2014
Upper Michigan
Fire Weather
Annual Operating Plan

Marquette, MI
(MQT)

Updated May 28, 2014

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I. INTRODUCTION

This Annual Operating Plan (AOP) will identify meteorological services to be provided by the Marquette, Michigan National Weather Service (NWS) Office. The area of responsibility encompasses all Upper Michigan. This includes areas of the Michigan Department of Natural Resources (DNR), Isle Royale National Park in the northwest, the Ottawa National Forest across the west, the Hiawatha National Forest central and east, Pictured Rocks National Lakeshore along portions of Lake Superior, Seney National Wildlife Refuge east, and the Bureau of Indian Affairs.

This NWS is supported by the Eastern Geographic Area Coordination Center (GACC).

Services provided by the NWS fall into two categories, traditional and special services. The traditional services are provided without cost and are coordinated between the user and the NWS office personnel. Most of these products are available upon request 24 hours a day throughout the year. Examples of traditional/core services include…

- Fire Weather Planning Forecast (FWF)
- Fire Weather Matrix (FWM) forecast for the National Fire Danger Rating System (NFDRS)
- Spot forecast
- Wildfire Potential Statement
- Fire Weather Watches and Red Flag Warnings
- Online Products (Fire Weather Graphics, Hourly Weather Graph, etc.)

Special services provided may include teaching weather related courses or an on-site Incident Meteorologist (IMET). Please reference the Geographic Area Mobilization Guide and/or the National Mobilization Guide for details about these special services.

II. SERVICE AREA AND ORGANIZATIONAL DIRECTORY

A. List of National Weather Service (NWS) offices and points of contact

1. Marquette, Michigan (MQT) office

Fire Weather Season: Traditionally April 15 to November 1. Wildfires across our area can occur almost any time of the year; however, there are generally two peaks of increased fire danger. These time periods are in the spring prior to green-up, and in the fall curing period prior to significant snow. If unavailable, our primary backup office is Gaylord, Michigan.

Online: www.crh.noaa.gov/mqt/?n=firewx (Fire Page)
http://spot.nws.noaa.gov/cgi-bin/spot/spotmon?site=mqt (Spot Page)
www.crh.noaa.gov/ndfd/graphical/sectors/mqtFireDay.php (Graphical Forecast Fire Page)
www.weather.gov/up (Forecast Area main page)
http://weather.gov/fire (National Weather Service Main Page)

Phone: 906-
906-
906-
906-475-5212 public

Address: 112 Airpark Drive South
Negaunee, MI 49866

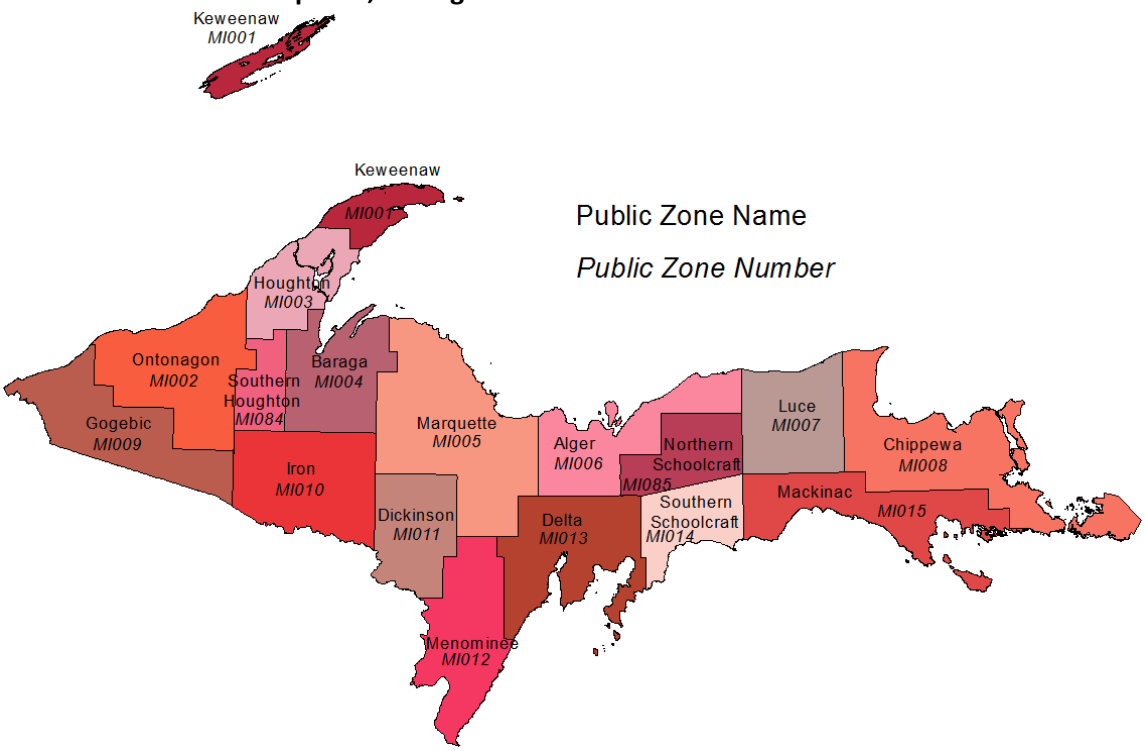
Fire Weather Program Leader:
Kari Fleegel (IMET), Kari.Fleegel@noaa.gov
Assistant Fire Weather Program Leader:
Jason Alumbaugh, Jason.Alumbaugh@noaa.gov
Additional Team Members:
Jon Voss, Keith Cooley
Meteorologist in Charge:
Robin Turner, Robin.J.Turner@noaa.gov

Watch/Warning Criteria:

- A dry spell for over a week (shorter before spring green-up or after fall color)
- Sustained Wind Speed > = 20 mph (10 m ASOS-Airport winds) or >= 15 mph (20 ft RAWS winds)
- Relative Humidity 25% or less
- Temperature 70 F or greater

Note: Temperature criteria is a soft criteria. Red Flag Warnings can be used for temperatures less than 70 degrees depending on other factors.

Marquette, Michigan Fire Weather Forecast Area



Upper Michigan Zone/County Names and Zone Numbers

Alger	MIZ006
Iron	MIZ010
Chippewa	MIZ008
Baraga	MIZ005
Delta	MIZ013
Dickinson	MIZ011
Gogebic	MIZ009
N. Houghton	MIZ003
S. Houghton	MIZ084

Keweenaw(including Isle Royale)	MIZ001
Luce	MIZ007
Mackinac	MIZ008
Marquette	MIZ005
Menominee	MIZ012
Ontonagon	MIZ002
N. Schoolcraft	MIZ085
S. Schoolcraft	MIZ014

2. Surrounding National Weather Service offices

a) Duluth, Minnesota (DLH) office

Online: www.crh.noaa.gov/dlh/?n=fireweather (Fire Page)
www.weather.gov/dlh (Forecast Area main page)

Phone: 218-
218-
218-
218-729-6697 public

Address: 5027 Miller Truck Highway
Duluth, MN 55811-1442

Fire Weather Program Leader:
Amanda Graning, Amanda.Graning@noaa.gov

Assistant Fire Weather Program Leader:

Geoff Grochocinski, Geoffery.Grochocinski@noaa.gov
Meteorologist in Charge:
Michael Stewart, Michael.Stewart@noaa.gov
Watch/Warning Criteria:
Relative Humidity < = 25%
Wind Speed > = 20 mph
Temperature > = 75 degrees F

b) Green Bay, Wisconsin (GRB) office

Online: www.crh.noaa.gov/grb/?n=firewx (Fire Page)
www.weather.gov/grb (Forecast Area Main Page)
Phone: 920-
920-
920-
920-494-2363 public
Address: 2485 South Point Road
Green Bay, WI 54313-5522
Fire Weather Program Leader:
Tim Kieckbusch, Tim.Kieckbusch@noaa.gov
Meteorologist in Charge:
Gary Austin, Gary.Austin@noaa.gov
Watch/Warning Criteria:
Relative Humidity < = 25%
Wind Speed (20 ft, 10 min avg.)> = 15mph
~17 mph, 10m airport wind
Temperature > = 75 degrees F

c) Gaylord, Michigan (APX) office

Online: www.crh.noaa.gov/apx/fire.php (Fire Page)
www.weather.gov/apx (Forecast Area Main Page)
Phone: 989-
989-
989-
989-731-3384 public
Address: 8800 Passenheim Road
Gaylord, MI 49735-9454
Fire Weather Program Leader:
David Lawrence, David.Lawrence@noaa.gov
Meteorologist in Charge:
Bruce Smith, Bruce.Smith@noaa.gov
Watch/Warning Criteria:
Relative Humidity < = 25%
Sustained Wind Speed > = 20 mph (10 m ASOS winds) or
>= 15 mph (20 ft RAWS winds)
*frequent gusts above wind criteria may be used in place of sustained winds.
Temperature > = 75 degrees F

d) Grand Rapids (GRR), Detroit (DTX), and Northern Indiana (IWX) offices

Grand Rapids (GRR) www.crh.noaa.gov/grr/fire (Fire Page)

Phone: 616-
616-
606-

Fire Weather Program Leader:
Nathan Jeruzal, Nathan.Jeruzal@noaa.gov

Assistant Fire Weather Program Leader:
Brian Meade, Brian.Meade@noaa.gov

Meteorologist in Charge:
Daniel Cobb, Daniel.Cobb@noaa.gov

Watch/Warning Criteria:
Relative Humidity < = 25%
Sustained Wind Speed > = 20 mph (10 m ASOS winds) or >= 15 mph (20 ft RAWS winds)
*frequent gusts above wind criteria may be used in place of sustained winds.
Temperature > = 75 degrees F

Detroit (DTX) www.crh.noaa.gov/dtx/?n=firewx (Fire Page)

Phone: 248-
248-
248-
248-620-9804 public

Fire Weather Program Leader:
Heather Orow, Heather.Orow@noaa.gov

Meteorologist in Charge:
Richard Wagenmaker, Richard.Wagenmaker@noaa.gov

Watch/Warning Criteria:
Relative Humidity < = 25%
Sustained Wind Speed > = 20 mph (10 m ASOS winds) or >= 15 mph (20 ft RAWS winds)
Temperature > = 75 degrees F

Northern Indiana (IWX) www.crh.noaa.gov/iwx/?n=firewx (Fire Page)

Phone: 574-
574-
574-834-1104 public

Fire Weather Program Leader:
Lonnie Fisher, Lonnie.Fisher@noaa.gov

Meteorologist in Charge:
Mark Frazier, Mark.Frazier@noaa.gov

Watch/Warning Criteria:
Relative Humidity < = 25%
Sustained Wind Speed > = 20 mph (10 m ASOS winds) or >= 15 mph (20 ft RAWS winds)
Temperature > = 75 degrees F

3. Other important NWS contacts

a) National Fire Weather Program Leader and Operations Coordinator

Online: http://weather.gov/fire

Heath Hockenberry - Program Leader 208
Heath.Hockenberry@noaa.gov

Larry Van Bussum – Ops. Coordinator 208-
208-
Larry.Vanbussum@noaa.gov
208-

Address: National Weather Service
3833 South Development Avenue, Bldg. 3807
Boise, ID 83705

b) Regional Operational Services Meteorologist (ROSM)

Online: www.crh.noaa.gov

Vacant – Central Region Headquarters Emergency Response Specialist 816-
816-

Address: National Weather Service,
Central Region Headquarters
7220 NW 101st Terrace
Kansas City, MO 64153

B. Participating agencies

1. Contacts and phone numbers

a) Geographic Area Coordination Center

Online: http://gacc.nifc.gov/eacc
Floor Coordinator 414-
414-
Address: Eastern Area Coordination Center
626 East Wisconsin Avenue, Suite 500
Milwaukee, WI 53202

Stephen Marien - Fire Weather Program Manager 651-
402-
651-
Stephen_Marien@nps.gov
Address: Mississippi National River and Recreation Area
111 East Kellogg Blvd, Suite 150
St. Paul, MN 55101

b) Hiawatha National Forest, USFS

Online: www.fs.fed.us.r9/forests/hiawatha/
Primary Initial Attack 906-
906-
Eric Rebitzke– Fire Management Officer (acting) 906-
970-
erebitzke@fs.fed.us
Linda Peterson – UPC Dispatch Center Manager (acting) 906-
906-
906-
lpeterson@fs.fed.us
Brenda Dale – East Unit FMO(St.Ignace) 906-
906-
bdale@fs.fed.us
Eric Rebitzke – West Unit FMO(Rapid River)906-
erebitzke@fs.fed.us
906-
906-428-5800 public
Address: 820 Rains Dr.
Gladstone, MI 49837

c) Isle Royale National Park, NPS

Online: www.nps.gov/isro
Richard Moore – Chief Ranger 906-
Richard_Moore@nps.gov
Marshall Plumer – East District Ranger 906-
Marshall_Plumer@nps.gov

906-
906-482-0984 public

Address: 800 East Lakeshore Drive
Houghton, MI 49931-1896

d) Michigan Department of Natural Resources (DNR)

Online: www.michigan.gov/dnr

Acting Duty Officer 906-
906-
906-249-1497 public

Celeste Chingwa – Resource Protection Manager chingwac@michigan.gov

Bryce Avery – Fire Specialist averyb1@michigan.gov

Keith Murphy – Fire Specialist murphyk1@michigan.gov

Debbie Wester – Dispatcher/Secretary westerd@michigan.gov

Address: 110 Ford Road
Marquette, MI 49855

e) Pictured Rocks National Lakeshore, NPS

Online: www.nps.gov/piro

Primary Initial Attack 906-

Eric Rebitzke– Fire Management Officer (acting) 906-
970-
erebitzke@fs.fed.us

Matt Davis – Park Ranger 906-
906-
matthew_davis@nps.gov

Bruce Leutusher – Vegetation/Fuels 906-
906-
906-387-2607 public/headquarters
906-387-3700 public/ Visitors Center

Address: N8391 Sand Point Road
P.O. Box 40
Munising, MI 49862-0040

f) Ottawa National Forest, USFS

Online: www.fs.fed.us/r9/ottawa

Dispatch Center/Duty Officer 906-

Brian Sabin - Dispatcher 906-
906-
906-
bsabin@fs.fed.us

Vacant/Jim Grant – Fire Management Officer 715-
~~906-~~
~~906-~~
dkarlovich@fs.fed.us

Randy Charles – Assistant Forest 906-

Supervisor 906-
rcharles@fs.fed.us
906-358-4551 public

Address: E23979 US Highway 2 East
Watersmeet, MI 49969

g) Seney National Wildlife Refuge, USFW

Online: www.fws.gov/midwest/seney/

Gary Lindsay – Fire Management Officer 906-
906-
906-
gary_lindsay@fws.gov

Greg McClellan – Deputy Refuge Manager 906-
906-
906-
greg_mcclellan@fws.gov

Vacant – Refuge Manager ~~906-~~
~~906-~~
906-586-9851 public
906-586-3800 fax

Eric Rebitzke– Fire Zone Management Officer (acting) 906-
970-
erebitzke@fs.fed.us

Address: 1674 Refuge Entrance Road
Seney, MI 49883

h) US Bureau of Indian Affairs (BIA)

Will Wiggins – Fire Management Fuels Specialist 906-
906-
wwiggins@up.net (primary)
christopher.wiggins@bia.gov (secondary)
906-

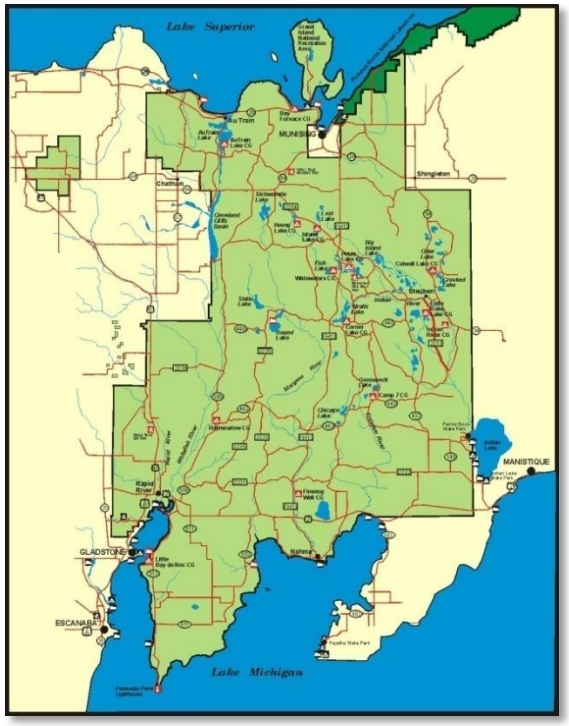
Address: 100 Hemlock Street
Baraga, MI 49908

2. Agency area maps

a) Hiawatha National Forest, USFS

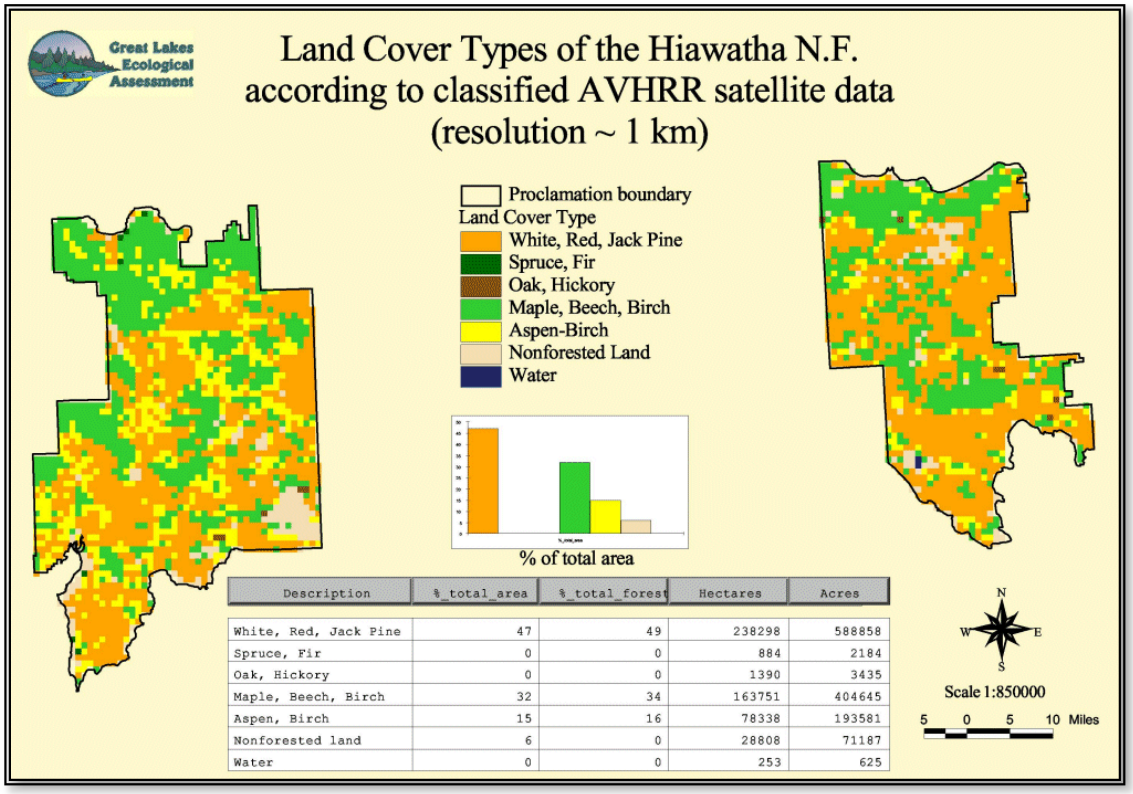
Images courtesy Hiawatha National Forest (http://www.fs.usda.gov/hiawatha)

Western Unit

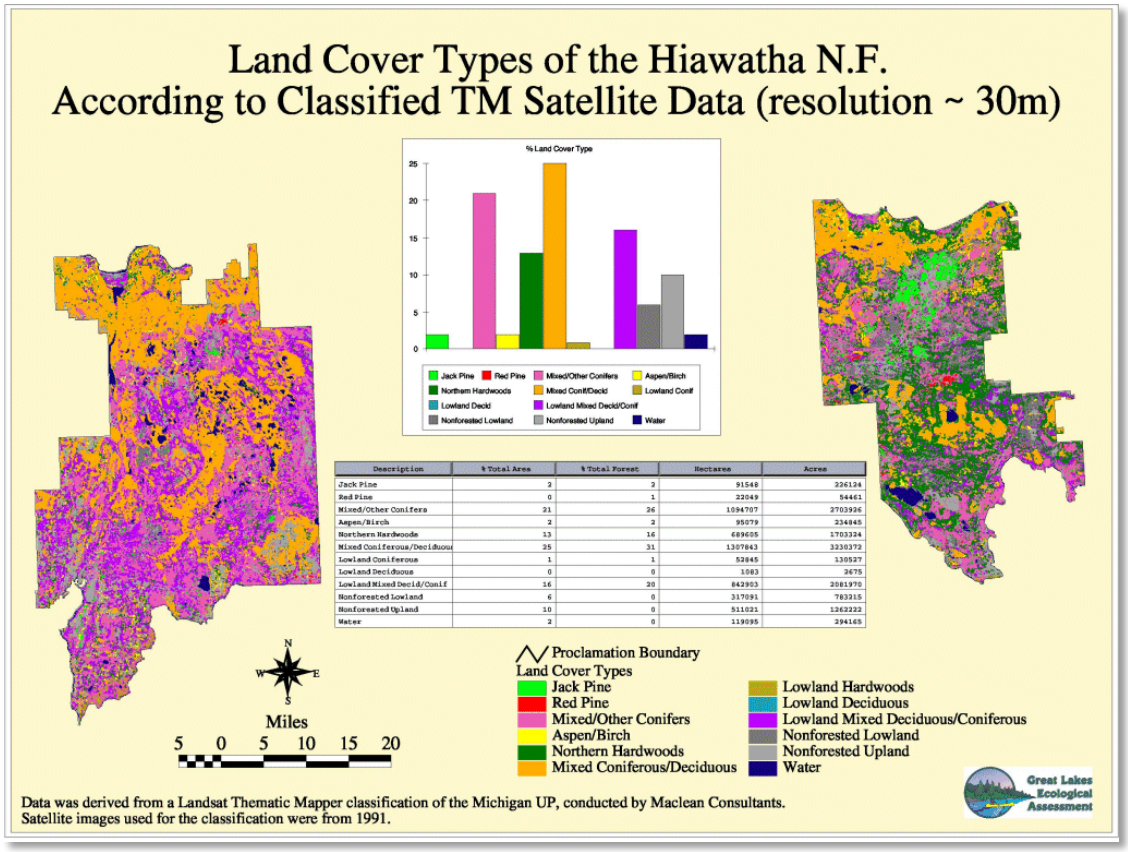


Eastern Unit

Land Cover Types image courtesy Great Lakes Ecological Assessment (http://www.ncrs.fs.fed.us/gla/existveg/images/hiaw_avhrr.gif and http://www.ncrs.fs.fed.us/gla/existveg/hiwa_tm.htm) based off of 1991 satellite



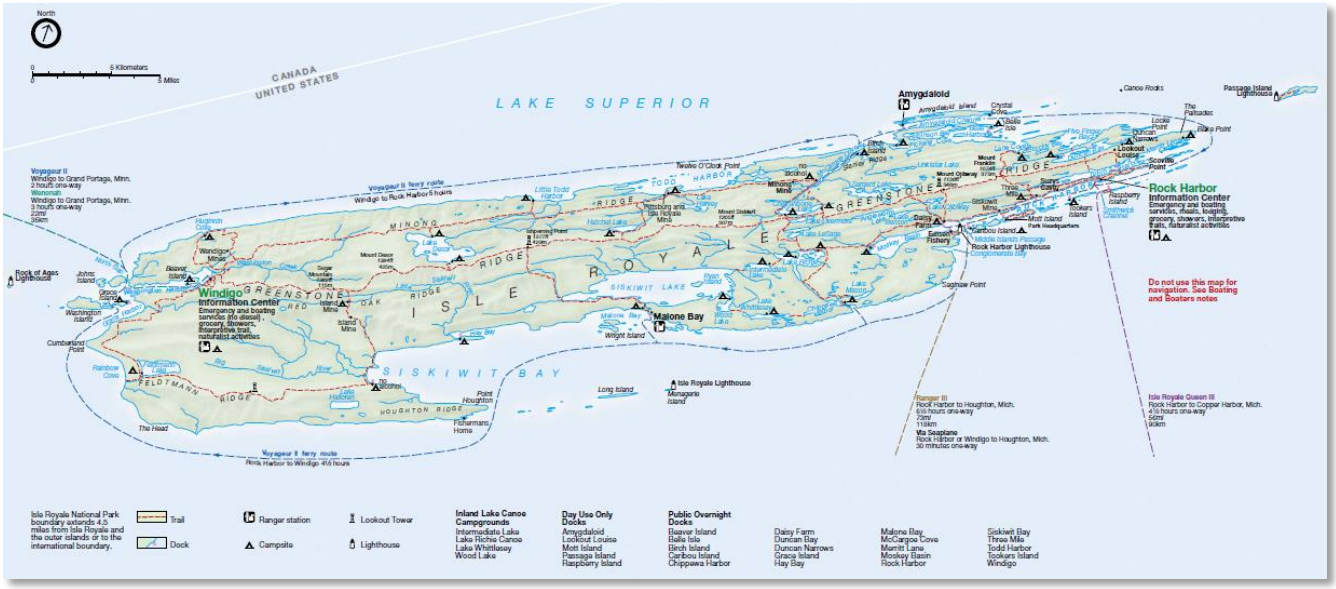
Description	% total area	% total forest	Hectares	Acres
White, Red, Jack Pine	47	49	238298	588858
Spruce, Fir	0	0	884	2184
Oak, Hickory	0	0	1390	3435
Maple, Beech, Birch	32	34	163751	404645
Aspen, Birch	15	16	78338	193581
Nonforested land	6	0	28808	71187
Water	0	0	253	625



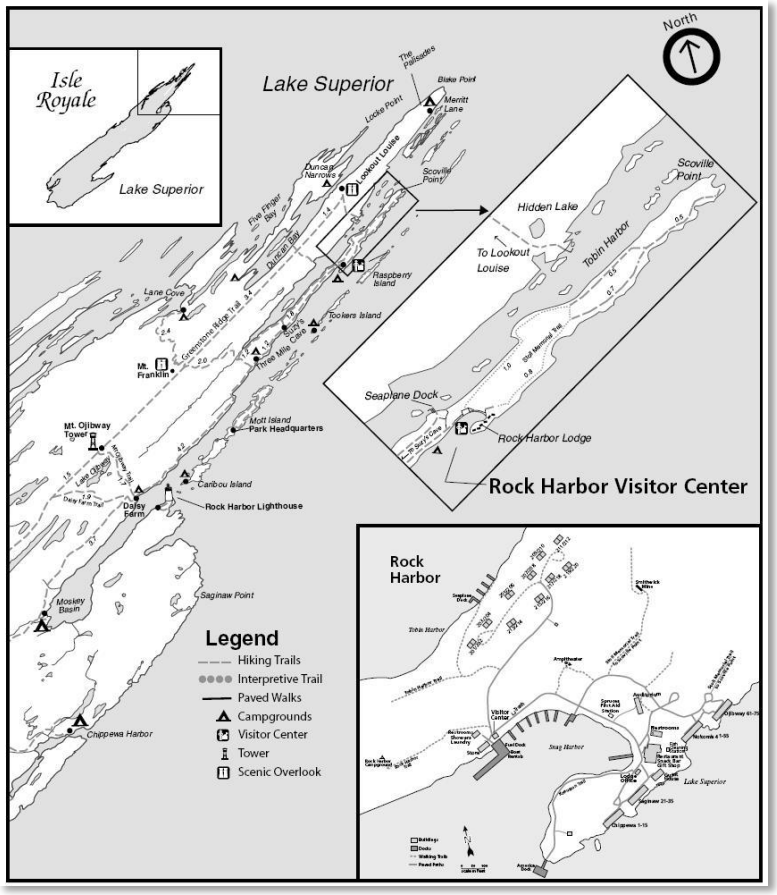
Description	% Total Area	% Total Forest	Hectares	Acres
Jack Pine	2	2	91548	226124
Red Pine	0	1	22049	54461
Mixed/Other Conifers	21	26	1094707	2703926
Aspen/Birch	2	2	95079	234845
Northern Hardwoods	13	16	689605	1703324
Mixed Coniferous/Deciduous	25	31	1307843	3230372
Lowland Coniferous	1	1	52845	130527
Lowland Deciduous	0	0	1083	2675
Lowland Mixed Decid/Conif	16	20	842903	2081970
Nonforested Lowland	6	0	317091	783215
Nonforested Upland	10	0	511021	1262222
Water	2	0	119095	294165

b) Isle Royale National Park, NPS

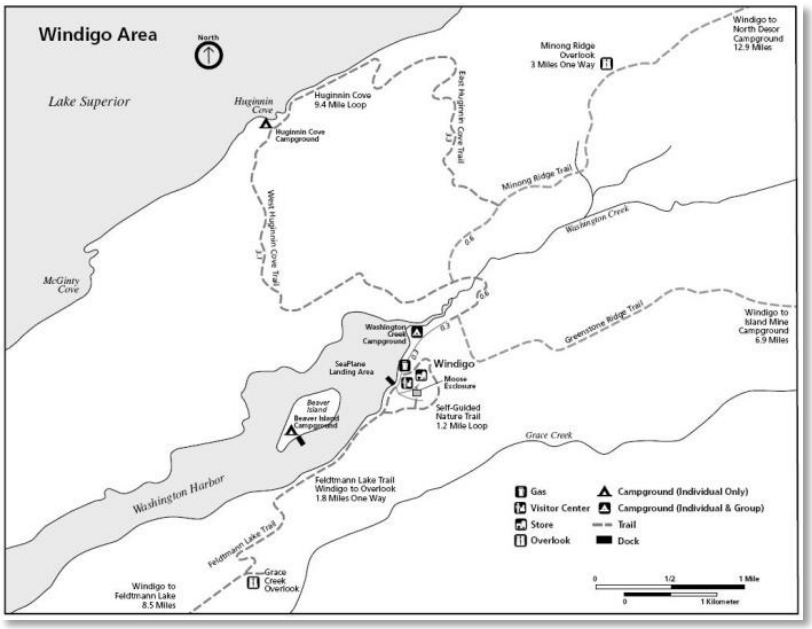
Images courtesy Isle Royale National Park (http://www.nps.gov/isro/index.htm)



Rock Harbor Area

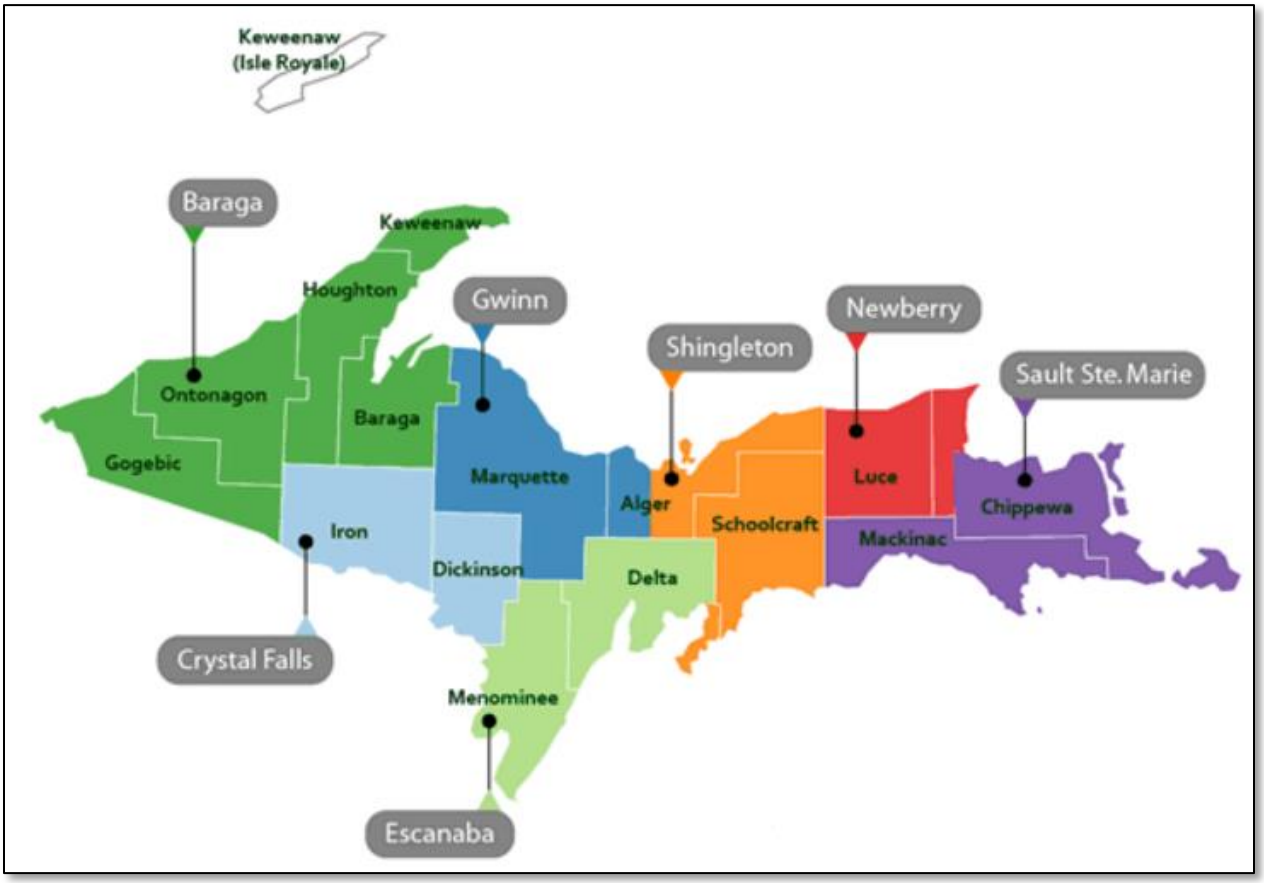


Windigo Area

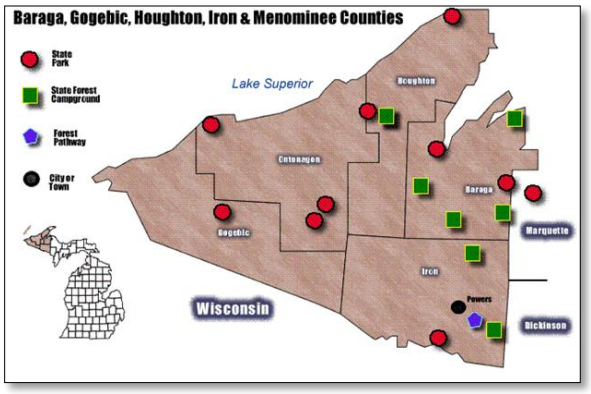


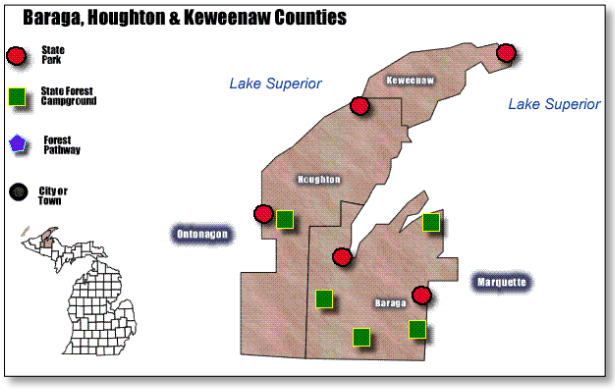
c) Michigan Department of Natural Resources (DNR)

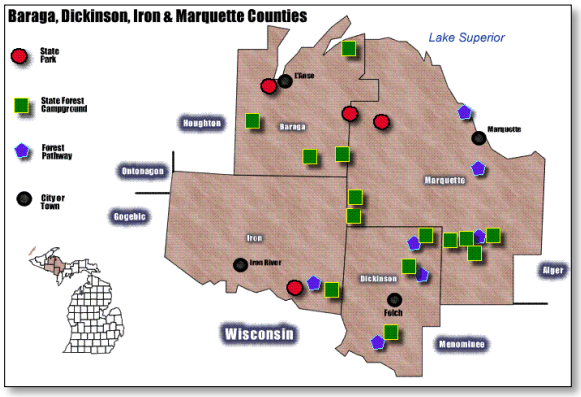
Images courtesy Michigan Department of Natural Resources (http://www.michigan.gov/dnr/0,4570,7-153-30301_30505-66516--,00.html)

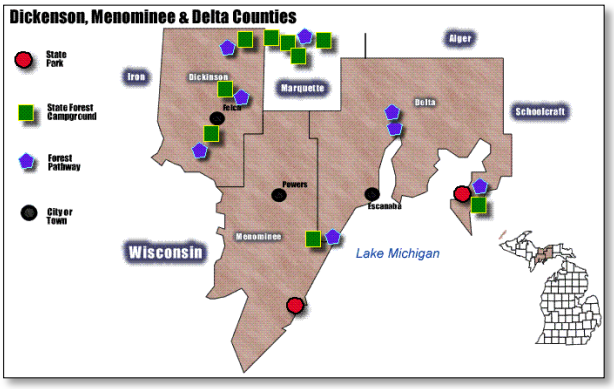


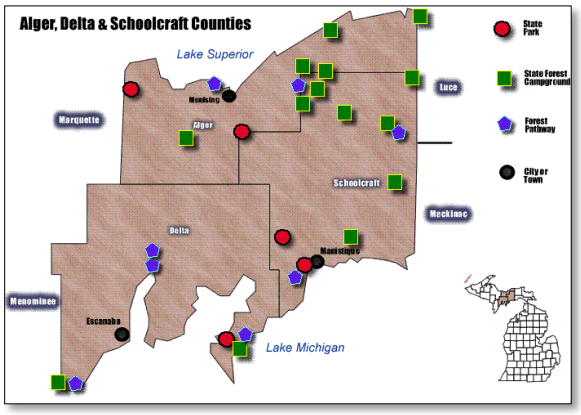
State Park, Forest Campground, and Pathways (by region)
http://www.michigandnr.com/parksandtrails/parkmap.aspx
http://www.michigandnr.com/parksandtrails/listing.aspx?list=parks

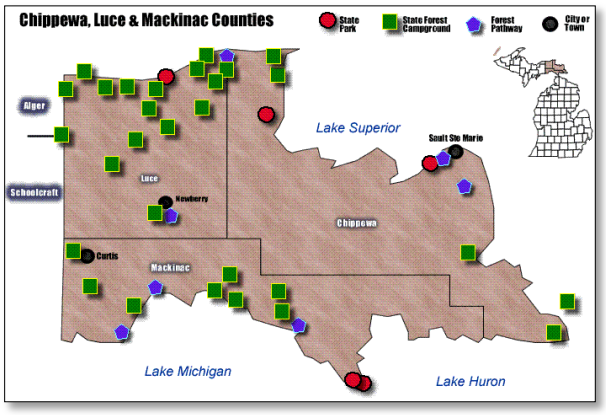





Baraga, Dickinson, Iron & Marquette Counties
State Park
State Forest Campground
Forest Pathway
City or Town
Lake Superior
Houghton
Baraga
Ontonagon
Gogebic
Marquette
Iron
Iron River
Dickinson
Felch
Alger
Menominee
Wisconsin


Dickenson, Menominee & Delta Counties
State Park
State Forest Campground
Forest Pathway
City or Town
Alger
Iron
Dickinson
Marquette
Delta
Schoolcraft
Powers
Escanaba
Menominee
Wisconsin
Lake Michigan

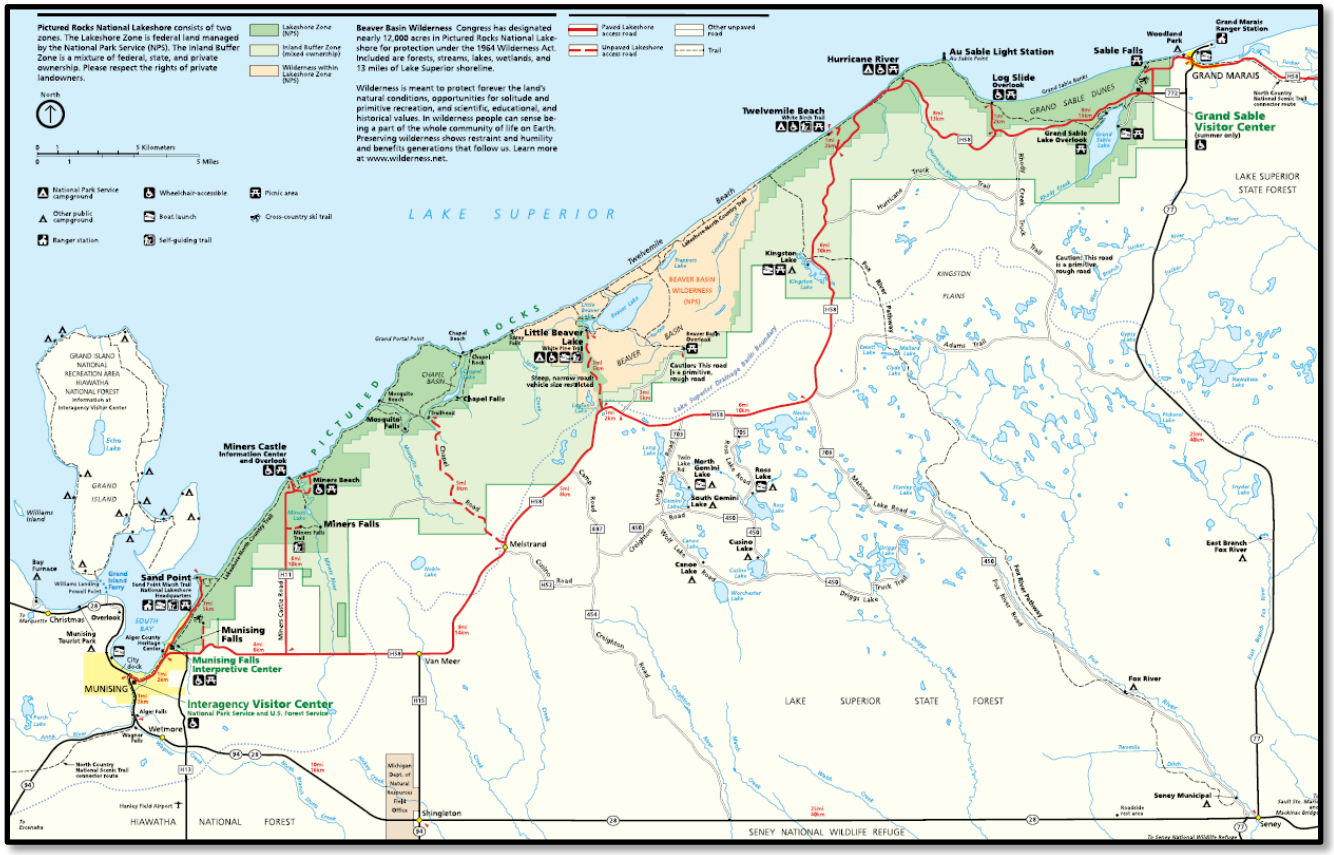

Alger, Delta & Schoolcraft Counties
State Park
State Forest Campground
Forest Pathway
City or Town
Lake Superior
Munising
Marquette
Alger
Luce
Schoolcraft
Mackinac
Delta
Manistique
Menominee
Escanaba
Lake Michigan


Chippewa, Luce & Mackinac Counties
State Park
State Forest Campground
Forest Pathway
City or Town
Alger
Lake Superior
Sault Ste Marie
Schoolcraft
Luce
Newberry
Chippewa
Curtis
Mackinac
Lake Michigan
Lake Huron

d) Pictured Rocks National Lakeshore, NPS

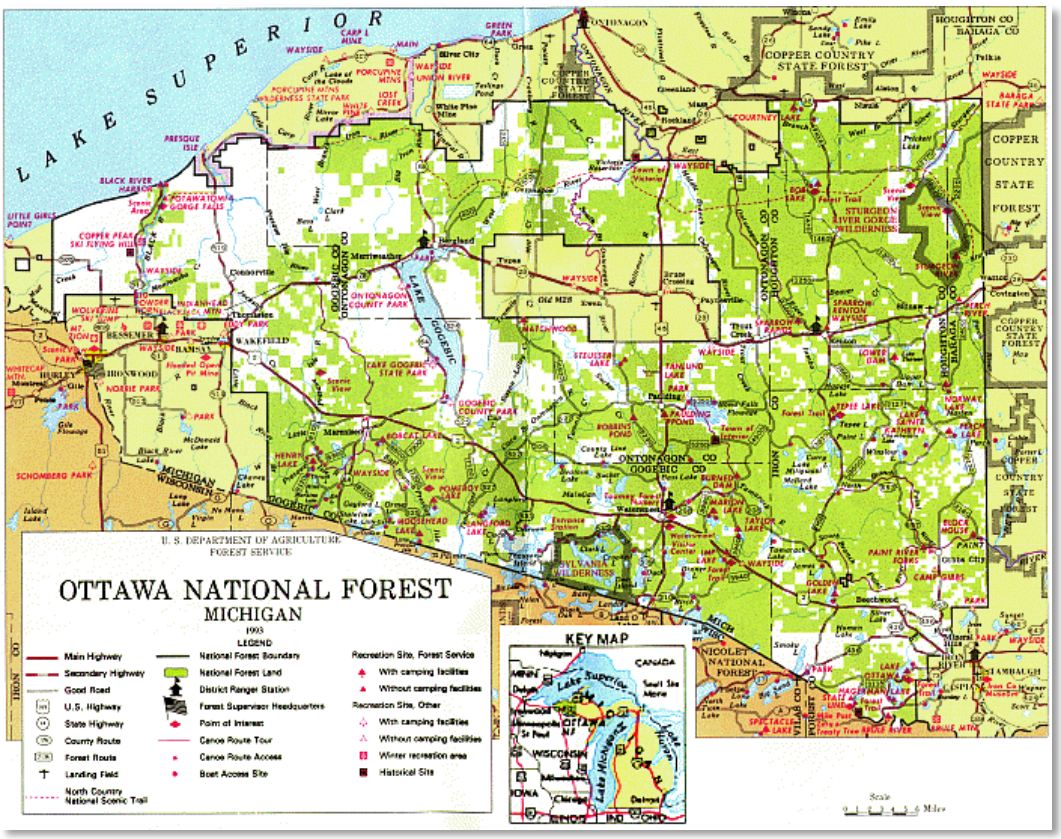
Images courtesy Pictured Rocks National Lakeshore ([http://www.nps.gov/piro)](http://www.nps.gov/piro)

Official Park Map and Guide (http://www.nps.gov/piro/planyourvisit/brochures.htm)

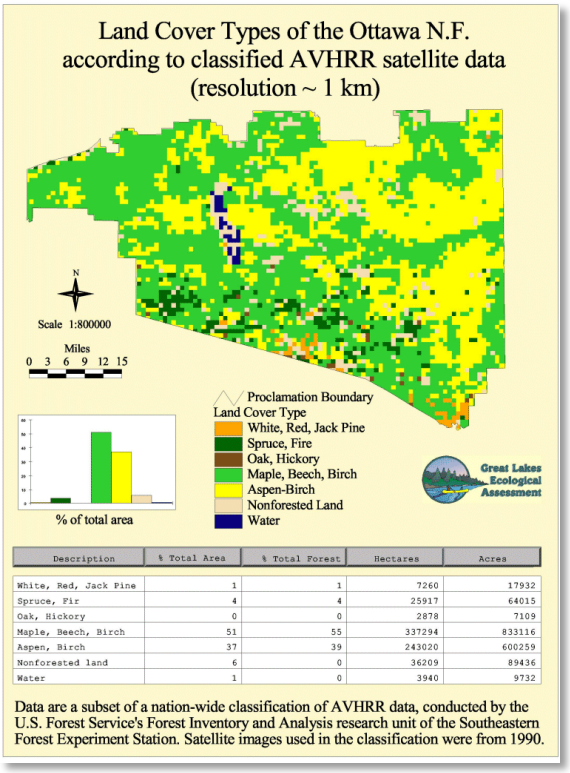


e) Ottawa National Forest, USFS

Image courtesy Ottawa National Forest (http://www.fs.usda.gov/main/ottawa/maps-pubs)

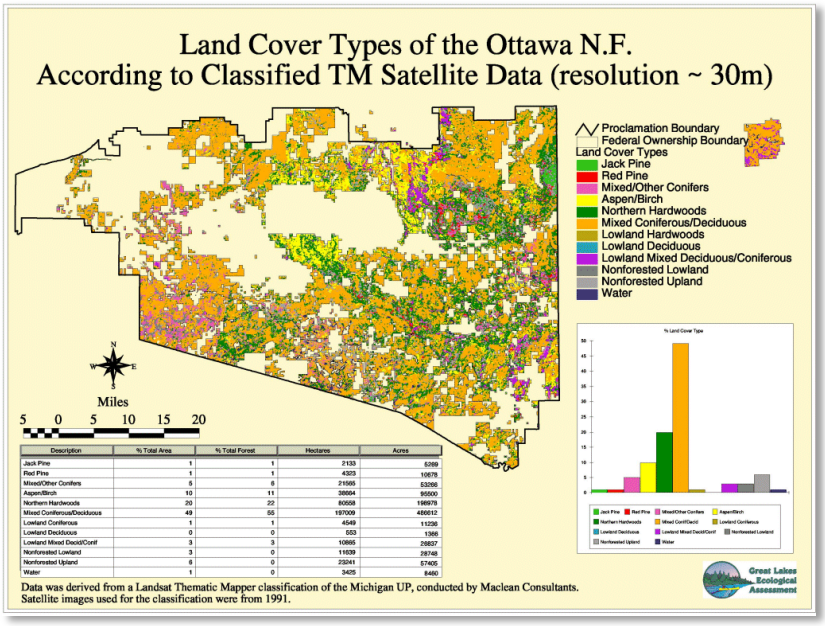


Land Cover Types image courtesy Great Lakes Ecological Assessment (http://www.ncrs.fs.fed.us/gla/existveg/ott_avhrr.htm and http://www.ncrs.fs.fed.us/gla/existveg/otta_tm.htm)



Description	% Total Area	% Total Forest	Hectares	Acres
White, Red, Jack Pine	1	1	7260	17932
Spruce, Fir	4	4	25917	64015
Oak, Hickory	0	0	2878	7109
Maple, Beech, Birch	51	55	337294	833116
Aspen, Birch	37	39	243020	600259
Nonforested land	6	0	36209	89436
Water	1	0	3940	9732

Data are a subset of a nation-wide classification of AVHRR data, conducted by the U.S. Forest Service's Forest Inventory and Analysis research unit of the Southeastern Forest Experiment Station. Satellite images used in the classification were from 1990.



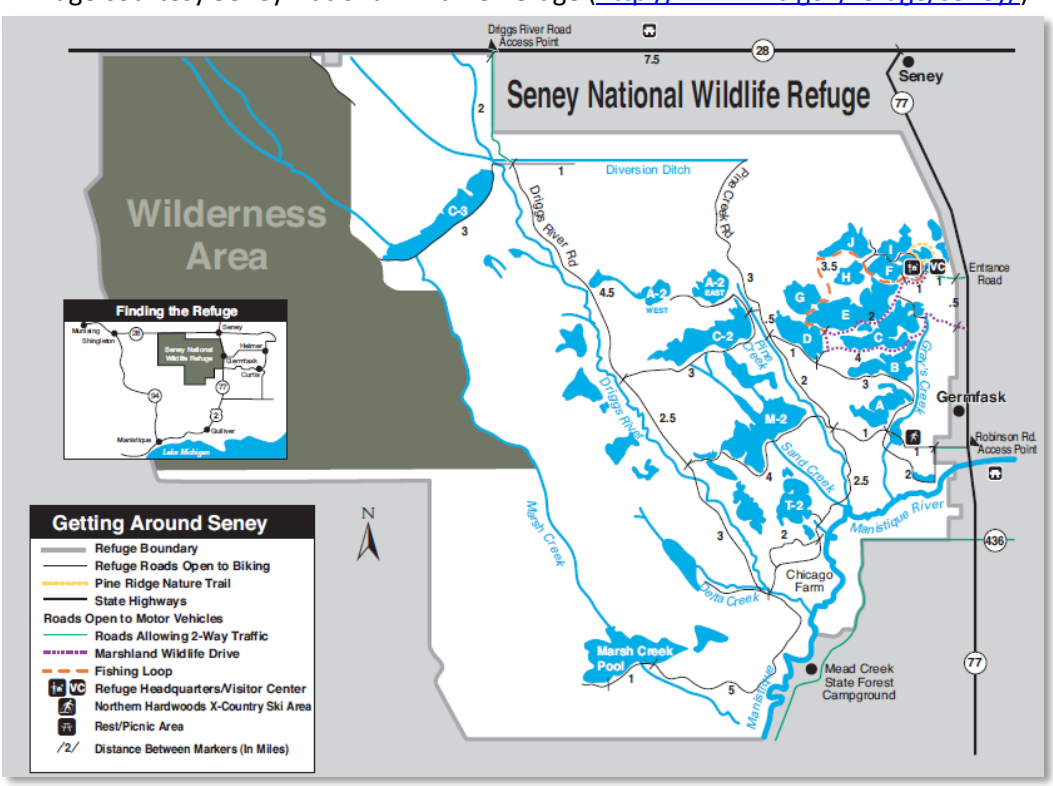
Description	% Total Area	% Total Forest	Hectares	Acres
Jack Pine	1	1	2133	5269
Red Pine	1	1	4323	10678
Mixed/Other Conifers	5	6	21595	53366
Aspen/Birch	10	11	38664	95500
Northern Hardwoods	20	22	80558	198979
Mixed Coniferous/Deciduous	49	55	197009	486612
Lowland Coniferous	1	1	4549	11236
Lowland Deciduous	0	0	553	1366
Lowland Mixed Decid/Conif	3	3	10865	26837
Nonforested Lowland	3	0	11639	28748
Nonforested Upland	6	0	23241	57405
Water	1	0	3405	8410

f) Seney National Wildlife Refuge, USFW

Seney National Wildlife Refuge also manages the following areas in the Marquette NWS forecast area …

- ***Harbor Island National Wildlife Refuge*** – 695 acres one mile north of Drummond Island
- ***West Huron Island lighthouse*** – 3 miles off the southern shore of Lake Superior, 18 miles east of the Keweenaw Peninsula
- ***Whitefish Point*** (migratory bird reserve) – 33 acres adjacent to the Great Lakes Shipwreck Historical Museum

Image courtesy Seney National Wildlife Refuge (http://www.fws.gov/refuge/seney/)



III. SERVICES PROVIDED BY THE NATIONAL WEATHER SERVICE

A. Fire weather products

1. Fire Weather Planning Forecast (ARBFWFMQT)

a) Issuance (seasonal, daily)

The National Weather Service in Marquette will produce the fire weather planning forecast during the fire season, which traditionally runs from April 15 to November 1. The start and end times are a collaborated between the National Weather Service and participating land management agencies. The forecast is then produced daily during the fire season, and is typically issued by 6 am local time. It will be updated during the day if significant differences are expected or occurring.

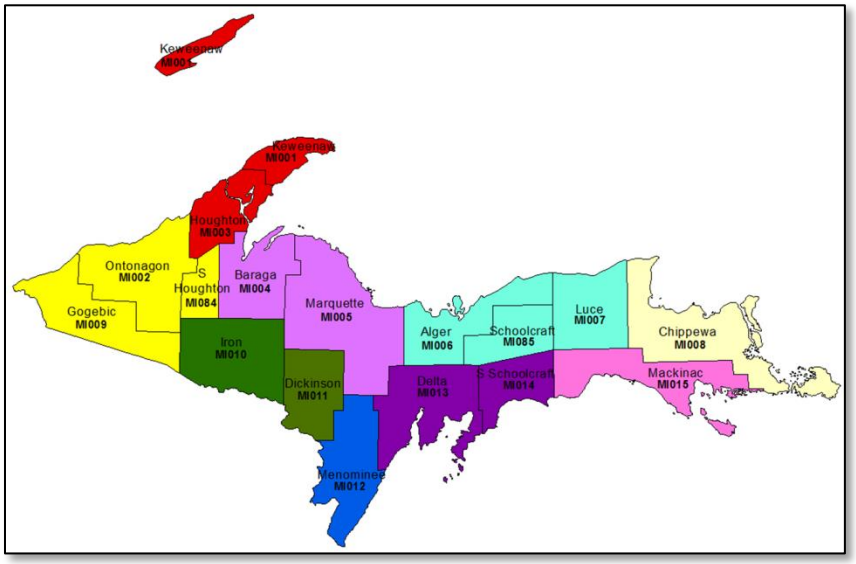
b) Posting

The primary way to receive our forecasts would be through our website, www.weather.gov/up and more specifically the Fire Weather link in the left column (www.crh.noaa.gov/mqt/?n=firewx). Forecasts are also available through WIMS and GACC Predicted Service, if needed.

c) Content

This product usually has a set county/zone combination, which may be broken down further if certain headlines are issued (Wind Advisory, High Wind Warning, Fire Weather Watch, and/or Red Flag Warning). The current county/zone combination can be changed upon agency agreement. The forecast will include the next 3 weather periods in detail: today, tonight, and tomorrow. The following forecast example, for western Upper Michigan, is only a fraction of the entire forecast.

Traditional County/Zone Combination:



Forecaster Note: The FWF is created in GFE, under "FWF." If a NPW (Wind Advisory/High Wind Warning) or RFW (Red Flag Warning/Fire Weather Watch) have been issued, the formatter will automatically break out the appropriate counties. This will need to be double checked for Mackinac and Chippewa Counties.

```
FIRE WEATHER PLANNING FORECAST FOR UPPER MICHIGAN
NATIONAL WEATHER SERVICE MARQUETTE MI
427 AM EDT SAT NOV 1 2014

...DRY TODAY THEN A CHANCE OF SHOWERS ON SUNDAY...

.DISCUSSION...HIGH PRESSURE OVER ONTARIO THIS MORNING WILL BRING DRY WEATHER
TO UPPER MICHIGAN TODAY AND TONIGHT BEFORE A LOW PRESSURE TROUGH MOVING IN
FROM THE NORTHWEST BRINGS A CHANCE OF RAIN SUNDAY INTO SUNDAY NIGHT. HIGH
PRESSURE WILL THEN RESULT IN DRY WEATHER AND A SLIGHT WARM UP FOR MONDAY AND
TUESDAY. TEMPERATURES WILL AVERAGE WELL ABOVE NORMAL FROM SUNDAY INTO THE
MIDDLE OF THE COMING WEEK.

MIZ002-009-084-021100-
WEST - GOGEBIC...ONTONAGON AND SOUTHERN HOUGHTON COUNTIES-
427 AM EDT SAT NOV 1 2014 /327 AM CDT SAT NOV 1 2014/

.TODAY...
SKY/WEATHER.........PARTLY CLOUDY.
MAX TEMPERATURE.....AROUND 52.
   24 HR TREND......UNCHANGED.
MIN HUMIDITY........30-35 PERCENT.
   24 HR TREND......UNCHANGED.
AIRPORT WINDS.......SOUTHEAST 5 MPH OR LESS.
PCPN AMOUNT.........NONE.
HOURS OF SUN........7.
LAL.................1.

.TONIGHT...
SKY/WEATHER.........MOSTLY CLOUDY.
MIN TEMPERATURE.....32-37.
   24 HR TREND......10 DEGREES WARMER.
MAX HUMIDITY........76-81 PERCENT INLAND TO 69 PERCENT AT THE SHORE.
   24 HR TREND......28 PERCENT DRIER.
AIRPORT WINDS.......SOUTHEAST 5 MPH OR LESS INCREASING TO SOUTH 5
                    TO 10 MPH BY MIDNIGHT...THEN INCREASING TO 10
                    TO 15 MPH LATE.
PCPN AMOUNT.........NONE.
LAL.................1.

.SUNDAY...
SKY/WEATHER.........MOSTLY CLOUDY. A SLIGHT CHANCE OF RAIN SHOWERS.
MAX TEMPERATURE.....AROUND 54.
MIN HUMIDITY........60-65 PERCENT.
AIRPORT WINDS.......SOUTH 10 TO 15 MPH BECOMING 15 TO 20 MPH
                    BY LATE MORNING...THEN BECOMING 10 TO 15 MPH BY
                    MID AFTERNOON.
PCPN AMOUNT.........NONE TO 0.06 IN.
HOURS OF SUN........3.
LAL.................1.

$$
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.FORECAST DAYS 3 THROUGH 7...

.MONDAY...PARTLY TO MOSTLY CLOUDY. PATCHY FOG EARLY WEST AND
CENTRAL. LOWS 36 TO 46. HIGHS 55 TO 63...WARMEST WEST. SOUTH
WINDS 5 TO 10 MPH.
.TUESDAY...PARTLY TO MOSTLY CLOUDY. A CHANCE OF SHOWERS WEST. LOWS
46 TO 50. HIGHS 55 TO 63. SOUTH WINDS 10 TO 15 MPH.
.WEDNESDAY...A CHANCE OF SHOWERS. MOSTLY CLOUDY. LOWS 44 TO 50.
HIGHS 55 TO 60. SOUTH WINDS 10 TO 15 MPH.
.THURSDAY...MOSTLY CLOUDY. A CHANCE OF LIGHT RAIN. A CHANCE OF
SNOW SHOWERS LATE. LOW AROUND 43. HIGHS 49 TO 54.
.FRIDAY...COLDER. MOSTLY CLOUDY. A CHANCE OF RAIN AND SNOW
SHOWERS. LOWS 30 TO 35 INLAND TO AROUND 37 AT THE SHORE. HIGHS
37 TO 42.

.OUTLOOK FOR SAT NOV  8 THROUGH FRI NOV 14...EXPECT BELOW NORMAL
TEMPERATURES AND ABOVE NORMAL PRECIPITATION.

$$
...................SMOKE MANAGEMENT FORECAST DATA...................

THE FOLLOWING VALUES ARE FOR 1 PM EST (2 PM EDT) TODAY...

                          HAINES    MIXING  TRANSPORT  VENTILATION
WIMS ID/         SITE/     INDEX  / HEIGHT /  WIND   /    INDEX
-----------------------------------------------------------------
471301 /    WAUSAUKEE/ 4 LOW       / 3000  / NE 5    /   150 (F)
200301         KENTON/ 4 LOW       / 3000  / NE 5    /   150 (F)
201004 /     MUNISING/ 4 LOW       / 3000  / N 5     /   175 (F)
201002 /     DOE LAKE/ 4 LOW       / 3500  / N 5     /   175 (F)
201103 /  HIGH BRIDGE/ 4 LOW       / 3300  / N 5     /   165 (F)
200703 /        GWINN/ 4 LOW       / 3200  / N 5     /   160 (F)
200903 /    LABRANCHE/ 4 LOW       / 3400  / N 5     /   170 (F)
200503 /       PELKIE/ 4 LOW       / 3600  / N 3     /   108 (P)
201504 /         RACO/ 4 LOW       / 3500  / N 3     /   105 (P)
200802 /    RANDVILLE/ 4 LOW       / 3100  / N 5     /   155 (F)
201401 /       REXTON/ 4 LOW       / 3500  / N 4     /   140 (F)
201505 /      RUDYARD/ 4 LOW       / 3700  / N 3     /   111 (P)
201202 /        SENEY/ 4 LOW       / 3600  / N 4     /   144 (F)
201302 /SPINCICH LAKE/ 4 LOW       / 3500  / N 4     /   140 (F)
201102 /   STONINGTON/ 4 LOW       / 3300  / N 5     /   165 (F)
200102 /    WAKEFIELD/ 4 LOW       / 2700  / NE 3    /   81 (P)
200103 /   WATERSMEET/ 4 LOW       / 2800  / N 3     /   84 (P)
       /DRUMND ISLAND/ 4 LOW       / 3600  / N 4     /   144 (F)
       /          KEW/ 4 LOW       / 2700  / NW 3    /   81 (P)

THE FOLLOWING VALUES ARE FOR 1 PM EST (2 PM EDT) SUN...

                          HAINES    MIXING  TRANSPORT  VENTILATION
WIMS ID/         SITE/     INDEX  / HEIGHT /  WIND   /    INDEX
-----------------------------------------------------------------
471301 /    WAUSAUKEE/ 2 VERY LOW  / 2000  / S 23    /   460 (G)
200301 /       KENTON/ 2 VERY LOW  / 2000  / S 23    /   460 (G)
201004 /     MUNISING/ 4 LOW       / 2000  / S 26    /   520 (G)
201002 /     DOE LAKE/ 4 LOW       / 2000  / S 26    /   520 (G)
201205 /  HIGH BRIDGE/ 4 LOW       / 2100  / S 24    /   504 (G)
200703 /        GWINN/ 2 VERY LOW  / 2000  / S 27    /   540 (G)
200903 /    LABRANCHE/ 2 VERY LOW  / 2300  / S 24    /   552 (G)
200503 /       PELKIE/ 2 VERY LOW  / 2200  / SW 28   /   616 (E)
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```
201504 /         RACO/ 4 LOW       / 2200  / S 21    /   462 (G)
200802 /    RANDVILLE/ 2 VERY LOW  / 2200  / S 25    /   550 (G)
201401 /       REXTON/ 4 LOW       / 1900  / S 20    /   380 (G)
201505 /      RUDYARD/ 4 LOW       / 2300  / S 19    /   437 (G)
201202 /        SENEY/ 4 LOW       / 2300  / S 24    /   552 (G)
201302 /SPINCICH LAKE/ 4 LOW       / 2100  / S 24    /   504 (G)
201102 /   STONINGTON/ 3 VERY LOW  / 2200  / S 24    /   528 (G)
200102 /    WAKEFIELD/ 2 VERY LOW  / 1900  / SW 31   /   589 (G)
200103 /   WATERSMEET/ 2 VERY LOW  / 1700  / SW 31   /   527 (G)
       /DRUMND ISLAND/ 4 LOW       / 2800  / S 20    /   560 (G)
       /          KEW/ 2 VERY LOW  / 1000  / SW 27   /   270 (F)

NOTE:  MIXING HEIGHTS ARE IN FEET ABOVE GROUND LEVEL
       TRANSPORT WINDS ARE IN MILES PER HOUR

.....................................................................

THE FOLLOWING IS POINT FORECAST INFORMATION VALID AT 1 PM EST.
NOTE THAT THE QPF IS FROM 7 AM TO 1 PM EST. ALSO...WIND SPEEDS HAVE
BEEN REDUCED BY A FACTOR OF 0.7 BY THE REQUEST OF LOCAL FIRE OFFICIALS.

WIMS ID/         SITE/TEMP/  RH/WSPD/WGUST/WDIR/ QPF
-------------------------------------------------
471301 /    WAUSAUKEE/  47/  45/   4/    8/   E/0.00
200301 /       KENTON/  46/  43/   2/    2/   E/0.00
201004 /     MUNISING/  45/  45/   1/    1/  NE/0.00
201002 /     DOE LAKE/  45/  45/   1/    1/  NE/0.00
201205 /  HIGH BRIDGE/  45/  47/   2/    2/  NE/0.00
200703 /        GWINN/  45/  46/   1/    1/   E/0.00
200903 /    LABRANCHE/  46/  45/   2/    2/   E/0.00
200503 /       PELKIE/  46/  48/   1/    1/  SE/0.00
201504 /         RACO/  43/  48/   2/    2/   N/0.00
200802 /    RANDVILLE/  47/  45/   1/    1/   E/0.00
201401 /       REXTON/  44/  45/   2/    2/   N/0.00
201505 /      RUDYARD/  42/  49/   3/    5/   N/0.00
201202 /        SENEY/  44/  45/   1/    1/   N/0.00
201302 /SPINCICH LAKE/  44/  47/   2/    2/   N/0.00
201102 /   STONINGTON/  45/  48/   2/    2/   E/0.00
200102 /    WAKEFIELD/  48/  41/   1/    1/  SE/0.00
200103 /   WATERSMEET/  47/  45/   1/    1/  SE/0.00
       /DRUMND ISLAND/  42/  58/   1/    1/   N/0.00
       /          KEW/  45/  55/   2/    2/   S/0.00
```

Time of issuance is located in the header of the product and is given in local time.

A headline is usually added, which describes the most important features of the period. In the case of a Red Flag Warning or Fire Weather Watch, information the reason, time frame, and areal coverage will be discussed.

Example:

```
...RED FLAG WARNING TODAY FOR SOUTH CENTRAL UPPER MICHIGAN INCLUDING
PORTIONS OF THE OTTAWA NATIONAL FOREST FOR LOW HUMIDITY AND STRONG WIND...

.DISCUSSION...
```

The discussion is a brief synopsis of the current conditions and what can be expected over the next 2 days, but may extend farther out if conditions are expected to significantly influence fire operations.

It will include the mention of major weather features expected to affect the forecast area, along with any fire weather specific concerns of low humidity, high winds, high temperatures, or significant frost. We will make every effort to not use the phrases “near red flag conditions” or “fire danger,” as this may create confusion. The discussion should be 8 lines or less, unless extreme fire weather deems otherwise.

SKY/WEATHER

The prevailing sky conditions across the area, given as Clear, Sunny, Mostly Sunny, Partly Cloudy, Partly Sunny, Mostly Cloudy, or Cloudy. There is a wide variety of weather options including a chance of rain showers, or a chance of showers and thunderstorms.

The chance of precipitation ranges from 0 to 100 percent. This value indicates the percent probability that any one location will receive measurable rain of 0.01 inches or greater.

0 - 14%	=	None, unless flurries, sprinkles, or drizzle
15 - 29%	=	Slight chance or isolated
30 - 59%	=	Chance or scattered
60 - 79%	=	Likely or numerous
80 - 100%	=	Definite

MAX/MIN TEMPERATURE
24 HOUR TREND

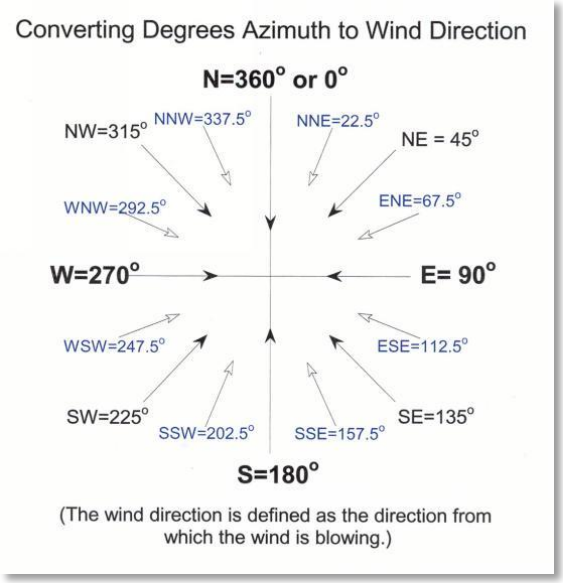
Maximum and minimum temperatures are forecast in degrees Fahrenheit. Maximum temperatures will be given during the daytime hours, and minimum temperatures for the overnight. 24 Hour Trend is a value, positive or negative, depicting the difference between the maximum or minimum temperatures of the previous day to those expected that period.

MAX/MIN HUMIDITY
24 HR TREND

The relative humidity is the ratio, in percent, of the amount of moisture in the air compared to the amount the air could hold if it were fully saturated (100%). Maximum values are given for the overnight periods, while minimum values are for the daytime hours.

AIRPORT WINDS

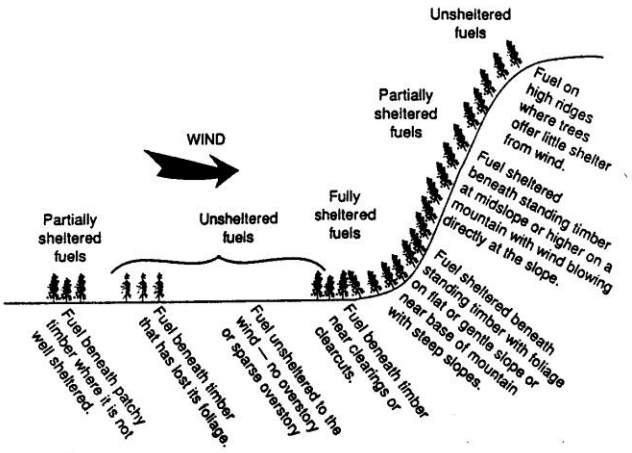
This value is a combination of wind direction and speed in mph. Significant gusts or erratic wind speed or direction changes will be included. Direction is given in the 8 cardinal points; the direction from which the wind is blowing. The 8 cardinal points are N, NE, E, SE, S, SW, W, and NW. Wind speed is given in miles per hour. Currently at the National Weather Service Office in Marquette, MI, the wind we place in this parameter is the traditional airport wind, or 10-meter (33-foot) wind, titled *Wind Speed and Direction*, *Surface Wind*, or just *Wind* in our graphical and text based products. The National Weather Service directive 10-401: Fire Weather Services Product Specification states, “Wind will be derived from the local surface wind grid which approximates the 20 foot, 10 minute average.” Due to land cover and specific location, a correction factor may be needed to get the 20-foot (*0.7 is standard for the table below), mid flame, or other wind value of interest.



MI DNR / US BEHAVE Wind speed & Fire Shape

WIND ADJUSTMENT TABLE				MIDFLAME WINDSPEED					
Airport Winds (mph)		Fire Weather Obs		Unsheltered Fuels			Partial Shelter	Fully Sheltered	
		10m	20ft	FM 4	FM 13	Others		Open	Dense
1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
1	1	1	1	1	1	0	0	0	0
2	2	2	1	1	1	1	1	0	0
3	3	2	2	2	2	1	1	1	0
4	4	3	3	2	2	2	1	1	0
5	5	4	4	3	3	2	2	1	1
6	5	5	4	4	3	2	2	1	1
7	6	6	5	4	4	3	2	1	1
8	7	6	6	5	4	3	2	2	1
9	8	7	6	5	5	4	3	2	1
10	9	8	7	6	5	4	3	2	1
11	10	9	8	7	6	4	3	2	1
12	11	10	8	7	6	5	4	2	1
13	12	10	9	8	7	5	4	3	1
14	13	11	10	8	7	6	4	3	1
15	14	12	11	9	8	6	5	3	2
16	14	13	11	10	8	6	5	3	2
17	15	14	12	10	9	7	5	3	2
18	16	14	13	11	9	7	5	4	2
19	17	15	13	11	10	8	6	4	2
20	18	16	14	12	10	8	6	4	2
21	19	17	15	13	11	8	6	4	2
22	20	18	15	13	11	9	7	4	2
23	21	18	16	14	12	9	7	5	2
24	22	19	17	14	12	10	7	5	2
25	23	20	18	15	13	10	8	5	3
26	23	21	18	16	13	10	8	5	3
27	24	22	19	16	14	11	8	5	3

28	**25**	**22**	**20**	**17**	**14**	**11**	**8**	**6**	**3**
29	**26**	**23**	**20**	**17**	**15**	**12**	**9**	**6**	**3**
30	**27**	**24**	**21**	**18**	**15**	**12**	**9**	**6**	**3**
40	**36**	**32**	**28**	**24**	**20**	**16**	**12**	**8**	**4**
50	**45**	**40**	**35**	**30**	**25**	**20**	**15**	**10**	**5**



1. No Wind Adjustment Downhill at night.

2. Generally, NWS wind forecasts are based on winds recorded at airports. These sites are usually much more exposed that our fire weather recording stations.

3. **Eye level winds** are the most appropriate to use in making fire behavior predictions in the US BEHAVE system. However, RAWS record windspeeds at **20 ft**. If you are using a NWS forecast product, or obtaining wind readings from a mast at 10m or 20ft at one of your fire weather sites, the eye level winds may be estimated from the chart above.

MI DNR CCFDRS Wind Speed & Fire Shape

Airport Winds (mph)	**Fire Weather Obs Windspeed, mph**		**Eye Level Windspeed, mph**		**Fire Shape Length:Width**	
	10m	**20ft**	**Unsheltered**	**Sheltered**	**Unshelt.**	**Shelt.**
1.0	**0.8**	**0.7**	**0.5**	**0.3**	**O1a, O1b**	**C,M,D,S**
1	1	1	1	0	1.4	1.0
2	2	1	1	1	1.4	1.0
3	2	2	2	1	1.4	1.0
4	3	3	2	1	2.3	1.1
5	4	4	3	2	2.6	1.2
6	5	4	3	2	2.9	1.3
7	6	5	4	2	3.2	1.4
8	6	6	4	2	3.2	1.4
9	7	6	5	3	3.4	1.6
10	8	7	5	3	3.6	1.8
11	9	8	6	3	3.8	1.9
12	10	8	6	4	4.0	2.1
13	10	9	7	4	4.0	2.1
14	11	10	7	4	4.2	2.3
15	12	11	8	5	4.4	2.5
16	13	11	8	5	4.5	2.7
17	14	12	9	5	4.6	2.9
18	14	13	9	5	4.7	2.9
19	15	13	10	6	4.8	3.1
20	16	14	10	6	5.0	3.3
21	17	15	11	6	5.1	3.5
22	18	15	11	7	5.2	3.7

23	18	16	12	7	5.2	3.7
24	19	17	12	7	5.4	3.9
25	20	18	13	8	5.5	4.1
26	21	18	13	8	5.6	4.3
27	22	19	14	8	5.8	4.5
28	22	20	14	8	5.8	4.5
29	23	20	15	9	5.9	4.7
30	24	21	15	9	6.0	4.9
40	32	28	20	12	6.3	5.4
50	40	35	25	15	6.9	6.4

Generally, NWS wind forecasts are based on winds recorded at airports. These sites are usually much more exposed than RAWS.

10 m winds are the most appropriate to use in determining Initial Spread Index (ISI) and making fire behavior predictions. However, our fire weather recording stations record windspeeds at **20 ft**. If you are taking eye level winds, working with a NWS forecast product, or obtaining 20 ft readings from our fire weather sites, the 10 m winds may be estimated from the chart above.

PCPN AMOUNT

Precipitation amount is given in hundredths of an inch (in), and is the average amount expected when precipitation is forecast. When the chance of precipitation is 14% or less a value of 0 will be given. At values at or above 15%, a range of probably values is given (example 0.12 to 0.25 in). A chance of precipitation (up to 60%) may also begin with a range of no precipitation, at the discretion of the forecasters (example, None to 0.12 in). This may be appropriate when spotty showers are expected or event uncertainty is high.

LAL

LAL or Lightning Activity Level describes the intensity or frequency of thunderstorms if forecast, otherwise a value of 1 is given. Since the objective is to describe the lightning activity, lightning counts take precedence over the cloud-storm-rain narrative descriptions. For instance, if the clouds fit the LAL 3 descriptive criteria, but the lightning average 3 cloud-to-ground discharges per minute, the LAL should be classified as a 4.

Lightning Activity Level Values		
	Cloud and Storm Development	*Cloud to Ground Lightning Strikes 5 min (15 min)…areal coverage*
1	No Thunderstorms	None…0%
2	Cumulus clouds are common but only a few reach the towering cumulus stage. Light rain will occasionally reach the ground. Lightning is very infrequent.	1-5 (1-8)…1-14%
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lighting is infrequent.	6-10 (9-15)…15-24%
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered. Moderate rain is common and	11-15 (16-25)…25-54%

	lightning is frequent.	
5	Towering cumulus and thunderstorms are numerous, covering more than three-tenths of the sky. Rain is moderate to heavy, with frequent and intense lightning.	>15 (>25)…>54%
6	Similar to LAL 3 except thunderstorms are dry.	

.FORECAST DAYS 3 THROUGH 7...

This portion of the forecast will contain general temperatures, sky conditions, and precipitation expected through the remainder of the 7 day forecast period. Wind direction and speed will be included through day 5, with gusts added when they are significant (typically over 35 mph).

.OUTLOOK FOR 8 TO 14 DAYS…

This extended outlook is taken directly from the daily forecast produced by the Climate Prediction Center, http://www.cpc.ncep.noaa.gov/products/predictions/814day/ . It includes temperature and precipitation probabilities compared to seasonal normal values for the time periods. Values of near normal, above normal, or below normal will be given.

.....SMOKE MANAGEMENT FORECAST DATA.....

This section includes the 1 pm EST (2 pm EDT) Haines Index, Mixing Height, Transport Winds, and Ventilation Index for different RAWS sites for current day and the next day (day 2).

HAINEX INDEX

Haines Index is the sum of a stability term and a moisture term. The sum provides an indication of the potential for wildfire growth and extreme behavior of a fire on a given day. A Haines Index of 2-3= Very Low, 4= Low, 5=Moderate, and 6= High. We use the low-elevation formula, which is as follows:

Stability Term **(T950-T850)**	***Moisture Term*** **(T850-Td850)**
1...3 C or less	**1**...5 C or less
2...4 to 17 C	**2**...6 to 9 C
3...8 C or greater	**3**...10 C or greater

MIXING HEIGHT

The mixing height is the depth of the unstable air in the boundary layer and is used for forecasting smoke or pollutant trajectories, in feet above ground level (FT-AGL). In other words, it's the layer in the atmosphere from the surface to the first inversion layer. This is the layer where vigorous mixing occurs due to convection. Quite variable in space and time, the mixed-layer depth typically increases during fair-weather daytime over land from tens of meters (around a hundred feet or less) shortly after sunrise to 1-4 km (about 3,000 to 13,000 feet) before sunset, depending on the location and season.

Forecaster Note: The Miller-Holzworth can be employed to calculate mixing height, but is a very basic, and assumes stability is based only on solar insolation, and does not take into account any changes in airmass during the day. Subsidence inversions, precipitation (non dry adiabatic parcel ascent), and upward vertical motion will usually result in different values. To estimate morning mixing heights, add 5 degrees C to the minimum surface

temperature. Then follow the dry adiabat to the intersection of the 12Z sounding. The height above the ground is the predicted morning height. Afternoon mixing heights can be forecast in much the same manner. The predicted maximum temperature is followed up the dry adiabat to the intersection of the 12Z sounding. This level is the forecast of the afternoon mixing height.

TRANSPORT WIND

Transport wind is defined as the average wind speed in all directions of all winds within the layer bounded by the surface and the mixing height. Transport winds provide land managers with information about the horizontal dispersion (location and distance downwind from the source) or suspended particles from prescribed fires.

VENTILATION INDEX

Smoke dispersal improves as the mixed layer and transport wind increase. A derived value used to indicate smoke dispersal is the ventilation index, which may also be called the clearing index:

Ventilation Index = {mixing height (ft agl)*transport winds (mph)}/ 100

Value		Rating
Less than 130	=	Poor (P)
130 – 299	=	Fair (F)
300 – 599	=	Good (G)
600 +	=	Excellent (E)

THE FOLLOWING IS POINT FORECAST INFORMATION VALID AT 1 PM EST.

The Point Forecast includes TEMP (temperature), RH (relative humidity), WSPD (wind speed), WDIR (wind direction), and QPF (quantitative precipitation forecasts). These forecasts are valid for each RAWS site at 1 pm EST (2 pm EDT).

2. Conference Calls

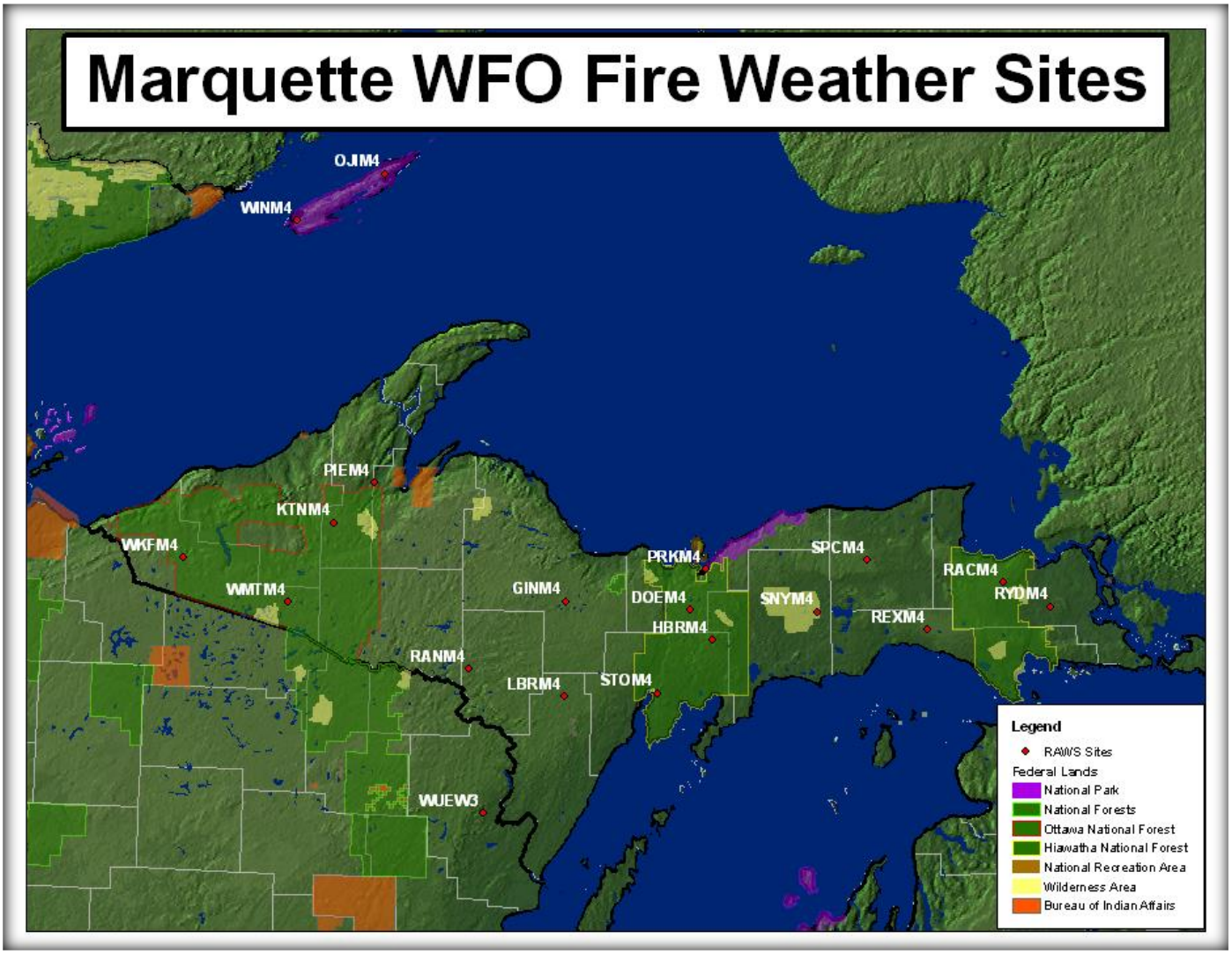
NWS Marquette and the Michigan Interagency Wildland Fire Protection Association (MIWFPA) will hold a conference call every Friday at 10 am Eastern as needed during the fire season. The day and time is flexible, and may be changed as needed. The conference call will be used to coordinate current weather, status of fuels, and the potential need for any Fire Weather Watches over the upcoming week. Calls will likely take place through spring green up and during any prolonged dry periods through the fire weather season. Depending upon the current fire weather conditions, additional calls may be needed during the week. The NWS will typically start off the call, followed by a discussion by MIWFPA agencies about available fuels, fire behavior, and resources.

NWS MQT conference call number
866- (participant code #)
(leader pin #)

3. Fire Weather Matrix (ARBFWMMQT) for National Fire Danger Rating System

The Fire Weather Matrix in a part of the The National Fire Danger Rating System (NFDRS). NFDRS evaluates complex model and fuel parameters as a quantitative means for evaluating the fire danger across a vast area such as a forest. The input values include daily weather observations, fuel moisture, and our Fire Weather Matrix. Fire managers receive numeric output that suggests the severity of fire danger over a large area.

Station Name (NFDRS Zone)	Station ID#	County	Controlling Agency	Elevation (ft)
Windigo/WINM4 (951)	200403	Keweenaw	NPS	830
Ojibway/OJIM4 (951)	200405	Keweenaw	NPS	1040
Wakefield/WKFM4 (952)	200102	Gogebic	MDNRE	1200
Watersmeet/WMTM4 (951)	200103	Gogebic	USFS	1605
Kenton/KNTM4	200301	Houghton	USFS	1262
Pelkie/PIEM4 (None)	200503	Baraga	MDNRE	1000
Randville/RANM4 (951)	200802	Dickinson	MDNRE	1255
Gwinn/GINM4 (950)	200703	Marquette	MDNRE	1225
Labranche/LBRM4 (None)	200903	Menominee	MDNRE	1000
Doe Lake/DOEM4 (950)	201002	Alger	USFS	815
Munising/PRKM4	201004	Alger	NPS	771
Stonington/STOM4 (949)	201102	Delta	USFS	653
High Bridge/HBRM4 (949)	201103	Delta	USFS	759
Seney/SNYM4 (950)	201202	Schoolcraft	USFWS	702
Spincich Lake/SPCM4 (951)	201302	Luce	MDNRE	896
Rexton/REXM4 (None)	201401	Mackinac	MDNRE	862
Raco/RACM4 (948)	201504	Chippewa	USFS	900
Rudyard/RYDM4 (None)	201505	Chippewa	MDNRE	700



a) Issuance (seasonal, daily)

The FWM, or Fire Weather Matrix point forecast product, is produced on a seasonal basis, similar to the Fire Weather Planning Forecast. This coded forecast is produced for all 18 NFDRS RAWS sites in the forecast area (plus Mott Island, 200401) on a routine basis. Additional sites may be added upon request to the fire weather focal point.

In 2011, the Fire Agencies implemented a combined automated and manual observation issuance system, using what is known as the Nelson model. This results in a new observation type, “N or R” and indicates that the Nelson model was used in determining 1-hour and 10-hour fuel moisture. Though several Nelson model observations are generated, only the final “N or R” type observation is stored for the 1300 LST observation. Several N-model calculations are performed to generate automated State of Weather (SOW) and Wet Flag. A user can at this point manually edit the SOW and Wet Flag values based on local knowledge. In this case, the observation is recalculated, and the type of observation becomes “O” to indicate user editing. The manual editing of SOW and Wet Flag is the key difference, along with automatic availability of the “N or R” observation type.

Forecaster Note: The FWM is created in the GFE Formatter Launcher, "FWM." Click Transmit to send the point forecasts after editing the forecast values. Check the latest observations, and make necessary changes to max/min temperature, relative humidity, and in extreme occasions the Wet Flag values. Add hours of precipitation by hand if needed. To check if the forecast made it for the final collective that runs around 4pm EST, view the text product NMCFWOER (O for Official, F for Forecast and R for Nelson Model).

b) Content

FNUS83 KMQT 261945
FWMMQT

FCST,200103,030127,13,2,17,92,1,1,NW,10,M,18,10,98,56,1,0,N

FCST, Station,Date,13,Wx,T,RH,L1,L2,WD,WS,M,TM,TN,HM,HN,P1,P2,N

Decoding the FWM (Fire Weather Matrix)
NOTE: All times are given in Eastern Standard/Daylight time. Adjust as needed for Central Time zone.
Station – NFDRS station number (starts with 20, indicating Michigan)
Date – ddhhmm (day, hour, minute)
13 – indicates that the forecast is valid at 1300 LST (18Z), this is a constant
Wx – state of weather given as a value of 0 through 9, at 18Z (1 pm EST / 2 pm EDT) tomorrow.

0 = Clear sky
1 = Scattered clouds
2 = Broken clouds
3 = Cloudy
4 = Fog
5 = Drizzle
6 = Rain
7 = Snow/sleet
8 = Showers
9 = Thunderstorms

T – temperature at 18Z (1 pm EST / 2 pm EDT) tomorrow (˚F)
RH – relative humidity at 18Z (1 pm EST / 2 pm EDT) tomorrow (%)
L1 – lightning activity level from 19Z today to 04Z tonight; 2 pm EST (3 pm EDT) to 11 pm EST (midnight EDT)
L2 – lightning activity level for 24 hours, from 04Z tonight until 04Z tomorrow night; 11 pm EST (midnight EDT) to 11 pm EST (midnight EDT)

Lightning Activity Level Guide (Coverage)

1 = No T-storms
2 = Isolated T-storms (1-14% coverage)
3 = Widely Scattered T-Storms (15-24% coverage)
4 = Scattered T-storms (25-54% coverage)
5 = Numerous (55+% coverage)
6 = Dry Lightning, when >=15% coverage and little or no rain

WD – wind direction at 18Z (1 pm EST / 2 pm EDT) tomorrow, using a 16-point compass (N, NNE, NE…)
WS – wind speed at 18Z (1 pm EST / 2 pm EDT) tomorrow (mph)
M – Missing, constant M given in place of forecast fuel moisture

TM – maximum temperature from 18Z (1 pm EST / 2 pm EDT) today until 18Z (1 pm EST / 2 pm EDT) tomorrow (˚F)
TN – minimum temperature from 18Z (1 pm EST / 2 pm EDT) today to 18Z (1 pm EST / 2 pm EDT) tomorrow (˚F)

HM – maximum humidity from 18Z (1 pm EST / 2 pm EDT) today to 18Z (1 pm EST / 2 pm EDT) tomorrow (%)
HN – minimum humidity from 18Z (1 pm EST / 2 pm EDT) today to 18Z (1 pm EST / 2 pm EDT) tomorrow (%)

P1 – hours of precipitation from 18Z (1 pm EST / 2 pm EDT) today until 10Z (500 am EST / 6 am EDT) tomorrow
P2 – hours of precipitation from 10Z (5 am EST / 6 am EDT) tomorrow until 18Z (1 pm EST / 2 pm EDT) tomorrow

WF – wet flag is used to indicate if fuels will be wet at 18Z tomorrow (1 pm EST / 2 pm EDT), and is given as Y or N. If Y is used, then all indices will be forced to zero. N is most common. A 75% or greater probability of precipitation at 18Z tomorrow (1 pm EST / 2 pm EDT) will result in a Y.

c) WIMS ID contact

All fire weather stations have been assigned numbers to be used as the identification number when entering into the Weather Information Management System (WIMS). If a new station is established, or a present station is moved, a new identification number should be requested from the Eastern Area GACC Meteorologist, in coordination with WIMS and the National Weather Service.

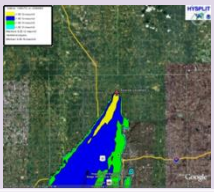
4. Site-specific wildland fire forecasts (Spot)

Spot Forecasts are are issued when requested by Interagency Wildland Fire Agencies for wildland fires or planned burn operations and are available 24 hours a day. They differ from our routine fire weather forecasts by incorporating greater detail in timing, higher resolution of terrain influences, as well as meso-scale and sometimes micro-scale weather influences impacting the site.

A Spot Forecast may also be requested for non-fire incidents or events. Examples would include search and rescue, HAZMAT, or other situation where the information would be critical to public safety. The request must be made by a government or contract government official (federal, state, tribal, or local).

A HYSPLIT trajectory run can be created for smoke by adding the words HYSPLIT and then an email address for the run to be sent to.
Example: Hysplit email.address@user.gov

Dispersion runs can be generated by calling the NWS MQT office. While this may be more helpful for shorter-term burns, they can still only be generated for fires (Rx or wildfires) of 100 acres or more. Contact the fire weather focal point for more information.

	Dispersion Model	Trajectory Model (Experimental)
Description	Forecasts the evolution of a smoke/chemical plume over time and space 	Forecasts where a parcel would travel from a given point starting at a specific elevation
Needed Information	Additional Information required (burn size, duration, email)	All gathered from spot request
Request Method	Phone	Spot Forecast Request
Produced by	NWS forecaster	Automated
Delivery Method	Email	Email
Return Time	Up to ½ hour	Few Minutes

a) Criteria

Before we issue a forecast for a particular site, we need detailed information about the site, who is making the request, and why. Some of these site details include elevation, latitude, longitude, and aspect. The more information we receive about a burn site, the more accurate our forecasts tend to be. Current weather information is of great benefit if available, including temperature, wind speed, and relative humidity. We will also need to know the requesting agency, project name, phone

number, and effective time for the requested forecast. The turnaround time between the request and forecast issuance is typically between 30 and 40 minutes.

Forecaster Note: If the online NWSpot program is down, complete requests using Form D-1 (located on the NWS MQT Fire webpage). If a spot forecast is completed using the D-1 form, make a note in the shift log and place a hard copy in mailbox of the fire weather focal point.

To compose a Spot Forecast, create/update any appropriate grids. Use the Formatter Launcher in GFE, and select FWS from the *Products* menu. After clicking the *Run Formatter* button, select the spot request. Fill in the appropriate boxes pertaining to the request, and click *OK*. Edit the spot forecast as needed, paying special attention local weather features and how they relate to any available observations. Large ranges are of little help to the user, so try to be as specific as possible. Be sure to address specific questions that came in with the request, either in the synopsis or elsewhere. Do not use the term "Red Flag" within the Spot Forecast or any other text products unless a Red Flag Warning is in effect!

Once completed, the Spot Forecast will be relayed back to the requesting agency via the NWSPOT program.

b) Content

A Spot Forecast traditionally contains sky conditions, weather, temperature, relative humidity, and wind speed.
Optional Spot Forecast elements include…

- Sky/Weather
- Temperature
- Relative Humidity
- General Wind (Note: This will be the same wind as discussed in the Fire Weather Planning Forecast (Airport Winds). General Wind is utilized, as the term Airport Wind is not an option in the NWS Spot template. Winds may be diminished or otherwise edited by the forecaster based on input of sheltering and other topographic information.
- Haines Index
- Smoke Dispersion (Transport Winds and Ventilation Index)
- Lightning Activity Level
- Mixing Height
- Wind Wave
- Rainfall Amount
- Additional information upon request

PRIMARY FORECAST ELEMENTS

TDA	TNT	TMR (Today, Tonight, Tomorrow)	
☐	☐	☐	Sky / Weather
☐	☐	☐	Temperature
☐	☐	☐	Relative Humidity
☐	☐	☐	General Wind
☐	☐	☐	Haines Index
☐	☐	☐	Smoke Dispersion
☐	☐	☐	Lightning Activity Level
☐	☐	☐	Mixing Height
☐	☐	☐	Wind Wave
☐	☐	☐	Rainfall Amount

All parameters, excluding Dispersion and Wind Wave, are discussed in length in the Fire Weather Planning Forecast section of this Annual Operating Plan.

DISPERSION

Clicking on the option for dispersion will result in the following 2 parameters, Transport Winds and Ventilation Index. The Ventilation Index was discussed in the Fire Weather Planning Forecast section. The Transport Wind is the average wind speed and direction in the mixed layer.

WIND WAVE

Wind Wave is the wave height in feet (ft). This parameter is, in our case, available over most of Lake Superior and northern Lake Michigan. It is especially important for search-and-rescue, spills, incidents, or near water fire operations.

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IF CONDITIONS BECOME UNREPRESENTATIVE,
CONTACT THE NATIONAL WEATHER SERVICE.
SPOT FORECAST FOR TEST LOCATION...MI DNR
NATIONAL WEATHER SERVICE MARQUETTE MI
1019 AM EDT TUE APR 12 2011

FORECAST IS BASED ON IGNITION TIME OF 1100 EDT ON APRIL 12.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...LOW PRESSURE OVER SOUTHEAST CANADA WILL MAINTAIN A
COOL NORTHWEST FLOW THROUGH WEDNESDAY. EXPECT NORTHWEST WINDS
GENERALLY IN THE 10 TO 15 MPH RANGE TODAY WITH GUSTS OCCASIONALLY
INTO THE 20 TO 25 MPH RANGE. LOOK FOR INCREASING CLOUD COVER THROUGH
THE DAY. A LOW PRESSURE TROUGH MOVING THROUGH THE AREA TONIGHT MAY
BRING A FEW SPRINKLES. ANOTHER TROUGH ON WEDNESDAY WILL BRING A
CHANCE OF A FEW LIGHT SHOWERS. HIGH PRESSURE WILL THEN BUILD INTO THE
REGION THROUGH THE END OF THE WEEK...BRINGING A WARMING TREND WITH
NO PRECIPITATION.

.TODAY...

SKY/WEATHER.........MOSTLY SUNNY THEN BECOMING MOSTLY CLOUDY.
MAX TEMPERATURE.....53 AT IGNITION...MAX 58.
MIN HUMIDITY........42 PERCENT AT IGNITION...MIN 37 PERCENT.
GENERAL WIND........WINDS NORTHWEST AT 11 MPH AT IGNITION...
                    OTHERWISE NORTH WINDS 7 TO 12 MPH INCREASING
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                    TO NORTHWEST 10 TO 15 MPH.
HAINES INDEX........4...OR LOW POTENTIAL FOR LARGE PLUME DOMINATED
                    FIRE GROWTH.
TRANSPORT WINDS.....NORTHWEST 16 TO 35 MPH INCREASING TO 24 TO 40
                    MPH LATE.
VENTILATION INDEX...GOOD (350) INCREASING TO EXCELLENT (2099).
LAL.................1.
MIXING HEIGHT.......300-1800 FT AGL INCREASING TO 7500-8000 FT AGL.
RAINFALL AMOUNT.....0.00 INCHES.

TIME (EDT)       11 AM  1 PM   3 PM   5 PM   7 PM
SKY (%)..........36     64     75     81     80
WEATHER COV......
WEATHER TYPE.....NONE   NONE   NONE   NONE   NONE
TEMP.............53     56     57     56     53
RH...............42     38     37     37     40
GENERAL WIND.....NW 11  NW 11  NW 12  NW 12  NW 11
GENERAL WIND GUST20     20     25     25     20
HAINES INDEX.....4      4      4      4      4
```

c) Procedures

The preferred method for requesting and issuing a spot forecast is from our website: http://spot.nws.noaa.gov/cgi-bin/spot/spotmon?site=mqt

If necessary, you may fax a Spot Request Form D-1 to our office or phone in the specific request. If you use this method, a call would be greatly appreciated to alert us of the arriving fax. This will expedite the process. Copies of the Spot Request Form D-1 can be downloaded from the following site, or made available upon request: http://www.weather.gov/directives/010/401f/WS_FORM_D_SPOT.pdf

Once sent, the forecasters will be alerted, as the product ARBSTQMQT alarms at the weather service office. A phone call to the forecast office is usually not needed, but may help clear up questions the forecasters may have about the request.

Once the forecast has been issued, the Spot website will auto-update/refresh. At the forecast office, the final forecast will also alert on the workstations, as the product ARBFWSMQT.

Feel free to test out our online request page. If you do send in a test request, please contact our office to tell one of the forecasters that you are doing so. If you have any questions about Spot requests feel free to give us a call. Feedback is greatly appreciated via the NWS Spot interface.

5. Wildfire Potential Statement (ARBRFDMQT)

a) Criteria

A Wildfire Potential Statement (ARBRFDMQT) can be used as an outlook to potential critical fire weather conditions beyond when a Fire Weather Watch is traditionally issued. It can also be utilized for those times when conditions do not quite meet specific Fire Weather Watch or Red Flag Warning criteria, but elevated fire danger remains due to forecast or ongoing weather conditions. The main concern is in the summer when we can have large wildfires in some of our more volatile fuels. In some cases we can have crown fires with significant fire spread in some of the Jack Pine forests when Relative Humidity values are closer to 35% (well above the 25% Red Flag Warning criteria value). This typically occurs when Temperatures are above normal and Winds are gusting over 25 mph.

The product briefly describes the fire danger, the weather conditions behind it, how long the conditions will last, and concludes with a brief call to action. A Special Weather Statement (SPS) may also be utilized for larger events, as it will automatically highlight on our website, and may be a higher alert product for local and national media sources. However, it is of note that the SPS will likely be overwritten when we have other near-critical weather. A couple of examples include near-severe thunderstorms and patchy dense fog

For the 2014 season, the criteria for this product have been changed:

- Wind Gusts must be forecast to be over 25 mph

- While Wind Gusts will be the most critical parameter to key off of for this product, we should otherwise be near Red Flag Warning criteria. Temperatures should generally be running above normal, with Relative Humidity values less than 40%.

Forecaster Note:
Due to the change in criteria, it will be important to coordinate the issuance of this product with our typical contacts. When a Wildfire Potential Statement has been issued, there is no need to include a special headline in the routine FWF. There is no requirement to update the statement at a certain time, but during a prolonged period of high fire danger RFDs should be issued at least once a day. No cancellation statement is needed when conditions improve. The RFD is created in GFE, under "RFD." Select the zones you want, with separate segments if appropriate. *Unless instructed to do otherwise by fire officials, avoid trying to describe the level of fire danger. Instead, use terms like elevated fire risk or increased fire potential. Only the u*se of the phrase "Extreme Fire Danger" in the headline of this product will activate the WWA maps (color coding on NWS web sites). Create/Edit the Top News of the Day story.

b) Content

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WILDFIRE POTENTIAL STATEMENT
NATIONAL WEATHER SERVICE MARQUETTE MI
500 AM EDT THU APR 14 2011

...VERY HIGH FIRE RISK TO CONTINUE THROUGH THE WEEKEND...
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HIGH PRESSURE CENTERED OVER HUDSON BAY...ALONG WITH A WEEK WITHOUT
RAINFALL...HAS RESULTED IN VERY DRY CONDITIONS AND AN INCREASED
WILDFIRE POTENTIAL ACROSS UPPER MICHIGAN. EXPECT NO RAINFALL AND
VERY LOW HUMIDITIES INTO THE WEEKEND...MAINTAINING THE VERY HIGH
FIRE RISK.

BECAUSE OF THE VERY HIGH FIRE RISK...POSTPONE ANY OUTDOOR
BURNING AT LEAST UNTIL NEXT WEEK. IF BURNING MUST BE DONE...CHECK
WITH LOCAL GOVERNMENTAL AGENCIES FOR ANY BURNING RESTRICTIONS THAT
MAY BE IN EFFECT.

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6. Fire Weather Watch, Red Flag Warning Program (ARBRFWMQT)

The Fire Weather Watches and Red Flag Warnings are issued to alert of combination of dry fuel and weather conditions that could result in extensive wildfire occurrence or extreme fire behavior. These conditions alert our land management agencies to the potential for widespread new ignitions or control problems with existing fires, both of which could pose a threat to life and property.

A **Fire Weather Watch** is issued 12 to 96 hours in advance of the onset of possible warning conditions.

A **Red Flag Warning** is issued within 24 hours of the event (or onset of warning conditions).

a) Criteria

The parameters used to define a watch or warning includes relative humidity, wind speed, and temperature, and fuel moisture (defined as a period of dry weather). Specific fuel moisture must be coordinated with our users.

- A dry spell for over a week (shorter before spring green-up or after fall color)
- Sustained Wind Speed > = 20 mph (10 m ASOS-Airport winds)
  or >= 15 mph (20 ft RAWS winds)
- Relative Humidity 25% or less
- Temperature 70 F or greater

Note: The temperature criterion is soft. Red Flag Warnings can be used for temperatures less than 70 degrees depending on other factors.

Initial watch/warning coordination may be accomplished during the semi-routine weekly MIWFPA conference call. If a Fire Weather Watch is already in effect and expected weather conditions still meet Red Flag Warning criteria, no ok is needed from MIWFPA to issue the Red Flag Warning. Once a Red Flag Warning is issued the different agencies of MIWFPA should be notified as soon as possible. If no Fire Weather Watch is in effect, then contact must be made with MIWFPA before a Red Flag Warning is issued. Contacts for MIWFPA coordination are listed below…

- Michigan DNR – Duty Officer
- Hiawatha NF and Pictured Rocks NL – Hiawatha Fire Management Officer (UPCC)
- Seney NWR – Gary Lindsay
- Ottawa NF – Duty Officer
- US BIA – Will Wiggins

Once a decision is made to issue a Fire Weather Watch or Red Flag Warning, the Fire Weather Forecast should be updated accordingly. You must also notify the EACC Floor Coordinator.

Forecaster Note: These products are created in the GFE Formatter Launcher, under "RFW." The expiration time of the RFW should generally line up with the issuance of the next FWF, unless conditions are anticipated to improve in the meantime. Update the FWF, and AFD to include WWA coding. Create and publish a story for the Top News of the Day.

b) Content

The following is an example of a Red Flag Warning; a fire weather watch would look very similar. The header will state whether it is a Fire Weather Watch or Red Flag Warning. This narrative product will be comprised of a headline followed by a brief statement with more detail as to where, when, and why the product has been issued.

```
RED FLAG WARNING
NATIONAL WEATHER SERVICE MARQUETTE MI
601 AM EDT WED SEP 22 2010

...RED FLAG WARNING IN EFFECT FROM 2 PM EDT /1 PM CDT/ THIS
AFTERNOON TO 9 PM EDT /8 PM CDT/ THIS EVENING FOR NORTHWEST UPPER MICHIGAN...

.HIGH PRESSURE WILL REMAIN ACROSS THE AREA TODAY. EXPECT AFTERNOON RELATIVE
HUMIDITY TO BOTTOM OUT AS LOW AS 20 PERCENT AWAY FROM THE MODERATING
INFLUENCE OF THE LAKE SUPERIOR AS HIGH TEMPERATURES REACH 65 TO 70. NORTHWEST
UPPER MICHIGAN MISSED OUT ON WIDESPREAD RAIN THAT FELL ON SUNDAY. SUSTAINED
WEST WINDS WILL BE 10 TO 15 MPH THIS AFTERNOON AS WELL.

ALTHOUGH THE WINDS ARE NOT LIKELY TO BE AS STRONG ON THURSDAY AFTERNOON AND
THE RELATIVE HUMIDITY WILL BE A BIT HIGHER...DAYTIME HIGH TEMPERATURES ARE
FORECAST TO PEAK FROM 70 TO 75 AWAY FROM THE GREAT LAKES. SO THE ELEVATED
FIRE RISK WILL PERSIST THROUGH THURSDAY BEFORE A CHANCE OF SHOWERS RETURNS
LATE THURSDAY NIGHT AND FRIDAY.

MIZ001>004-009-084-290100-
/O.NEW.KMQT.FW.W.0001.080528T1800Z-080529T0100Z/
KEWEENAW-ONTONAGON-NORTHERN HOUGHTON-BARAGA-GOGEBIC-
SOUTHERN HOUGHTON-
601 AM EDT WED SEP 22 2010 /501 AM CDT WED SEP 22 2010/

...RED FLAG WARNING IN EFFECT FROM 2 PM EDT /1 PM CDT/ THIS AFTERNOON TO 9 PM
EDT /8 PM CDT/ THIS EVENING...

THE NATIONAL WEATHER SERVICE IN MARQUETTE HAS ISSUED A RED FLAG
WARNING...WHICH IS IN EFFECT FROM 2 PM EDT /1 PM CDT/ THIS AFTERNOON TO 9 PM
EDT /8 PM CDT/ THIS EVENING.

HIGH TEMPERATURES WILL WARM TO 65 TO 70 DEGREES TODAY AWAY FROM LAKE SUPERIOR
WITH RELATIVE HUMIDITY VALUES DROPPING TO AS LOW AS 17 TO 24 PERCENT THIS
AFTERNOON INTO THIS EVENING AWAY FROM LAKE SUPERIOR. WEST WINDS WILL BE 10 TO
15 MPH THIS AFTERNOON AND EARLY EVENING WITH CRITICAL FIRE WEATHER CONDITIONS
EXPECTED FROM 2 PM EDT TO 9 PM EDT TODAY. CONDITIONS WILL IMPROVE AFTER
SUNSET WITH TEMPERATURES FALLING...RELATIVE HUMIDITIES RISING AND WINDS DYING
DOWN.

A RED FLAG WARNING MEANS THAT CRITICAL FIRE WEATHER CONDITIONS ARE EITHER
OCCURRING NOW...OR WILL SHORTLY. A COMBINATION OF STRONG WINDS...LOW RELATIVE
HUMIDITY...AND WARM TEMPERATURES WILL CREATE EXPLOSIVE FIRE GROWTH POTENTIAL.

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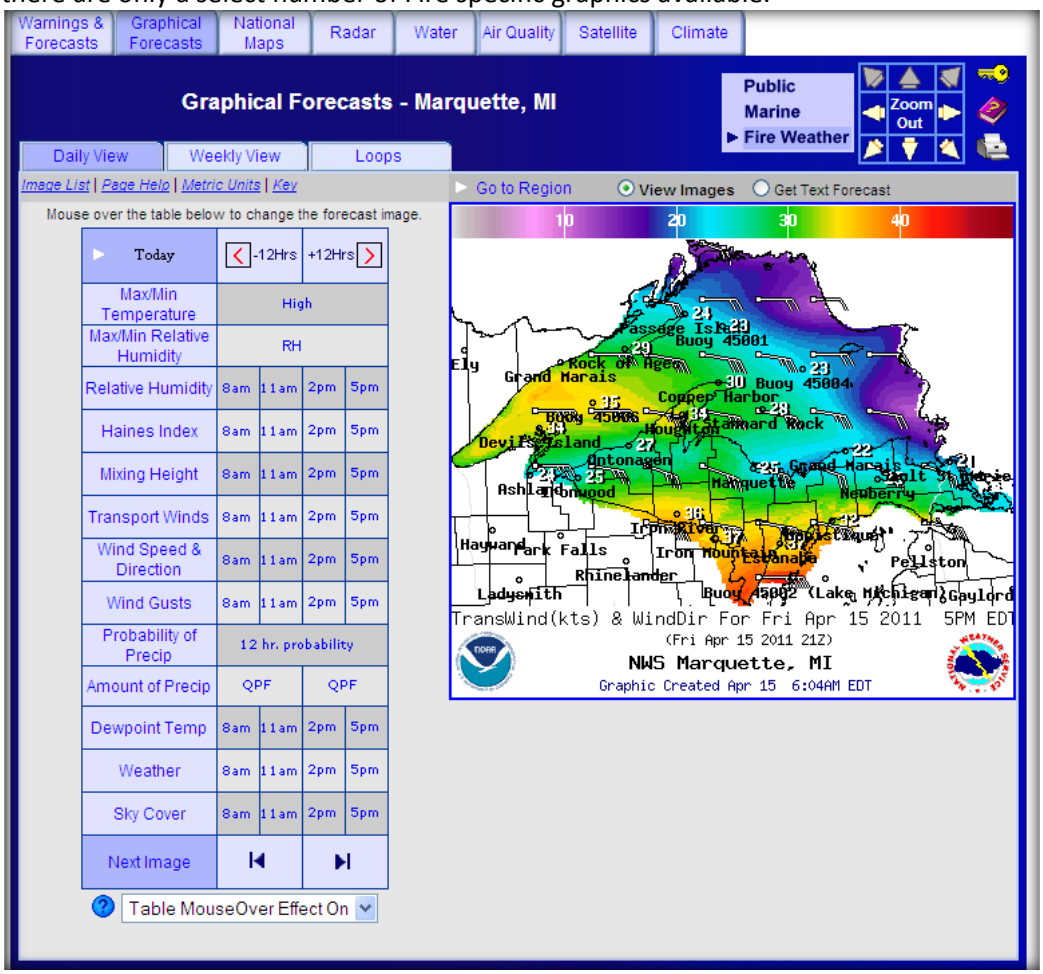
7. Specific Online Products

There are many fire specific data and forecasts offered through our local and national NWS fire pages:
www.crh.noaa.gov/mqt/?n=firewx
http://weather.gov/fire
The following are just a few of the more useful products available.

a) Fire Weather Graphics

http://www.weather.gov/forecasts/wfo/sectors/mqtFireDay.php#tabs
(image below) Weather elements displayed in a map form in 3, 6, or 12 hour increments depending on the parameter. Data is available out through 6-7 days, with most Fire Weather elements going through the next 2 days. This product is updated several times a day, with the Fire Weather elements updated at least 2 times a day during the fire season (around 6 am and 5 pm).

A new zoomable higher quality interface is available at
http://preview.weather.gov/graphical
While this way of viewing our Graphical Forecasts will give you a cleaner looking image, there are only a select number of Fire specific graphics available.

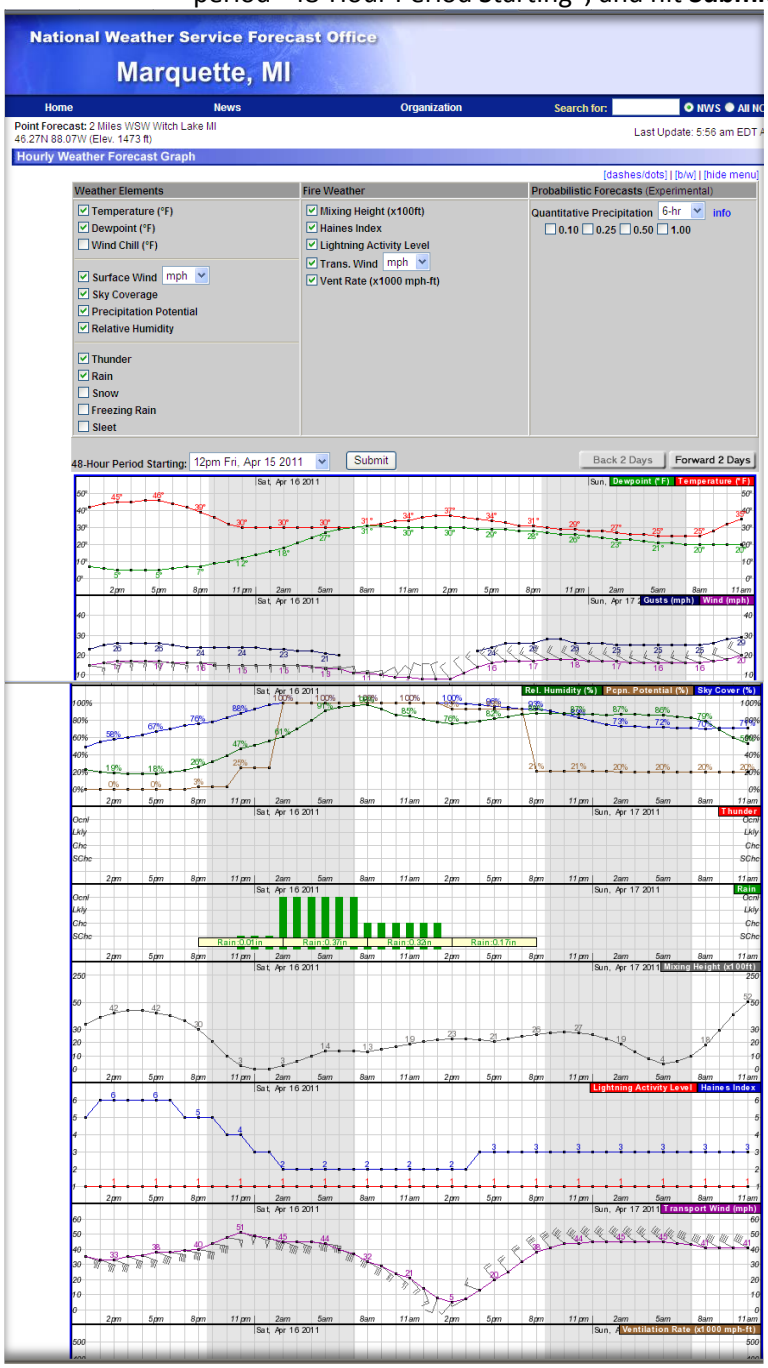


b) Hourly Weather Graph

http://www.weather.gov/mqt

Point-based hourly weather output for most parameters through the next 6-7 days, with most Fire Weather elements going through the next 2 days. This product is updated several times a day, with the Fire Weather elements updated at least 2 times a day during the fire season (around 6 am and 5 pm).

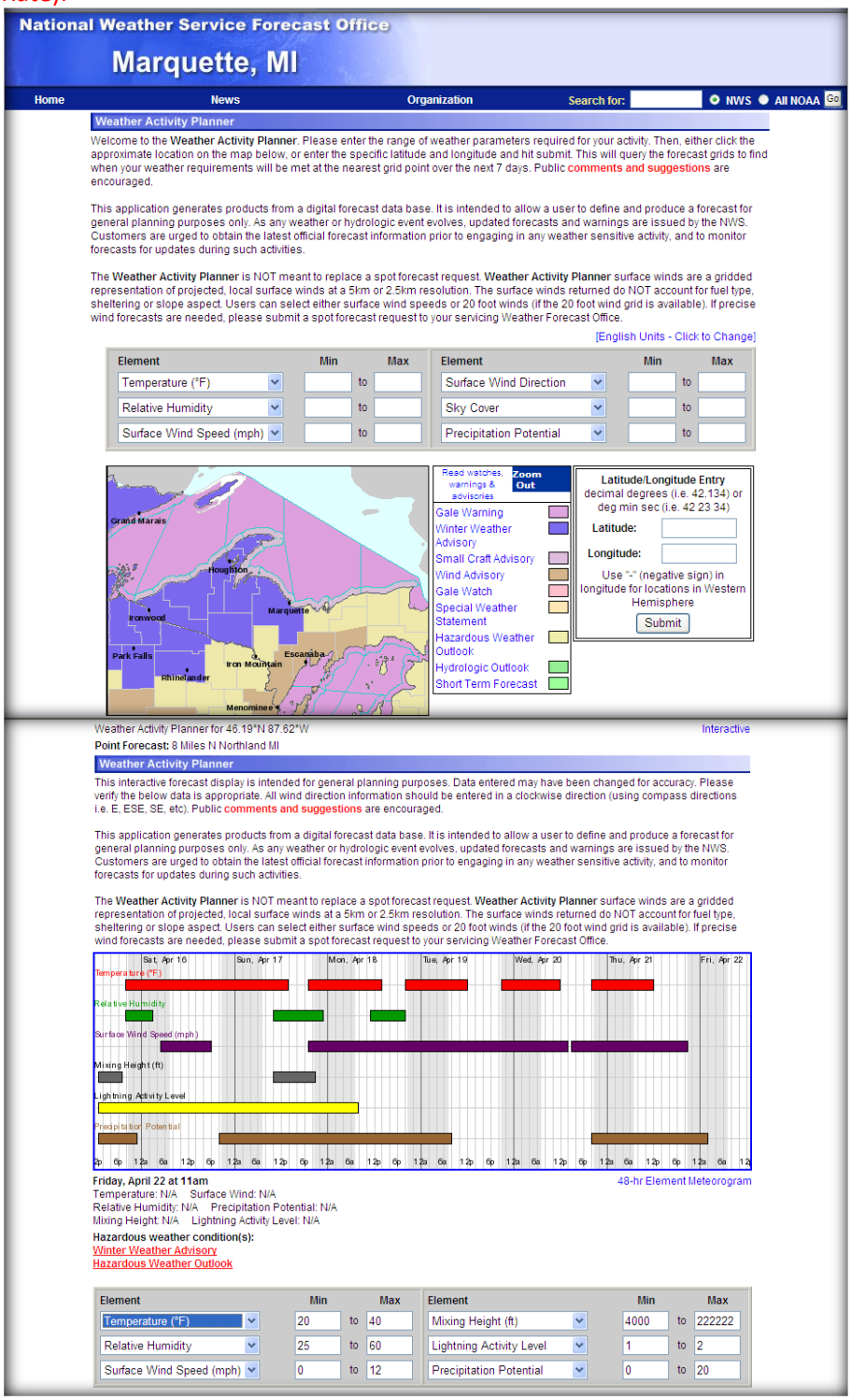
- On the map, click on your desired location
- If needed, edit location via the map in middle of page
- Scroll down to the bottom-right side of the page
- Select **Hourly Weather Graph**
- Select your desired Weather/Fire Weather Elements, adjust the time period "48-Hour Period Starting", and hit **Submit**



c) Weather Activity Planner

http://forecast.weather.gov/wxplanner.php?site=mqt

To assist in prescribed burn planning, the Weather Activity Planner will allow you to easily find windows where the prescription conditions will be available. Caution: several fire specific parameters will only be available for the first 2 days (example…Mixing Height, Transport Wind, Haines Index, Lightning Activity Level, Vent Rate).



d) Farsite Weather Input

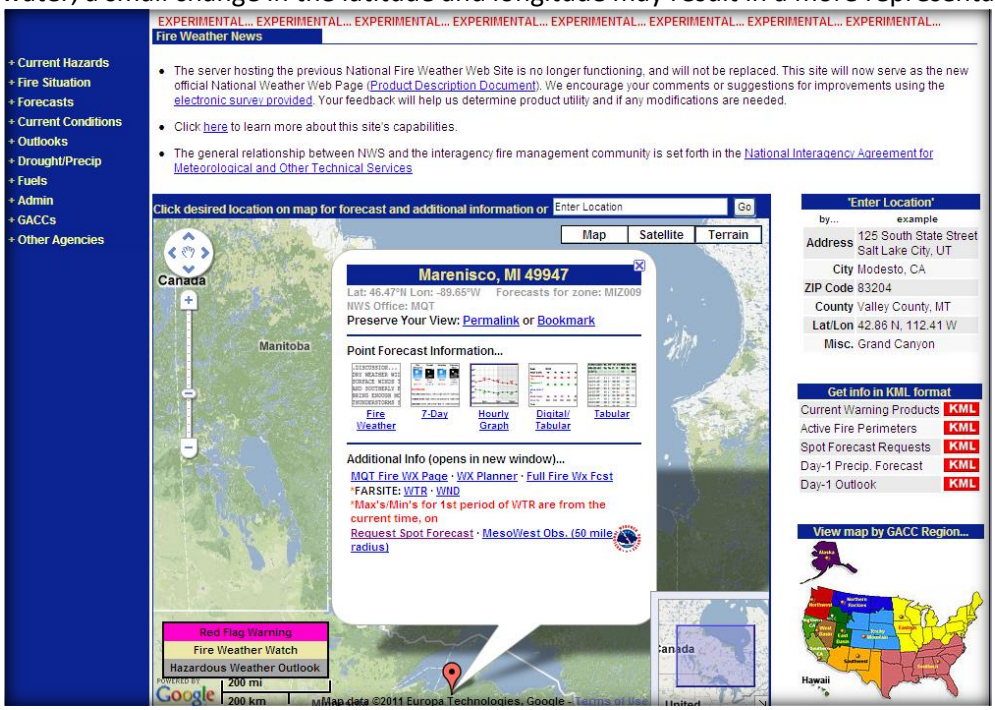
http://weather.gov/fire (zoom into and click on the area of interest, open WTR and WND files for FARSITE)

or

http://radar.srh.noaa.gov/fire/FARSITE/wtr.php?lat=46.468&lon=-89.6484

http://radar.srh.noaa.gov/fire/FARSITE/wnd.php?lat=46.468&lon=-89.6484

Adjust the 2 links above for your specific latitude and longitude, remembering that forecast outputs are for 2.5 km grid boxes. Caution: If the location is in rough terrain or near a body of water, a small change in the latitude and longitude may result in a more representative forecast.



B. Special services, procedures for obtaining and billing

Special services could include teaching weather related courses or an on-site Incident Meteorologist (IMET).

When land management agencies wish for a fire weather forecaster to teach a course, the request should be made at least 3 weeks ahead of time. This can be done by calling or emailing the Fire Weather Program Manager(s). A one-day trip will not incur any costs to the requesting agency. However, with an overnight stay, travel expenses should be paid for by the requesting agency. In most cases reimbursement agreements are in place.

Please reference the Geographical Area Mobilization Guide and/or the National Mobilization Guide for details about IMET dispatches for wildland fire suppression operations.

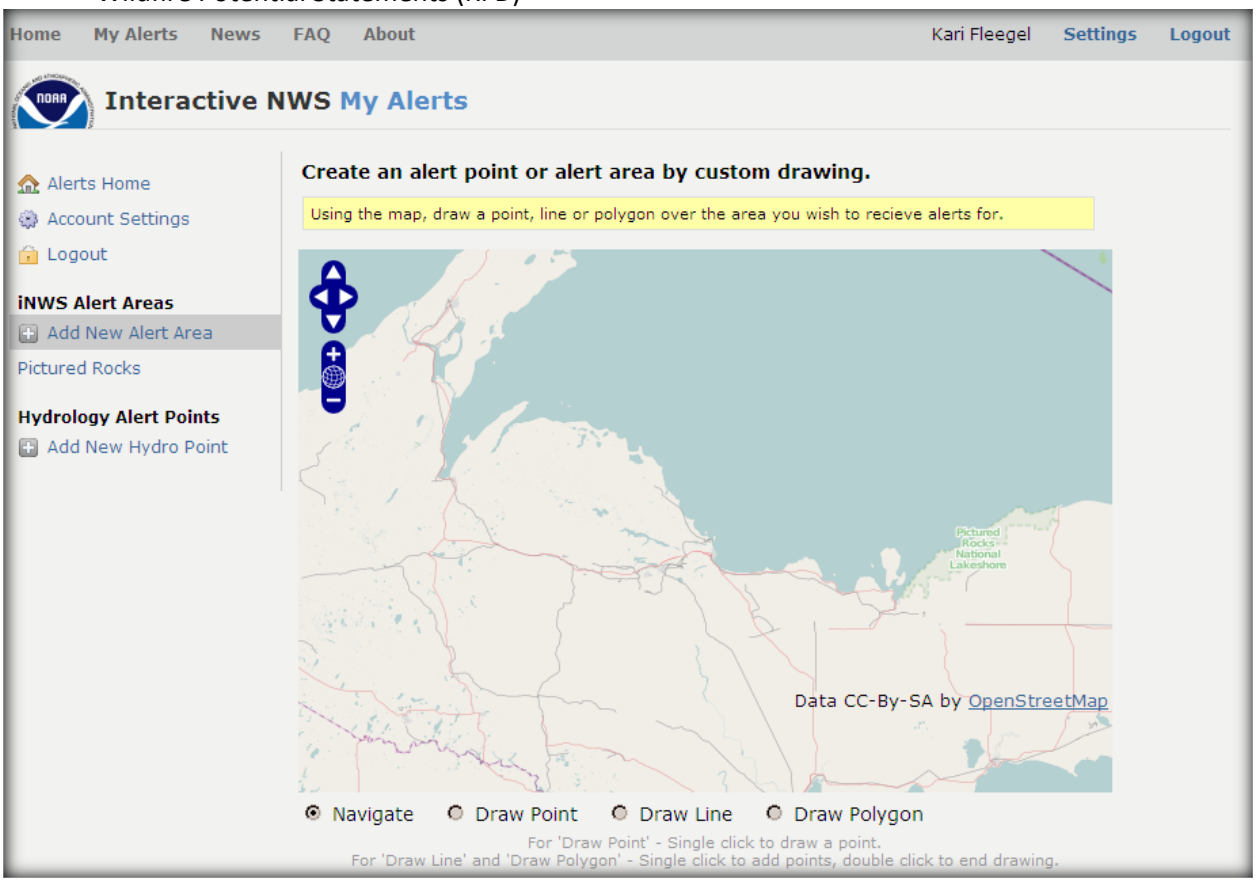
C. Alert Communications

1. iNWS (Watch/Warning/Advisory Alerts)

http://inws.wrh.noaa.gov

The iNWS network is available for emergency personnel, which includes wildland firefighters and emergency planners. You are able to sign up for a location specific account that will provide you with email and/or text messages for selected Watch, Warning, and Advisory products issued by the National Weather Service. While many alerted products are available including Severe Thunderstorm and Tornado Warnings, the following products are for fire weather purposes…

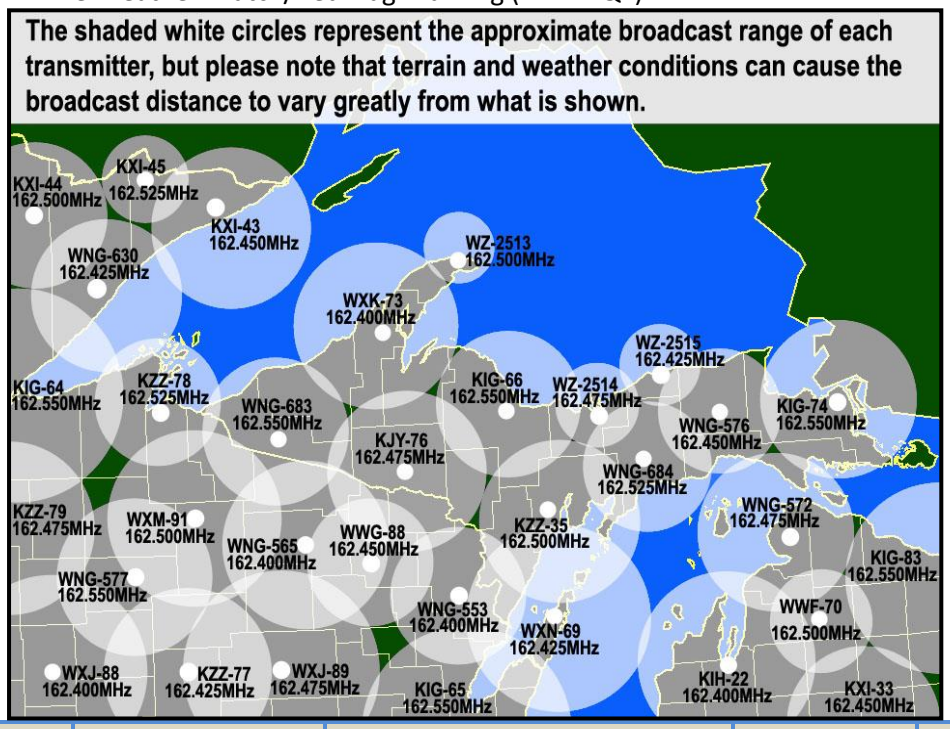
- Red Flag Warnings/ Fire Weather Watches (RFW)
- Wildfire Potential Statements (RFD)



2. NOAA Weather Radio All Hazards

The products listed below will play on NOAA Weather Radio All Hazards at various intervals from every broadcast cycle, every 10 minutes, or more infrequent as needed. The periodicity of each product will vary depending on the severity of the fire situation and the presence of additional weather hazards (example- severe thunderstorms, flooding, etc.). However, they are typically broadcast every 10 minutes. Please contact the Fire Weather Focal Point(s) with any periodicity change requests.

- Wildfire Potential Statement (RFDMQT)
- Fire Weather Watch/Red Flag Warning (RFWMQT)



Call Sign	Site Name	Site Location (County)	Frequency	Power
KZZZ78	Ashland	Ashland (Ashland)	162.525	1000
WZ2513	Copper Harbor	Copper Harbor (Keweenaw)	162.500	300
KJY76	Crystal Falls	Crystal Falls (Iron)	162.475	1000
KZZ35	Escanaba	Escanaba (Delta)	162.500	1000
WNG572	Emmet County	Emmet County (Cheboygan)	162.475	300
WZ2515	Grand Marais	Grand Marais (Alger)	162.425	100
WXK73	Houghton	Painesdale (Houghton)	162.400	1000
WNG84	Manistique	Steuben (Schoolcraft)	162.525	300
WNG683	Marinesco	Marinesco (Gogebic)	162.550	300
KIG66	Marquette	Negaunee (Marquette)	162.550	300
WZ2514	Munising	Munising (Alger)	162.475	100
WNG576	Newberry	Newberry (Luce)	162.450	300
KIG74	Sault St. Marie	Daftner (Chippewa)	162.550	1000
WXN69	Sister Bay	Sister Bay (Door)	162.425	1000
WNG553	Wausaukee	Wausaukee (Marinette)	162.400	1000

IV. JOINT RESPONSIBILITIES

Service boundaries and fire weather forecast zones, and text product specifics may be negotiated to meet customer and forecaster need.

V. SIGNING PAGE AND EFFECTIVE DATES OF THIS AOP

This Agreement shall be effective until the issuance of the next Annual Operating Plan, expected out March of next year.

National Weather Service, Marquette, MI, NOAA

_____ _____

Kari Fleegel – Fire Weather Focal Point/IMET ***Date***
Jason Alumbaugh – Assistant Fire Weather Focal Point
Robin J. Turner – Meteorologist in Charge

Hiawatha National Forest, USFS

_____ _____

Eric Rebitzke – UPCC Fire Management Officer (acting) ***Date***
Linda Peterson – UPCC Manager (acting)

Isle Royale National Park, NPS

_____ _____

Richard Moore, Chief Ranger ***Date***
Marshall Plumer- East District Ranger

Michigan Department of Natural Resources

_____ _____

Celeste Chingwa – Resource Protection Manager ***Date***
Bryce Avery – Fire Specialist
Keith Murphy – Fire Specialist

Pictured Rocks National Lakeshore, NPS

_____ _____

Matthew Davis – Park Ranger ***Date***
Bruce Leutusher – Vegetation/Fuels
Eric Rebitzke – UPCC Fire Management Officer (acting)

Ottawa National Forest, USFS

_____ _____

Vacant/Jim Grant – Fire Management Officer (acting) ***Date***
Brian Sabin – Dispatcher

Seney National Wildlife Refuge, USFW

_____ _____

Gary Lindsay – Fire Management Officer ***Date***
Greg McClellan – Deputy Refuge Manager
Eric Rebitzke – UPCC Fire Management Officer (acting)

US Bureau of Indian Affairs (BIA)

_____ _____

Will Wiggins – Fire Management Fuels Specialist ***Date***