



January 26, 2018

Senator Julie A. Rosen, Chair  
Senator Richard Cohen, Ranking Minority Member  
*Senate Finance Committee*

Senator Bill Ingebrigtsen, Chair  
Senator David Tomassoni, Ranking Minority Member  
*Senate Environment and Natural Resources Finance Committee*

Representative Jim Knobloch, Chair  
Representative Lyndon Carlson, Sr., Ranking Minority Member  
*House Ways and Means Committee*

Representative Dan Fabian, Chair  
Representative Rick Hansen, Ranking Minority Member  
*House Environment and Natural Resources Policy and Finance Committee*

Dear Senators and Representatives:

Please find attached the *Annual Report on Emergency Firefighting Expenditures* as indicated in Minnesota Laws 2011, First Special Session chapter 2, article 1, section 4, subdivision 4. This report provides information on fire danger, fire occurrences, and firefighting expenditures from the Emergency Fire Direct and Open Appropriations for FY2017.

If you have questions or concerns, please contact either:

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Wildfire Section Manager  
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Wildfire Administration Supervisor  
651-259-5277 or [larry.himanga@state.mn.us](mailto:larry.himanga@state.mn.us)

Sincerely,

A handwritten signature in blue ink, appearing to read 'Tom Landwehr'.

Tom Landwehr  
Commissioner

c: Dan Mueller, Senate Fiscal Analyst  
Brad Hagemeyer, House Fiscal Analyst  
Legislative Reference Library (two hard-copies, one electronic copy)  
DNR Library

Minnesota Department of Natural Resources - Commissioner's Office

500 Lafayette Road, Saint Paul, MN 55155

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**Minnesota Department of Natural Resources**

**Fiscal Year 2017**

**Annual Report on Emergency Firefighting Expenditures**



**Department of Natural Resources**  
**Fiscal Year 2017 Report on Emergency Firefighting Expenditures**

**Executive Summary**

Total expenditures of state general funds for wildfire protection and emergency response by the Department of Natural Resources (DNR) in Fiscal Year 2017 totaled \$23,432,522. This includes an Emergency Firefighting Open Appropriation of \$16,271,730.

General weather and precipitation patterns, in addition to actual fire occurrence, affect the total expenditures for fire preparedness (prevention and presuppression) and suppression. In order to minimize the number of fires and respond quickly to extinguish fires, a combination of preparedness and suppression activities is required. Resources must be ready for deployment to meet fire potential, even if no fires occur.

Minnesota experienced 573 fires that burned 2,295 acres in FY17. This is significantly below the 20-year average of 1,561 fires and 34,602 acres burned annually.

These lower-than-average numbers can be attributed to the weather, which has the largest impact on fire activity. Although spring 2017 began with very warm and dry weather, by May the southern two-thirds of the state had received enough rain and snow to limit fire potential. This precipitation pattern continued through the summer, resulting in fewer fires. However, the far northwest part of the state had much drier weather, which created record-setting fire indices for several weeks. Surprisingly, very few large fires occurred during this period.

As a result of weather conditions, the DNR did not mobilize any Minnesota Incident Management Teams (IMT) through the Minnesota Incident Command System (MNICS) to fight in-state fires in FY17. However, the DNR and other MNICS agencies actively mobilized crews, aircraft, and overhead personnel to aid several western states, which experienced a critical shortage of resources in one of the most intense and expensive fire seasons on record. These requests for out-of-state assistance are supported through mutual aid agreements, with costs reimbursed to the State of Minnesota.

In FY17, the DNR Division of Forestry (Division) used a mix of ground and aerial resources to suppress fires. The ground fleet had 207 firefighting engines and 46 tracked vehicles designed to access off-road and remote areas. A mix of aircraft under “exclusive use” and “call-when-needed” contracts, owned or operated by the Division, and obtained through interagency and partnership agreements provided tactical aerial firefighting support and intelligence to ground firefighters. In FY17, the DNR responded with tactical firefighting aircraft to 112 requests on 63 wildfires. The DNR assessed fleet inventory and has scheduled several trucks and tracked vehicles for replacement over the next five years.

**Department of Natural Resources  
Fiscal Year 2017 Annual Report on Emergency Fire Expenditures**

**Purpose**

This report addresses the requirements of Minnesota Laws 2011, First Special Session chapter 2, article 1, section 4, subdivision 4, which states in part:

“By January 15 of each year, the commissioner of natural resources shall submit a report to the chairs and ranking minority members of the house and senate committees and divisions having jurisdiction over environment and natural resources finance, identifying all firefighting costs incurred and reimbursements received in the prior fiscal year.”

The cost of producing this report was \$4,950.

**State Funding for Emergency Firefighting**

**Expenditures**

Emergency Firefighting Direct Appropriation: Laws of 2016 appropriated \$7,145,000 the first year and \$7,145,000 the second year for prevention, presuppression, and suppression costs of emergency firefighting and other costs incurred under *Minnesota Statutes*, section 88.12.

Emergency Firefighting Open Appropriation: Laws of 2016 further states “the amount necessary to pay for presuppression and suppression costs during the biennium is appropriated from the general fund.”

During Fiscal Year 2017 (FY17), The Department of Natural Resources (DNR) expended \$16,271,731 under the Open Appropriation authority.

Attachment 1, *Emergency Fire Direct and Open Appropriations*, shows state firefighting expenditures broken down between salary and operating costs.

**Reimbursements to the General Fund**

**Payments and Collections**

The DNR receives payments for certain fire-related activities. These include payments for supplies sold to local government units (e.g., fire departments) from the Interagency Fire Cache (Cache Sales authorized under *Minnesota Statutes*, section 88.065) and collections from responsible parties for starting illegal or negligent fires (Fire Cost Collections authorized under *Minnesota Statutes*, section 88.75). These receipts are deposited directly into the general fund and are not used by the DNR.

## **FY17 Receipts**

- Cache Sales                   \$ 93,388
- Fire Cost Collections       \$169,484

### Special Revenue Fund

This is a temporary use of the state emergency firefighting appropriations and is included for complete disclosure. The DNR provides firefighters and aircraft to assist federal partners within Minnesota, mobilizes firefighters for out-of-state assistance with national wildfire emergencies, and assists Great Lakes Forest Fire Compact (Compact) partners. These costs are initially charged to the Emergency Fire Special Revenue Fund and invoiced for reimbursement as soon as is practical. During FY17 the DNR expended \$3,423,285 of reimbursement costs for national mobilizations and Compact support. The federal government reimburses federal costs and Compact partners (adjoining states and Canadian provinces) reimburse their costs as well.

The Special Revenue Fund may be reimbursed for more than actual costs from out-of-state deployments. The revenue is generated by out-of-state mobilizations of equipment, such as wildland fire engines, and includes a portion of the fixed costs associated with this equipment. The emergency firefighting appropriation pays for fixed costs. Reimbursement revenue in excess of actual costs is periodically transferred to the general fund.

### **Reimbursements to the General Fund in FY17**

- Cache Sales                   \$93,388
  - Fire Cost Collections       \$169,483
  - Fire Cost Collections       \$ 0
- Total   \$262,871**

### **Planning and Readiness**

General weather and precipitation patterns, as well as actual fire occurrence, affect wildfire preparedness and response base costs. Before fire season starts, the DNR trains firefighters, maintains and secures equipment, establishes contracts for aerial detection and suppression, supports rural fire departments in securing equipment, and continues fire prevention efforts. All of these factors together encompass preparedness activities.

To guide its level of readiness from week to week, the DNR uses a tiered system to determine potential wildfire risks and establish fire-planning levels.

Attachment 2, *A Guideline for Statewide Planning Level Determination*, shows the criteria and planning levels currently in use.

These planning level guidelines are reviewed and implemented at bi-weekly conference calls with fire managers from all agencies cooperating in Minnesota wildfire suppression efforts. The planning level, combined with daily fire danger indices, establishes the preparedness level needed to effectively respond to wildfires. Historically, about 80 percent of the state's wildfires occur during Planning Level III. Major fires can and do occur at this level. In FY17 had 197 days of possible wildfire danger (i.e. at least one region at Planning Level II or higher). Of the possible wildfire days, 141 were at Planning Level II, 41 were at Planning Level III, 15 were at Planning Level IV, and 0 were at Planning Level V.

## **Fire Suppression and Presuppression**

The success of the DNR's fire suppression strategy is largely due to aggressive initial attack. The goal is to keep fires small. Once a fire escapes initial attack, costs and damages increase exponentially.

Preparedness (prevention and presuppression) and suppression activities work together to reduce wildfire damages. Presuppression encompasses actions taken before a fire starts in order to ensure more effective suppression. These activities include overall planning, recruitment and training of personnel, procurement of firefighting equipment and contracts, and maintenance of equipment and supplies. Suppression costs include activities that directly support and enable the DNR to suppress wildfires during times when fires are likely to occur, including the repositioning of resources. As fire danger and fire occurrence increase, the resources that must be positioned for immediate response also increase. Suppression costs were approximately 57.5 percent \$13,500,000 of the direct and open fire appropriations in FY17. Presuppression costs were approximately 41 percent or \$9,600,000 of the direct and open fire appropriations in FY17.

The DNR cost-coding structure provides accountability for fire expenditures. Costs are tracked by type of activity and the administrative area level location.

Attachment 3, *FY2017 State Fire Cost Summary*, shows the percentages of fire expenditures allocated to prevention, presuppression, and suppression activities.

Attachment 4, *Ten-Year Expenditure History – State Firefighting Costs*, shows the 10-year fire expenditure history.

## Fire Occurrence and Causes

### General Activity

In FY17, 573 fires occurred, burning 2,295 acres. This is significantly below the 20-year average of 1561 fires burning about 34,602 acres annually.

Number of Fires By Cause				
	FY 2017	%	20 Yr. Ave.	%
Debris Burning	223	39%	558	36%
Incendiary/Arson	105	18%	428	27%
*Misc./Unknown	124	22%	213	14%
Equipment Use	70	12%	172	11%
Campfires	31	5%	65	4%
Lightning	6	1%	24	2%
Smoking	5	1%	41	3%
Railroad	9	2%	59	4%
Total	573	100.0%	1561	100.0%

\*Misc./Unknown includes items that usually do not account for a major percentage on their own such as electric fences, powerlines, fireworks, fires started within a structure, prescribed fires, "other" (sources like hot ashes, spontaneous combustion), and cause unknown

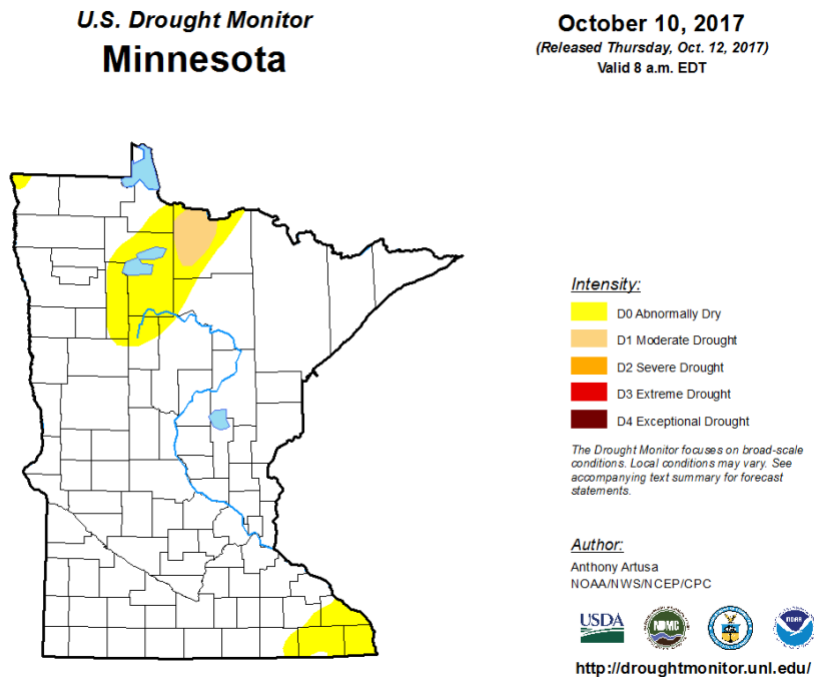
Attachments 5, *Minnesota Fires and Acres Burned*, and Attachment 6, *FY2017 Number of Wildfires by Cause*, graphically illustrate fire history and causes.

## Fire Behavior and Weather

In FY17, no fires within the state's jurisdiction exceeded 200 acres in size. However, Minnesota did experience fires of more than 200 acres on federal and tribal land. Heavy fire activity was limited to a period of several days in mid-May in central and northwestern Minnesota.

In 2016, the year ended fairly wet with some areas at 110 to 150 percent of normal rainfall for the season. The spring of 2017 began dry; however, timely rains made for lower-than average fire seasons across much of the southern and northeastern parts of the state. Drought conditions continued and worsened in the northwest throughout the spring and into the summer. March 2017 was windy and relatively warm, but by the beginning of April, the two-thirds of the state received enough rain to limit fire potential. A late-season snowfall in May continued this wet pattern into the summer. However, the far northwest part of the state had a much drier pattern which allowed for record-setting fire indices for several weeks. Surprisingly, very few large fires occurred during this period.

Late spring saw a cooling pattern, with continued rainfall that moderated fire activity for much of the state. Waves of thunderstorms occurred throughout the state on May 15 and 16, generating two-to-four inches of rain in a single event in the southeast. This wet trend for much of southern Minnesota continued into June, contrasting sharply with the drought in the northwest. By September, though, adequate rain resolved drought conditions for much of the northwest.



Seasonal precipitation totals from April through early September ranked above average for much of central and northeast Minnesota; only the northwestern part of the state remained significantly below normal. The southern counties had near normal precipitation levels, except extreme southeastern Minnesota, which was abnormally dry.



Remote Automatic Weather Stations (RAWS) are used in fire weather forecasting and preparedness. To improve efficiency and usability, three additional RAWS were modified to the new Tri-leg format. This configuration allows for easier maintenance and mobility to change locations if necessary. The remaining state-owned RAWS will be modified to the tri-leg format before the 2018 spring fire season. In addition to the 20 state maintained systems, there are about 30 additional RAWS in Minnesota that are used to predict and monitor fire danger.



Figure 1: RAWS station.

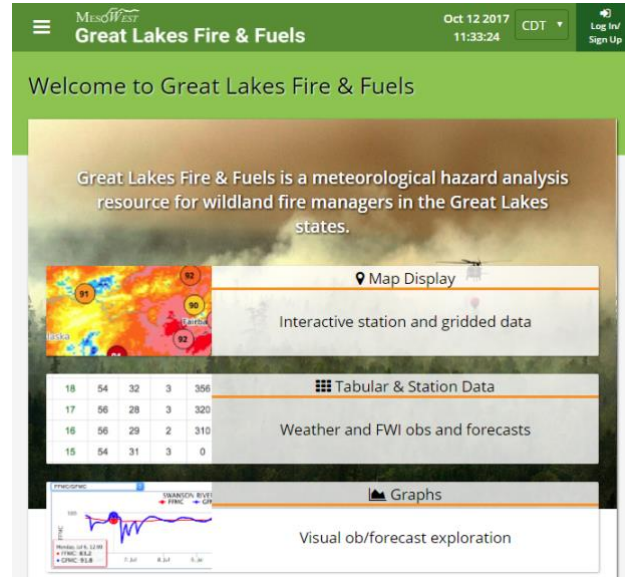


Figure 2: Great Lakes Fire and Fuels Website.

The RAWS stations feed information into the Great Lakes Fire and Fuels web application, which underwent a larger system upgrade encompassing Michigan and Wisconsin. This website allows for improved monitoring of weather conditions and fire behavior potential by fire managers.

## Fire Response

### **Cooperative Fire Response**

While in-state fire response was about average throughout the fiscal year, and no Minnesota Incident Command System (MNICS) teams were mobilized, the DNR actively mobilized resources to out-of-state incidents late into 2016. In May 2017, national fire activity picked up again and Minnesota mobilized resources to support these fire suppression efforts.

In FY17, the western United States began to experience one of the most intense and expensive fire seasons on record. There was a critical shortage of resources to fight fires nationally, so the DNR and other MNICS agencies actively mobilized crews, aircraft, and overhead personnel to aid several western states. These requests are supported through mutual aid agreements, with all costs reimbursed to the state.



Figure 3. Interagency fire crew.

The DNR sent 162 agency employees and casual firefighters to aid in out-of-state firefighting efforts in FY17. They primarily worked on fires in California, Arizona, Washington, Colorado, Idaho, Montana, Wyoming, Utah, and Oregon. The DNR also sent 21 firefighters to British Columbia and Manitoba when those provinces experienced intense fire activity.

In addition to aiding in firefighting efforts, the Division, works with agency partners to provide valuable wildland fire training for firefighters. These trainings and partnerships provide the opportunity to experience firefighting in diverse conditions throughout North America, gain valuable skills, and secure qualifications needed for fighting wildfires in Minnesota. They also build important relationships that are critical to responding when incidents in Minnesota.

### **Interagency All-Hazard Response**

In July 2016, two major windstorms created extensive damage across the northern half of Minnesota, downing both trees and power lines. A Type 3 Incident Management Team (IMT) was mobilized on two occasions to aid in cleanup and recovery.

In June 2017, MNICS team members participated in a training exercise to evaluate the preparedness of staff and resources in a public health emergency. The training successfully resulted in several recommendations to improve the IMT response in the event of activation. Another drill is proposed for calendar year 2018.

The DNR has an agreement with the Department of Health to activate MNICS IMTs to manage the Strategic National Stockpile (SNS) receiving and distribution sites. The Center for Disease Control maintains the SNS which consists of pharmaceutical and medical supplies that would be made available if there is a public health emergency (e.g. terrorist attack, flu outbreak, or earthquake). No MNICS IMTs were activated for this work in FY17.

### **In-state Wildfire Response**

In FY17, the DNR responded to 573 fires which burned 2,295 acres in Minnesota. This is considerably less than the 20-year annual average of 1,561 fires and 34,602 acres.

The DNR responded to numerous wildfires throughout the state. The current mix of aircraft, continued partnerships, and attention to wildfire preparedness helped keep the fires small and allowed most to be controlled within 24 hours.

In FY17, the number of arson-caused fires remained below the 20-year average. The DNR continued its emphasis on early detection and the use of the Forest Watch system which uses video surveillance and computer monitoring.



**Figure 4. Engine being used on an initial wildfire attack.**

## Firefighting Fleet

The DNR maintains a fleet of engines and tracked vehicles for firefighting purposes. Engines are medium to large-sized pickup trucks, customized for wildland firefighting on mostly dry, upland sites. They are driven directly to fire sites.

Tracked vehicles are custom built firefighting units driven by two endless metal belts, or tracks. They are designed to fight fires on wet sites, like swamps. The DNR uses two basic tracked vehicle models, the J-5 and the Muskeg. They are positioned on trailers and towed to a fire site.

## Engines

Many forestry areas use heavy duty half-ton trucks. These units are less expensive to purchase and operate than larger-sized engines. When equipped with a small slip-on water tank and pump, they serve well as a maneuverable initial attack unit. The most common fire vehicle is a one-ton pickup; these trucks haul 300 gallons of water. Service body pickups are 1¼ or 1½ ton medium pickups, that are fitted with compartments for storing various firefighting equipment. The fleet did not expand in 2017. Fifteen trucks are scheduled for replacement in 2018.



Figure 5. Type 4 Wildfire Engine (2008 Model).

2017 Engine Fleet		
Type	Size	Number
T7	½ ton HD	36
T6	1 ton	110
T6 – Service Body	1 ¼ ton	36
T6 – Service Body	1 ½ ton	9
T4	3 ton	16
Total Engines		207

## Tracked Vehicles

The DNR fleet of 46 tracked vehicles is aging. Maintenance of these machines is becoming costly and time consuming as parts are becoming harder to find. There are 12 J-5s in active status that were manufactured in 1988. The newest J-5s were manufactured in 2008. These assets need to be replaced over the next five to ten years.

The DNR recently took delivery of three new J5-style tracked vehicles. Seasoned DNR tracked vehicle operators will test these vehicles. If deemed suitable for firefighting in Minnesota, the DNR will order several of these units each year until the small tracked-vehicle fleet is modernized.

There are also several old Muskeg tracked vehicles: 8 of 11 units were manufactured in or prior to 2006, with the oldest Muskeg manufactured in 1993. The DNR’s Management Resources Unit will begin developing a Request for Proposals for Muskeg replacements early in 2018. If a successful bidder is found, initial replacement units could be delivered as early as 2020.

<b>2017 Tracked Vehicle Fleet</b>		
<b>Type</b>	<b>Model</b>	<b>Number</b>
J-5	Bombardier	14
J-5	Camoplast	21
Total J-5		35
Muskeg	Bombardier	7
Muskeg	Camoplast	1
Muskeg	Crostrack	3
Total Muskeg		11

### **Firefighting Aircraft**

In FY17, the DNR responded with tactical firefighting aircraft to 112 requests on 63 wildfires. To meet preparedness and response levels, the DNR used a mix of aircraft under “Exclusive Use” and “Call-When-Needed” contracts, owned or operated by the DNR, and obtained through interagency and partnership agreements.

The DNR uses several types of aircraft to provide tactical aerial firefighting support and intelligence to ground firefighters.

The agency operates two light, fixed-wing airplanes for aerial supervision on fires, fire detection, transportation, logistical and administrative support and aerial photography. They include a Cessna 310, which is owned by the DNR, and a Cessna 206, which is owned by the United States Forest Service (USFS) and on loan to the State through the Federal Excess Property Program. The DNR recently purchased a Quest Kodiak airplane which was partially funded with proceeds from the sale of the CL-215 water-scooping aircraft in 2015. The Quest Kodiak will replace the Cessna 206, which will be returned to the USFS. The Quest Kodiak will provide an improved platform for aerial supervision and logistical fire support.

During 2017, the DNR contracted services for the following:

- Four FireBoss airtankers (800 gallon single-engine water-scooping aircraft)
- Two Single-Engine Air Tankers (SEAT), these have the same airframe as the FireBoss but are ground-based airtankers on wheels
- Eight helicopters with water buckets
- Four light airplanes used for aerial supervision
- 15 light airplanes used for fire detection and tactical intelligence

Interagency partnerships continued to play a key role in the DNR’s aerial firefighting program:

- The Red Lake Agency, with assistance from the Bureau of Indian Affairs (BIA), provided one helicopter, one FireBoss and one SEAT in Bemidji.
- The USFS provided two helicopters and three float planes (Beavers) in Ely, as well as a

CL-415 and an aerial detection aircraft.

- The DNR and the USFS partnered to contract an additional “Call-When-Needed” helicopter.

The DNR also obtains firefighting aircraft when needed from a variety of other sources, including:

- Helicopters from the Minnesota Army National Guard (five Blackhawks with 660 gallon water buckets and two Chinooks with 2,000 gallon water buckets)
- Two helicopters from the Minnesota State Patrol
- CL-215s and/or CL-415s and aerial supervision aircraft from the Provinces of Ontario and Manitoba
- Additional airtankers and helicopters from Federal agencies that are on National contracts and are paid for by Federal partners

### **Rural Fire Department Support**

The Division of Forestry’s Rural Fire Program is a cost effective way to protect lives, property, and natural resources of Minnesota residents. This program has effectively and efficiently supported rural communities throughout Minnesota for the past 38 years. The cooperative effort provides rural communities with low-cost equipment obtained through an agreement with the USFS, the Department of Defense and the DNR.



**Figure 6. Engine converted and ready for service.**

In 2017, the Federal Surplus Property Program acquired and distributed more than \$6.8 million dollars of equipment and supplies to local fire departments in the state. More than 500 Minnesota communities and four state agencies benefited from this program.

Distributed items included:

- 10 freightliner truck chassis that will be converted to water tenders
- One remote rescue support unit
- Three fire engines
- Two water tenders
- 10 generators (60 Kilowatt)
- Hand tools, safety goggles, and other safety items



## **Attachments**

**Attachment 1: Emergency Fire Direct and Open Appropriations**

**Attachment 2: A Guideline for Statewide Planning Level Determination**

**Attachment 3: FY2017 State Fire Cost Summary**

**Attachment 4: Ten-Year Expenditure History - State Firefighting Costs**

**Attachment 5: Minnesota Fires and Acres Burned From 2007 – 2017**

**Attachments 6: FY2017 Number of Wildfires by Cause**

## Attachment 1

### Emergency Fire Direct and Open Appropriation

#### FY2017 State Expenditures by Category

Direct Appropriation*	\$7,160,792
Open Appropriation	\$16,271,730
<b>Total</b>	<b>\$23,432,522</b>
Salary Costs	\$11,740,443
Operating Costs	\$11,692,079
<b>Total**</b>	<b>\$23,432,522</b>
*Includes dollars rolled forward from FY16	
**Actual expenditure as of 10/04/2017	



**A Guideline for Statewide Wildfire Planning Level Determination**

	PLANNING LEVEL I	PLANNING LEVEL II	PLANNING LEVEL III	PLANNING LEVEL IV	PLANNING LEVEL V
<b>BI (Q) spring</b> , pre-green, floating 5 day average	Not applicable	0-45	46-70	71-95	96+
<b>BUI</b> (after <b>June 1</b> , floating 5 day average)	Not applicable	0-25	26-50	51-67	68+
<b>ERC (Q)</b> (alternate summer/fall indicator, after June 1, floating 5 day average)	Not applicable	0-15	16-29	30-36	37+
<b>8-14 day Weather Forecast</b>	Winter conditions, most of state snow covered, temps below freezing.	Normal conditions for season, adequate precip. expected	Less than normal precip. and RH, higher than normal temps forecast	Dry weather patterns persisting, no change forecast	Dry pattern intensifying. Unstable weather forecast leading to extreme fire behavior conditions.
<b>MN Regional Planning Levels</b>	All Regions/Agencies at P.L. I	One or more Regions/Agencies at P.L. II	Two or more Regions/Agencies at P.L. III	Two or more Regions/Agencies at P.L. IV	Two or more Regions/Agencies at P.L. V
<b>Eastern Area Planning Level</b>	I	I - II	I - III	I - IV	I - IV
<b>National Planning Level</b>	I - II	I - III	I - IV	I - V	I - V
<b>Fire Occurrence</b> (Initial Attack)	Rare, infrequent fire occurrence	Fires reported in scattered Areas. Generally less than 10 fires/day statewide.	Multiple Areas/Agencies reporting fires. 10 to 20 fires/day statewide	Multiple Areas/Agencies reporting fires. 20 to 30 fires/day statewide	Multiple Areas/Agencies reporting fires. 30+ fires/day statewide.
<b>Fire Occurrence</b> (Escaped fires)	None	None	1-2 fires requiring extended attack statewide (with active fire)	3-5 fires requiring extended attack statewide	5+ fires requiring extended attack statewide
<b>Sociopolitical Considerations</b>	Statewide or Regional events such as fishing opener or the Fourth of July; natural events such as floods or windstorms; other unexpected or unusual events that may have large scale impacts should be considered.				
<b>Resource Availability</b>	Normal complement of personnel.	No shortages expected.	Moderate demand for some in-state resource types expected	Shortage of certain in-state resource types	Most in-state resources committed. Out-of-State assistance necessary.
<b>In-State Mobilization</b>	None	Less than 5% of statewide resources assigned out of home unit.	Some short term movement occurring, 5-10% of statewide resources assigned out of home unit.	10-20% of statewide resources assigned out of home unit.	20%+ of statewide resources assigned out of home unit.
<b>Out-of-State Mobilization</b>	If out-of-state mobilization is occurring or anticipated to occur, an 'A' designator will be applied at the current Planning Level.				

- Once Planning Level III has been reached in the spring, preparedness will not drop below that level until May 31 or later.
- Terms used above, which are calculated daily from weather and fuel measurements:
  - BI (Q) = **Burning Index**, fuel model Q: A measure of fire danger based on the probability of ignition and fire spread in a specified forest type.
  - BUI = **Build Up Index**: An indication of the dryness of larger sized woody fuels, which becomes a significant factor during a drought.
  - ERC (Q) = **Energy Release Component**, fuel model Q: A measure of the expected heat release from a fire, which will be experienced by firefighters on the fire line.

**Attachment 3**

<b>FY2017 - State Fire Cost Summary</b>			
<b>By Type of Activity and Appropriation</b>			
	<b>Emergency Firefighting Direct</b>	<b>Emergency Firefighting Open</b>	<b>Total Open and Direct Combined</b>
<b>Fire Prevention</b>	4.5%	0%	<b>1.5%</b>
<b>Fire Presuppression</b>	40.5%	41.5%	<b>41%</b>
<b>Fire Suppression</b>	55%	58.5%	<b>57.5%</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Fire Prevention** activities include public information and education, fire permitting, and operation of the Township Fire Warden system, as well as advice and assistance to communities and homeowners about protecting their property in the event of a wildfire in their community (Firewise).

State Fire Prevention activities are supplemented by annual grants from the USDA Forest Service as follows:

- State Fire Assistance – approximately \$590,000 (supports fire prevention and readiness).
- Volunteer Fire Assistance – approximately \$300,000 (supports Rural Fire Department readiness).
- Cooperative Fire Assistance – approximately \$150,000 (supports Firewise – Community Fire Protection activities).

**Fire Presuppression** includes activities undertaken before a fire happens to ensure more effective suppression. These activities include: overall planning, recruitment and training of personnel, procurement of firefighting equipment, and contracts, and maintenance of equipment and supplies.

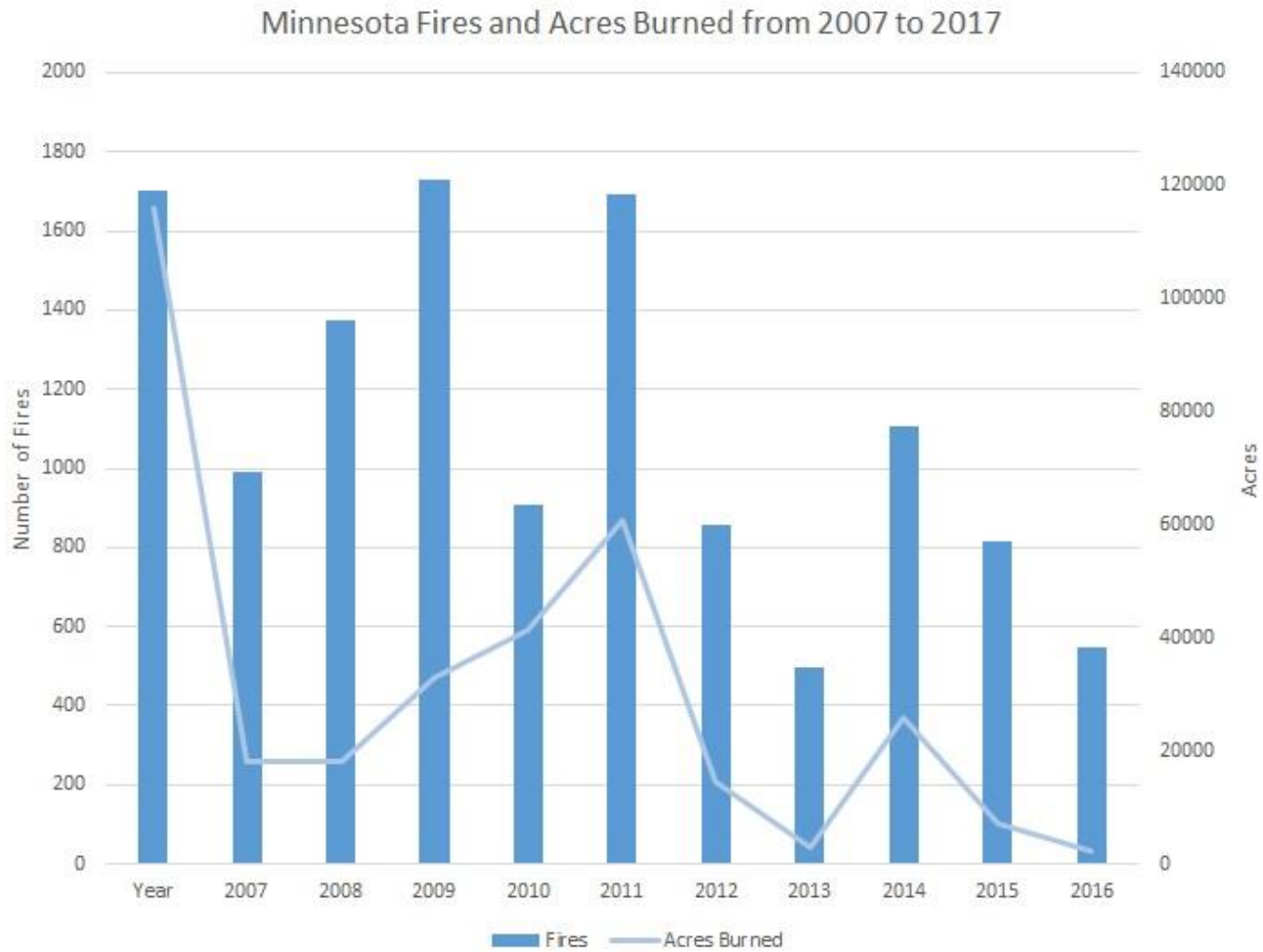
**Fire Suppression** includes direct action to suppress wildfires and other activities that support and enable the DNR to suppress wildfires during times when fires are likely to occur, including the repositioning of firefighting resources.

Attachment 4

**Ten-Year Expenditure History – State Firefighting Costs**

Nominal Dollars By Source of Funds	FY 2008	(b) FY 2009	(c) FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	10 Year Average	
Emergency Fire-Direct	\$6,938,928	\$7,388,440	\$7,109,695	\$6,928,432	\$7,066,975	\$7,184,311	\$6,918,792	\$7,363,656	\$6,739,596	\$7,160,792	\$7,079,962	
Emergency Fire-Open	\$12,221,642	\$11,695,791	\$13,873,176	\$8,558,008	\$17,303,580	\$23,373,476	\$15,008,912	\$18,971,895	\$17,709,549	\$16,271,730	\$15,498,776	
<b>Fire Activity Total</b>	<b>\$19,160,570</b>	<b>\$19,084,231</b>	<b>\$20,982,871</b>	<b>\$15,486,440</b>	<b>\$24,370,555</b>	<b>\$30,557,787</b>	<b>\$21,927,704</b>	<b>\$26,335,551</b>	<b>\$24,449,145</b>	<b>\$23,432,522</b>	<b>\$22,578,738</b>	
Cost Recovery	(a) \$3,636,908	\$3,058,986	\$3,007,734	\$2,610,699	\$1,523,872	\$3,426,210	\$602,622	\$1,032,502	\$628,660	\$262,871	\$1,979,106	
<b>Net Cost to General Fund</b>	<b>\$15,523,662</b>	<b>\$16,025,245</b>	<b>\$17,975,137</b>	<b>\$12,875,741</b>	<b>\$22,846,683</b>	<b>\$27,131,577</b>	<b>\$21,325,082</b>	<b>\$25,303,049</b>	<b>\$23,820,485</b>	<b>\$23,169,651</b>	<b>\$20,599,631</b>	
Reimbursable Mobilization Fire Costs	(d) \$2,442,486	\$2,014,520	\$2,125,711	\$2,204,635	\$4,913,097	\$4,451,095	\$1,806,396	\$2,106,290	\$4,370,469	\$3,423,285	\$2,985,798	
(a) Fire Cache Sales, Fire Cost Collections, Permanent School Trust Fund - protection services reimbursement, excess recovery from Special Revenue Fund. Beginning in FY 02, Cost Recoveries were deposited to the general fund. In FY 10, School Trust Fund protection services were included retroactive to FY 2001. FY 2013 was the last year School Trust Funds were applied.							(a) Cost Recovery Breakout	\$ 262,871				
(b) \$600,000 direct fire support that had been funded through the forest management account, moved to the emergency fire appropriation in FY 08							Fire Cost Collections -	\$ 169,483				
(c) \$600,000 leave time (vacation, sick leave) attributable to fire activity that had been funded through the forest management account, moved to the emergency fire appropriation in FY 09.							Fire Cache Sales -	\$ 93,387				
(d) This is not a state expenditure. Costs are initially expended from the Fire Fund for assistance to federal partners and other states. Minnesota will be reimbursed.							Excess Recovery, Sp. Rev.	\$ 0				
							Note the major reduction in Cost Recovery from previous years is due to School Trust Fund protection services no longer being included					

## Attachment 5



### FY 2017 - NUMBER OF WILDFIRES BY CAUSE

