

Annual Report on Emergency Fire Expenditures

04 - 0621

FY 2004

Purpose

The purpose of this Report is to address the requirements of Minnesota Laws of 2003 Chapter 128, Article 1, Section 5, subd. 4, which states in part:

“By November 15, each year, the commissioner of natural resources shall submit a report to the chairs of the house of representatives way and means committee, the senate finance committee, the environment and agriculture budget division of the senate finance committee, and the house of representatives environment and natural resources finance committee, identifying all firefighting costs incurred and reimbursements received in the prior fiscal year.”

Funding Sources for Emergency Firefighting

Emergency Fire Fighting - Direct Appropriation: Laws of 2003 appropriated \$7,650,000 ⁽¹⁾ for prevention, presuppression and suppression costs of emergency firefighting, and other costs incurred under Minnesota Statutes, section 88.12.

(Laws of 2003 Chapter 128, Article 1, Section 5, subd. 4)

Emergency Fire Fighting – Open Appropriation: Under the authority of this appropriation, during FY 2004, \$9,560,026 was expended.

(Laws of 2003 Chapter 128, Article 1, Section 5, subd. 4, further states in part that “If the appropriation for either year is insufficient to cover all costs of presuppression and suppression, the amount necessary to pay for emergency firefighting expenses during the biennium is appropriated from the general fund.”)

Attachment 1 shows the costs from the fire appropriations by object of expenditure.

⁽¹⁾ This figure does not include \$18,500 of unspent funds balanced forward from FY 2003 to FY 2004, and \$5,600 unspent from FY 2004 balanced forward to FY 2005.

Uses of the Emergency Firefighting Appropriations

Change in FY 04

Beginning July 1, 2003, all fire program costs, including prevention, presuppression and suppression, are funded exclusively from the two fire accounts. Division of Forestry general operations funds were reduced and the fire-direct appropriation was increased to accommodate this change.

Collections and Reimbursements to the General Fund: The division collects costs for certain fire related activities. These include reimbursement for supplies sold to local government units (e.g. fire departments) from the Inter-agency Fire Cache (Cache Sales – authorized under M.S. § 88.065), and charges against responsible parties for starting illegal or negligent fires, (Fire Cost Collections – authorized under M.S. § 88.75). Additionally, collections for the CL-215 airtankers in excess of actual contract costs are transferred to the general fund.

Prior to FY 2002 these reimbursements were retained by Division of Forestry and expended for firefighting. This was changed starting in FY 2002. These collections are now deposited directly to the general fund and are not used by the division.

In FY 2004, collections came from the following sources:

- Cache Sales - \$ 92,566
- Fire Cost Collections- \$ 398,977
- CL-215 - \$ 142,620
- **Total Collections - \$ 634,163**

National Mobilization: The division sends firefighters and the CL-215 airtankers out of state to respond to national wildfire emergencies. The federal government reimburses these costs. These costs are charged to the Emergency Fire Non-State account, (Special Revenue Fund 200.) Federal reimbursements are deposited to the account to cover the costs. During FY 2004 the division expended \$4,440,968 in reimbursable costs incurred for national mobilizations. Approximately \$2.66mm is due to firefighter mobilizations and \$1.78mm is due to CL-215 mobilizations. This is not a use of the emergency fire appropriations, but is included here due to perennial interest on this topic.

Suppression and Presuppression Costs

A primary feature of the Division's fire suppression strategy is aggressive initial attack. The goal is to keep fires small. Once a fire escapes initial attack, costs and damages increase exponentially.

The following discussion is offered to explain how preparedness and suppression activities work together to reduce wildfire damages. Presuppression levels move on a continuum that is proportional to fire danger. Presuppression costs include activities undertaken in advance of fire occurrence to ensure more effective suppression. These 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 division to suppress wildfires during times when fires are likely to occur, including the pre-positioning of resources. As fire danger and fire occurrence increase, the resources that must be positioned for immediate response also increase.

Presuppression costs amounted to 21% of the direct and open fire appropriations. Historically, presuppression has composed 25% or less of the fire account.

The division uses a cost coding system to provide accountability for emergency fire account expenditures. A detailed project coding system is in place, and all fire account expenditures must be coded. This enables managers to identify costs charged to individual fires, and to hold area supervisors accountable for local expenditures.

Attachment 2 shows the percentages of fire expenditures spent on prevention, presuppression and suppression.

Planning

An additional effort to identify base costs for wildfire response was associated with the restructuring of guidelines for determining potential wildfire risks and establishing fire planning levels. This resulted in the development of criteria to guide the determination of fire planning (or readiness) levels.

Attachment 3 shows the criteria and planning levels currently in use.

These planning levels are reviewed at a weekly conference call by fire managers from all the agencies that cooperate in Minnesota wildfire suppression efforts. Planning levels are set for each region of the state, and for the state as a whole. The planning level, combined with daily fire danger indices, establish the preparedness level needed to effectively respond to wildfires. Historically, about 80% of wildfires in the state occur during planning level 2. Major fires also can and do occur at this level.

In FY 2004 there were 219 days of possible wildfire danger. (i.e. at least one region at planning level 1 or higher). Of the possible wildfire days, 112 were at Planning Level 1, 61 were at Planning level 2, and due to an extremely dry period in the late summer of 2003, 46 days were at Planning Level 3 or higher (about 3 times the historical average.) On 18 days, at least one region was at a higher level than the rest of the state due to local conditions. Historically, for the six years that a formalized planning level system has been in use, the average number of days at Planning Level 1 or higher is 240.

Attachment 4 shows the ten-year fire expenditure history.

FY 2004 Fire Season

General Activity: In FY 2004, 1782 fires occurred burning 42,594 acres. Historically, the state experiences an average of about 1650 fires per year burning just over 44,000 acres. As a result of the dry fall conditions, 458 fires totaling 6673 acres were reported by DNR Forestry offices from July through December. This is over twice the ten-year average number of fires that historically occur in the late summer to fall period.

# Fires By Cause				
	FY 2004	%	20 Yr. Ave.	%
Lightning	25	2	26	2
Campfires	51	3	44	2
Smoking	41	2	56	3
Debris Burning	609	34	630	38
Arson	501	28	481	29
Equipment Use	184	10	124	8
Railroad	147	8	83	5
Misc./Unknown	224	13	202	13
Total	1782		1649	

See **Attachments 5a and 5b** for a graphical representation of fire history and causes.

Overall, FY 2004 turned out to be a fairly average year by fire numbers, but it was a much more hazardous year in terms of fire danger. The following discussion of fire conditions describes factors that created a need for higher than normal readiness levels.

Discussion of Fire Behavior and Danger Levels: An extended dry period over much of the State continued from mid-July 2003 and persisted into February 2004. By early September 2003, fuel moistures were at record dryness levels in the Brainerd, Little Falls, and Detroit Lakes areas. These conditions elevated the need for personnel and equipment to be ready for action, and made it more difficult to contain and mop-up (i.e. extinguish all remaining fire and eliminate the potential for reignition) ongoing fires. September 7 and 8 saw a number of fires exhibiting extreme fire behavior with flame lengths in excess of twenty feet, (which is beyond the capability of ground resources to attack independently) high rates of spread, and frequent torching in conifer stands. Quick action by ground forces, backed up by DNR CL-215's and contract helicopters ultimately kept fires relatively small.

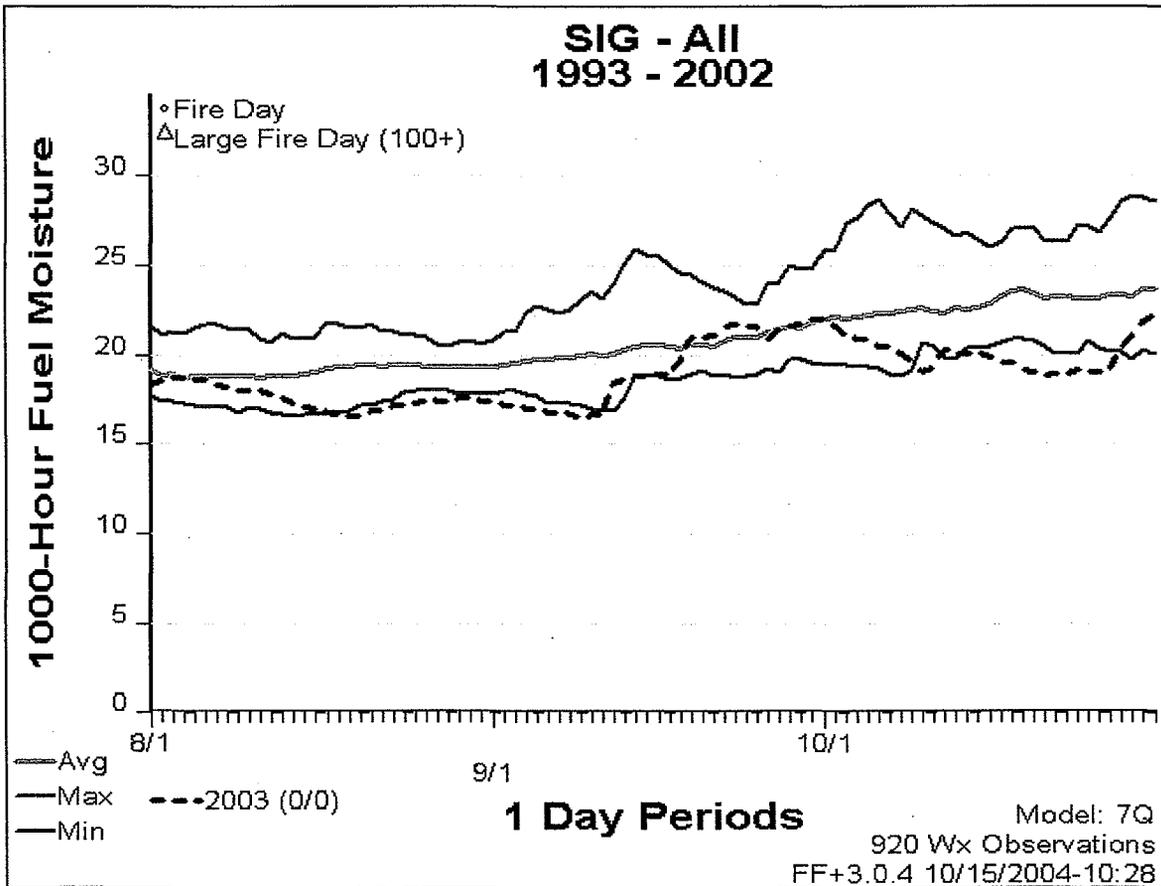


Figure 1: Statewide average fuel moisture conditions during the fall of 2003, compared to the previous ten years.

The graph above shows that 1000-hour fuel moisture levels during the fall of 2003 were at or below record low levels when compared to the previous ten years. (1000-hour fuels are defined as dead woody material with a diameter between three and six inches.) 1000-hour fuels indicate long-term dryness and the likelihood of persistent, deep-burning fire.

By mid-February snow depth ranged from three feet on the ground in portions of the Arrowhead to four inches in parts of southern Minnesota. Over-winter precipitation improved, but did not eliminate the drought conditions present over much of the State.

The months of March and April remained cool over the northeastern part of the State, which slowed snowmelt and delayed the onset of fire season in that area. Central and western Minnesota experienced above average temperatures during the month of April, which increased fire activity in that part of the State. By mid-April burning conditions in central Minnesota had reached very high to extreme levels. Small grass fires quickly grew in size, burning with high intensity and spreading quickly. Fires in timbered areas also exhibited erratic behaviors such as; torching of individual trees and spot fires caused by wind-blown embers. These factors increased the difficulty of containment. By mid-May, fire occurrence had decreased as vegetation began to green up and wetting rains became more frequent.

The protection of homes and lives remains a major factor in fire suppression tactics and suppression costs. Housing development in the rural environment continues to present significant fire suppression problems. The federally funded Fire Wise program is helping communities and individual homeowners to reduce the hazard of property damage from wildfires.

Major Incidents in FY 04

The Louisburg Grade fire started on April 14 in the Laq Qui Parle Wildlife Management Area. Strong winds and low relative humidity allowed the fire to spread quickly in the dry grasses and carry through wooded areas. DNR firefighters along with fire departments from eleven neighboring communities saved eight building sites in the path of the fire. A Red Flag Warning for strong wind, low humidity, and high temperature was issued by the National Weather service on April 15. A MNICS (Minnesota Interagency Incident Command System) Incident Management Team was mobilized to manage the fire until it was controlled on April 17. A total of 7334 acres were burned, making the Louisburg Grade one of the largest fires in southwest Minnesota in many years.

CL - 215 Aircraft

The division purchased two CL-215 aircraft in FY 2001. The cost for both aircraft was \$6,390,000. The purchase was financed by borrowing at the direction of the Department of Finance. Annual payments for the two aircraft are \$1,528,991 for five years. We are in the fourth year of payments and will retire the debt in December of 2005.

The Canadian built CL-215 is especially suited for Minnesota in that it is a water scooping aircraft. The short turn around time for delivering water on a wildfire can be as little as 5 minutes. Whereas land based tankers, which have to return to an airport for reloading, can take 30 - 60 minutes or more to return. This short turn around time for the CL-215's has saved buildings and resources. An additional benefit to the State owning vs. renting these aircraft, is that they are available for the entire fire season.

In FY 2004 these aircraft made 268 water drops, delivering 375,200 gallons of water on 22 wildfires in Minnesota. During times of low fire danger the tankers may be temporarily sent to other states under cooperative contracts. In FY 2004, they were sent to Montana for 43 days and Alaska for a total of 36 days. Savings to the State of Minnesota for these federal mobilizations was \$522,830, as a result of not having to pay daily availability costs while the aircraft were out of the state. In addition, the state charged rates in excess of its contract costs for the mobilization to Alaska. As a result, \$142,620 will be transferred to the state's general fund. Together, these help to offset the State's cost of owning the air tankers.

Attachment 6 summarizes the ownership costs for the CL-215's

Land based air tankers are still occasionally used in the state. In the spring of 2004, to fill the gap from snow-melt on the ground to ice-out in the lakes when the state's own water scooping aircraft could operate, the DNR and U.S. Forest Service shared the cost of importing a P3 Orion and a P2V airtankers for a short time. However, much of the national air-tanker fleet is grounded due to catastrophic wing failures of certain heavy airtankers working in the western states. This has created a national shortage of heavy airtankers, and underscores the importance of having exclusive use aircraft (e.g. CL-215's) that are designed and built for airtanker work to meet the state's needs.

Attachment 7 illustrates where CL-215's fought fire in 2004

Attachments

Attachment 1 - Fire Expenditures by Object Category for Emergency Fire Appropriations

Attachment 2 – Percentage of fire costs in prevention, presuppression and suppression

Attachment 3 - Guideline for Statewide Planning Level Determination

Attachment 4 - Ten Year Expenditure History of Fire Fighting Costs.

Attachments 5a and 5b – Graphical Representation of Wildfire History and Causes.

Attachment 6 - Summary of costs for CL-215 Air Tankers

Attachment 7 – CL-215 dispatches in 2004

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Attachment 1

**Emergency Fire Direct and Open Appropriations
Expenditures by Category
FY 2004**

Direct Appropriation	7,650,000
Open Appropriation	9,560,026
Salary Costs	8,159,134
Operating Costs	7,521,901
Debt Service	1,528,991
Total	<u>17,210,026</u>

FY 2004 Fire Cost Summary						
By Type of Activity and Appropriation						
	Emergency Firefighting Direct	Emergency Firefighting Open	Total			
Fire Prevention	2%	0%	1%			
Fire Presuppression	35%	5%	21%			
Fire Suppression	63%	95%	78%			
Total			100.0%			

	PLANNING LEVEL 0	PLANNING LEVEL I	PLANNING LEVEL II	PLANNING LEVEL III	PLANNING LEVEL IV
BI (Q) spring, pre-green, floating 5 day average	Not applicable	0-45	46-70	71-95	96+
BUI (after June 1, floating 5 day average)	Not applicable	0-25	26-50	51-67	68+
ERC (Q) (alternate summer/fall indicator, after June 1, floating 5 day average)	Not applicable	0-15	16-29	30-36	37+
8-14 day Weather Forecast	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.
MN Regional Planning Levels	All Regions/Agencies at P.L. 0	One or more Regions/Agencies at P.L. I	Two 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
Eastern Area Planning Level	0-I	0-II	0-III	0-IV	0-IV
National Planning Level	0-II	0-III	0-IV	0-IV	0-IV
Fire Occurrence (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.
Fire Occurrence (Escaped fires)	None	None	1-2 fires requiring extended attack Statewide (more than mop-up)	3-5 fires requiring extended attack Statewide	5+ fires requiring extended attack Statewide
Sociopolitical Considerations	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.				
Resource Availability	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.
In-State Mobilization	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.
Out of State Mobilization	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 has reached level II in spring, preparedness will not drop below P.L. II 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 fireline.

Attachment 4

Department of Natural Resources, Division of Forestry
Wildfire Activities Ten Year Expenditure History

Nominal Dollars By Source of Funds	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000(b)	FY 2001(c)	FY 2002	FY 2003	FY 2004	10 Year Average
Forestry General	\$1,374,870	\$1,667,949	\$1,912,828	\$2,325,257	\$2,559,669	\$2,658,615	\$2,640,289	\$2,748,183	\$2,884,809	\$0 (e)	\$2,077,247 (g)
Emergency Fire-Direct	\$735,000	\$2,736,000	\$2,552,980	\$3,470,065	\$3,522,870	\$2,822,957	\$4,412,245	\$5,998,430	\$5,983,070	\$7,650,000	\$3,988,362
Cost Recovery(a)	\$281,132	\$155,105	\$283,494	\$269,728	\$486,253	\$777,690	\$952,255	n.a.	n.a.	n.a.	\$320,566
Emergency Fire-Open	\$3,122,822	\$1,347,211	\$2,981,529	\$4,554,168	\$2,945,915	\$7,768,174	\$9,435,941	\$8,870,452	\$9,084,514	\$9,560,026	\$5,967,075
Fire Program Total	\$5,513,824	\$5,906,265	\$7,730,831	\$10,619,219	\$9,514,707	\$14,027,436	\$17,440,730	\$17,617,065	\$17,952,393	\$17,210,026	\$12,353,250
Cost Recovery(a)	\$281,132	\$155,105	\$283,494	\$269,728	\$486,253	\$777,690	\$952,255	\$391,698 (d)	\$448,568	\$634,163	\$468,009
Net Cost to State	\$5,232,692	\$5,751,160	\$7,447,337	\$10,349,490	\$9,028,454	\$13,249,746	\$16,488,475	\$17,225,367	\$17,503,825	\$16,575,863	\$11,885,241
Out of State Fire Costs/ Reimbursement	\$2,188,512	\$1,176,091	\$1,410,139	\$302,889	\$299,106	\$1,028,550	\$2,604,290	\$2,876,747	\$2,962,300	\$4,440,968 (f)	\$1,928,959

(a) Fire Cache Sales, Fire Cost Collections, CL-215 earnings

(b) \$1.9mm Ne MN preparedness initiative (Blowdown)

(c) Purchase of CL-215's

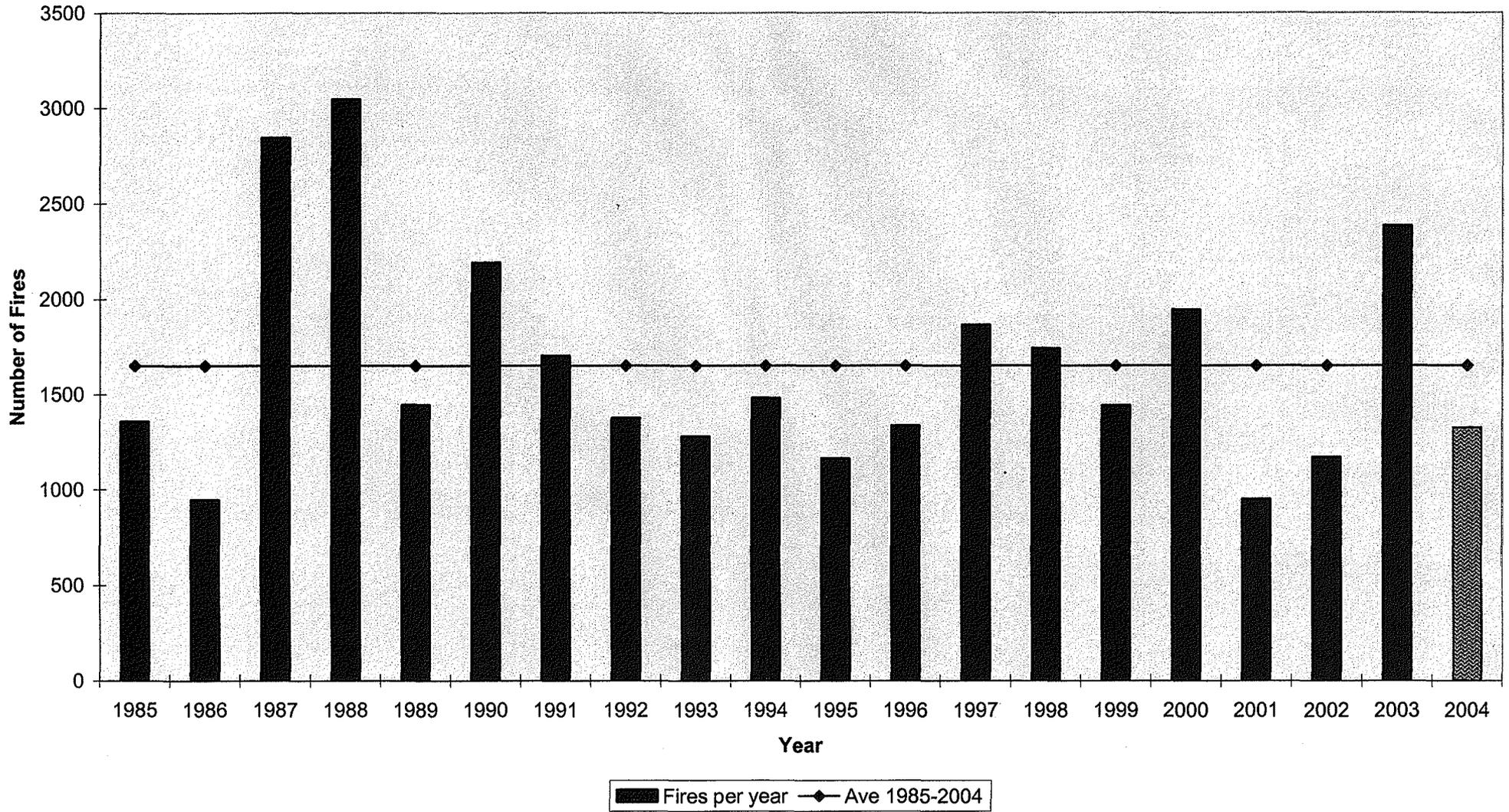
(d) Does not include a one-time Fed Disaster (FEMA) payment of \$1.7mm for the Carlos Edge Fire of 1999

(e) Beginning in FY 2004, all firefighting costs are paid by the emergency fire appropriations.

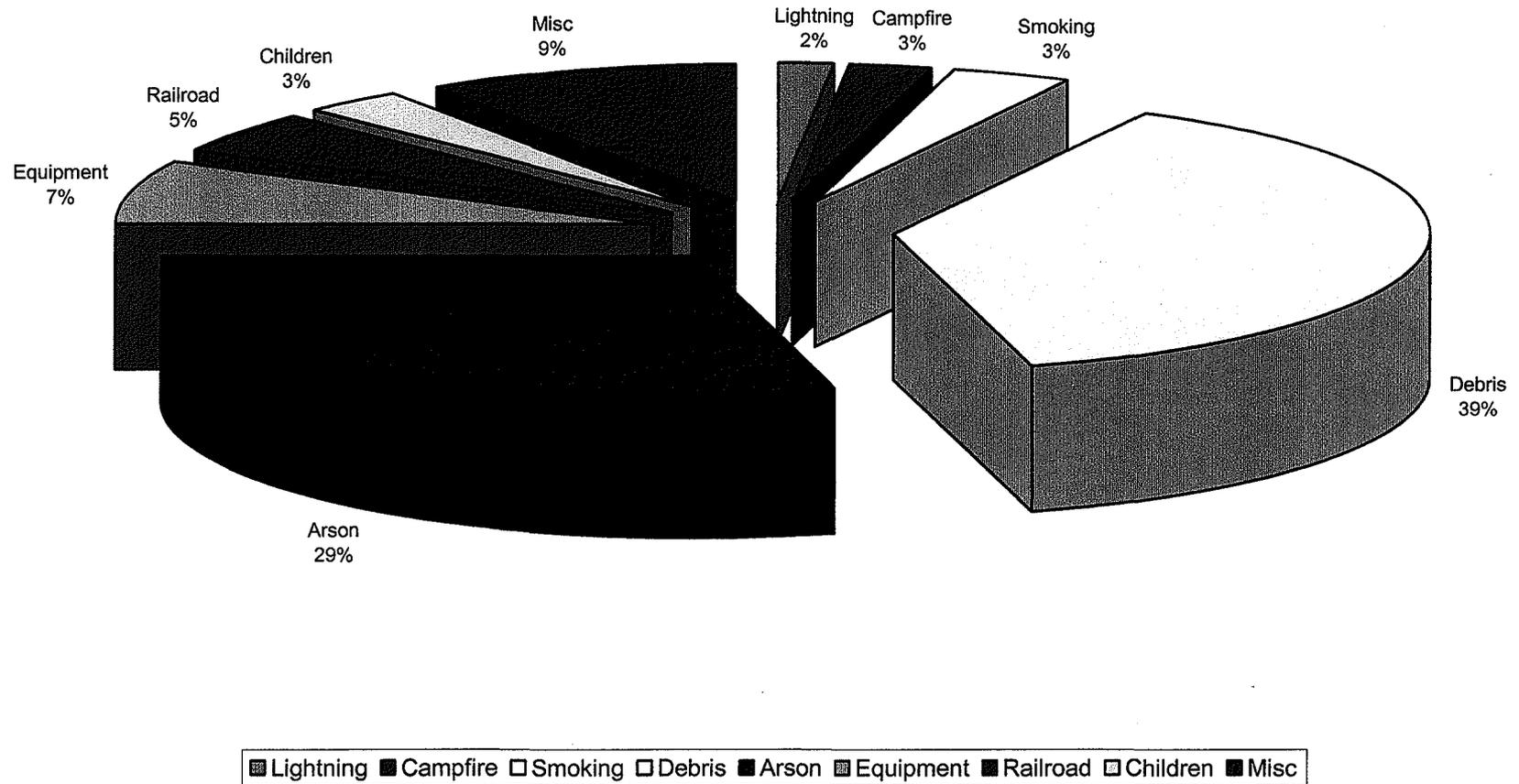
(f) \$2.66mm for personnel deployments and \$1.78mm for CL-215 deployments.

(g) Fire costs are no longer paid from the Forestry division's general appropriation. In FY 03, just prior to this change, the 10 year average was \$2,266,992

MN DNR Wildfires by Calendar Year 1985 to 2004 (to date)



MN DNR Average Wildfires by Cause, Calendar Year 1985 - 2004



Attachment 6

**CL – 215 AIR TANKER OWNERSHIP and OPERATION COSTS
FY 2004**

State Owned (2 aircraft):

Availability Cost: (246 days) @ \$4,225.00	=	\$1,039,350	
Availability Cost: (154 days) @ \$4,430.00	=	\$ 682,220	
(rate change 4/15/2004)			
400 days availability total	=		\$1,721,570
State flight time cost: (24.72 hrs) @ \$2,710.00	=	\$ 69,991	
State flight time cost: (25.66 hrs) @ \$2,840.00	=	\$72,874	
Total State flight time cost	=		\$ 139,865
Annual liability insurance policy			\$ 258,400
Annual loan payment: (five year term)			<u>\$1,528,991</u>
Ownership and Operation Cost:			\$3,648,826
Savings from use in support of federal mobilizations: (daily availability)		\$ (522,830)	
Reimbursements in excess of contract costs (to be transferred to the general fund)		\$ (142,620)	
Net Ownership and Operation Cost:			\$2,983,376

Discussion:

Components of ownership costs include the Loan Payment, Liability Insurance, and a contract to operate, maintain, and repair the aircraft. Contract costs comprise Flight Time and Availability amounts paid to the contractor.

- 1) Loan Payment - completes purchase of the aircraft over a five-year term. The final scheduled payment will be made in 2005.
- 2) Liability Insurance - protects the state from the loss of the aircraft.
- 3) Flight time - is an hourly rate paid to the contractor that operates the aircraft for hours actually flown on firefighting missions.
- 4) Availability is a daily rate paid to the contractor that operates the aircraft. This covers the annual costs of having the aircraft "ready to fly" for the required 200 days per year (which is the anticipated season of need in this state).

Due to a national shortage of conventional air tankers in the United States, Minnesota cannot be guaranteed an air tanker upon request; it would depend upon national availability.

Flight Time Summary

- The CL-215's flew a total of 50.38 hours on in-state fires under state responsibility.
- An additional 17.31 hours were flown in-state assisting federal partners, for which the state was reimbursed at the contract rate.
- And 314.06 hours were flown in Montana and Alaska, for which the state was reimbursed, along with \$142,620 in excess costs that are to be transferred to the general fund.
- For a total annual flight time of 381.75 hours.

CL-215 Dispatches in FY 2004

(Red text represents reimbursed use)

Montana Fires
30 Major Fires
602,000 gallons
Protected: Structures
and Natural Resources

Alaska Fires
17 Major Fires
266,000 gallons
Protected: Natural
Resources

