L.C.E.S. CHECKLIST

LOOKOUTS / COMMUNICATION

- ▫ Competent and trusted individual(s)?
- ▫ Radio and frequencies?
- ▫ Watch or timepiece?
- ▫ Map and communication Plan?
- ▫ Knowledge of crew(s) location on fire?
- ▫ Good vantage point and safe location?

ESCAPE ROUTES

- ▫ Scouted?
- ▫ Able to walk?
- ▫ Timed?
- ▫ Marked?
- ▫ Away from fire head?

SAFETY ZONE (No shelter needed)

- ▫ Clean burn / natural / man-made / vehicles?
- ▫ Scouted?
- ▫ Close enough considering ROS?
- ▫ Large enough for the number of people?
- ▫ Terrain?

MN Interagency Fire Center (MIFC) Dispatch
402 11TH ST. SE, GRAND RAPIDS, MN 55744
218-327-4558

Minnesota Fire Suppression Field Pocket Guide

2012

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2012

Standard Firefighting Orders

1. Keep informed on fire weather conditions and forecasts.
2. Know what your fire is doing at all times.
3. Base all actions on current and expected behavior of the fire.
4. Identify escape routes and safety zones and make them known.
5. Post lookouts when there is possible danger.
6. Be alert. Keep calm. Think clearly. Act decisively.
7. Maintain communications with your forces, supervisor and adjoining forces.
8. Give clear instructions and insure they are understood.
9. Maintain control of your forces at all times.
10. Fight fire aggressively, having provided for safety first.

18 Watchouts Situations

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communication link with crewmembers/supervisors.
8. Constructing line without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and the fire.
12. Cannot see main fire, not in contact with anyone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather is getting hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make escape to safety zones difficult.
18. Taking a nap near the fire line.

Wildland/Urban Watch Outs

1. Unified Command not implemented
2. Poor access and narrow one-way roads. Bridge load limits
3. Inadequate water supply
4. Wood construction and shake roofing. Open soffits. Unscreened gable vents
5. Natural fuels <30 feet from structures
6. Poor access around structures because of accumulations of junk, etc
7. Hazardous materials in path of fire, including unmarked barrels, dumps, etc
8. Structures surrounded by flashy fuels
9. Chaotic suppression actions or panic during public evacuations
10. Powerline situations, unsure of power status. Propane tanks near structures

Notes:

Phonetic Alphabets

Law Enforcement		Fire/EMS & Military	
A ..... Adam	N ..... Nora	A ..... Alpha	N ..... November
B ..... Boy	O ..... Ocean	B ..... Bravo	O ..... Oscar
C ..... Charlie	P ..... Paul	C ..... Charlie	P ..... Papa
D ..... David	Q ..... Queen	D ..... Delta	Q ..... Quebec
E ..... Edward	R ..... Robert	E ..... Echo	R ..... Romeo
F ..... Frank	S ..... Sam	F ..... Foxtrot	S ..... Sierra
G ..... George	T ..... Tom	G ..... Golf	T ..... Tango
H ..... Henry	U ..... Union	H ..... Hotel	U ..... Uniform
I ..... Ida	V ..... Victor	I ..... India	V ..... Victor
J ..... John	W .... William	J ..... Juliet	W ..... Whiskey
K ..... King	X ..... X-ray	K ..... Kilo	X ..... X-ray
L ..... Lincoln	Y ..... Young	L ..... Lima	Y ..... Yankee
M ..... Mary	Z ..... Zebra	M ..... Mike	Z ..... Zulu

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Phone Number / Addresses

MN State Duty Officer (after hours)
800-422-0798

MIFC
402 11th St SE, Grand Rapids, MN 55744
218-327-4558
pager 218-755-6410
Fax 218-327-4528

MNDNR Forestry Fire Sec. Mgr
500 Lafayette Rd, St. Paul, MN 55155
651-259-5282
pager 651-247-3631
Fax 651-296-5954; cell 651-247-3631

Superior (MN-SUF) and Chippewa (MN-CPF) Natl Forests
402 11th St SE, Grand Rapids, MN 55744
218-327-4175, 4174, or 4173
888-650-3392
Fax 218-327-4528

USFW, Reg 3, Minnesota Zone
>Sherburne/Crane Meadows NWR
17076 293rd Ave
Zimmerman, MN 55398
Don Lantz, Zone FMO (acting)
763-389-3323 ext. 22 (office)
651-357-7152 (cell)
Russ Langford, FMO
763 244-9844 (cell)
763-389-3493 (fax)
>Agassiz NWR
22996 290th ST NE
Middle River, MN 56737
218 449-4115 (office), 449-3241 (fax)
Larry Anderson, FMO
218 689-5741 (cell)
>Big Stone NWR
44843 Cty Rd 19
Odessa, MN 56276
320 273-2191 (office) 273-2231 (fax)
Dan Angelo, FMO
320 304-0177
>Detroit Lakes/Tamarac/Hamden Slough
26624 N Tower Rd
Detroit Lakes, MN 56501
218 847-4431 (office) 847-4156 (fax)
Steve Schumacher, FMO
218 849-5775 (cell)
>Fergus Falls NWR
18965 Cty Hwy 82
Fergus Falls, MN 56537
218 739-2291 (office) 739-9534 (fax)
Troy Boschee, FMO
218 770-6192 (cell)
>Litchfeild NWR
22274 - 615th Ave
Litchfeild, MN 55355
320 693-2849 (office) 593-2552 (fax)
Kris Larson, FMO
320 293-0790 (cell)
>MN Valley NWR
3815 American Blvd East
Bloomington, MN 55425
952 854-5900 (office)
612 725-0710 (fax)
Lee Nelson, FMO
612 280-8164 (cell)
>Morris NWR
43875 - 230th St
Morris, MN 56267
320 589-1001 (office) 589-2624 (fax)
Seth Grimm, FMO
320 287-0370 (cell)
>Rydell NWR
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B.I.A. Midwest Region Office
B Whipple Fed Bldg, 1 Fed Dr, Rm 550
Ft. Snelling, MN 55111
612-713-4400
after hours 218-327-4558
Fax 612-713-4401

B.I.A. Minnesota Agency (MN_MNA)
Fed Bldg, 522 Minnesota Av, Rm 418
Bemidji, MN 56601
218-751-2011 x408, x452
after hours 218-327-4558
fax 218-751-4367

Voyageurs Natl Park (MN-VOP)
360 Hwy 11 East
International Falls, MN 56649
Dispatch 218-283-6600
fax 218-285-7407

St. Croix Natl Scenic Riverway
401 N Hamilton St, St. Croix Falls, WI 54024
715-483-2260
715-635-8346 x426
Fax 715-483-3288

MN Homeland Security/ Emergency Management
402 11th St SE, Grand Rapids, MN 55744
218-327-4496
fax 218-327-4527

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DNR Forestry Offices

NW Region - 1 [218-308-2361]
215 Birchmont Beach Rd NE
Bemidji, MN 56601

Bemidji Area - 111 [218-308-2065]
2220 Bemidji Ave N
Bemidji, MN 56601

Blackduck Area - 117 [218-835-3161]
417 B Foretry Dr
Balckduck, MN 56630

Warroad Area - 121 [218-386-1304]
804 Cherne Dr NW
Warroad, MN 56763

Baudette - 131 [218-634-2172]
206 Main St E
Baudette, MN 56623

Backus - 142 [218-947-3232]
4391 Hwy 87 NW
Backus, MN 56435

Park Rapids - 161 [218-732-3309]
607 First St W
Park Rapids, MN 56470

NE Region - 2 [218-999-7836]
1201 E Hwy 2
Grand rapids, MN 55744

Deer River Area - 221 [218-246-8343]
403 Division St
Deer River, MN 56636

Aitkin Area - 232 [218-927-4040]
1200 Minnesota Av S
Aitkin, MN 56431

Hibbing Area - 234 [218-262-6760]
1208 E Howard St
Hibbing, MN 55746

Sandstone Area - 244 [320-245-6789]
613 Hwy 23 S
Sandstone, MN 55072

Tower Area - 245 [218-753-2580]
650 Hwy 169
Tower, MN 55790

Cloquet Area - 251 [218-879-0880]
1604 S Hwy 33
Cloquet, MN 55720

Two Harbors Area - 253 [218-834-1420]
1568 Hwy 2
Two Harbors, MN 55616

Littlefork Area - 261 [218-278-6651]
421 3rd Ave
Littlefork, MN 56653

Central Region - 3 [651-259-5830]
1200 Warner Rd
St. Paul, MN 55106

Little Falls Area - 312 [320-616-2450]
16543 Haven Rd
Little Falls, MN 56345

Rochester Area - 341 [507-208-2838]
2300 Silver Creek Rd NE
Rochester, MN 55906

Cambridge Area—351 [763-689-7100x221]
800 Oak Savanna Ln SW
Cambridge, MN 55008

St. Paul Headquarters [651-259-5300]
500 Lafayette Rd
St. Paul, MN 55155

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Office [651-259-5282]
Cell [218-244-9664]
Pager [612-589-1072]

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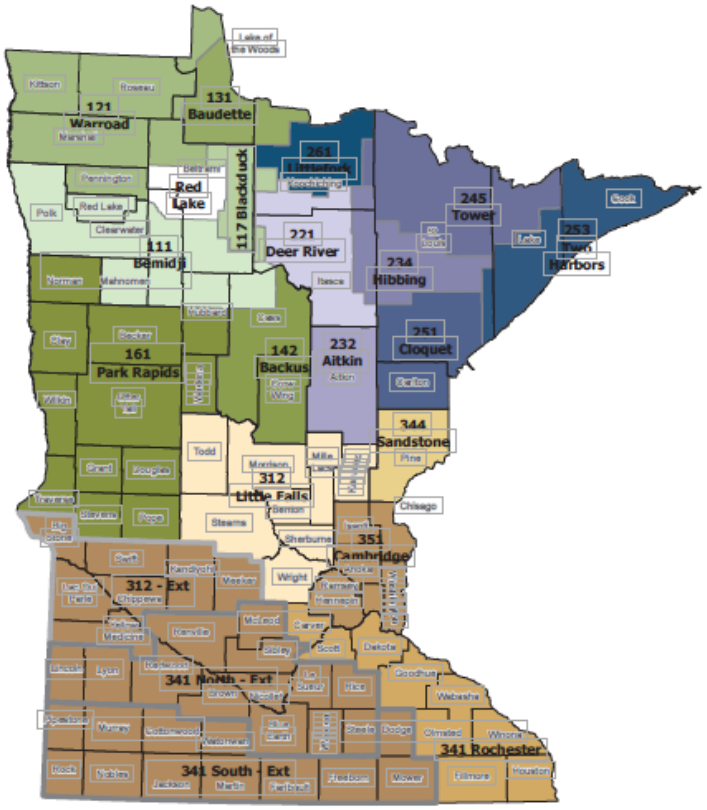

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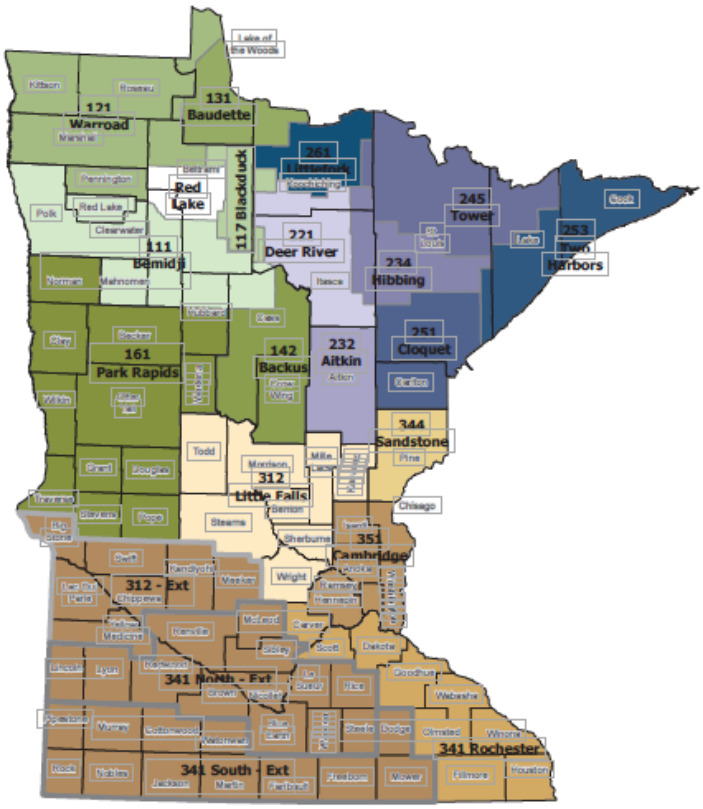
Lake of the Woods
Kittson
Roseau
121
Warroad
Marshall
131
Baudette
Pennington
Red Lake
Red
Lake
Polk
Clearwater
117 Blackduck
111
Bemidji
Norman
Mahnomer
Becker
161
Park Rapids
Wilkin
Grant
Douglas
Todd
142
Backus
Cass
Morrison
Mille Lacs
312
Little Falls
Stearns
Benton
Sherburne
Isanti
Chisago
Pine
Kanabec
351
Camhridge
Swift
Chippewa
312 - Ext
Wright
Meeker
Kandiyohi
McLeod
Carver
Scott
Sibley
Dakota
Goodhue
Wabasha
Nicollet
Le Sueur
Rice
Lyon
Redwood
Brown
341 North - Ext
Steele
Dodge
Olmsted
Winona
341 Rochester
Murray
Cottonwood
Watonwan
Blue Earth
Faribault
Freeborn
Mower
Fillmore
Houston
Rock
Nobles
Jackson
Martin
341 South - Ext
261
Koochiching
Itasca
245
Tower
Lake
253
Lake
Harbors
221
Deer River
234
Hibbing
232
Aitkin
251
Cloquet
Carlton
344
Sandstone

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COMMUNICATIONS/RADIO SYSTEM

- □ All the MNICS wildland fire agencies will operate using a VHF radio system
- □ Most of the MNICS wildland fire agencies will be operating on a VHF Narrowband radio system by spring 2010
- □ This common and familiar system allows resources to function together seamlessly, sharing resources as the need arises
- □ Most of the radios either contain our partner agency frequencies or are field programmable
- □ None of the MNICS wildland fire agencies plan any immediate changes from the current VHF systems
- □ The current system allows MNICS personnel to travel nationally to incidents and use their home unit radio after reprogramming
- □ The next likely change will be to migrate to a VHF digital system

MN Interagency Primary Frequency List

**Denotes Narrowband status*

Use/Locations	Receive	Tone	Transmit	Tone
Tactical 1 {W.B}	151.475		151.475	
Air-to-Ground	151.340*	110.9	151.340	110.9
Air-to-Air	123.025			
Tac 2/MNICS	170.475*		170.475	
Fire Mutual Aid {W.B.}	154.295		154.295	
Statewide	151.415*	103.5	151.415	103.5

ARMER system (800 Mhz)

The State of Minnesota is also building an 800 Mhz system, called ARMER, in the Twin Cities, Rochester, St. Cloud and other outstate areas. To keep in contact with the various local Fire Departments and other county agencies, the Fire Center has procured a small cache (24) of these portables for use. We will be using the Motorola model XTS -2500 portables to work with any of the entities that have migrated onto this system.

800 Mhz cannot directly communicate with VHF systems. The 800 dispatcher needs to establish a "patch" to allow VHF to talk to ARMER radios.

GROUND OPERATIONS COMMUNICATION

The Ground operations communication needs can be broken into different levels: Initial Attack, Extended Attack, and Project Incidents. Regardless of the level of operations, there are still several steps that will remain common:

1. All resources reporting to an incident will "report in" with the Incident Commander. If radio communications are available, they may be used; otherwise, "face to face" communications should be used. (Remember: LCES)
2. Resources with different communication capabilities must be coordinated with the Incident Commander.
3. Use the MNICS frequency as a contact frequency and command net until a radio cache system arrives.

Fire Origin Protection and Cause Determination

All Initial Attack resources should maintain a basic supply of materials to protect the wildfire origin:

Flagging tape	Wire flags	Notebook
Digital or film camera	GPS	Flashlight

Things to-Do

1. Record observations en-route to and upon arrival at the fire scene.
2. Record weather data upon arrival.
3. Identify possible witnesses. Write down names and contact information.
4. Initially photograph the fire scene.
5. The IA Incident Commander should attempt to assess the General Origin Area and protect it from any further disturbance.
6. Identify and protect any evidence at or near the scene, including footprints, tire tracks, ignition sources/devices, etc. Protect, do not collect. Leave collection to enforcement officials.
7. Record identity of people and vehicles at or near the scene. Use camera if possible.
8. Try not to allow anyone to enter the General Origin Area. Also limit suppression activities in this area, if possible, to preserve evidence.
9. Request law enforcement or a wildfire investigator to assist with origin & cause determination.

Possible Causes

- ☑ Lightning
- ☑ Campfire
- ☑ Smoking
- ☑ Piled debris burning
- ☑ Burn barrel / outdoor stove
- ☑ Running fire
- ☑ Ag operations
- ☑ Farm equipment
- ☑ Road maintenance
- ☑ ATV
- ☑ Vehicle brakes, exhaust, etc
- ☑ Vehicle dragging parts
- ☑ Welding/Cutting
- ☑ Railroad locomotive exhaust
- ☑ Railroad brakes / wheel bearing
- ☑ ROW maintenance
- ☑ Electric fence
- ☑ Power line
- ☑ Children
- ☑ Fireworks
- ☑ Prescribed fire
- ☑ Incendiary/Arson

COMMUNICATIONS/RADIO SYSTEM

- □ All the MNICS wildland fire agencies will operate using a VHF radio system
- □ Most of the MNICS wildland fire agencies will be operating on a VHF Narrowband radio system by spring 2010
- □ This common and familiar system allows resources to function together seamlessly, sharing resources as the need arises
- □ Most of the radios either contain our partner agency frequencies or are field programmable
- □ None of the MNICS wildland fire agencies plan any immediate changes from the current VHF systems
- □ The current system allows MNICS personnel to travel nationally to incidents and use their home unit radio after reprogramming
- □ The next likely change will be to migrate to a VHF digital system

MN Interagency Primary Frequency List

**Denotes Narrowband status*

Use/Locations	Receive	Tone	Transmit	Tone
Tactical 1 {W.B}	151.475		151.475	
Air-to-Ground	151.340*	110.9	151.340	110.9
Air-to-Air	123.025			
Tac 2/MNICS	170.475*		170.475	
Fire Mutual Aid {W.B.}	154.295		154.295	
Statewide	151.415*	103.5	151.415	103.5

ARMER system (800 Mhz)

The State of Minnesota is also building an 800 Mhz system, called ARMER, in the Twin Cities, Rochester, St. Cloud and other outstate areas. To keep in contact with the various local Fire Departments and other county agencies, the Fire Center has procured a small cache (24) of these portables for use. We will be using the Motorola model XTS -2500 portables to work with any of the entities that have migrated onto this system.

800 Mhz cannot directly communicate with VHF systems. The 800 dispatcher needs to establish a "patch" to allow VHF to talk to ARMER radios.

GROUND OPERATIONS COMMUNICATION

The Ground operations communication needs can be broken into different levels: Initial Attack, Extended Attack, and Project Incidents. Regardless of the level of operations, there are still several steps that will remain common:

1. All resources reporting to an incident will "report in" with the Incident Commander. If radio communications are available, they may be used; otherwise, "face to face" communications should be used. (Remember: LCES)
2. Resources with different communication capabilities must be coordinated with the Incident Commander.
3. Use the MNICS frequency as a contact frequency and command net until a radio cache system arrives.

8

Fire Origin Protection and Cause Determination

All Initial Attack resources should maintain a basic supply of materials to protect the wildfire origin:

Flagging tape	Wire flags	Notebook
Digital or film camera	GPS	Flashlight

Things to-Do

1. Record observations en-route to and upon arrival at the fire scene.
2. Record weather data upon arrival.
3. Identify possible witnesses. Write down names and contact information.
4. Initially photograph the fire scene.
5. The IA Incident Commander should attempt to assess the General Origin Area and protect it from any further disturbance.
6. Identify and protect any evidence at or near the scene, including footprints, tire tracks, ignition sources/devices, etc. Protect, do not collect. Leave collection to enforcement officials.
7. Record identity of people and vehicles at or near the scene. Use camera if possible.
8. Try not to allow anyone to enter the General Origin Area. Also limit suppression activities in this area, if possible, to preserve evidence.
9. Request law enforcement or a wildfire investigator to assist with origin & cause determination.

Possible Causes

- ☑ Lightning
- ☑ Campfire
- ☑ Smoking
- ☑ Piled debris burning
- ☑ Burn barrel / outdoor stove
- ☑ Running fire
- ☑ Ag operations
- ☑ Farm equipment
- ☑ Road maintenance
- ☑ ATV
- ☑ Vehicle brakes, exhaust, etc
- ☑ Vehicle dragging parts
- ☑ Welding/Cutting
- ☑ Railroad locomotive exhaust
- ☑ Railroad brakes / wheel bearing
- ☑ ROW maintenance
- ☑ Electric fence
- ☑ Power line
- ☑ Children
- ☑ Fireworks
- ☑ Prescribed fire
- ☑ Incendiary/Arson

33

MOBILIZATION / DEMOBILIZATION

A. Work/Rest

MNICS agencies will adhere to the National Work/Rest Policy on incidents in Minnesota. Federal personnel will adhere to the National Work/Rest Policy on all incidents.

Work/Rest Guidelines: Plan for and ensure that all personnel are provided a minimum 2:1 work to rest ratio (for every 2 hours of work or travel, provide 1 hour of sleep and/or rest).

Work shifts that exceed 16 hours and/or consecutive days that do not meet the 2:1 work/rest ratio should be the exception, and no work shift should exceed 24 hours. However, in situations where this does occur (for example, initial attack), incident management personnel will resume the 2:1 work/rest ratio as quickly as possible.

State of Minnesota, DNR Work/Rest Guidelines - Supervisors and Incident Commanders shall schedule personnel, including themselves, to provide for the following off-duty periods:

1. Schedules will be developed to provide for a 2:1 hour work/rest ratio.
2. One hour of off-duty, unpaid time should be provided for every two hours of work. For example: if a person works for 12 hours, he/she should have a minimum of 6 hours off.
3. A minimum of one full day (24 continuous hours) of off-duty time shall be scheduled within each two-week pay period. The person shall not be on-call during the off-duty period. An employee shall work no more than 20 days in a row without approval from the Regional Forester.
4. The State of Minnesota cannot provide paid R&R days. Employees may use leave, comp. time or unpaid time off to meet work/rest time off requirements. This includes required time off when returning from off-unit and/or out of state assignments.

[Additional State of Minnesota, DNR Work/Rest Guidelines are in the Wildfire Protection Business Management Manual.]

B. Length of Assignment

Assignments to large or complex incidents, including those in Minnesota, will follow the national standard. If a typical assignment exceeds past seven days, the home unit and agency are responsible to find replacements.

C. Demobilization

1. 2200 Hour Rule - All MNICS agencies have agreed to a common 2200 Rule. Resources will not be released from the incident or staging area if they are not able to arrive to their final destination by 2200 hours.
2. MNICS agencies should discourage their resources from making their own travel arrangements. Travel should be coordinated thru MIFC/Expanded Dispatch.

Initial Attack Communications

Initial Attack is the responsibility of the local agency. If several steps are taken on incidents that may involve other agencies, the radio capabilities that we now have can be optimized.

1. If the Minnesota DNR places their mobile radios into the scan mode and scans their tactical frequency.
2. If the Minnesota DNR puts their mobile and portable radios in the monitor mode. (Disable CTCSS).

Extended Attack Communications

Extended Attack is the gray area between an Initial Attack Incident and a Project Incident. It will usually require more organization than Initial Attack and last for a longer period of time.

1. Request additional communication equipment, through normal dispatch channels, early in the incident.
2. Establish an Incident Command Post with capability of communicating with those agencies on the incident. Maintain a radio from each participating agency at the Command Post for relaying information.
3. Consider using Tac 2/MNICS freq. for a command and check-in frequency until incident communications are established.
4. Switch to a tactical frequency as soon as possible to relieve pressure off the agency frequencies.

Project Incident Communication

The Project Incident will require more resources and more communications. This increased load will often put a great strain on an agency's normal communications system and therefore, a radio cache system thru MIFC should be ordered.

Air Operations / Communications

Air Operations will vary with the agency involved but these points remain constant:

1. Aircraft call designators will be the last 3 digits of their "N" or tail number.
2. All forest Service and State of Minnesota aircraft, contract or service owned, will always monitor 168.625 MHZ (Emergency air frequency).
3. Air-to-ground communications:

MINNESOTA DNR - All air-to-ground communications on an incident will be initially conducted on the DNR Area simplex frequency, the DNR air-to-ground frequency 151.340 or as designated by the Incident Commander. Air-to-air communications will initially be conducted on 122.925 by all MNICS agencies.

SUPERIOR NATIONAL FOREST - All air-to-ground communications on an incident will be conducted on 166.675 (Air/Ground), Forest Simplex (169.925) or NIFC Tactical frequencies.

ALL OTHER AGENCIES - Since the other agencies, for the most part, only have radios capable of communicating on their own frequencies, air operations should be conducted on the agencies simplex frequency unless directed otherwise by the dispatcher.

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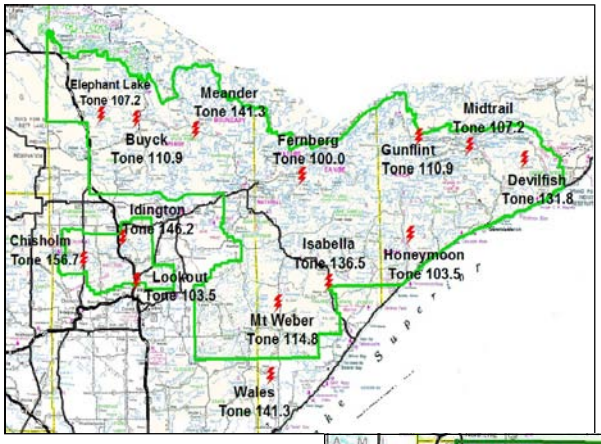
9

MNICS Agency Repeater Locations
(frequencies are listed in MNICS Mob Guide)



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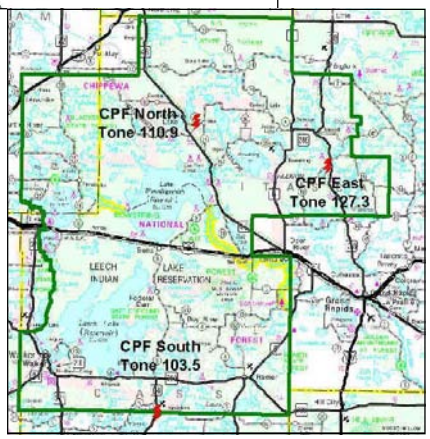

Fire Danger Area:

- Chippewa National Forest
- March to June
- Cass Lake Weather Station
  * Meets NWCG Wx Station Standards

Fire Danger Interpretation:

EXTREME -- Use extreme caution
(Caution) -- Watch for change
Moderate -- Lower Potential, but always be aware

Maximum -- Highest Burning Index by day for 1980 - 2007
Average -- shows peak fire season over 28 years (2526 observations)
90th Percentile -- Only 10% of the 2526 days from 1980 - 2007 had an Burning Index above 38

Local Thresholds - Watch out: Combinations of any of these factors can greatly increase fire behavior: 20' Wind Speed over 14 mph, RH less than 21%, Temperature over 84, Fire Weather Index (CAN) over 29

Remember what Fire Danger tells you:

- ✓ Burning Index gives day-to-day fluctuations calculated from 2 pm temperature, humidity, wind, daily temperature & rh ranges, and precip duration.
- ✓ Wind is part of BI calculation.
- ✓ Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- ✓ Listen to weather forecasts -- especially WIND.

Past Experience:

The number of days between precipitation events is a critical factor that determines liklihood of fire occurance, intensity and spread.

Fires at this time of year burn primarily in light fuels that dry quickly and are highly reactive to wind conditions. High rates of spread and changes to spread direction are possible.

Responsible Agency: U.S Forest Service
FF+4.0 beta3 04/10/2008-16:00 (C:\Documents and Settings\...\CPF Master 2007 with fires)
Design by NWCG Fire Danger Working Team

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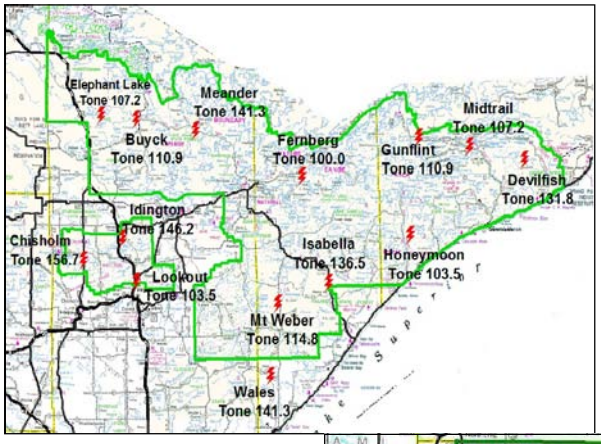

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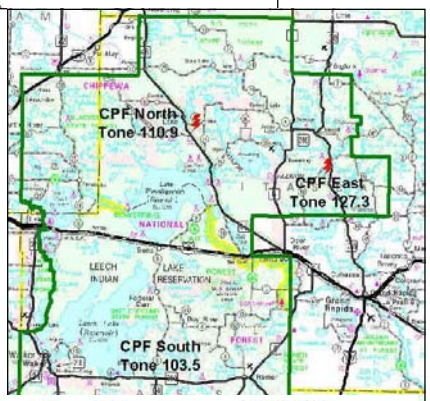

DNR Forestry Radio System 2012

- DNR Forestry Repeaters

Fire Danger Area:

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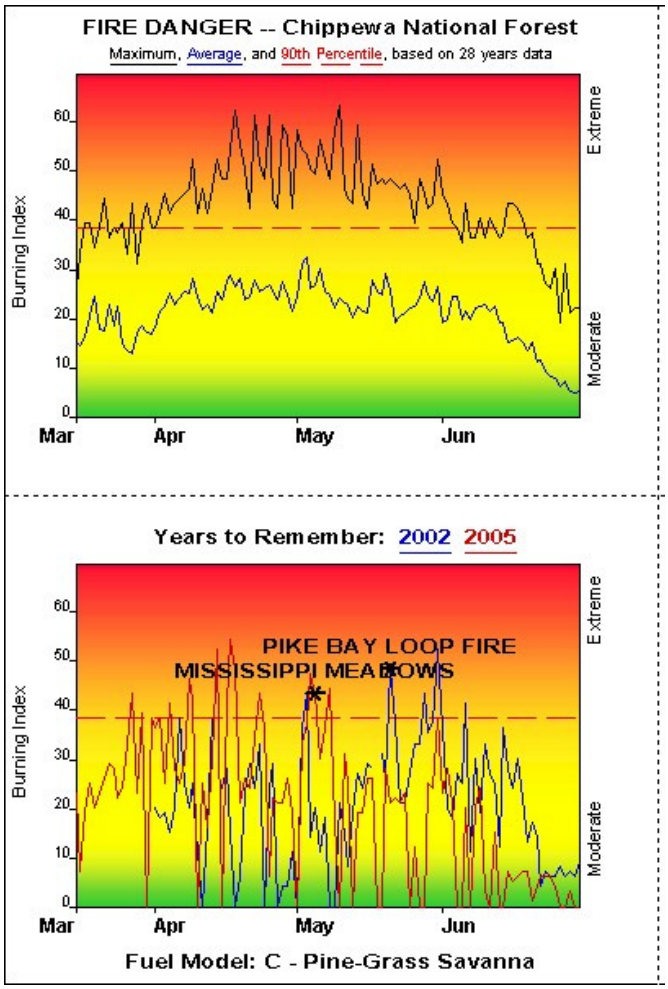
FIRE DANGER -- Chippewa National Forest
Maximum, Average, and 90th Percentile, based on 28 years data
Burning Index
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Mar
Apr
May
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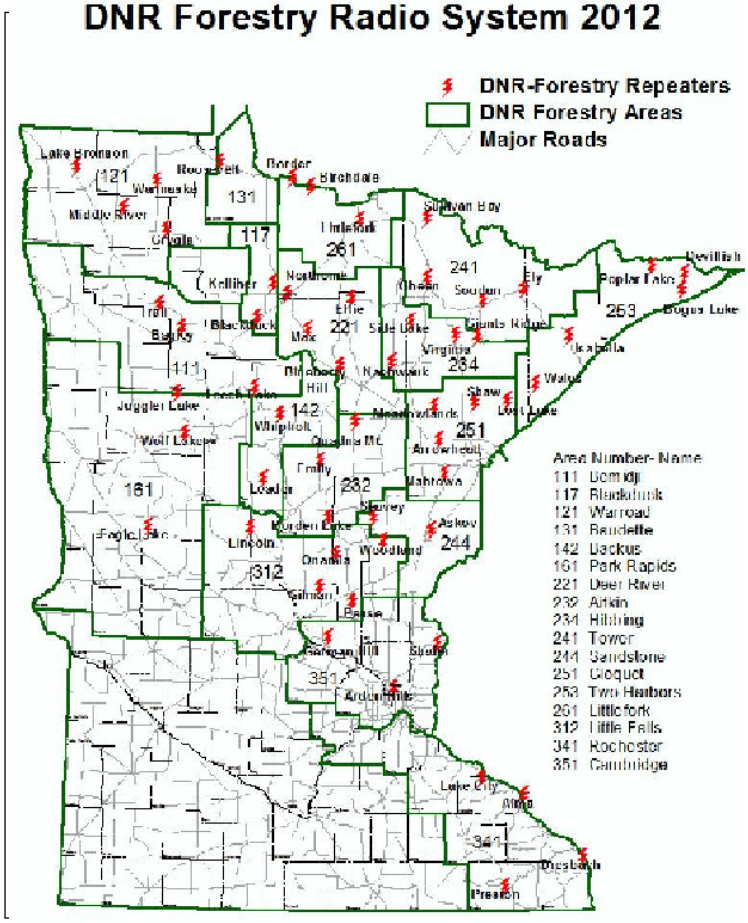
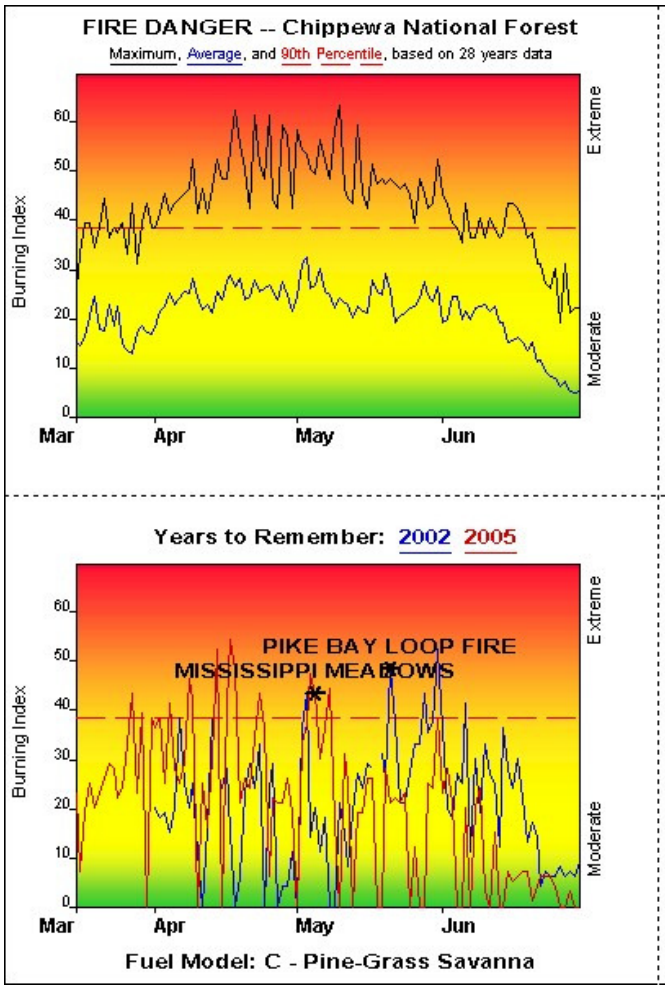
Years to Remember: 2002 2005
PIKE BAY LOOP FIRE
MISSISSIPPI MEADOWS
Fuel Model: C - Pine-Grass Savanna


DNR Forestry Radio System 2012
DNR-Forestry Repeaters
DNR Forestry Areas
Major Roads
Area Number- Name
111 Bemidji
117 Blackduck
121 Warroad
131 Baudette
142 Backus
161 Park Rapids
221 Deer River
239 Arkin
284 Hibbing
241 Tower
244 Sandstone
251 Cloquet
253 Two Harbors
261 Littlefork
312 Little Falls
341 Rochester
351 Cambridge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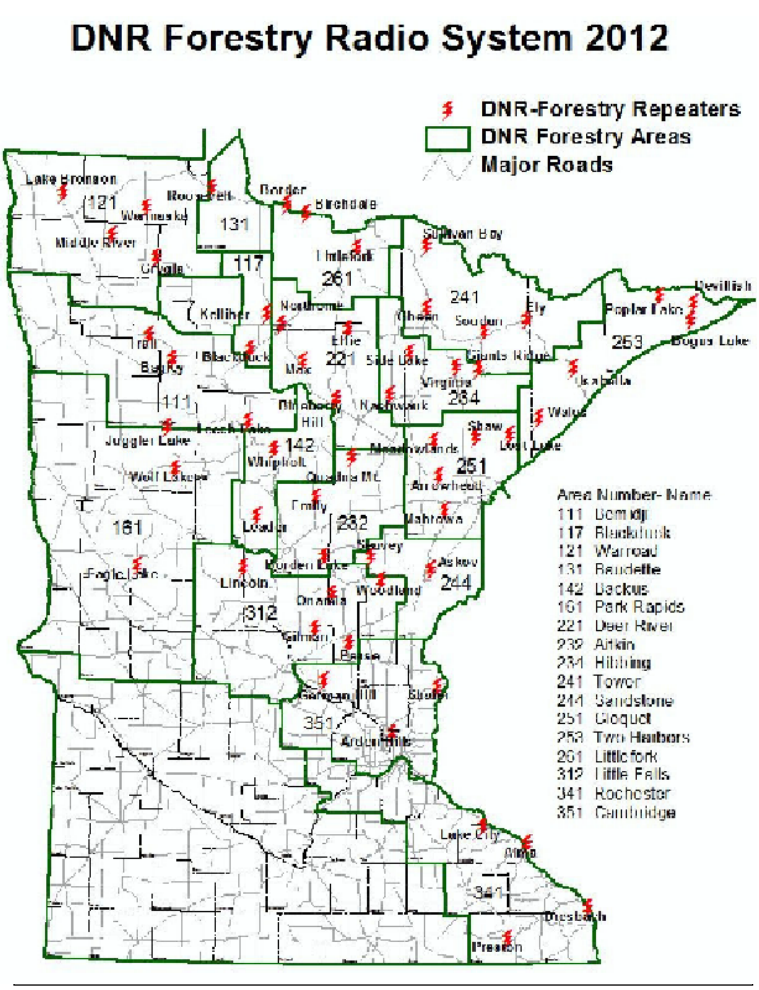
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11

Minnesota Fire Suppression Air Resources

DeHavilland Beaver

Typ 4. 125 gallon load
Uses: Detection, Air Attack, suppression, transport, Med EVAC
Considerations:
- □ Limited to one canoe per load
- □ Requires ~> ½-mile for takeoff
- □ Capable of a 5 passenger transport or 3 firefighter transport with IA gear. Also has hazardous materials transport capabilities

Air Tractor 802 Fire Boss

Typ 3, 800 gallon load (w/ foam)
Uses: Suppression
Considerations:
- □ Quick turnaround times
- □ Requires < ¾-mile for dipping
- □ No lead plane

Canadair CL-215

Typ 3, 1400 gallon load (w/ foam)
Uses: Suppression, with a lead plane and ASGS
Considerations:
- □ Requires > 1-mile for dipping
- □ May be stationed at Anoka, Brainerd, Bemidji, or Hibbing

(Type 1) and (Type 2) Airtankers Based on fire conditions, Minnesota may resource order Typ 1/2 airtankers. These fire retardant aircraft can be based at any of the tanker bases.

S.E.A.T. (Typ3) Airtankers SEAT airtankers have been used in Minnesota and can be based at Princeton or any of the tanker bases.

Helicopters (Typ 1/2/3) Minnesota MNICS agencies maintain ## helicopter bases throughout the northern portion of the State. Helicopters are dispatched through the local DNR/USFS Forest Dispatch.

Minnesota National Guard Arrangements with the MNG has made available helicopter resources for fire suppression. There is a lag time for response depending on the alert level established. Requests are processed through MIFC.

Wildfire Detection Aircraft During the active wildfire season, Areas with wildfire suppression responsibilities utilize contracted small aircraft for air detection.

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Fire Danger Area:

- Superior Natioonal Forest
- June-October Fire Season
- Ely, MN Weather Station
  * Meets NWCG Wx Station Standards

Fire Danger Interpretation:

EXTREME -- Use extreme caution
(Caution) -- Watch for change
Moderate -- Lower Potential, but always be aware

Maximum -- Highest Energy Release Component by day for 1970 - 2007
Average -- shows peak fire season over 38 years (5067 observations)
90th Percentile -- Only 10% of the 5067 days from 1970 - 2007 had an Energy Release Component above 34

Local Thresholds - Watch out: Combinations of any of these factors can greatly increase fire behavior: 20' Wind Speed over 15 mph, RH less than 25%, Temperature over 90, Fire Weather Index (CAN) over 15

Remember what Fire Danger tells you:

- ✓ Energy Release Component gives seasonal trends calculated from 2 pm temperature, humidity, daily temperature & rh ranges, and precip duration.
- ✓ Wind is NOT part of ERC calculation.
- ✓ Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- ✓ Listen to weather forecasts -- especially WIND.

Past Experience:

The number of days between precipitation events is a critical factor that determines likelihood of fire occurance, intensity and spread.

Fires at this time of the year burn in heavier fuels with high intensities. Long range spotting is common as fires transition to the crowns. Winds will affect the direction of fire spread. Fires burning in blowdown, many times are too intense for handcrews alone and may require additional support.

Responsible Agency: U.S. Forset Service
FF+4.0 beta3 04/10/2008-16:15 (C:\Documents and Setti...\SUF Master 2007 with his fires)
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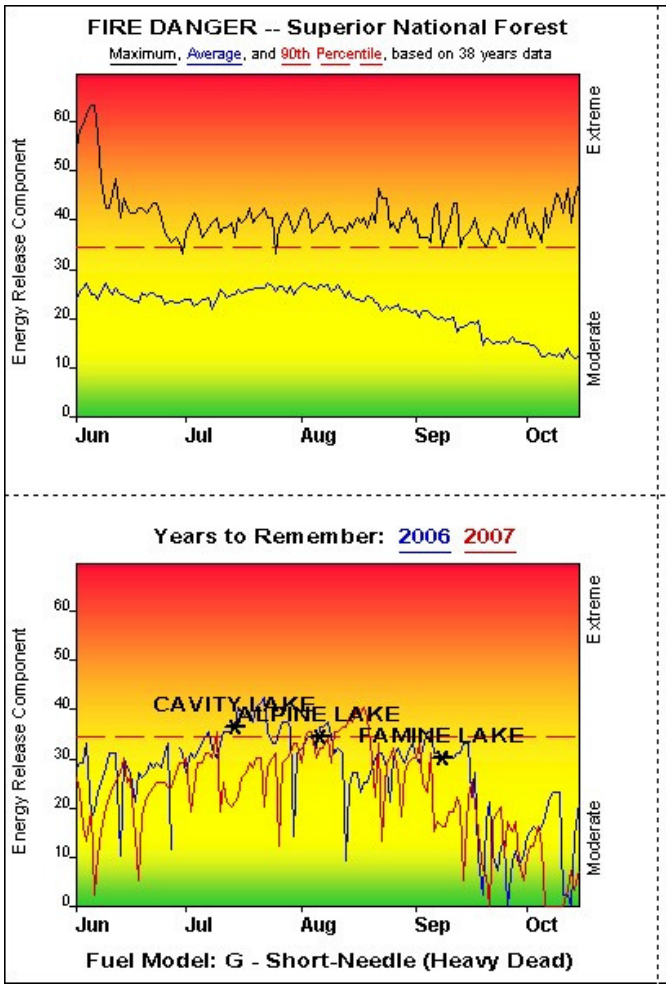


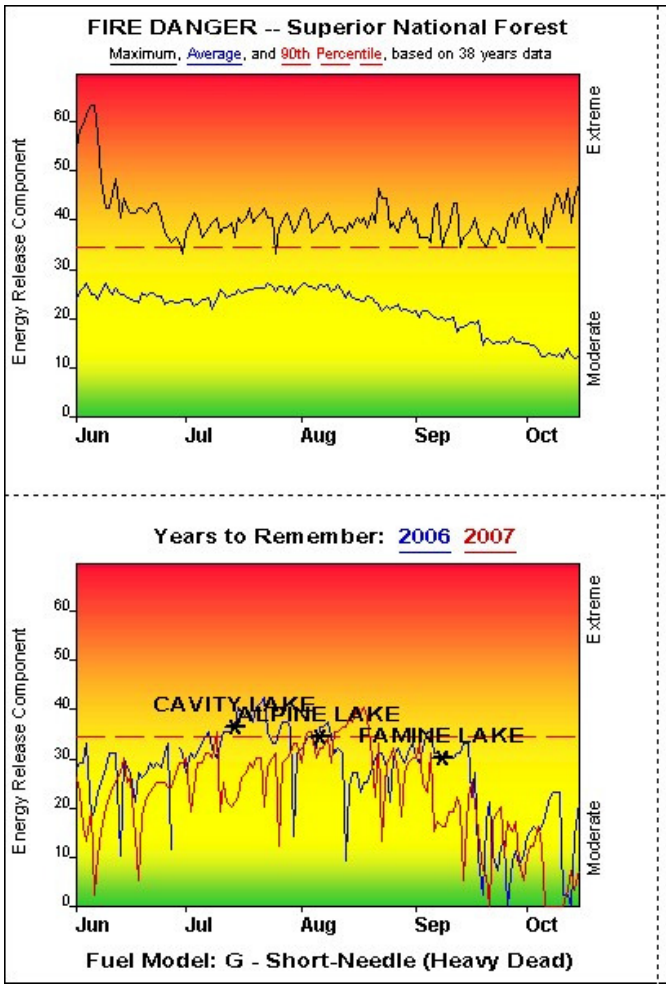
Lead Planes MN DNR utilizes single engine and twin-engine fixed wing aircraft as air attack platforms. The pilot may perform the role of the Air Tactical Group Supervisor (ATGS) if qualified.

A Lead plane, ref. FSH 5709.16, Chapter 26, must be on order for Federal incidents involving non-initial attack rated air tanker pilots and/or Modular Airborne Fire Fighting System (MAFFS), or over congested air space.

Communications

All aircraft operating on MNICS incidents will have at a minimum, a VHF-AM (Victor) communications system with a minimum of 720 frequencies and a VHF-FM communications system operating in the 150 to 174 MHz frequency range.

122.925	Air to Air, & Air to Ground Designated Natural Resources Frequency
123.975	Air to Ground - Air tanker base operations within 10 miles of base
122.700	CTAF: Brainerd, Forest Lake
122.800	CTAF: Bemidji, Cloquet, Ely, Grand Rapids
123.000	CTAF: Hibbing, Princeton
122.900	CTAF: Hill City, Sandstone - uncontrolled airstrips
122.925	Air to Air - Canadian Border area, (2) miles either side and North of Border
126.200	Air to Ground - Camp Ripley Miller Field Tower (approved for MN Army National Guard A/A)
122.925 or 122.850	Air to Air & Air to Ground - State of Wisconsin Operations
124.650	Alternate Air – Air Initial Attack AM - **Alpha**
119.950	Alternate Air – Air Initial Attack AM - **Bravo**
119.850	Alternate Air – Air Initial Attack AM - **Charlie**
126.500	Air to Ground - Minneapolis Approach
122.750	MNICS - Air to Air - All Risk Frequency ***(Non-fire)***
121.500	Emergency Locator Transmitter - (ELT)
126.050	Anoka Tower
1255	Transponder Code for Initial Attack Fire Missions



28

Lead Planes MN DNR utilizes single engine and twin-engine fixed wing aircraft as air attack platforms. The pilot may perform the role of the Air Tactical Group Supervisor (ATGS) if qualified.

A Lead plane, ref. FSH 5709.16, Chapter 26, must be on order for Federal incidents involving non-initial attack rated air tanker pilots and/or Modular Airborne Fire Fighting System (MAFFS), or over congested air space.

Communications

All aircraft operating on MNICS incidents will have at a minimum, a VHF-AM (Victor) communications system with a minimum of 720 frequencies and a VHF-FM communications system operating in the 150 to 174 MHz frequency range.

122.925	Air to Air, & Air to Ground Designated Natural Resources Frequency
123.975	Air to Ground - Air tanker base operations within 10 miles of base
122.700	CTAF: Brainerd, Forest Lake
122.800	CTAF: Bemidji, Cloquet, Ely, Grand Rapids
123.000	CTAF: Hibbing, Princeton
122.900	CTAF: Hill City, Sandstone - uncontrolled airstrips
122.925	Air to Air - Canadian Border area, (2) miles either side and North of Border
126.200	Air to Ground - Camp Ripley Miller Field Tower (approved for MN Army National Guard A/A)
122.925 or 122.850	Air to Air & Air to Ground - State of Wisconsin Operations
124.650	Alternate Air – Air Initial Attack AM - **Alpha**
119.950	Alternate Air – Air Initial Attack AM - **Bravo**
119.850	Alternate Air – Air Initial Attack AM - **Charlie**
126.500	Air to Ground - Minneapolis Approach
122.750	MNICS - Air to Air - All Risk Frequency ***(Non-fire)***
121.500	Emergency Locator Transmitter - (ELT)
126.050	Anoka Tower
1255	Transponder Code for Initial Attack Fire Missions

13

AIR TANKER BASES LOCATED WITHIN MINNESOTA

BASE NAME	RUNWAY LENGTH	STORAGE CAPACITY RETARDANT	STORAGE CAPACITY WATER	F.B.O. PH. #	TANKER BASE PH. #	FUEL TYPE AVAILABLE	ADMIN. BY
HIBBING TANKER BASE	6758' 3075'	20,000 GALS	20,000 GALS	218-263-4353	218-262-7334 F:262-7327	100 LL JET A	MNDNR MIFC
ELY TANKER BASE	5600'	10,000 GALS	10,000 GALS	218-365-5600	218-365-4831	100 LL JET A	USFS SUF
BRAINERD TANKER BASE	6500' 2800' 4080'	15,000 GALS	10,000 GALS	218-829-3398	218-828-2575 F:828-2707	100 LL JET A	MNDNR MIFC
BEMIDJI TANKER BASE	7002' 5700'	13,500 GALS	10,000 GALS	218-751-1880	218-755-4380 F:755-4379	100 LL JET A	MNDNR MAA MIFC
PRINCTON SEAT BASE (TEMP)	3900	3000 1500	10,000 GALS GALS	NONE	320-630-0729 F:389-2172	100 LL JET A	MNDNR MIFC
WARROAD TANKER BASE (TEMP)	5400	3000 GALS	10,000 GALS	218-386-9431	218-386-3492 F:386-1141	100 LL JET A	MNDNR MIFC
ANOKA TANKER BASE (TEMP)	5000' 4855'	NONE	NONE (10,000 AVAILABLE ON REQUEST)	VIA CIRRUS 763-784-6614	218-244-1144 F: via CIRRUS 763-784-8110 (attn: DNR)	100 LL JET A	MNDNR MIFC

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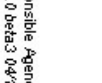
Fire Danger Area:

- Superior National Forest
- May-June Fire Season
- Bly, MN Weather Station
- * Meets NWCG Wx Station Standards

Fire Danger Interpretation:



EXTREME -- Use extreme caution

(Caution) -- Watch for change

Moderate -- Lower Potential, but always be aware

Maximum -- Highest Burning Index by day for 1970 - 2007

Average -- shows peak fire season over 38 years (2213 observations)

90th Percentile -- Only 10% of the 2213 days from 1970 - 2007 had an Burning Index above 49

Local Thresholds - Watch out:

Combinations of any of these factors can greatly increase fire behavior:

20' Wind Speed over 15 mph, RH less than 25%,

Temperature over 90, Fire Weather Index (CAN) over 15

Remember what Fire Danger tells you:

- Burning Index gives day-to-day fluctuations calculated from 2 pm temperature, humidity, wind, daily temperature & rh ranges, and precip duration.
- Wind is part of BI calculation.
- Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- Listen to weather forecasts -- especially WIND.

Past Experience:

The number of days between precipitation events is a critical factor that determines likelihood of fire occurance, intensity and spread.

Fires at this time of year burn primarily in light fuels that dry quickly and are highly reactive to wind conditions. High rates of spread and changes to spread direction are possible.

Responsible Agency: U.S. Forest Service

FF+4.0 beta3 04/10/2008-16:22 (C:\Documents and Setti...\SUF Master 2007 with his fires)

Design by NWCG Fire Danger Working Team

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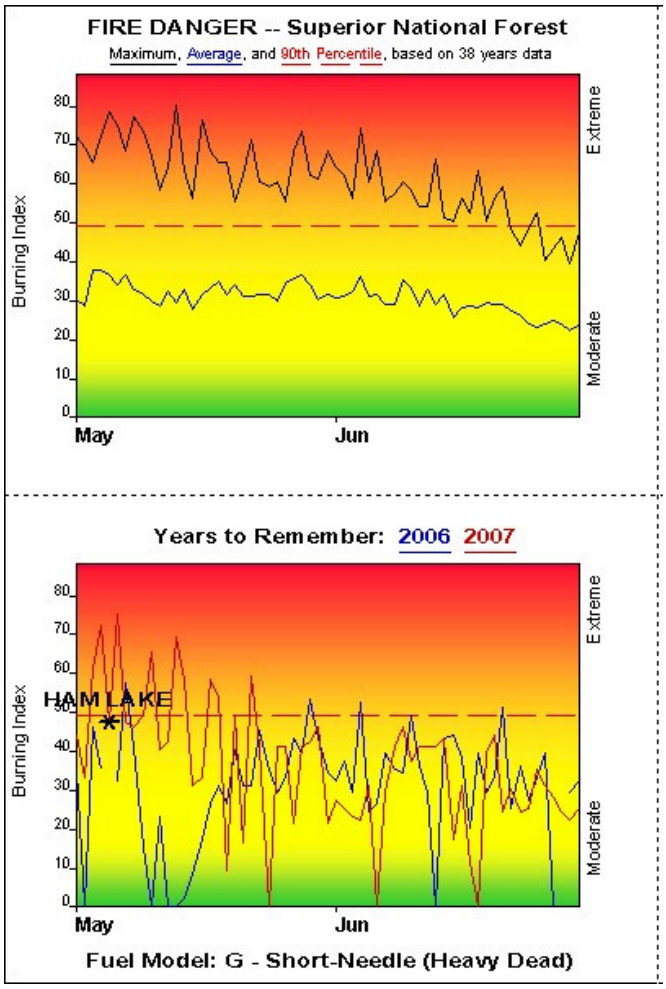


Finance

Crew Time Reports

- Use CTR's for all personnel time recording (Form 261)
- Harzard pay must list the Hazard in remarks..

Equipment Time Reports

- Contract Equipment must show meal break unless ordered to continue working during meal time and documented in remarks

Meals

- Document reason for not showing meal break in remarks

Lodging

- Generally all lodging is paid by individual resource, unless Logistics makes arrangements

Fuel and Vehicle expenses

- If vehicle is on the resource order and has an E number, the incident pays, otherwise it is incidental expense to home unit.

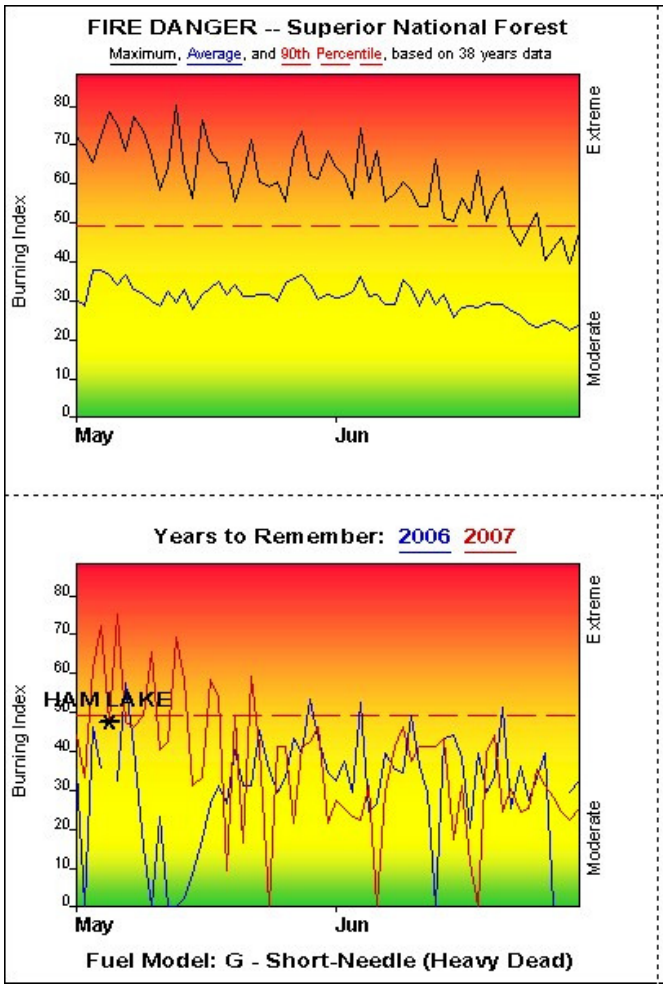
Accidents

- Document with home unit forms. Home unit processes repairs, with incident rarely billed back.

Injuries

- Document with home unit forms and workman's compensation claims within 48 hours.

Any questions about time, purchases or other finance issues—ask someone in Finance Section for assistance.



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FFMC – Fine Fuel Moisture Code		
0-80	Low	75 Some surface fire spread
81-87	Moderate	80 Continuous fire spread
88-90	High	90 Spot fires likely, easy ignition
91-92	Very High	92 Extreme fire behavior
93+	Extreme	

DMC – Duff moisture Code		
0-12	Low	25 Duff burns, lightning starts possible
13-27	Moderate	40 Moderate fire intensity
28-41	High	50 Extreme fire behavior
42-62	Very High	50+ Most available fuel moisture gone
63+	Extreme	

DC – Drought Code		
0-79	Low	15 Deep organic layers are saturated
80-209	Moderate	250 Extended mop-up, peat will burn
210-274	High	300 Deep burning of peat, more persistent fires
275-359	Very High	
360+	Extreme	

ISI – Initial Spread Index		
0-4	Low	<7 Primary surface fire
5-8	Moderate	10 High rates of spread likely
9-11	High	12 Torching more frequent
12-18	Very High	20 Extreme fire behavior
19+	Extreme	

BUI – Build Up Index		
0-19	Low	30 Heavier fuels combust
20-34	Moderate	60 Extended mop-up
35-54	High	80 Extreme fire behavior in medium and heavier fuels, even with low ISI
55-76	Very High	100 Lowland spruce can crown
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FWI – Fire Weather Index		
0-5	Low	Creeping surface fires
6-14	Moderate	Low to moderate spread
15-21	High	Torching, spotting, intermittent crowning
22-32	Very High	Active crowning possible
33+	Extreme	Major fire development possible

Fire Behavior Characteristics and Fire Suppression Interpretation

FWI Intensity Class	Head Fire Flame Lgt (ft)	Interpretation
1	< 1	Smoldering fire
2	1-4	Creeping fire – direct attack with hand tools
3	4-8	Torching, spotting – dozers, pumps, aircraft
4	8-11	Crowning is possible. Dozers, pumps and aircraft
5	≥ 12	Crowning is probable. Potential for major runs. Limit to flanking or indirect attack.

1. Bombardier J-5
- ☐ Water capacity 110 gal
- ☐ 118 Hp engine
- ☐ Weight – 5,600 lb
- ☐ 1.8 psi ground pressure
- ☐ Top speed 22 mph

2. Bombardier Muskeg HY
- ☐ Water capacity 350 gal
- ☐ 155 Hp engine
- ☐ Weight – 16,000 lb
- ☐ 2.9 psi ground pressure
- ☐ Top speed 6.5 mph

3. Foremost Nodwell
- ☐ Water capacity 1,000 gal
- ☐ 240 Hp engine
- ☐ Weight – 36,000 lb
- ☐ 3.0 psi ground pressure
- ☐ Top speed 7 mph

4. Marshmaster
- ☐ Water capacity 110 gallons
- ☐ 87 hp diesel engine
- ☐ Floating load cap. is 1300 lb
- ☐ 8 mph on land, 2 mph on water

5. Track Hoe
- ☐ Used for digging peat
- ☐ In combination with swamp pads, track hoes can be used to recover the above vehicle stuck in wetlands

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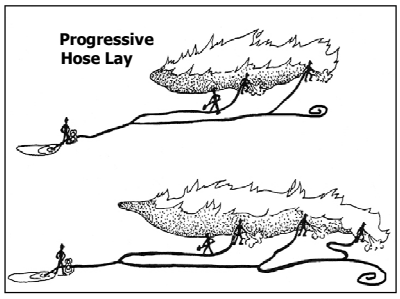


uncomplicated hose lays

Small flooding operations may use a simple 2½" hose trunk line with a pair of 1½" lateral lines at the end and no nozzle. Straight stream nozzles work best if a flow of 20-30 gpm at 50 psi is available at the business end.

This is a very common technique. The main trunk line progresses around the fire with lateral lines installed to the fire edge.

A progressive hose lay can easily supply 2-3 nozzles, depending on friction loss and required head pressure. It provides numerous opportunities for lateral lines to speed up mop-up and to prevent having to move trunk lines.

If you suspect that there is peat burning on your fire, contact the local forestry office for more assistance. Peat fires are very expensive to suppress, so getting expert help fast is very important.

Hazards:

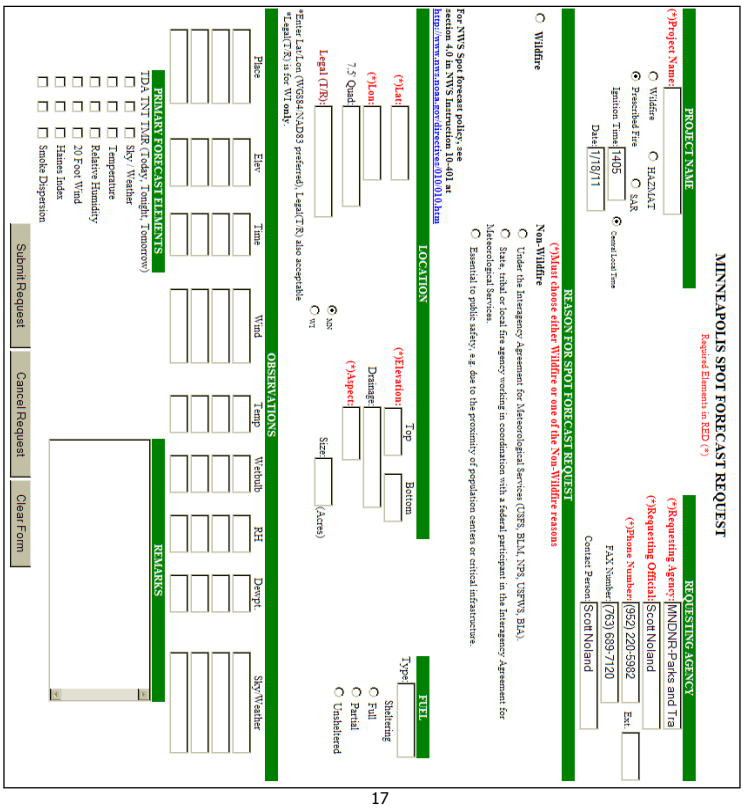
1. Burning peat holes are hazards to people and equipment.
2. Stay out of smoke, as much as possible
3. A tree that looks alive and healthy may have all supporting roots burned away and topple with no warning. Watch out for falling snags!
4. Impaired visibility from peat smoke or blowing ash has caused accidents and lawsuits. Be sure to put up warning signs on the highway. Contact the county state highway department for signs.
5. The smoke is a health hazard firefighters and nearby

or

to

Spot Weather Forecast

The following online form is accessed through the local NWS Office. It is accessed from the Home page via the Fire Weather Forecast. This form is provided as a guide in the field for the data that is needed by the NWS. Relay this information to the fire dispatcher so they can request the forecast.



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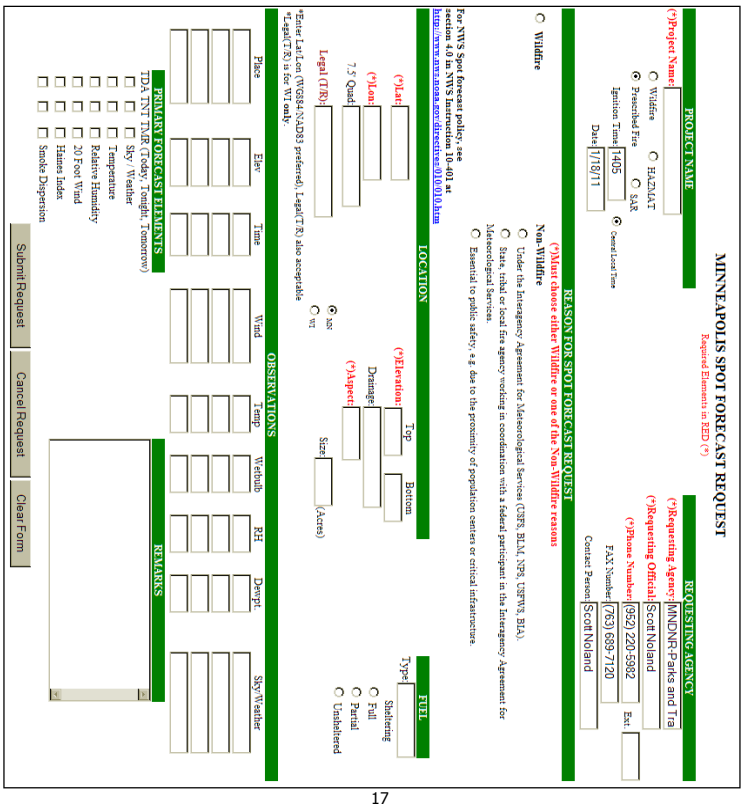

WILDLAND/URBAN FIRES

Suppressing wildfires in the wildland urban interface can generate many problems, from establishing communications between mixed agencies to determining what basic strategy and tactics will be effective.

When Arriving on Scene

1. Assess the situation. What is the scope of the incident and what will be needed to stabilize it.
2. Have a plan for receiving and deploying incoming resources. New resources need to be briefed and organized.
3. Some initial considerations:
   - A brief but thorough size-up. Look at the big picture. Fuels. Threatened structures. Access. Begin to formulate a plan of attack.
   - Utilize a Unified Command to bring in expertise that you may lack.
   - Staging Areas and/or places to check-in to alleviate congestion/confusion.
   - Communications and Frequencies
     - Utilize local Mutual-Aid for a multi-agency command net
     - Move tactical communication to local fire department or agency tactical frequencies
     - Forming Unified Command will allow each agency to directly talk at ICP and utilize agency frequencies to communicate with field operations

Tactical Fire Operations in the Urban Interface

Five factors that affect your actions:

1. Firefighter and public safety. Be aware of escape routes and safety zones, power lines and hazardous materials.
2. Fire behavior with rate of spread and direction.
3. What are the surrounding fuels at structure sites?
4. Resources - what is on-scene; what is available and when will it arrive?
5. Are the structures and exposures susceptible to fire? Do Structure Triage

Considerations

- Firebrands/spotting - Depending on the vegetative fuels and wind, a wildfire can project burning embers up to a mile ahead of the flame front. As these firebrands shower down on homes and structures, incident responders should expect multiple ignitions on and around homes. Some of these ignitions may not threaten or ignite a house for up to as long as two hours.
- Safety Zones/Re-entry - If there is an adequate safety zone, suppression resources may stay inside the residential development and be able to return to threatened structures sooner to mop up or overhaul any structure starts or spot fires that threaten structures.
- Structure Triage - Remove as much flammable vegetation and other materials (e.g., lawn chair cushions, wooded chairs, tables). Doing this, you'll both reduce

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Smoke and the rank odor of burning peat will carry a long way from the source. Use your nose to detect peat smoke. Once you have smelled peat smoke, you will always be able to identify the odor. Orange colored ash on the surface is an indicator that there is burning peat. Whitish, light gray, or tan colored ash indicates that there is intense heat associated with a burning peat fire below the surface.

Use infrared cameras from air or ground to locate peat that is burning under ground. Use GPS units from aircraft to locate remote spots.

Suppression

Initial attack must be aggressive. Keep the fire small. If burning peat is a potential, do not allow the fire to burn through a peat land, if possible. Areas with the potential for burning peat should be checked and rechecked often to determine if the peat has ignited.

Wet and stir the burning peat to extinguish.

Pumping operations should lean towards 4-cycle pumps to minimize equipment failures due to the demanding use.

Application of the water directly to the burning edge is the most effective use of nozzles. Use a straight stream to cut and stir the peat.

Lofting the water over burning peat is ineffective in extinguishing peat. It only cools the surface that gets wet, allowing hot peat to continue to burn beneath.

Depending on amount of burning peat, hose lays are very effective. Larger areas will require larger systems, like irrigation piping. Utilize water tenders and drop tanks. Peat fire suppression usually requires relatively

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Peat Fire Suppression / Mop-up

Initial Attack must be done aggressively to limit the surface area of burning peat and to prevent deep burning. Peat fires only get worse over time without aggressive suppression action. They can burn all winter.

What is peat

Peat is a brownish-black organic soil made up of partially decomposed, loosely compacted plant matter. Most peat soils also contain a great deal of woody and rooted material. There are several categories of peat lands:

- Forested peat land - most of these bogs are covered with a stunted forest of black spruce and occasionally tamarack.
- Open bog or swamp peat land - these areas are dominated by a lawn of sedges. Woody plants are found in small scattered islands.
- Brush peat land - predominately willow and alder brush

Within these categories are areas that have been disturbed, mostly through agricultural activity. These disturbed areas greatly change the characteristics of the peat. Peat that has been drained by ditching or tiling, along with the resulting spoil piles, dry out at a faster rate than undisturbed peat.

Things to Consider when Suppressing Peat Fires

- □ Values at risk (farmlands, wetlands, homes) Remember that many cleared peat lands are farmed for hay crops. If they burn, there is no land left to farm.
- □ Peat fires are very costly to extinguish
- □ Peat fires will burn underground, under the snow, through the winter
- □ Smoke can be a health hazard for people with respiratory problems
- □ Dense smoke can cause problems with visibility on highways
- □ Suppression can tie up resources for a long time

What To Do

After the first burning period, peat fires tend to be extended attack incidents. Dig down into peat to determine if there is any available moisture. Depth of burning peat is a big consideration when determining course of action.

Early morning detection is recommended, when conditions indicate that a peat fire is possible. Calm conditions and cooler temperatures make peat smoke wisps more

or eliminate fuel and conserve your water. (You'll need that water for the second objective.) Increase the moisture level of the surrounding vegetation closest to the house. You won't need to drench the entire yard. Rather, you want to raise the moisture level of the dry fine fuels next to the home and as time and water quantities are available wet dry vegetation in the yard and vulnerable parts of the house.

- □ Water Supplies - First of all, don't overlook any potential domestic sources, e.g. garden hose, pool, pond. Locate portable drop tanks in strategic locations and where easy to refill. Identify the haul time and distance to refill drop-tanks.
- □ Not all structures can be saved. In some cases it is not safe to try and save a structure that is in heavy fuel, has poor access or is surrounded by hazardous materials.
- □ Be sure to continue to patrol residential areas after the fire has passed to locate and suppress any new starts or rekindles.

Evacuation

Coordinate all evacuations of residents with local County Sheriff and fire department staff. Anticipate the need for evacuation and alert resources on fire. Suppression resources may need to change from suppression to evacuation assistance.

Peat Fire Suppression / Mop-up

Initial Attack must be done aggressively to limit the surface area of burning peat and to prevent deep burning. Peat fires only get worse over time without aggressive suppression action. They can burn all winter.

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Are You Prepared?
Keep your chimney clean and install spark arrester.
Keep 100 feet of garden hose attached.
Keep fire tools available: shovel rake, ladder.
Keep your roof clear of leaves, needles, and other debris.
Avoid outdoor burning. Recycle mulch and compost whenever possible.
Remove all but scattered trees within 30 feet of structures.
Keep your woodpile 30 feet from structures and fuel tanks.
Keep burnable materials from under and around all structures.
Keep your grass green and mowed 100 feet from any structure.
Keep driveways accessible for fire trucks and provide a turn-around area.
For the next 70 feet, thin and prune your coniferous trees.

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HAZARDS IN THE MINNESOTA

Parasites: Giardia and other parasites can be found in most lakes and streams. Be careful to avoid using unfiltered water when filling canteens, washing dishes and swimming. To treat water, use approved water filters, add iodine or boil water for 5-7 minutes.

Poison Ivy: Poison ivy can be found throughout the State. The poison is absorbed by the skin almost immediately, although symptoms may not appear for 12 to 24 hours. Washing the exposed skin with soap and cold water can remove residual poison and prevent it from being spread. Treat affected skin with calamine.

Ticks: Both deer and wood ticks are found in Minnesota. Minnesota has a high incidence of Lymes disease. If you find a tick attached, identify the type and remove it properly. If a red target-shaped rash appears around the bite, seek medical attention immediately.

Bees and Hornets: If stung by a bee or hornet, remove the stinger by scraping, do not squeeze. If swelling occurs, treat with calamine, baking soda or mud. Keep victim calm and be alert for signs of anaphylactic shock, including nausea, severe swelling and closing of airways. If any symptoms occur, seek immediate medical attention.

Slippery rocks: Sound simple, but can be treacherous. Watch footing, especially when loading/unloading at boat landings and on ledge rock.

Hypothermia: Hypothermia is common even during the summer months. Take caution in and around the water on cold or windy days. Get victims out of wet clothes and into dry, warm clothing or sleeping bags.

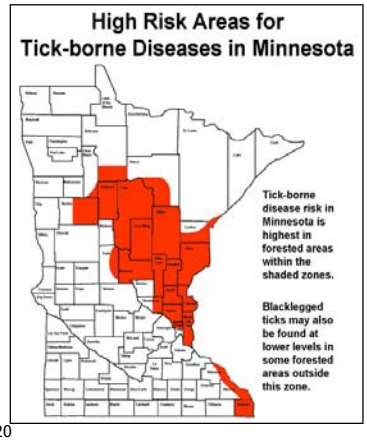
Dehydration: Drink plenty of water throughout the day.

Sunburn: Use sunscreen. The temperature may not feel warm, but the rays are intense. Especially be aware of sun reflecting off water.

Portages: Watch your footing and balance. Don't carry more than you can handle safely.

Paddle hazards: ***Do Not Run Rapids***. It looks easy, but it's dangerous. Know your limits when paddling on windy days. It's better to be wind bound than drowned.

P.P.E.: All personnel are required to use full Personal Protective Equipment appropriate for their duties as identified in the NFPA Standards on Protective Clothing and Equipment for Wildland Fire Fighting, listed in the Fireline Handbook.



Driving/Roads: Most fire access routes within the State consist of minimally maintained narrow, winding roads with limited visibility. Loose, gravelly and/or sandy surfaces with scattered rock create poor surface conditions and many roads may be wet and soft due to moist, lowland soil types. Tourism traffic can also be frequent on many of these same roads along with local traffic.

Snags: Abundant across the northern half of the State with many high risk tree species [rot and shallow root systems] and those subjected to insect infestations. Shallow soil depths and areas with large trees growing upon ledge rock create numerous hazardous snags both live and dead.

Open Water Operations

- □ Life jackets are required to be worn by everyone in the watercraft.
- □ Know the watercraft's limitations: bulk, weight and passenger limits
  Don't overload the watercraft beyond the factory.
- □ A heavily loaded canoe in calm water is a sunken canoe in wind.
- □ Keep a low center on gravity when entering/riding/exiting a canoe.
- □ If possible, avoid taking high winds broadside in a canoe.
- □ On big water, travel close to shore when possible/practical.
- □ If the watercraft swamps (tips over), stay with it and use it for additional floatation.
- □ Prevent damage to the watercraft. It's your ride home.
- □ Always have a spare paddle onboard.
- □ Keep an eye on the weather. Watch for approaching storm fronts.
- □ Stay off/get off the water during lightning storms.

Outboard Motor Operation

1. Use proper fuel mixture; 4-stroke engine use straight gas.
2. Use proper 2-cycle oil or check oil levels in 4-stroke engine.
3. Attach fuel line, open fuel tank vent and pump bulb 2-5 times.
4. Use full choke for cold engine.
5. Put gear-shift in neutral, turn safety switch to run, and ensure lower unit (propeller) is in the water.
6. Turn engine over (pull cord or electric start) until fires/false start.
7. Turn choke off and turn engine over 3-5 times. If engine still does not start, repeat #6. If successful, go to #12.
8. If engine starts, allow it to idle to warm up.
9. Ensure water pump is working (warm water discharge).
10. Put shift in desired direction (forward/reverse) and gradually throttle.
11. To stop engine, decrease throttle and shift into neutral, hit kill switch.
12. If engine fails to start - check fuel line connections - check that gear-shift is in neutral - safety switch is in run position.
13. If engine fails to start - check spark plug(s) condition and replace as necessary.

Note: Each outboard motor has it's own travel fuel tank and tool kit.

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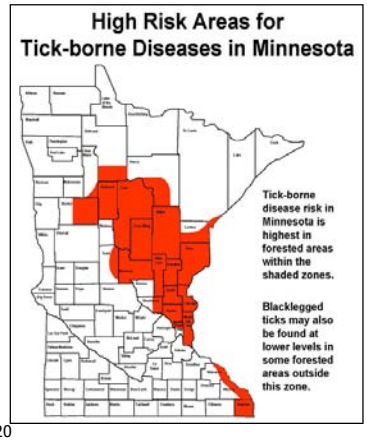

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