

Aerial Attack on Wildfires and the Minnesota Incident Command System



Aircraft have been widely employed in Minnesota for the suppression of wildfires since the 1970s. Effective use of aircraft allows fast response to fires, permitting Minnesota's wildland agencies to dramatically reduce the loss of life and property suffered in the early years of the state's history. Helicopters and airplanes have proved useful for locating fires, dropping water or retardant, delivering firefighters and supplies, mapping, reconnaissance, intelligence gathering, medical evacuations, and arsonist apprehension.

Due to the abundance of lakes and rivers in Minnesota, bucket-equipped helicopters and water-scooping fixed-wing aircraft are particularly effective for initial attack, helping to keep fires small, manageable, and less expensive to control and contain. They have also demonstrated their worth on non-fire incidents such as floods, search-and-rescue missions, and storm recovery operations.

The Minnesota Incident Command System (MNICS) organization, which includes the Minnesota Department of Natural Resources, U.S. Forest Service, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Park Service, Homeland Security Emergency Management, and the Minnesota State Fire Marshall (as an ex-officio member), was established in 1984. Its creation was originally driven by the need for wildfire agencies to coordinate and share resources, including aerial suppression assets. MNICS evolved to a level of cooperation that includes all aspects of wildfire, plus other all-hazard emergency management.

During fire season, the MNICS agencies contract for helicopters, air tankers, aerial supervision platforms, and detection planes to augment the handful of government-owned aircraft dedicated to wildfire missions. During periods of high fire danger and incidence, this fleet can be reinforced with aircraft from other parts of the country. Pre-existing agreements allow for common aircraft specifications, pilot requirements, costs, length of hire, and other necessary details. MNICS agencies are responsible for contracting aircraft and for specialized pilot training. In addition, a MNICS goal is to recruit, develop, and maintain a sufficient cadre of highly trained personnel with a unique set of fire and aviation competencies.

MNICS has three functional levels. The Board of Directors is composed of agency supervisors and offers direction and support, but is not typically involved in daily activities. The Task Force is comprised of the fire supervisors for each agency, and meets frequently to direct MNICS activities. Working Teams are established by the Task Force to resolve issues in specific areas, such as operations, logistics, communications, training, finance, prevention, outreach, prescribed fire, and aviation.



Ron Goetzinger

Minnesota Interagency Fire Center

Located in Grand Rapids, the Minnesota Interagency Incident Support Center (MIFC) provides critical services to wildland firefighters and emergency services personnel in Minnesota, the nation, and Canada. MIFC facilitates the interagency exchange of fire suppression and support resources, provides a nexus to collect and disseminate fire intelligence, and coordinates dispatching functions. This includes assigning fire crews, tracking resource orders, and allocating aerial assets within the state.

The facility also houses the Northeast Interagency Incident Support Cache, which supplies critical firefighting equipment to the 20 states of the Eastern Area; the National Symbols Center, which distributes Smokey Bear materials; and a training facility for hosting a wide range of courses in fire, aviation, leadership, emergency management and the Incident Command System (ICS).

This coordination of federal and state government agencies not only avoids duplication of services, but also enhances cooperation and effectiveness, providing significant savings to taxpayers.



Christi Powers

Aircraft dispatch desk at MIFC.



Jason Blain

MNICS interagency hand crew on assignment in western United States.



Textron Aviation

Light airplanes, such as this Cessna are used for aerial detection and initial size-up of fires. Size-up includes the basic firefighting standard of establishing LCES (lookouts, communications, escape routes, and safety zones).



Nicole Selmer, U.S. Forest Service

The U.S. Forest Service employs the de Havilland Beaver—on floats, skis, and wheels—for a wide variety of missions including personnel and cargo transport, fire detection, water dropping, medical evacuations, and law enforcement.



Chris Loftstuen

The Minnesota DNR's Quest Kodiak is used as an aerial supervision platform, coordinating incident aircraft missions and controlling airspace to provide a safe flying environment.



Minnesota DNR

The Bureau of Indian Affairs was the first agency in Minnesota to deploy the 802 Air Tractor; a single engine air tanker (SEAT), which carries 800 gallons of water or retardant.



Paul Woods

Originally developed in Minnesota, the FireBoss, a SEAT on floats-with-wheels (amphibs) has water-scooping capability. It first fought fire in the United States on April 25, 2007 for the Minnesota DNR.



Paul Wannarka

This land-based large air tanker (LAT), a BAe 146, delivers 2,500+ gallons of retardant.



Mark V. Carr

MNICS agencies contract for CL-415s. The aircraft scoops up to 1,600 gallons in 10 seconds, requiring about a mile of open water.



Joel Martin

This commonly used light helicopter, a Bell 206 L-4, drops water and transports firefighters for initial attack operations. Other valuable missions are longline cargo delivery, thermal imaging, medevacs, aerial ignition, and intelligence-gathering.



Mark Erickson

This Minnesota Army National Guard UH-60 or Blackhawk helicopter has a 600-gallon bucket with shallow-water filling capability. It can also be used for other missions such as cargo transport and medevacs.

Aviation Working Teams

The Great Lakes Forest Fire Compact and the National Cooperative Fire Agreement

The Great Lakes Forest Fire Compact (GLFFC), comprised of the states of Minnesota, Michigan, Wisconsin, and the provinces of Ontario and Manitoba, also shares air resources. A quick-strike mutual aid agreement allows air tankers and helicopters to cross the international border in a streamlined process to assist with wildfire or other emergencies. A quick-strike is typically one fuel cycle in duration, but can be extended if necessary. For Minnesota agencies, Ontario and Manitoba CL-215/415s are the closest additional air tankers available to the state.

The National Cooperative Fire Agreement allows Minnesota wildfire assets to be exchanged or shared nationally. This includes personnel and aircraft. As budgets across the country are challenged, agencies realize more than ever that they can't do it alone. The agreement permits the movement of resources between states, provinces, and other countries.

MNICS Aviation Working Team

Comprised of aviation experts from each MNICS agency, this group collaborates regarding emergency response aviation operational issues including aircraft capabilities, radio frequencies, communications equipment, and procedures for safe operations within incident airspace. Participating agencies adopted the "Minnesota Incident Command System All Risk Aviation Operations Plan," spurred by the governor's decree that all responses to emergencies meet National Incident Management System (NIMS) standards as established by the Department of Homeland Security (DHS).

Air Operations and Procedures

Each agency operates under their existing aviation operations policy and/or interagency policy as appropriate. Standard operating procedures are in the following documents:

- Minnesota DNR—Forestry: *Minnesota DNR Air Operations Manual*.
- U.S. Forest Service: *5700 Manual*; *Interagency Helicopter Operations Guide (IHOG)*.
- Department of the Interior: *DOI Manual*; *IHOG*.

Great Lakes Forest Fire Compact Aviation Committee

This group of aviation experts from Minnesota, Michigan, Wisconsin, Manitoba, and Ontario ensures that procedures, operating plans, and agreements are in place to enable members to exchange resources during times of critical need. Border crossing protocols, "quick-strike" agreements, radio frequency plans, and GLFFC partner operating plans are all products of this committee.



Jerry Jaskowiak, U.S. Forest Service

Aerial Ignition

Fighting fire with fire is an ancient practice that still works today. Helicopters can carry airborne ignition devices that create flames quickly and precisely—to deny wildfires fuel, or to use convection to "steer" head fires in a desired direction.

Fire is also a key ecological component in Minnesota's wildlands. The MNICS agencies support prescribed fire programs for a range of land management goals including fuels reduction, enhancement of wildlife habitats, and forest regeneration. Aerial ignition is sometimes the safest and most efficient means to attain prescribed fire objectives.



Cody Bosek

IF YOU FLY, WE CAN'T

DRONES NEAR WILDFIRES ARE NOT SAFE

FLYING DRONES OR UAS (UNMANNED AIRCRAFT SYSTEMS) WITHIN OR NEAR WILDFIRES WITHOUT PERMISSION COULD CAUSE INJURY OR DEATH TO FIREFIGHTERS AND HAMPER THEIR ABILITY TO PROTECT LIVES, PROPERTY, AND NATURAL CULTURAL RESOURCES

FIRE MANAGERS MAY SUSPEND AERIAL FIREFIGHTING UNTIL UNAUTHORIZED UAS LEAVE THE AREA, ALLOWING WILDFIRE TO GROW LARGER.

CONTACT YOUR NEAREST LAND MANAGEMENT AGENCY OFFICE TO LEARN MORE ABOUT UAS AND PUBLIC LANDS

US Forest Service

Minnesota DNR 500 Lafayette Road St. Paul, MN 55155-4040 888-646-6367 or 651-296-6157 www.mndnr.gov	Minnesota Interagency Fire Center 402 SE 11th Street Grand Rapids, MN 55744 218-327-4436 front desk 218-327-4558 MIFC Dispatch	Digital Version:
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This information can be made available in alternative formats such as large print, braille or audio tape by emailing info.dnr@state.mn.us or by calling 651-296-6157.

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These partners are equal opportunity providers and employers.

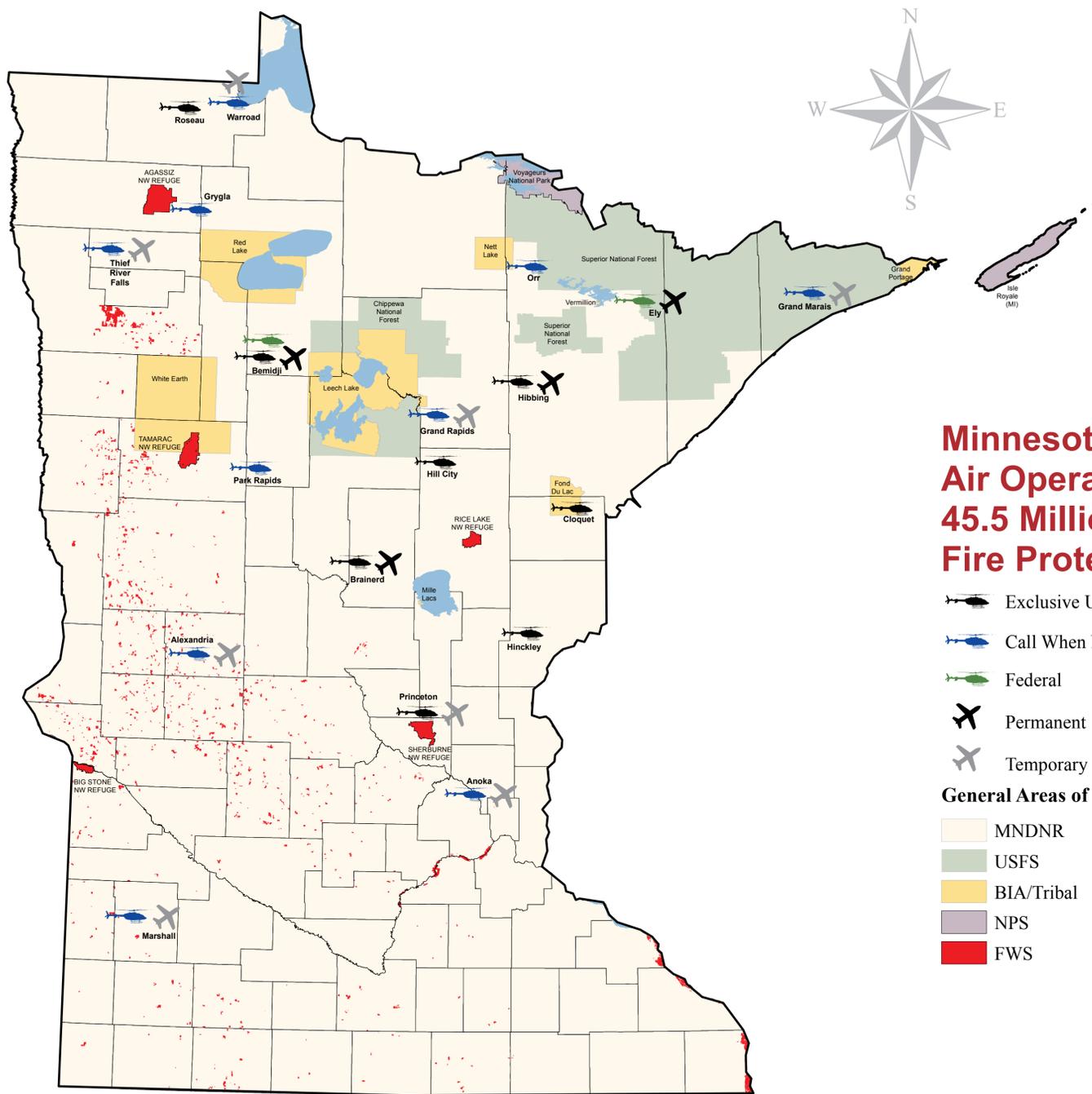


Minnesota Wildfire Air Operations

Protecting Lives, Property and Our Natural Resources



Matt Herberg



Minnesota Interagency Air Operations 45.5 Million Acre Fire Protection Area

- Exclusive Use
- Call When Needed
- Federal
- Permanent
- Temporary

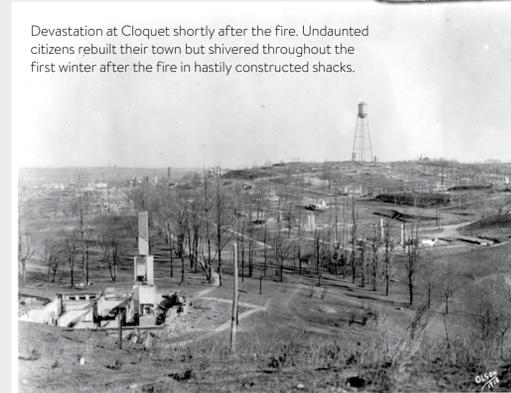
General Areas of Protection

- MNDNR
- USFS
- BIA/Tribal
- NPS
- FWS

Fire History

The Great Lakes States suffered the deadliest wildfires in U.S. history, with the loss of almost 2,500 lives in Minnesota, Michigan, and Wisconsin in four major incidents from 1871 to 1918. The economic loss associated with these fires—timber and structures—was enormous. These disasters were partially the result of the logging and farming practices of the day, and spurred the formation of state forestry agencies with organized fire suppression units.

The Minnesota DNR Division of Forestry was established in 1911, when it was called the Minnesota Forest Service. Many changes in organizational structure and operations have occurred, but one constant is the statutory responsibility for wildfire suppression statewide.



Devastation at Cloquet shortly after the fire. Undaunted citizens rebuilt their town but shivered throughout the first winter after the fire in hastily constructed shacks.

Minnesota Historical Society



Dead Man's Curve, Cloquet Fire.

Minnesota Historical Society

Historical Large Fires

Year	Fire Name	Impact
1871	The Peshtigo Fire	Wisconsin remains the deadliest in United States history, with 1,500 people killed, and 1.2 million acres burned in one day.
1881	The Great Fire of 1881	A Michigan fire, charred a million acres and killed 138 people.
1894	The Great Hinckley Fire	In Minnesota, burned over 300,000 acres, destroyed 12 towns, and killed 418 people.
1918	The Cloquet Fire	The thriving sawmill town of 12,000 was gutted; timber and property losses estimated at \$30 million; 551 people perished.
2007	The Ham Lake Fire	In the Minnesota Arrowhead region burned 75,000 acres and over 130 structures in the United States and Canada, but no lives were lost.
2011	The Pagami Creek Fire	In the Boundary Waters Canoe Area Wilderness charred 92,682 acres.

Fire Season

Typically, Minnesota experiences an intense spring (April-May) fire season dominated by cured fine fuels such as grass. After green-up, occurrence may taper off, but some of the biggest fires have been summer and autumn events. Wildfires are possible at any time during the snow-free seasons.



Sue Prom



Sue Prom

Images of the Ham Lake Fire, May 2007.

Minnesota's Wildfire Situation

Annually, the MNICS agencies take action on 1,597 fires for 44,325 acres (2006-2016). Even with significant changes in land use and development over the past century—for example, no more massive clear-cuts and uncontrolled burning—the potential for loss of life and property is still great. This is the result of dramatic population growth, and increasing residential development in what is termed the "wildland-urban-interface." A wildfire that threatened only vegetation a generation ago, now may also threaten homes and businesses. Aircraft can be a key component of a timely and successful initial attack, protecting lives, property and natural resources.



Mark Erickson

One of many homesteads destroyed by the Green Valley Fire in 2013.



Melissa Carlor, Winona Daily News

Landing Zone Requirements

Minnesota wildland fire agencies typically employ Type-III, or "light" helicopters for initial response to fires and other emergencies. The basic landing zone (LZ) or "helispot" dimensions as outlined in the *Interagency Helicopter Operations Guide* for such ships are:

- a 15-foot by 15-foot touchdown pad that should be flat and not endangered by spreading fire or other incident hazards.
- an open area around the pad of 75 feet diameter, free of any obstructions that could impinge on the rotors, both main and tail; communicate LZ information to the pilot.

Ideally, there is also an approach-and-departure path of 300 feet in two directions to avoid high-performance take-offs and landings. It's the task of the pilot and helicopter manager to select appropriate spots, but ground personnel may be requested to provide suggestions in proximity to the incident. As with all operations, establishing effective communications is key. Minnesota DNR wildfire aircraft have radio capability in the AM, FM, and 800Mhz bands, and when working with local agencies (i.e., fire departments, law enforcement) will make every attempt to establish a radio communications link.



U.S. Forest Service

Air Tankers and Water Scooping Aircraft

- Air tankers and water scooping airplanes, which are commonly used in Minnesota, are under the control of an Air Tactical Group Supervisor (ATGS).
- The ATGS will inform the Incident Commander of the drop and request confirmation that the line is clear. Personnel should move away 200 feet perpendicular to the drop, and should not take cover behind a tree or snag.
- When drop(s) are completed, the ATGS will report all clear, and firefighters may move in.
- If you are caught in a drop zone, lay on the ground face down, with your head pointed in the direction of the approaching aircraft. Secure your helmet with a chinstrap or with your hand. Keep a firm grip on any tools, extending them away from you and downslope.



© Dustin, BLM Aviation

Unmanned Aerial Systems

While unmanned aerial systems (UAS), or drones, can pose significant hazards to firefighters in the air and on the ground, they also present opportunities to safely perform dangerous wildfire missions. MNICS agencies are exploring the use of UAS in wildland fire reconnaissance with tools such as infrared cameras. They could be used to map the perimeters in smoke-obscured terrain, or to identify areas of intense heat. The ultimate goal for UAS on wildfire incidents is to supply fire managers with real-time data on size and growth, fire behavior, and to potentially reduce risk to pilots and aircrews.