OH	Fairport, OH	Cleveland, OH	Lorain, OH	Vermilion, OH	Huron, OH	Sandusky, OH	Put-in-Bay, OH	Port Clinton, OH	Toledo, OH	Monroe, MI	Detroit River Light, MI	Amherstburg, Ontario	Trenton, MI	Wyondotte, MI	Detroit, MI	Chatham, Ontario	Mount Clemons, MI	St. Clair Flats, MI/Ont.	Algonac, MI	Marine City, MI	St. Clair, MI	Port Huron, MI	Port Colborne, Ontario	Old Mackinac Point, MI
OLD MACKINAC POINT, MI (a)	358	414	459	475	527	538	588	580	569	539	500	473	460	435	417	399	391	387	380	363	369	363	348	334	326	324	320	309	322	296	286	274	266	25 9	247	553	-
PORT COLBORNE, ONTARIO	201	146	109	89	52	18	41	33	22	25	65	92	104	130	160	180	190	198	204	204	213	237	227	219	227	229	234	244	292	278	267	281	287	294	306	-	
PORT HURON, MI (b)	111	167	212	228	280	291	341	333	322	292	253	226	213	188	170	152	144	140	133	116	122	116	101	87	79	77	73	62	75	49	39	27	19	12	-		
St. Clair, MI	99	155	200	216	268	279	330	322	311	281	241	214	201	176	158	141	133	129	122	105	111	105	89	75	67	65	61	50	63	37	27	15	7	-			
Marine City, MI	92	148	193	209	261	272	322	314	303	273	234	207	194	169	151	133	125	121	114	97	103	97	82	68	60	58	54	43	56	30	20	7	-				
Algonac, MI	86	143	188	203	255	267	317	309	296	268	228	201	188	163	145	128	120	116	109	92	98	92	76	62	55	53	48	37	49	22	14	-					
St. Clair Flats, MI/Ont. (c)	72	129	174	189	241	253	303	295	284	254	215	187	174	149	131	114	106	102	95	78	84	78	62	48	41	39	34	23	35	15	-						
Mount Clemons, MI	83	140	185	200	252	264	314	306	295	265	226	199	185	161	142	125	117	113	106	89	95	89	73	59	53	50	45	35	49	-							
Chatham, Ontario	97	154	199	214	265	278	328	320	309	279	239	212	198	174	156	139	130	127	120	102	108	102	87	73	66	63	59	48	-								
Detroit, MI (Woodward Ave.)	49	106	151	166	217	230	280	272	261	231	191	164	150	126	108	91	82	79	72	54	60	54	39	25	18	15	11	-									
Wyondotte, MI	39	96	141	156	208	220	270	262	251	221	182	154	141	116	98	81	73	69	62	45	51	45	29	15	8	5	-										
Trenton, MI	34	91	136	151	203	215	265	257	246	216	177	149	136	111	93	76	68	64	57	40	46	40	24	10	13	-											
Amherstburg, Ontario	31	88	133	148	200	212	262	254	243	213	173	146	133	108	90	73	64	61	54	36	42	36	21	7	-												
Detroit River Light, MI	24	81	126	141	193	205	255	247	236	206	166	139	126	101	83	66	58	54	47	30	36	30	14	-													
Monroe, MI (piers)	33	89	134	149	200	213	263	255	244	214	174	147	133	109	89	68	60	5	48	30	35	21	-														
Toledo, OH (river mouth)	45	98	143	159	210	223	272	265	254	224	185	157	144	119	96	72	65	59	52	38	40	-															
Port Clinton, OH	37	75	120	136	187	199	249	241	230	200	160	131	118	92	67	43	36	29	22	12	-																
Put-in-Bay, OH	27	66	111	127	177	190	240	232	221	190	150	122	109	83	51	38	32	27	21	-																	
Sandusky, OH (wharves)	41	69	114	130	178	190	239	232	221	189	149	120	107	79	55	29	21	14	-																		
Huron, OH	47	68	111	124	172	184	233	226	215	183	142	113	99	72	47	20	11	-																			
Vermilion, OH	46	62	104	117	163	175	225	217	206	174	133	104	90	63	37	11	-																				
Lorain, OH	48	57	97	109	154	166	215	208	197	164	124	95	80	53	28	-																					
Cleveland, OH (main entrance)	65	53	85	93	134	146	194	187	176	143	102	73	59	33	-																						
Fairport, OH	83	48	62	66	104	116	165	157	146	114	73	44	30	-																							
Ashtabula, OH	108	63	56	47	79	90	138	130	119	86	45	15	-																								
Conneaut, OH	122	74	59	48	68	80	126	118	107	74	33	-																									
Erie, PA	149	98	70	53	47	54	98	89	78	45	-																										
Dunkirk, NY	188	134	98	78	50	28	55	48	37	-																											
Buffalo, NY	218	163	126	106	72	38	21	13	-																												
Tonawanda, NY	230	174	137	117	83	49	8	-																													
Niagara Falls, NY	237	182	145	125	90	57	-																														
Port Maitland, Ontario	187	132	95	75	37	-																															
Port Dover, Ontario	175	120	83	62	-																																
Port Burwell, Ontario	123	65	23	-																																	
Port Stanley, Ontario	108	49	-																																		
Rondeau, Ontario	63	-																																			
Kingsville, Ontario	-																																				

(a) From sailing point north of Old Mackinac Point.
(b) From foot of Grand River Avenue.
(c) From south end of canal dike.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding southward in St. Clair River and Lake, and Detroit River, then eastward along the south shore of Lake Erie to Niagara River, and returning westward along the north lake shore

DISTANCES BETWEEN POINTS ON LAKE HURON AND ST. MARYS RIVER

(Statute Miles)

	Thessalon, Ontario	Algoma Mills, Ontario	Gore Bay, Ontario	Little Current, Ontario	French River, Ontario	Key Harbor, Ontario	Byng Inlet, Ontario	Parry Sound, Ontario	Depot Harbor, Ontario	Port McNicoll, Ontario	Midland, Ontario	Penetanguishene, Ontario	Collingwood, Ontario	Meaford, Ontario	Owen Sound, Ontario	Wiarton, Ontario	Southampton, Ontario	Kincardine, Ontario	Goderich, Ontario	Port Sanilac, MI	Harbor Beach, MI	Saginaw, MI	Bay City, MI	East Tawas, MI	Au Sable, MI	Alpena, MI	Rockport, MI	Stoneport, MI	Rogers City, MI	Cheboygan, MI	Mackinac Island, MI	St. Ignace, MI	Port Dolomite, MI	DeTour, MI	Sault Ste. Marie, MI	Old Mackinac Point, MI	Port Huron, MI
Port Huron, MI (a)	*238	+238	+250	225	224	232	229	247	243	267	266	265	258	241	238	228	121	94	65	33	63	175	162	119	117	157	166	182	194	233	243	247	239	224	269	247	-
Old Mackinac Point, MI (b)	69	*101	*116	*143	*196	*205	*211	235	231	256	255	254	247	230	227	217	189	192	211	215	186	223	210	163	142	115	83	78	54	18	7	6	27	45	90	-	
Sault Ste. Marie, MI (c)	& 48	& 88	&108	&131	&184	&193	&201	&242	+238	268	267	266	259	242	239	229	207	213	234	238	208	246	232	185	165	137	107	96	84	84	84	90	68	45	-		
DeTour, MI	%24	%58	%76	%101	%154	%163	%171	201	198	224	222	221	214	197	194	185	162	168	189	193	164	201	187	140	120	92	61	51	40	39	39	44	23	-			
Port Dolomite, MI	+92	+90	+108	+135	197	199	198	218	215	243	241	238	233	220	219	207	176	183	203	218	190	219	206	163	143	113	76	70	47	31	26	28	-				
St. Ignace, MI	%68	*100	*115	*142	*195	*204	*209	234	231	256	254	252	246	229	227	217	191	194	214	216	187	224	210	163	143	115	83	82	55	20	8	-					
Mackinac Island, MI	%63	*95	*110	*137	*190	*199	*204	229	226	251	249	248	241	224	221	212	186	189	209	212	184	220	207	159	140	111	79	77	50	17	-						
Cheboygan, MI	%63	*92	*106	*133	*186	*195	*197	221	217	242	241	240	233	216	213	204	175	178	198	202	173	210	196	149	129	101	69	66	40	-							
Rogers City, MI	*63	+74	+87	+114	157	163	164	187	183	208	206	206	199	182	177	169	139	142	161	163	134	171	157	110	90	61	31	27	-								
Stoneport, MI	+75	+73	+92	+118	145	147	147	166	163	190	189	186	181	164	163	151	115	120	146	158	130	154	141	97	76	48	9	-									
Rockport, MI	*79	+79	+92	+119	136	143	143	166	162	187	186	185	178	161	158	148	112	113	132	134	106	142	129	82	62	31	-										
Alpena, MI	*107	+107	+120	+143	145	151	152	174	171	195	193	192	185	168	165	156	109	107	124	125	97	129	116	69	49	-											
Au Sable, MI	*135	+135	+148	158	160	163	166	183	180	204	202	201	189	177	174	165	98	85	93	86	58	83	69	21	-												
East Tawas, MI	*155	+155	+168	175	176	180	182	199	196	220	218	217	210	194	190	181	110	94	95	88	60	68	54	-													
Bay City, MI	*202	+202	+215	222	223	228	229	245	243	267	265	264	257	240	237	226	153	136	137	130	102	13	-														
Saginaw, MI	*216	+216	+228	235	237	242	242	258	256	280	278	278	271	254	250	241	167	149	151	144	115	-															
Harbor Beach, MI	*178	+178	+191	171	171	176	176	194	190	214	213	212	205	188	185	175	79	56	47	32	-																
Port Sanilac, MI	*207	+207	+219	197	196	201	201	219	215	239	238	237	230	213	210	200	97	70	47	-																	
Goderich, Ontario	+195	+196	204	169	172	172	174	192	189	213	211	210	207	187	183	174	64	36	-																		
Kincardine, Ontario	+173	+174	174	141	142	149	144	162	158	182	181	180	176	156	153	144	30	-																			
Southampton, Ontario	+166	+166	155	122	123	130	125	143	140	163	162	161	157	137	134	125	-																				
Wiarton, Ontario (d)	+188	158	142	110	88	79	81	74	71	76	74	73	53	36	29	-																					
Owen Sound, Ontario (d)	+197	167	152	119	97	97	89	79	75	71	70	69	46	29	-																						
Meaford, Ontario (d)	+200	169	153	121	96	96	86	71	68	55	53	52	24	-																							
Collingwood, Ontario (d)	+217	186	171	138	108	107	97	80	76	57	55	54	-																								
Penetanguishene, Ontario	+224	187	172	139	106	104	94	72	69	12	10	-																									
Midland, Ontario (d)	+225	186	173	140	107	105	95	73	70	7	-																										
Port McNicoll, Ontario (d)	+227	190	174	142	106	106	97	75	71	-																											
Depot Harbor, Ontario (d)	193	155	140	107	73	71	62	6	-																												
Parry Sound, Ontario (d)	197	159	143	111	77	75	65	-																													
Byng Inlet, Ontario (d)	155	118	102	70	31	27	-																														
Key Harbor, Ontario (d)	148	110	94	62	22	-																															
French River, Ontario (d)	139	101	86	53	-																																
Little Current, Ontario	86	48	33	-																																	
Gore Bay, Ontario	61	27	-																																		
Algoma Mills, Ontario	43	-																																			
Thessalon, Ontario	-																																				

(a) From foot of Grand River Ave.
(b) From sailing course point north of Old Mackinac Point.
(c) From abreast east end of U.S. center pier and (except those marked by $) via Middle Neebish and DeTour; distances downbound through West Neebish are 1 mile less.
(d) Distances to Georgian Bay ports (except those marked *, +, $, =) are via the bay entrance from Lake Huron and St. Marys River points and via Little Current from North Channel points.

* Via False Detour and North Channels.
\+ Via Mississaqi Straight and North Channel.
$ Via Lake Nicolet, St. Joseph and North Channels.
= Via Potagannissing Bay and North Channel.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding from St. Marys River southward along the west shore, and returning northward up the east shore, around Georgian Bay, and westward through North Channel.

DISTANCES BETWEEN POINTS ON LAKE MICHIGAN

(Statute Miles)

	Beaver Island Harbor, MI	Petoskey, MI	Charlevoix, MI	Traverse City, MI	Frankfort, MI	Portage Lake, MI	Manistee, MI	Ludington, MI	Pentwater, MI	White Lake, MI	Muskegon, MI	Grand Haven, MI	Holland, MI	Saugatuck, MI	South Haven, MI	St. Joseph, MI	Michigan City, IN	Gary, IN	Indiana Harbor, IN	South Chicago, IL	Chicago, IL	Waukegan,	Kenosha, WI	Racine, WI	Milwaukee, WI	Port Washington, WI	Sheboygan,	Manitowoc, WI	Kewaunee, WI	Algoma, WI	Sturgeon Bay, WI	Green Bay, WI	Menominee, MI	Escanaba, MI	Manistique, MI	Port Inland, MI	Old Mackinac Point, MI
OLD MACKINAC PT., MI (a)	41	55	56	97	122	142	150	173	184	213	224	238	257	263	261	300	325	336	334	333	324	296	282	272	259	237	212	191	170	161	155	198	155	129	75	59	-
Port Inland, MI	31	66	55	88	96	116	123	146	157	186	197	211	229	235	253	271	298	314	308	304	298	270	254	245	226	204	179	161	131	124	110	149	104	78	23	-	
Manistique, MI	43	76	64	94	91	110	118	141	152	182	193	207	225	232	250	268	294	303	301	298	290	260	244	235	220	195	168	146	120	111	103	135	92	66	-		
Escanaba, MI	99	113	99	120	91	106	112	130	141	170	181	195	213	220	238	255	280	288	286	283	274	242	226	217	201	176	149	127	100	90	69	101	55	-			
Menominee, MI (b)	122*	134*	119*	138*	80	86	87	96	108	135	146	159	177	183	200	216	239	246	243	240	230	198	184	172	155	130	103	81	52	43	22	49	-				
Green Bay, WI	165*	176	160	178	105	111	112	123	134	159	171	184	202	209	225	242	264	272	268	265	255	223	209	197	180	155	128	106	78	68	47	-					
Sturgeon Bay, WI	123	129	113	131	58	64	65	76	87	113	124	137	155	162	178	195	217	225	222	218	208	176	162	150	133	108	81	58	30	21	-						
Algoma, WI	131	135	119	136	59	60	59	66	75	100	111	123	142	146	163	179	200	206	203	200	190	158	142	132	115	89	62	40	12	-							
Kewaunee, WI	138	143	126	143	62	60	58	61	70	93	104	116	135	141	156	171	192	197	194	191	181	149	133	123	105	79	53	31	-								
Manitowoc, WI	161	163	147	164	79	71	66	60	64	79	90	102	118	123	137	150	169	173	169	166	156	123	107	97	79	53	26	-									
Sheboygan, WI	180	181	165	182	95	83	76	60	63	68	78	87	102	106	118	130	146	149	146	143	132	99	83	74	55	29	-										
Port Washington, WI	206	205	189	206	119	104	98	80	76	72	77	84	94	97	105	112	124	125	121	118	107	74	58	48	29	-											
Milwaukee, WI	228	227	211	228	140	125	117	97	91	78	80	83	88	89	93	96	104	103	99	96	85	51	35	26	-												
Racine, WI	242	241	225	242	153	137	129	108	100	81	80	80	79	80	80	78	84	83	78	75	64	30	14	-													
Kenosha, WI	252	251	234	252	163	147	138	117	108	86	87	86	82	82	79	75	76	73	67	64	54	18	-														
Waukegan, WI	266	265	249	266	177	160	152	130	122	100	96	93	86	84	78	70	64	58	52	49	38	-															
Chicago, IL	294	293	276	293	204	186	179	156	146	120	114	108	95	90	77	60	38	25	19	15	-																
South Chicago, IL	302	301	285	302	213	196	188	165	154	127	120	114	100	95	79	60	33	14	7	-																	
Indiana Harbor, IN	304	303	287	304	215	198	189	167	156	129	122	115	99	95	79	59	31	13	-																		
Gary, IN	309	308	292	309	216	199	191	167	157	129	121	114	99	93	77	55	22	-																			
Michigan City, IN	295	294	278	295	206	189	181	157	146	117	108	99	82	75	57	36	-																				
St. Joseph, MI	269	268	251	268	179	162	154	130	119	88	78	69	50	44	24	-																					
South Haven, MI	251	250	233	250	161	144	136	111	101	39	58	49	29	22	-																						
Saugatuck, MI	232	231	215	232	143	126	118	93	83	51	40	29	8	-																							
Holland, MI	227	226	210	227	137	120	112	88	77	45	34	23	-																								
Grand Haven, MI	206	205	189	206	117	100	92	67	57	25	13	-																									
Muskegon, MI	195	194	178	195	106	89	80	56	46	13	-																										
White Lake, MI	184	183	167	184	95	78	69	45	35	-																											
Pentwater, MI	154	153	137	154	65	48	39	14	-																												
Ludington, MI	143	142	126	143	54	37	26	-																													
Manistee, MI	118	117	100	118	28	10	-																														
Portage Lake, MI	110	109	93	110	20	-																															
Frankfort, MI	93	92	75	92	-																																
Traverse City, MI	69	58	45	-																																	
Charlevoix, MI	33	18	-																																		
Petoskey, MI	37	-																																			
Beaver Island Harbor, MI	-																																				

(a) From sailing course point north of Old Mackinac Point.
(b) Distances from Menominee and Green Bay to Lake Michigan points (except those marked with *) are via Sturgeon Bay Canal.
* Via Rock Island Passage.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding southward along the west shore and returning northward along the east shore.

DISTANCES BETWEEN POINTS ON LAKE SUPERIOR

(Statute Miles)

	Gargantua Harbor, Ontario	Michipicoten, Ontario	Quebec Harbor, Ontario	Peninsula Harbor, Ontario	Rossport, Ontario	Thunder Bay, Ontario	Passage Island, MI	Rock of Ages, MI	Grand Marais, MN	Taconite, MN	Silver Bay, MN	Two Harbors, MN	Duluth, MN	Superior, WI	Port Wing, WI	Bayfield, WI	Ashland, WI	Ontonagon, MI	Keweenaw, Upper Entry	Houghton, MI	Dollar Bay, MI	Lake Linden, MI	Chassell, MI	Portage Entry, MI	Eagle Harbor, MI	Copper Harbor, MI	Mendota Canal, MI	L'Anse, MI	Huron Bay, MI	Marquette,	Munising, MI	Grand Marais, MI	Whitefish Point, MI	Sault Ste. Marie, MI	Old Mackinac Point, MI	Port Huron, MI
PORT HURON, MI (a)	360	391	385	465	503	542	498	532	574	603	621	640	664	662	633	606	618	544	501	490	487	493	485	476	473	458	458	486	473	429	400	361	311	269	247	-
OLD MACKINAC POINT, MI (b)	181	212	206	285	324	363	319	353	395	426	444	461	485	483	454	426	439	365	322	311	308	314	306	297	294	279	279	307	294	249	221	182	134	90	-	
SAULT STE. MARIE, MI (c)	91	121	116	195	234	273	229	263	305	334	352	371	394	393	364	336	349	274*	232*	221	218	224	215	207	204	189	189	217	204	159	131	92	42	-		
Whitefish Point, MI	54	83	74	153	192	231	187	221	263	292	310	329	352	351	322	294	307	232*	190*	179	176	182	173	165	162	147	147	175	162	117	89	50	-			
Grand Marais, MI	78	102	70	144	171	198	154	182	224	255	270	289*	312*	310*	282*	252*	264*	187*	143*	133	130	135	127	119	123	108	105	129	114	68	40	-				
Munising, MI	112	136	97	162	179	193	150	174	212*	245	260	271*	293*	291*	263*	233*	245*	168*	124*	114	111	116	108	99	113	100	93	110	93	42	-					
Marquette, MI	135	154	112	160	164	171	128	149*	181*	228	239	239*	261*	260*	231*	201*	213*	136*	93*	84	81	84	76	68	91	76	67	78	62	-						
Huron Bay, MI	165	179	132	159	152	157	113	110*	142*	156*	181*	201*	223*	222*	193*	163*	175*	98*	54*	44	41	46	38	30	74	60	44	39	-							
L'Anse, MI	179	192	146	169	162	145*	108	95*	127*	151*	168*	186*	208*	206*	178*	148*	160*	83*	39*	29	26	31	23	14	70	71	51	-								
Mendota Canal, MI	138	152	105	125	117	122	78	103	145	172	190	212	234	232	204	174*	186*	110*	69*	55	52	58	50	41	42	27	-									
Copper Harbor, MI	137	145	100	112	99	100	56	77	119	142	161	185	208	206	178	150	163	88	45	56	59	71	65	60	16	-										
Eagle Harbor, MI	151	159	114	122	102	96	53	65	105	129	146	170	194	192	163	135	147	72	31	41	45	57	50	56	-											
Portage Entry, MI	168	181	135	157	149	130*	94	81*	113*	136	153	171*	193*	192*	163*	133*	145*	68*	25*	14	11	17	9	-												
Chassell, MI	177	190	143	166	145	125	89	76	108	128	146	166	188	187	158	128	140	63	20	9	6	12	-													
Lake Linden, MI	185	198	151	174	151	131	95	82	113	136	153	172	194	193	163	134	146	69	26	15	11	-														
Dollar Bay, MI	180	192	146	163	139	119	83	70	102	122	140	160	182	181	152	122	134	57	14	3	-															
Houghton, MI	182	195	149	160	136	116	80	67	99	118	135	157	179	178	149	119	131	54	11	-																
Keweenaw, Upper Entry, MI	180	187	142	149	126	105	69	56	88	108	125	147	169	167	139	109	120	44	-																	
Ontonagon, MI	221	228	183	189	165	117	103	68	76	86	95	114	136	135	106	74	82	-																		
Ashland, WI	295	304	258	261	227	164	165	115	85	77	62	71	93	92	63	16	-																			
Bayfield, WI	282	291	246	254	221	149	152	99	70	60	45	57	78	77	49	-																				
Port Wing, WI	312	319	275	272	233	169	175	121	83	56	35	22	34	32	-																					
Superior, WI	340	347	303	300	259	195	199	147	107	78	54	28	7	-																						
Duluth, MN	342	349	305	300	259	195	200	147	105	77	53	26	-																							
Two Harbors, MN	319	327	281	277	236	172	177	124	82	55	27	-																								
Silver Bay, MN	300	302	260	250	210	145	156	100	55	25	-																									
Taconite, MN	280	283	240	227	190	130	136	78	31	-																										
Grand Marais, MN	252	256	214	199	157	92	99	47	-																											
Rock of Ages, MI	209	213	171	155	112	49	53	-																												
Passage Island, MI	164	166	127	102	63	44	-																													
Thunder Bay, Ontario (d)	208	209	171	142	102	-																														
Rossport, Ontario	157	155	125	71	-																															
Peninsula Harbor, Ontario	114	112	86	-																																
Quebec Harbor, Ontario	41	49	-																																	
Michipicoten, Ontario	32	-																																		
Gargantua Harbor, Ontario	-																																			

(a) From foot of Grand River Avenue.
(b) From sailing course point north of Old Mackinac Point
(c) From abeam of east end of United States center pier.
(d) old Port Arthur.
* Via Keweenaw Waterway.

EXPLANATION
Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward around the north shore.

ILLINOIS WATERWAY CHANNELS AND DISTANCES

(Statute Miles)

No.	Name of Channel	Length of connecting channel	From lake shore, Wilmette Harbor	From east end of north pier, Chicago Harbor	From east end of north pier, Calumet Harbor
1	North Shore Channel - From Wilmette Harbor	8.1			
	To connection with North Branch of Chicago River	–	8.1	9.0	59.3
2	Chicago River, North Branch - from North Shore Channel	7.3			
	To junction of branches and main channel	–	15.5	1.6	52.0
3	Chicago River, Main Channel - from junction of branches	1.6			
	To east end of north pier, Chicago Harbor	–	17.0	–	53.6
4	Chicago River, South Branch - from junction of branches	3.9			
	West Fork of South Branch	0.6			
	To connection with Sanitary and Ship Canal (No. 8a below)	–	20.0	6.1	47.5
5	Calumet River - from east end of north pier, Calumet Harbor	7.7	67.5	53.6	–
6	Little Calumet River - west from Calumet River cutoff channel	6.0	59.8	45.9	7.7
7	Calumet - Sag Channel - from Little Calumet River connection	16.2	53.8	39.9	13.7
	To connection with Sanitary and Ship Canal	–	37.6	23.7	29.9
8	Chicago Sanitary and Ship Canal:				
	(a) From West Fork of South Branch, Chicago River (No. 4)	30.0			
	(b) From Calumet - Sag Channel connection (No. 7 above)	12.4			
	To connection with Des Plaines River, Lockport Lock	–	50.0	36.1	42.3
9	Des Plaines River - from Lockport Lock	18.1			
	To head of Illinois River	–	68.1	54.3	60.5
10	Illinois River - from head of river	272.9			
	To mouth of the Mississippi River	–	341.1	327.2	333.4
11	Illinois River - from head of river	62.7			
	To connection of Illinois and Mississippi Canal (No. 12)	–	130.9	117.0	123.2
12	Illinois and Mississippi Canal - from Illinois River	75.0			
	To Mississippi River at mouth of Rock River	–	205.9	192.0	198.1

DISTANCES ON NEW YORK STATE WATERWAYS

(Statute Miles)

City - Local Point	From Buffalo, Erie Basin	From Oswego, Lake Terminal	From Troy Lock
Erie Canal			
Buffalo - Erie Basin	-	214.2	353.3
Tonawanda - Terminal	12.9	201.3	340.3
Lockport - Lower Terminal	30.9	183.3	322.3
Rochester	93.9	126.9	265.9
Newark - Dock	124.3	89.9	228.9
Syracuse - Terminal	190.1	37.2	176.2
Rome - Terminal	235.9	69.1	117.3
Utica - Terminal	249.9	83.1	104.9
Little Falls - Terminal	270.8	104.0	82.5
Amsterdam - Terminal	313.3	146.5	40.0
Schenectady	330.1	163.3	23.8
Cohoes	351.6	184.8	1.7
Troy Lock	353.3	186.5	-
Cayuga and Seneca Canal			
Watkins Glen	201.4	116.8	255.9
Ithaca	191.4	106.7	245.8
Oswego Canal			
Fulton - Dock Wall	202.5	11.7	174.7
Oswego - Lake Terminal	214.2	-	186.5
Champlain Canal and Lake			
Mechanicville - Terminal	360.1	193.3	11.4
Fort Edward - Terminal	388.7	222.0	40.1
Whitehall - Terminal	411.2	244.5	62.6
Burlington - Landing	481.8	315.1	133.1
Plattsburg - Terminal	497.2	330.5	148.5
Rouses Point - Terminal	593.3	366.5	173.0

Conversion of Degrees to Points and Points to Degrees

°	'	Points	°	'	Points
000	00	N	180	00	S
002	49		182	49	
005	38	N ½ E	185	38	S ½ W
008	26		188	26	
011	15	N x E	191	15	S x W
014	04		194	04	
016	53	N x E ½ E	196	53	S x W ½ W
019	41		199	41	
022	30	NNE	202	30	SSW
025	19		205	19	
028	08	NNE ½ E	208	08	SSW ½ W
030	56		210	56	
033	45	NE x N	213	45	SW x W
036	34		216	34	
039	23	NE ½ N	219	23	SW ½ S
042	11		222	11	
045	00	NE	225	00	SW
047	49		227	49	
050	38	NE ½ E	230	38	SW ½ W
053	26		233	26	
056	15	NE x E	236	15	SW x W
059	04		239	04	
061	53	NE x E ½ E	241	53	SW x W ½ W
064	41		244	41	
067	30	ENE	247	30	WSW
070	19		250	19	
073	08	ENE ½ E	253	08	WSW ½ W
075	56		255	56	
078	45	E x N	258	45	W x S
081	34		261	34	
084	23	E ½ N	264	23	W ½ S
087	11		267	11	
090	00	E	270	00	W
092	49		272	49	
095	38	E ½ S	275	38	W ½ S
098	26		278	26	
101	15	E x S	281	15	W x N
104	04		284	04	
106	53	ESE ½ E	286	53	WNW ½ W
109	41		289	41	
112	30	ESE	292	30	WNW
115	19		295	19	
118	08	SE x E ½ E	298	08	NW x W ½ W
120	56		300	56	
123	45	SE x E	303	45	NW x W
126	34		306	34	
129	23	SE ½ E	309	23	NW ½ W
132	11		312	11	
135	00	SE	315	00	NW
137	49		317	49	
140	38	SE ½ S	320	38	NW ½ N
143	26		323	26	
146	15	SE x S	326	15	NW x N
149	04		329	04	
151	53	SSE ½ E	331	53	NNW ½ W
154	41		334	41	
157	30	SSE	337	30	NNW
160	19		340	19	
163	08	S x E ½ E	343	08	N x W ½ W
165	56		345	56	
168	45	S x E	348	45	N x W
171	34		351	34	
174	23	S ½ E	354	23	N ½ W
177	11		357	11	

Table For Estimating Time of Transit

Distance	Speed in knots																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	30
Nautical Miles	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours	Days-hours
10	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	.....	.....	.....	.....	.....	.....
20	0-3	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
30	0-4	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1
40	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1
50	0-6	0-6	0-5	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2
60	0-8	0-7	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2
70	0-9	0-8	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2
80	0-10	0-9	0-8	0-7	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3
90	0-11	0-10	0-9	0-8	0-8	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3
100	0-13	0-11	0-10	0-9	0-8	0-8	0-7	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-3
200	1-1	0-22	0-20	0-18	0-17	0-15	0-14	0-13	0-13	0-12	0-11	0-11	0-10	0-10	0-9	0-9	0-8	0-8	0-7
300	1-14	1-9	1-6	1-3	1-1	0-23	0-21	0-20	0-19	0-18	0-17	0-16	0-15	0-14	0-14	0-13	0-13	0-12	0-10
400	2-2	1-20	1-16	1-12	1-9	1-7	1-5	1-3	1-1	1-0	0-22	0-21	0-20	0-19	0-18	0-17	0-17	0-16	0-13
500	2-15	2-8	2-2	1-21	1-18	1-14	1-12	1-9	1-7	1-5	1-4	1-2	1-1	1-0	0-23	0-22	0-21	0-20	0-17
600	3-3	2-19	2-12	2-7	2-2	1-22	1-19	1-16	1-14	1-11	1-9	1-8	1-6	1-5	1-3	1-2	1-1	1-0	0-20
700	3-16	3-6	2-22	2-16	2-10	2-6	2-2	1-23	1-20	1-17	1-15	1-13	1-11	1-9	1-8	1-6	1-5	1-4	0-23
800	4-4	3-17	3-8	3-1	2-19	2-14	2-9	2-5	2-2	1-23	1-20	1-18	1-16	1-14	1-12	1-11	1-9	1-8	1-3
900	4-17	4-4	3-18	3-10	3-3	2-21	2-16	2-12	2-8	2-5	2-2	1-23	1-21	1-19	1-17	1-15	1-14	1-12	1-6
1,000	5-5	4-15	4-4	3-19	3-11	3-5	2-23	2-19	2-15	2-11	2-8	2-5	2-2	2-0	1-21	1-19	1-18	1-16	1-9
2,000	10-10	9-6	8-8	7-14	6-23	6-10	5-23	5-13	5-5	4-22	4-15	4-9	4-4	3-23	3-19	3-15	3-11	3-8	2-19
3,000	15-15	13-21	12-12	11-9	10-10	9-15	8-22	8-8	7-20	7-8	6-23	6-14	6-6	5-23	5-16	5-10	5-5	5-0	4-4
4,000	20-20	18-21	16-16	15-4	13-21	12-20	11-22	11-3	10-10	9-19	9-6	8-19	8-8	7-22	7-14	7-6	6-23	6-16	5-13
5,000	26-1	23-4	20-20	18-23	17-9	16-1	14-21	13-21	13-1	12-6	11-14	10-23	10-10	9-22	9-11	9-1	8-16	8-8	6-23
6,000	31-6	27-19	25-0	22-17	20-20	19-6	17-21	16-16	15-15	14-17	13-21	13-4	12-12	11-22	11-9	10-21	10-10	10-0	8-8

Distance of Visibility of Objects of Various Elevations at Sea

This table gives the approximate geographic range of visibility for an object which may be seen by an observer. It is necessary to add to the distance for the height of any object the distance corresponding to the height of the observer's eye above sea level.

Height (feet)	Distance - Naut. miles	Distance - Statute miles	Height (meters)	Height (feet)	Distance - Naut. miles	Distance - Statute miles	Height (meter)
1	1.2	1.3	0.3	120	12.8	14.7	36.6
2	1.7	1.9	0.6	125	13.1	15.1	38.1
3	2.0	2.3	0.9	130	13.3	15.4	39.6
4	2.3	2.7	1.2	135	13.6	15.6	41.2
5	2.6	3.0	1.5	140	13.8	15.9	42.7
6	2.9	3.3	1.8	145	14.1	16.2	44.2
7	3.1	3.6	2.1	150	14.3	16.5	45.7
8	3.3	3.8	2.4	160	14.8	17.0	48.8
9	3.5	4.0	2.7	170	15.3	17.6	51.8
10	3.7	4.3	3.1	180	15.7	18.1	54.9
11	3.9	4.5	3.4	190	16.1	18.6	57.9
12	4.1	4.7	3.7	200	16.5	19.0	61.0
13	4.2	4.9	4.0	210	17.0	19.5	64.0
14	4.4	5.0	4.3	220	17.4	20.0	67.1
15	4.5	5.2	4.6	230	17.7	20.4	70.1
16	4.7	5.4	4.9	240	18.1	20.9	73.2
17	4.8	5.6	5.2	250	18.5	21.3	76.2
18	5.0	5.7	5.5	260	18.9	21.7	79.3
19	5.1	5.9	5.8	270	19.2	22.1	82.3
20	5.2	6.0	6.1	280	19.6	22.5	85.3
21	5.4	6.2	6.4	290	19.9	22.9	88.4
22	5.5	6.3	6.7	300	20.3	23.3	91.4
23	5.6	6.5	7.0	310	20.6	23.7	94.5
24	5.7	6.6	7.3	320	20.9	24.1	97.5
25	5.9	6.7	7.6	330	21.3	24.5	100.6
26	6.0	6.9	7.9	340	21.6	24.8	103.6
27	6.1	7.0	8.2	350	21.9	25.2	106.7
28	6.2	7.1	8.5	360	22.2	25.5	109.7
29	6.3	7.3	8.8	370	22.5	25.9	112.8
30	6.4	7.4	9.1	380	22.8	26.2	115.8
31	6.5	7.5	9.5	390	23.1	26.6	118.9
32	6.6	7.6	9.8	400	23.4	26.9	121.9
33	6.7	7.7	10.1	410	23.7	27.3	125.0
34	6.8	7.9	10.4	420	24.0	27.6	128.0
35	6.9	8.0	10.7	430	24.3	27.9	131.1
36	7.0	8.1	11.0	440	24.5	28.2	134.1
37	7.1	8.2	11.3	450	24.8	28.6	137.2
38	7.2	8.3	11.6	460	25.1	28.9	140.2
39	7.3	8.4	11.9	470	25.4	29.2	143.3
40	7.4	8.5	12.2	480	25.6	29.5	146.3
41	7.5	8.6	12.5	490	25.9	29.8	149.4
42	7.6	8.7	12.8	500	26.2	30.1	152.4
43	7.7	8.8	13.1	510	26.4	30.4	155.5
44	7.8	8.9	13.4	520	26.7	30.7	158.5
45	7.8	9.0	13.7	530	26.9	31.0	161.5
46	7.9	9.1	14.0	540	27.2	31.3	164.6
47	8.0	9.2	14.3	550	27.4	31.6	167.6
48	8.1	9.3	14.6	560	27.7	31.9	170.7
49	8.2	9.4	14.9	570	27.9	32.1	173.7
50	8.3	9.5	15.2	580	28.2	32.4	176.8
55	8.7	10.0	16.8	590	28.4	32.7	179.8
60	9.1	10.4	18.3	600	28.7	33.0	182.9
65	9.4	10.9	19.8	620	29.1	33.5	189.0
70	9.8	11.3	21.3	640	29.5	34.1	195.1
75	10.1	11.7	22.9	660	30.1	34.6	201.2
80	10.5	12.0	24.4	680	30.5	35.1	207.3
85	10.8	12.4	25.9	700	31.0	35.6	213.4
90	11.1	12.8	27.4	720	31.4	36.1	219.5
95	11.4	13.1	29.0	740	31.8	36.6	225.6
100	11.7	13.5	30.5	760	32.3	37.1	231.7
105	12.0	13.8	32.0	780	32.7	37.6	237.7
110	12.3	14.1	33.5	800	33.1	38.1	243.8
115	12.5	14.4	33.1	820	33.5	38.6	249.9

Example: Determine the geographic visibility of an object 65 feet above the water, for an observer whose eye is 35 above the water:

Height of object	65 feet	9.4 nautical miles
Height of observer	35 feet	6.9 nautical miles
Computed geographic visibility		16.3 nautical miles

Standard Abbreviations Used In Broadcasts

Various (continued)	
Aeronautical Radiobeacon	AERO RBN
Articulated Daybeacon	ART DBN
Articulated Light	ART LT
Destroyed	DESTR
Discontinued	DISCONTD
Established	ESTAB
Exposed Location Buoy	ELB
Fog Signal Station	FOG SIG
Large Navigational Buoy	LNB
Light	LT
Light List Number	LLNR
Lighted Bell Buoy	LBB
Lighted Buoy	LB
Lighted Gong Buoy	LGB
Lighted Horn Buoy	LHB
Lighted Whistle Buoy	LWB
Ocean Data Acquisition System	ODAS
Privately Maintained	PRIV MAINTD
Radar Beacon	RACON
Radar Reflector	RA REF
Temporarily Replaced by Unlighted Buoy	TRUB
Temporarily Replaced by Lighted Buoy	TRLB
Whistle	WHIS
Light Characteristics	
Alternating	AL
Characteristic	CHAR
Composite Group-Flashing	FL(2+1)
Composite Group-Occulting	OC(2+1)
Continuous Quick-Flashing	Q
Fixed and Flashing	FFL
Fixed	F
Group-Flashing	FL(3)
Group-Occulting	OC(2)
Interrupted Quick-Flashing	IQ
Isophase	ISO
Morse Code	MO(A)
Occulting	OC
Single-Flashing	FL
Colors[1]	
Black	B
Blue	BU
Green	G
Orange	OR
Red	R
White	W
Yellow	Y

Organizations	
Commander, Coast Guard District (#)	CCGD(#)
Coast Guard	CG
Corps of Engineers	COE
National Geospatial-Intelligence Agency	NGA
National Ocean Service	NOS
National Weather Service	NWS
Vessels	
Aircraft	A/C
Fishing Vessel	F/V
Liquefied Natural Gas Carrier	LNG
Motor Vessel[2]	M/V
Pleasure Craft	P/C
Research Vessel	R/V
Sailing Vessel	S/V
Compass Directions	
North	N
South	S
East	E
West	W
Northeast	NE
Northwest	NW
Southeast	SE
Southwest	SW
Months	
January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	NOV
December	DEC
Days of the Week	
Monday	MON
Tuesday	TUE
Wednesday	WED
Thursday	THU
Friday	FRI
Saturday	SAT
Sunday	SUN

[1] Color refers to light characteristics of Aids to Navigation only
[2] M/V includes: Steam Ship, Container Vessel, Cargo Vessel, etc.

Standard Abbreviations Used In Broadcasts

Countries and States	
Alabama	AL
Alaska	AK
American Samoa	AS
Arizona	AZ
Arkansas	AR
California	CA
Canada	CN
Colorado	CO
Connecticut	CT
Delaware	DE
District of Columbia	DC
Florida	FL
Georgia	GA
Guam	GU
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Marshall Islands	MH
Massachusetts	MA
Missouri	MO
Mississippi	MS
Mexico	MX
Michigan	MI
Minnesota	MN
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Northern Mariana Islands	MP
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Puerto Rico	PR
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
United States	US
Utah	UT
Vermont	VT
Virgin Islands	VI
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY

Various	
Anchorage	ANCH
Anchorage Prohibited	ANCH PROHIB
Approximate	APPROX
Atlantic	ATL
Authorized	AUTH
Average	AVG
Bearing	BRG
Breakwater	BKW
Broadcast Notice to Mariners	BNM
Channel	CHAN
Code of Federal Regulations	CFR
Continue	CONT
Degrees (temp; geo pos)	DEG
Diameter	DIA
Edition	ED
Effect/Effective	EFF
Entrance	ENTR
Explosive Anchorage	EXPLOS ANCH
Fathom(s)	FM(S)
Foot/Feet	FT
Harbor	HBR
Height	HT
Hertz	HZ
Horizontal Clearance	HOR CL
Hour	HR
International Regulations for Preventing Collisions at Sea	COLREGS
Kilohertz	KHZ
Kilometer	KM
Knot(s)	KT(S)
Minute (time; geo pos)	MIN
Moderate	MOD
Mountain, Mount	MT

Standard Abbreviations Used In Broadcasts

Various (continued)	
Operating Area	OPEREA
Pacific	PAC
Point(s)	PT(S)
Position	POS
Position Approximate	PA
Pressure	PRES
Private/Privately	PRIV
Prohibited	PROHIB
Publication	PUB
Range	RGE
Reported	REP
Restricted	RESTR
Rock	RK
Saint	ST
Second	SEC
Signal Station	SIG STA
Station	STA
Statute Mile(s)	SM
Storm Signal Station	S SIG STA
Temporary	TEMP
Thunderstorm	TSTORM
Through	THRU
True	T
Uncovers; Dries	UNCOV
Universal Coordinate Time	UTC
Urgent Marine Information Broadcast	UMIB
Velocity	VEL
Vertical Clearance	VERT CL
Visibility	VIS
Yard(s)	YD
Warning	WARN
Weather	WX
Wreck	WK

Measurements and Equivalencies

Unit	Equivalency	Unit	Equivalency
nautical mile	1,852 meters 6,076.12 feet	acre	43,560 square feet 4,046.82 square meters
statute mile	5,280 feet 1,609.3 meters 1.6093 kilometers	pound (avoirdupois)	453.59 gram
cable	0.1 nautical mile (CN) 720 feet (US)	gram	0.0 022 046 pound (avoirdupois)
fathom	6 feet 1.8288 meters	short ton	2,000 pounds
foot	0.3048 meter	long ton	2,240 pounds
inch	2.54 centimeters	metric ton	2,204.6 pounds
meter	39.37 inches 3.281 feet 1.0936 yards	kilogram	2.2 pounds
kilometer	1,000 meters	liter	1.0567 quarts
knot	1.6877 feet per second 0.5144 meters per second	barrel (petroleum)	42 gallons (US)
miles per hour (statute)	1.466 feet per second 0.44704 meters per second		

Conversion Factors

	Known Value	Multiply By	Unknown Value
Linear	inches	25.40	millimeters
		2.540	centimeters
	centimeters	0.032808	feet
	feet	30.48	centimeters
		0.3048	meters
		0.00016458	nautical miles
	yard	0.9144	meters
	meters	3.2808	feet
		1.094	yards
		0.0005399	nautical miles
	statute miles	0.86897	nautical miles
		1.6093	kilometers
		1,609.3	meters
	nautical miles	1.151	statute miles
Area	square feet	0.0929	square meters
		0.00002296	acres
	square meters	10.764	square feet
		0.0002471	acres
	acres	4,046.9	square meters
		43,560	square feet
		0.404685	hectare
	hectare	2.471054	acres
		10,000	square meters
		1.07639×10^5	square feet
Depth	fathoms	1.8288	meters
	meters	0.54681	fathoms
		3.2808	feet
	feet	0.3048	meters
Rate	feet per second	0.5925	knots
		0.6818	miles per hour
		30.48	centimeters per second

	Known Value	Multiply By	Unknown Value
Rate	statute miles per hour	0.8689	knots
		1.467	feet per second
		0.447	meters per second
	knots	1.151	miles per hour
		0.5144	meters per second
		1.6878	feet per second
	centimeters per second	0.01944	knots
		0.02237	miles per hour
		0.032808	feet per second
Mass	grams	0.035275	ounces
		0.002205	pounds
	ounces	28.349	grams
	pounds	0.45359	kilograms
	short tons	2,000	pounds
		0.89286	long tons
		0.9072	metric tons
	long tons	2,240	pounds
		1.12	short tons
		1.016	metric tons
	metric tons	1,000	kilograms
		0.9842	long tons
		1.1023	short tons
		2,204.6	pounds
Volume	barrels (petroleum)	42	gallons (US)
		158.99	liters
	barrels (liquid, US)	31.5	gallons (US)
		26.229	gallons (British)
		119.24	liters
	gallons (US)	0.02381	barrels (petroleum)
		3.7854	liters
	liters	0.26417	gallons (US)

METRIC STYLE GUIDE

Prefixes: Some of the metric units listed include prefixes such as kilo, centi, and milli. Prefixes, added to a unit name, create larger or smaller units by factors that are powers of 10. For example, add the prefix kilo, which means a thousand, to the unit gram to indicate 1000 grams; thus 1000 grams become 1 kilogram. The more common prefixes follow.

Factor		Prefix	Symbol
1 000 000	10^6	mega	M
1 000	10^3	kilo	k
1/100	10^{-2}	centi	c
1/1000	10^{-3}	milli	m
1/1 000 000	10^{-6}	micro	µ

Spelling: All units and prefixes should be spelled as shown in this guide.

Conversions: Conversions should follow a rule of reason; do not include figures that imply more accuracy than justified by the original data. For example, 36 inches should be converted to 91 centimeters, not 91.44 centimeters (36 inches x 2.54 centimeters per inch = 91.44 centimeters), and 40.1 inches converts to 101.9 centimeters, not 101.854.

Capitalization of Units: The names of all units start with a lower case letter except, of course, at the beginning of the sentence. There is one exception: in "degree Celsius" (symbol °C) the unit "degree" is lower case but the modifier "Celsius" is capitalized. Thus body temperature is written as 37 degrees Celsius.

Capitalization of Symbols: Unit symbols are written in lower case letters except for liter and those units derived from the name of a person (m for meter, but W for Watt, Pa for Pascal, etc.).

Capitalization of Prefixes: Symbols of prefixes that mean a million or more are capitalized and those less than a million are lower case (M for mega (millions), m for milli (thousandths)).

Pluralizations of Units: Names of units are made plural only when the numerical value that precedes them is more than 1. For example, 0.25 liter or 1/4 liter, but 250 milliliters. Zero degrees Celsius is an exception to this rule.

Pluralization of Symbols: Symbols for units are never pluralized (250 mm=250 millimeters).

Incorrect Terms: The prefix "kilo" stands for one thousand of the named unit. It is not a stand-alone term in the metric system. The most common misuse of this is the use of "kilo" for a "kilogram" of something. The word "micron" is an obsolete term for the quantity "micrometer." Also "degree centigrade" is no longer the correct unit term for temperature in the metric system; it has been replaced by degree Celsius.

Spacing: A space is used between the number and the symbol to which it refers. For example: 7 m, 31.4 kg, 37° C.

When a metric value is used as a one-thought modifier before a noun, hyphenating the quantity is not necessary. However, if a hyphen is used, write out the name of the metric quantity with the hyphen between the numeral and the quantity. For example:

a 2-liter bottle, not a 2-L bottle;
a 100-meter relay, not a 100-m relay;
35-millimeter film, not 35-mm film.

In names or symbols for units having prefixes, there is no space between letters making up the symbol or name. Examples: milligram, mg; kilometer, km.

Spaces (not commas) are used in writing metric values containing five or more digits. Examples 1 234 567 km, 0.123 456 mm. For values with four digits, either a space or no space is acceptable.

Period: Do not use a period with metric unit names and symbols except at the end of a sentence.

Decimal Point: The dot or period is used as the decimal point within numbers. In numbers less than one, zero should be written before the decimal point. Examples: 7.038 g; 0.038 g.