

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE NOAA, NATIONAL WEATHER SERVICE MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS TO: NATIONAL WEATHER SERVICE (W/OH12x1) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 7116 SILVER SPRING, MD 20910	HSA OFFICE: Marquette, MI
	REPORT FOR (MONTH / YEAR): April 2013
	DATE: June 5, 2013
	SIGNATURE: Robin J. Turner, MIC Justin Titus, Meteorologist
When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).	



An X inside this box indicates no flooding occurred within this Hydrologic Service Area.

April Flooding

Flooding commenced during the last few days of April and, in most cases, continued into May (see may flood report for all data) in our Hydrologic Service Area (HSA). The flooding was the result of melting the anomalously high snow pack for the period of mid to late April. Primary flooding concerns were over western Upper Michigan where snowfall amounts were greater and terrain favored flooding more than over the east. In the Marquette HSA, 6 out of 13 river forecast points exceeded flood stage in April (another 2 added in May). Of the 6 river forecast points that exceeded flood stage in April, none went above moderate flood stage. With warmer temperatures and less snowpack over south central Upper Michigan, primarily in Menominee County and immediately surrounding areas, melting occurred in early to mid April. Over the south central HSA, some minor nuisance flooding was observed as ice jams worked their way through some of the river system...but not significant impacts were noted and none of these sites went over flood stage. An areal flood warning was issued for Gogebic County where non river specific flooding was likely the worst. Areal flood advisories were also issued for Gogebic, Baraga and Marquette Counties in April. Due to the combination of April and May flooding, Michigan's Governor Rick Snyder declared a state of disaster for 19 counties and two cities. 6 of the 19 counties declared in the disaster are within our HSA, including Baraga, Gogebic, Houghton, Keweenaw, Marquette and Ontonagon. Flood damage estimates were in excess of 6.5 million dollars. Thankfully, no lives were lost during the flooding.

Decision support services included providing daily briefings to several Emergency Managers regarding flooding, and potential impacts. A webinars and information packet on weather and flooding was provided to Emergency Management and County/City officials a few days before the event.

April Precipitation

April precipitation continued to be above to well above normal in most locations, especially in areas favored by north to northwest wind lake effect snow. Persistent north to northwest winds favored areas from Ironwood to the Keweenaw Peninsula and areas from around Marquette and east for lake effect snow. Cold temperatures allowed for virtually no melting of the existing snowpack in most places, except in the south central HSA where most of the snow was melted by the middle of April. Elsewhere, temperatures stayed cold enough through most of April to keep liquid locked up in the frozen snow pack. As temperatures transitioned toward a much warmer pattern later in the month and into May, significant melting of the snow pack resulted.

Mid April snow depth and snow water equivalent (SWE) readings:

Location	Snow Depth (in)	SWE (in)
Ironwood	20	9.7
Bessemer	23	4.6
Mohawk	38	8.5
Painesdale	38	17.0
Calumet	27	11.1
Chassell Twp	22	5.0
Net River	18	5.9
Amasa	18	4.6
Elmwood	17	5.4
Beechwood	14	4.3
Stammaugh	15	5.4
Michigamme	18	4.1
Alpha	14	2.5
Nestoria	24	8.5
Peshekee	37	13.8
Champion	19	6.1
Republic	20	4.7
NWS Marquette	35	12.3
Harvey	16	5.0
Marquette	10	4.9
Carlshend	15	5.9
Gwinn	10	4.3
Arnold	13	4.8
Channing	13	4.2
Boney Falls Dam	9	2.7
Gemini Lake	40	13.7

Below is a chart of some of the larger cities in the Upper Peninsula, with monthly precipitation in inches, the amount of inches above or below normal for the month and any applicable record high or low rank.

Location	Precipitation	Above/Below	Rank	Snowfall	Above/Below	Rank
WFO Marquette	4.76	1.75	6 th	27.6	13.1	7 th
Marquette City	3.97	1.52		13.4	6.9	
Houghton Airport	M			M		
Ironwood	6.53	3.89	3 rd	45.0	33.6	1 st
Iron Mountain	3.69	1.33		8	3.4	
Manistique	M			11.0	8.4	4 th
Munising	4.13	1.93	10 th	17.9	10.3	8 th
Newberry	2.75	M		M	M	
Ontonagon 6SE	3.82	1.56	5 th	29.5	22.6	1 st

Other monthly precipitation totals from coop observers:

Location	Precipitation (inches)	Snowfall (inches)
Alberta (Baraga County)	4.86	24.5
Amasa (Iron County)	3.67	13.5
Atlantic Mine (Houghton County)	5.81	53.0
Baraga 7NW (Baraga County)	4.67	30.1
Big Bay (Marquette County)	5.46	31.0
Chatham (Alger County)	3.72	13.1
Clarksburg (Marquette County)	3.83	20.3
Cooks (Schoolcraft County)	M	M
Copper Harbor (Keweenaw County)	5.17	17.7
Garden Corners (Delta County)	2.82	9.6
Gladstone (Delta County)	3.27	8.7
Greenland 6N (Ontonagon County)	5.21	29.5
Gwinn (Marquette County)	3.08	8.4
Harvey (Marquette County)	3.12	7.8
Herman (Baraga County)	5.28	46.9
Jacobsville (Houghton County)	5.17	31.7
Mohawk (Keweenaw County)	5.77	41.8
Menominee (Menominee County)	3.57	8.4
Norway (Dickinson County)	3.44	10.4
Stambaugh (Iron County)	4.24	M
Twin Lakes (Houghton County)	5.84	53.6
Watersmeet (Gogebic County)	4.97	21.6
Watton (Baraga County)	5.03	24.2

Drought Discussion

According to the April 30th, 2013 release of the U.S. Drought Monitor, only a small part of the Upper Peninsula along the Wisconsin Border in Dickinson and Iron Counties was classified under Abnormally Dry (D0) drought. For the latest drought status, please go to <http://www.crh.noaa.gov/mqt/?n=drought>.

April Temperatures

Below is a table of some of the larger cities in the Upper Peninsula, with average monthly temperature and number of degrees above or below normal for the month, and the rank of an all-time warmest or coldest month, where applicable.

Location	Temperature (degrees)	Above/Below	Rank
WFO Marquette	32.4	-5.5	5 th
Marquette City	35.6	-4.5	
Houghton Airport	31.9	-6.1	2 nd
Ironwood	30.9	-8.4	2 nd
Iron Mountain	36.1	-5.4	7 th
Manistique	34.3	-4.5	5 th
Munising	33.8	-5.2	
Newberry	34.1	-3.9	8 th
Ontonagon 6SE	36.3	-5.6	3 rd

April River Levels

According to the United States Geological Survey, April streamflow was generally below normal (10-24 percentile) in most Lake Superior Basins of Upper Michigan and normal (25-75 percentile) to much above normal (>90 percentile) in Lake Michigan Basins of Upper Michigan.

April Products Issued

1 Areal Flash Flood Watch (ARBFFAMQT)
1 Areal Flood Watches (ARBFFAMQT)
1 Areal Flood Warnings (ARBFLWMQT)
2 Areal Flood Advisories (ARBFLSMQT)
10 Areal Flood Statements (ARBFLSMQT)
4 River Flood Watches (ARBFFAMQT)
11 River Flood Warnings (ARBFLWMQT)
4 River Flood Advisories (ARBFLSMQT)
20 River Flood Statements (ARBFLSMQT)
2 Hydrologic Statements (ARBRVSMQT)
6 Hydrologic Outlook (ARBESFMQT)

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