Ministry of Natural Resources

Forest Fire Management

Background

The Public Safety and Emergency Response Program of the Ministry of Natural Resources (Ministry) provides leadership for the delivery of emergency management services to protect people and property from various hazards. The Ministry's primary responsibilities are detecting and suppressing forest fires on 90 million hectares of Crown land in Ontario and managing an air fleet used for forest fire fighting, natural resource management, and passenger transportation for all government ministries.

The Ministry is also responsible for managing provincial obligations relating to six other types of hazards: floods; drought/low water; dam failures; erosion; soil and bedrock instability; and emergencies related to crude oil and natural gas production/storage and salt-solution mining.

At the time of our audit, the Ministry employed about 220 full-time forest fire management staff at its head office in Sault Ste. Marie, two regional offices in Dryden and Sudbury, and 19 fire management headquarters located across the northern part of the province. As many as 1,000 additional staff are hired on a contractual basis as needed during the fire season. Aviation services employed about 160 full-time and seasonal employees, and emergency response employed eight full-time staff.

Figure 1: Ten-year Summary of Program Costs
Source of data: Ministry of Natural Resources

Fiscal Year	Fixed Costs	Extra Firefighting Costs	Total Program Costs
	($ million)		
1996/97	39.3	66.1	105.4
1997/98	38.3	49.9	88.2
1998/99	36.1	88.8	124.9
1999/00	34.0	73.1	107.1
2000/01	35.7	27.8	63.5
2001/02	34.5	62.4	96.9
2002/03	37.4	70.4	107.8
2003/04	35.1	103.6	138.7
2004/05	35.9	37.7	73.6
2005/06	36.6	66.8	103.4
Average	**36.3**	**64.7**	**101.0**

For the 2005/06 fiscal year, expenditures for the Public Safety and Emergency Response Program totalled $103.4 million. Program fixed costs, for full-time staff and infrastructure expenditures, amounted to $36.6 million. Extra costs, such as additional staffing and contracted services that are incurred to deal with year-to-year fluctuations in the number and intensity of fires, amounted to $66.8 million. As Figure 1 shows, program costs vary significantly from year to year.

Audit Objectives and Scope

The objectives of our audit of the Public Safety and Emergency Response Program were to assess whether the Ministry of Natural Resources had established adequate procedures to ensure that:

- forest fire management, aviation services, and emergency response functions were delivered effectively in accordance with applicable legislation, agreements, and standards;
- operations were carried out with due regard for economy and efficiency; and
- the extent to which program objectives were met was being appropriately measured and reported.

The scope of our audit included discussions with fire, aviation, and emergency management staff, a review and analysis of program policies, management reports, and other relevant documentation as well as research into comparable practices in other jurisdictions. In recent years, the Ministry's Internal Audit Services Branch had performed work on a number of areas within the Program that we found useful in finalizing the scope of our audit.

Our audit was substantially completed in April 2006 and was performed in accordance with the standards for assurance engagements, encompassing value for money and compliance, established by the Canadian Institute of Chartered Accountants, and accordingly included such tests and other procedures as we considered necessary in the circumstances. The criteria used to conclude on our audit objectives were discussed with, and agreed to, by ministry management and related to systems, policies, and procedures that the Ministry should have in place.

Summary

We found that once forest fires were detected, the Ministry of Natural Resources (Ministry) had a good track record of effectively suppressing the fires. However, the Ministry did not have measures for assessing the effectiveness of its procedures for detecting forest fires and consequently could not demonstrate that its fire-detection performance was adequate to support successful fire suppression. In addition, although the Ministry had implemented a number of good initiatives to help prevent forest fires, a comprehensive strategy for fire prevention may more effectively focus efforts in this area. We also found that, while the Ministry had a number of processes in place to help ensure that its operations were carried out in an economic and efficient manner, we noted areas where improvements could be made. Our more significant observations are as follows:

- In the last five years, the Ministry reported that once a fire was detected, it essentially achieved a 96% success rate in suppressing the fire by noon the next day or limiting its extent. However, we noted instances where more timely detection of fires might have allowed firefighters to more readily bring them under control, which could have resulted in significantly reduced suppression costs. We noted two other Canadian jurisdictions that detected two-thirds of fires through planned methods as opposed to Ontario, which detected one-third of all fires through proactive ministry efforts. As well, these other jurisdictions had adopted more rigorous monitoring and reporting of their success in detecting fires when they were still small.
- In 2005, one region had a significant number of fires caused by railways, and regional staff had directly observed railway workers fail-

ing to comply with required practices for fire prevention. Railways operating in Ontario are required to submit an annual work schedule and a five-year plan for fire preparedness and prevention to the Ministry. One railroad company had not submitted its five-year plan and had submitted only a partial annual work plan. This company caused 36 fires in the 2005 calendar year that cost the Ministry over $1 million for fire suppression.

- Forest fires put firefighters at a high risk of injury. In 2005, a total of 285 worker injuries were recorded, over 40 of which resulted in Workplace Safety and Insurance Board (WSIB) claims. Although the Ministry has implemented a number of worker safety initiatives and is developing a system for accident reporting and analysis, this system needs to provide information that relates the number of injuries over time to the number or severity of the fires in the fire season and/or the number of firefighter days worked. Such information could help the Ministry prioritize and assess the effectiveness of its safety initiatives.
- Based on an innovative simulation modelling exercise, the Ministry implemented a program, beginning in 1999, to reduce firefighting costs by better utilizing its resources and optimizing the number of seasonal firefighters and contracted helicopters. Since that time, the Ministry estimates that this program has achieved savings of over $23 million.
- An external consulting firm, engaged by the Ministry in 2005, concluded that the Ministry's aviation services delivery model—a ministry-operated fleet complemented at peak workload times with externally contracted aircraft—was well suited to its requirements and recommended that the government retain the existing aviation delivery model and continue improvements over the long term.
- The Ministry had negotiated a favourable price for aviation fuel purchases from two suppliers at various locations throughout the province. However, we found that the Ministry had often paid more than the negotiated price for aviation fuel and was unable to verify whether the $4.7 million it paid for aviation fuel in the 2005/06 fiscal year was billed correctly.
- In 2004, the Ministry was assigned new responsibility for developing a plan for emergency management of a number of potential hazards, including failed dams and abandoned oil and natural gas wells. The Ministry found that over 300 dams were high-risk and, if breached, could cause extensive damage. It also estimated that there could be as many as 50,000 abandoned natural gas and crude oil wells in the province, many of which pose a range of threats, including the build-up of explosive gas or groundwater contamination. The Ministry has begun to implement procedures to mitigate such risks, but at the conclusion of our audit field work, the Ministry had not completed the identification of specific ministry actions to be undertaken in various emergency situations related to these responsibilities.

Detailed Audit Observations

FOREST FIRE MANAGEMENT

Annually over the last decade, an average of over 1,300 forest fires have burned almost 200,000 hectares, or 2,000 square kilometres, in Ontario. Half of these forest fires were caused by human activity as noted in Figure 2.

Figure 2: Historical Summary of Forest Fires in Ontario, 1995–2005

Source of data: Ministry of Natural Resources

	Summary of Forest Fires		
Calendar Year	# of Fires	Hectares Burned	% Human-caused
1995	2,122	612,436	47
1996	1,245	445,146	48
1997	1,636	38,525	59
1998	2,279	158,278	38
1999	1,017	328,263	63
2000	644	6,733	70
2001	1,562	10,732	35
2002	1,132	172,585	40
2003	1,039	314,219	50
2004	432	1,676	74
2005	1,961	45,235	32
Average	**1,369**	**193,984**	**50**

The goal of forest fire management is to prevent personal injury, economic loss, and social disruption from forest fires, to promote an understanding of the ecological role of fire, and to utilize the beneficial effects of fire in the management of natural resources. Forest fire management helps protect communities, homes, and recreational properties. Even forest fires that occur in remote areas of the province can affect services in the more populated areas as they can impact railways, roadways, telecommunications, and electrical and natural gas transmission corridors that the public relies on for uninterrupted service.

The Ministry of Natural Resources' Aviation and Forest Fire Management Branch is headquartered in Sault Ste. Marie and has operational responsibilities primarily in Northern Ontario. The Branch's Provincial Response Centre, also located in Sault Ste. Marie, attempts to predict forest fires and monitors ongoing fires across the province. It also co-ordinates fire suppression operations by setting priorities for firefighting and allocating resources accordingly. If necessary, the Provincial Response Centre may request assistance from, or allocate resources to, other jurisdictions.

Regional response centres located in Sudbury and Dryden are responsible for fire operations within their respective east/west fire regions. These operations are carried out from a number of bases distributed across each region and include operations for fire detection as well as the deployment of firefighters and equipment to fire locations.

Forest Fire Prediction and Detection

During fire season, ministry staff attempt to predict the number and location of forest fires using a prediction model that factors in weather observations, the amount of moisture in the forest, and fire behaviour. Relatively accurate fire prediction can help staff prepare for firefighting. For example, fire detection aircraft can fly over areas at high risk of fire, and with prompt detection, the deployment of staff and aircraft to those areas can be expedited. Such measures can ultimately reduce the costs of fire suppression because they allow for fires to be attacked and suppressed on a more timely basis.

The Ministry's prediction model is generally helpful in planning for forest fire management and the allocation of resources. In 2005, the Ministry introduced factors into its model to better predict fires caused by lightning. Although the Ministry kept track of both fire predictions and actual fires, it did not assess or report on the accuracy of its predictions. We selected three five-day periods during the 2005 fire season to compare the accuracy of the

Figure 3: Comparison of Actual and Predicted Forest Fires for Selected Periods in 2005

Prepared by the Office of the Auditor General of Ontario

Five-day Periods	Actual Fires	Predicted Fires	Variance (%)
period 1	136	121	-11
period 2	278	221	-21
period 3	161	202	+25

Ministry's fire predictions with actual outbreaks of forest fires. We found that the variance between the predicted and actual number of forest fires started within the periods selected varied by up to 25%, as shown in Figure 3. Such assessment and reporting could help to refine the Ministry's prediction capabilities and ultimately help reduce the cost of fire suppression and the loss of natural resources.

Forest fires that are detected early require fewer resources to suppress and cause less damage than those not detected early. The Ministry uses a variety of techniques to detect fires, including organized aerial and ground detection patrols. We calculated that such proactive ministry activities have resulted in the detection of one-third of the forest fires started in the past three years. The remaining forest fires were reported either by the general public (54%) or ministry staff not specifically assigned to detection patrols (13%). In contrast, planned fire detection methods in two other Canadian jurisdictions have resulted in the identification of almost two-thirds of all reported fires. While these detection methods are not strictly comparable to those used by the Ministry—since these other jurisdictions use, for example, manned fire observation towers—such positive results suggest there may be room for improvement in the Ministry's detection capabilities.

We noted instances where fires were not detected in a timely manner and firefighters were not able to readily bring them under control, resulting in significant costs for fire suppression. For example, on a high fire-start day in 2005, when 51 active fires were recorded on the fire log, we noted that four of the 10 forest fires we sampled had not been detected from within one to seven days of their estimated start times. Subsequently, three of the four fires either were not under control by noon the next day or were not confined to a size of less than four hectares, thus not meeting ministry standards for suppression once a fire has been detected. Suppression costs for these fires were $128,000, $228,000, and $312,000, respectively.

We noted that two other Canadian jurisdictions have adopted performance targets for detecting fires while they are still small. One of these jurisdictions defines a failure of forest fire detection as: the time from fire ignition to detection that is greater than 40 minutes; suppression costs plus damage exceeding $20,000; or the size of the fire at detection exceeding 0.2 hectares.

The Ministry does not assess its actual performance in early fire detection or whether that performance is improving, stable, or deteriorating over time. Adopting standards for fire detection could help focus early detection initiatives that, if successful, would reduce the cost of forest fire suppression and minimize personal injury, economic loss, and social disruption.

RECOMMENDATION 1

To help reduce the cost of fire suppression as well as to achieve its objectives of preventing personal injury, economic loss, and social disruption, the Ministry of Natural Resources should:

- formally assess its fire prediction results in order to help refine its prediction model and determine areas for improvement;
- consider adopting forest fire detection standards and performance targets;
- analyze the reasons for any trends in its fire detection capabilities; and
- report on its success in predicting and detecting forest fires.

Forest Fire Response

In 2004, the Ministry adopted a new strategy for forest fire management to help ensure public safety, protect the wood supply, promote an understanding of fire's role in the ecosystem, and prevent fires

through public education and awareness. Every fire is to receive a response based on the predicted behaviour of the fire, the potential impact of the fire on persons, property, and economic value, and the estimated cost of the response.

Prior to 2005, the Ministry reported only on its initial response to forest fires as a measure of its success province-wide. The Ministry considered a fire successfully attacked if it achieved one of the following: the fire was under control before noon the day after it was reported; the final size of the fire was limited to four hectares; or the fire remained within predetermined boundaries. From 2001 to 2005, the Ministry reported that it substantially achieved its target of 96% initial attack success (2005—97.8%; 2004—99.5%; 2003—95.6%; 2002—97%; 2001—96%).

The Ministry's new strategy for forest fire management refined its performance measurement of forest fire suppression by having the Ministry report its success by zone rather than for the province as a whole. Performance targets for fire management have been developed for each zone/sub-zone and the extent to which those targets are achieved is to be reported annually. In 2005, the Ministry reported that it had substantially achieved the targets set for fire response, as shown in Figure 4.

Figure 4: 2005 Initial Forest Fire Response Targets/Success by Zone

Source of data: Ministry of Natural Resources

Fire Management Zone/ Sub-zone	% Initial Response Success	% Initial Response Target
Boreal	96	96
Great Lakes/St. Lawrence	98	96
Hudson Bay	100[1]	90
Northern Boreal	100[1]	94
Bak Lake Sub-zone	n/a[2]	96
Parks	95	96

1. All fires reported were adjacent to economic values at risk and required initial action based on a full response.
2. No fires reported.

For some fires a decision can be made to increase, decrease, or discontinue suppression efforts according to whether costs and potential damage can be minimized or the benefits of fire, such as ecological renewal, can be realized. In these cases, considerations and decisions about responding to the fire are to be documented in a fire-assessment report. The fire-assessment report describes current and anticipated fire activity, the potential impact of the fire on persons and property, and the options for fire response.

We reviewed the completeness and accuracy of fire-assessment reports at the regional office we visited and selected forest fires from one of the days in the fire season where there were 42 fires on the fire log. We selected seven fires covering larger areas throughout the region. All seven had been difficult to control, and fire-assessment reports should have been completed for each of them. However, two reports had not been prepared as required, and a third was missing key information such as the response objective, cost estimate, potential impact of the fire on persons, property, and economic values, and fire behaviour prediction. Without such information, management cannot determine whether corrective actions should be taken or whether other fire control alternatives need to be considered.

The Ministry was developing two additional measures for fire response, one for sustained action and the other for response time. Reporting on these two measures was scheduled to begin in 2006; however, these measures were still being developed at the time of our audit.

Sustained action was to be measured as a percentage of achievement of the objectives stated in the fire-assessment reports. However, such a measure cannot be determined without properly completed fire-assessment reports. In addition, the Ministry did not have a method for capturing information from the fire-assessment reports to enable it to measure sustained action. The measure

for response times was to be a percentage of compliance with established guidelines for response times and preparedness of resources for firefighting. At the time of our audit, these guidelines were being updated to accommodate the reporting of response times.

RECOMMENDATION 2

To help enhance the information available relating to fire response and suppression and thereby help the Ministry of Natural Resources improve its capabilities in these areas, the Ministry should:

- monitor fire-assessment reports to ensure they are completed when required and that all necessary information is documented; and
- develop a method to capture and summarize relevant information from fire-assessment reports and update guidelines to enable meaningful reporting on the sustained-action and response-times performance measures.

Performance Measures for Forest Areas Burned

In addition to the fire response performance measures, the Ministry introduced three new performance measures for the forest area burned:

- Forest Depletion—This measure relates to the protection of the province's wood supply in areas where commercial forestry is carried out. The Ministry's response to fire in forestry areas is intended to limit the loss of this valuable wood supply.
- Hazard Reduction—This measure relates to the reduction of hazards caused by dead or dying forest due to insect infestation or trees felled by severe storms. Such areas can provide an abundance of tinder-like matter that can become a fire hazard. For forest renewal purposes, the Ministry may allow a modified fire response or allow fires to burn in these areas if the risks and costs are acceptable.
- Ecosystem Renewal—Some areas of the province require fire to maintain their natural state, since certain plants require fire to regenerate and certain kinds of wildlife require fire disturbance to create the proper habitat. In particular, some major parks contain examples of fire-dependent ecosystems that are naturally exposed to fire on a cyclical basis. In such areas, where the risk is acceptable, the Ministry may let natural fires burn or purposely set fires in a prescribed manner to create the desired natural habitat.

In 2005, the Ministry accumulated data for the past decade for each zone and for each of these performance measures to calculate a 10-year average and reported on the achievement of these measures as illustrated in Figure 5.

The additional new performance measures provide more meaningful information because they recognize both the negative and positive effects of fire. The Ministry reported that it had achieved its targets for the protection of valuable wood supplies. However, at the time of our audit, the Ministry had not yet developed a method for assessing which areas require intentional burning to reduce fire hazard risk and which natural fires should be intentionally left to burn to reduce fire hazard risk. In the meantime, the Ministry had based its achievement of targets for reducing fire hazards on the number of fires set intentionally for this purpose.

In regard to ecosystem renewal, the strategy for forest fire management states that fire can have positive benefits by renewing the forest, creating natural habitats, and providing diversity in the landscape. The strategy promotes the role of fire in achieving positive benefits in ecosystems that depend on fire disturbance and, as noted in Figure 5, calls for the burning of 59,600 to 166,000

Figure 5: Ten-year Average of Performance Targets and Results for Forest Area Burned

Source of data: Ministry of Natural Resources

	Forest Depletion Area Hectares Burned		Hazard Reduction Area Hectares Burned			Ecosystem Renewal Area Hectares Burned		
Fire Management Zone	Target Less Than	Achieved	Target Minimum	Target Maximum	Achieved	Target Minimum	Target Maximum	Achieved
Boreal	55,000	52,882	0	5,000	2,920	2,000	5,000	4,592
Great Lakes / St. Lawrence	2,100	963	0	100	638	100	1,000	0
Hudson Bay	—[1]	—[1]	—[3]	—[3]	0	50,000	125,000	37,016
Northern Boreal	—[1]	—[1]	—[3]	—[3]	0	5,000	25,000	7,503
Bak Lake Sub-zone	18,000	785	—[3]	—[3]	—[2]	—[3]	—[3]	—[2]
Parks	—[3]	—[3]	0	5,000	1,600	2,500	10,000	7,385
Total	**75,100**	**54,630**	**0**	**10,100**	**5,158**	**59,600**	**166,000**	**56,496**

1. Not applicable because the zone is not within the area of forestry activity.
2. Not applicable because this sub-zone is not separate for this measure.
3. No targets have been set.

hectares of forest on a 10-year rolling average. In the first year of reporting on this measure, the Ministry stated that it met the minimum requirements for three of the five zones for which targets had been set. Overall, the Ministry calculated that, over the last 10 years, an annual average of 56,496 hectares were burned for ecological renewal, which was slightly less than the minimum requirements of the forest fire management strategy. The calculations for the area of ecological renewal were based on natural fires for which a modified fire suppression or monitoring only response was selected, as opposed to fires intentionally set for ecological renewal purposes.

One of the areas in which ecosystem renewal processes are being developed is in the Parks Zone, which consists of 11 parks, each of which is a representative example of native biodiversity within an ecologically defined region. The strategy for forest fire management states that forest fire management plans must be developed for each park. In addition to identifying opportunities for ecosystem renewal, each plan is to consider public safety, capital assets within the park and adjacent to it, timber values within and surrounding the protected areas, the protection of species at risk of extinction, and maintenance of critical habitat. Currently, eight out of 11 parks, which account for 86% of the acreage in the Parks Zone, do not have plans for fire management in place.

RECOMMENDATION 3

To help achieve its objectives of protecting valuable wood supplies and utilizing fire's beneficial effects in resource management, the Ministry of Natural Resources should:

- develop processes for identifying areas where fire is necessary for hazard reduction and ecological renewal; and
- complete the required plans for fire management for the eight of 11 parks that do not have such plans in place.

Fire Investigations and Reviews

Forest fire investigations attempt to identify the exact source and cause of a fire. These investigations allow information to be gathered to help identify recurring fire causes, to assist in efforts to prevent fires, and to successfully prosecute any violators of the *Forest Fires Prevention Act*. An investigation report is prepared for every forest fire

detected. For those fires of a significant size that are caused by human activity, a further investigation is carried out, and charges may be laid as a deterrent and/or the cost of fire suppression could be pursued.

We visited one region where 437 fires were caused by human activity in 2005. The regional office had selected a sample of investigation reports related to these fires and had reviewed them to establish trends, determine adherence to policy and guidelines, and detect and identify strengths and weaknesses in investigation techniques. The review contained a number of recommendations for improvements in the process for fire investigations, including the collection of sufficient evidence, ensuring that reports are properly completed, and ensuring staff trained in advanced investigation techniques are available when needed.

Ministry policy requires, in addition to investigation reports on individual fires, higher-level provincial and regional reviews of the plans made for, and actions taken on, significant forest fires. These reviews identify and recommend improvements to forest fire management practices. A review at the provincial level is to be conducted for fires that are high-profile, have caused significant damage, or have resulted in high cost to control. However, we were informed that no provincial reviews had been conducted since the policy was adopted in 1989.

At the regional level, reviews are to be conducted if fires are not controlled in the initial attack or exhibit unusual behaviour, or if the handling of the fire or situation was noteworthy. Reviews are to be completed for a minimum of 1% of fires in a region. In the region we visited, there had been 1,442 forest fires during the 2005 fire season, for which 14 to 15 fire reviews should have been completed. However, the regional office could provide only four reviews for the 2005 fire season, and there was no consistency in the form and content of these reports. Completion of the required number of reports and formal reporting standards could assist management in identifying recurring issues and help in developing plans for corrective actions.

RECOMMENDATION 4

To improve its techniques of fire investigation, help identify recurring causes of fire, assist in fire prevention efforts, and provide a deterrent, the Ministry of Natural Resources should:

- take action to resolve any training, documentation, or evidence-gathering weaknesses already identified in the process of fire investigation; and
- clearly define the criteria for determining when a fire review at the provincial level is necessary and develop guidelines for the form and content of fire reviews at both provincial and regional levels.

Forest Fire Prevention

In 2004, the Ministry's new strategy for forest fire management called for educating the public about its responsibility for reducing the number of forest fires caused by humans. Educational priorities were to be based on statistical information about the causes of fires. Guidelines and operating procedures were to be developed to help reduce the risk of fires being started by people working, living, or engaged in recreational activities in forested areas.

Over the last three calendar years (2003–2005), the Ministry reported that there were 3,432 forest fires in the province, of which 1,970 were started by lightning, 1,375 were caused by known human activity, and 87 were of unknown origin, as shown in Figure 6.

In 2006, the Ministry adopted a five-year public education program to promote forest fire prevention. A number of activities were proposed for implementation, such as updates to brochures on fire prevention, the development of an Internet site as a source for educational information, revitalizing the image of Smokey the Bear, and the promotion of Wildfire Prevention Week. An annual summary

Figure 6: Summary of Forest Fires by Cause, 2003–05

Source of data: Ministry of Natural Resources

Fire Cause	2003	2004	2005	Total Fires	# of Known Human-caused
lightning	517	113	1,340	**1,970**	–
recreational (camping)	126	128	234	**488**	488
miscellaneous (children)	112	57	111	**280**	280
resident (chimney sparks)	111	54	90	**255**	255
railway (welding repairs)	66	18	89	**173**	173
forestry (machinery)	24	29	42	**95**	95
incendiary (arson)	24	15	15	**54**	54
other industrial (mining)	12	5	13	**30**	30
unknown	47	13	27	**87**	–
Total fires	**1,039**	**432**	**1,961**	**3,432**	
Total known human-caused	**475**	**306**	**594**		**1,375**

of education activities is to be carried out, with a program evaluation report in 2010.

Aside from these educational initiatives, the Ministry also restricts the use of open fires in designated areas to reduce the number of fires caused by humans during periods of high fire risk. In addition, the Ministry has guidelines in place for those activities that pose a risk of starting forest fires, including guidelines for forestry and mining and for work on railroads and power lines. The Ministry also performs compliance activities and investigations that may lead to invoicing those responsible for forest fires to recover costs and/or laying charges under the *Forest Fires Prevention Act*.

In December 2004, the Ministry prepared a business case for fire prevention that examined historical information on forest fires and identified and ranked the fires by cause. The business case showed that the number of fires in several categories was increasing over time, and it suggested activities to help to prevent fires caused by humans, as well as target setting for fire prevention. Two other jurisdictions in Canada were identified as having implemented specific targets for fire prevention. The business case also noted that the activities proposed to reduce the occurrence of fires caused by humans would require incremental spending that was expected to result in net savings if measured over a five-year period, which would allow sufficient time to get the proposed activities for fire prevention in place. However, at the time of our audit, the proposed activities had not been implemented and targets for fire prevention had not been set.

In 2005, one regional office that had noted a significant number of fires caused by railways investigated and implemented measures for fire prevention. Regional staff had directly observed railway workers in non-compliance with required practices for fire prevention. Railways are required to develop plans for fire prevention and must submit a five-year plan for fire preparedness and prevention and an annual work schedule to the Ministry. Five railway companies were required to file these plans and work schedules in the region we visited. Two companies had submitted adequate annual work schedules and five-year plans and two other companies were substantially compliant. The fifth railroad company, which had caused 36 fires in 2005, had not submitted a five-year plan and had submitted only a partial annual work plan.

The regional office was aware that significant technology changes had occurred in railway

operations and that fire investigators required an understanding of current railway operations to effectively investigate fires on railway lands. In January 2006, the regional office completed the development of a training curriculum specifically for railway-fire investigations. This is a best practice that may be worth considering for the other region as well as for other industrial causes of forest fires.

RECOMMENDATION 5

To help prevent forest fires and ensure appropriate action is taken when fires are caused by human carelessness or repeat offenders, the Ministry of Natural Resources should implement an overall strategy for forest fire prevention that includes:

- a specific prevention and compliance strategy for each major type of forest fire caused by humans;
- an estimate of the potential costs and benefits of the proposed initiatives to address each type of forest fire caused by humans as well as performance targets for each initiative; and
- mechanisms to report on the achievement of results.

Firefighter Training and Safety

In addition to its permanent staff, the Ministry hires over 1,000 part-time firefighters each fire season. Some are hired for the entire season while a greater number are hired on an as-needed basis. Each firefighter must be certified by an accredited training agency or by the Ministry itself. The Ministry also participates in the development of national standards for firefighters so that personnel can be exchanged among jurisdictions at times of peak fire activity. The Ministry has contracted out entry-level training to private companies and keeps more advanced training in-house.

Figure 7: Firefighter Injuries, 2003–05

Source of data: Ministry of Natural Resources

Injury	2003	2004	2005
WSIB	188	67	165
non-WSIB	158	89	120
Total	**346**	**156**	**285**

Firefighting is high-risk work. In 2005, a total of 285 injuries were recorded of which 165 were reported to the Workplace Safety and Insurance Board (WSIB). Over 40 of these injuries resulted in WSIB claims for a total of 460 lost-time days. Reported injuries to firefighters are shown in Figure 7.

The Ministry business plan states that its firefighting program will continue to place the highest priority on the safety of its firefighters. Since 2003, the Ministry has produced an annual safety report that is supposed to summarize the number of employee accidents, injuries, and health-related incidents, analyze trends, and make recommendations for improvement. We reviewed the safety reports for the 2003, 2004, and 2005 fire seasons and noted that the safety reporting process has become increasingly more complete and useful over the last three years. While no recommendations were included in the 2003 report, the 2004 report included recommendations for a range of activities from front-line firefighting safety to proper techniques for lifting and carrying. The report for the 2005 fire season included actions taken on the previous year's recommendations. However, we noted that the safety reports compare the number of injuries over time but do not factor in the number or severity of the fires in each fire season or the number of firefighter days worked. Such analysis could assist the Ministry in determining whether its safety initiatives are working.

As the Ministry has taken on an increasing number of training programs, its training unit has identified a need for effective testing and evaluation to determine whether individuals are getting

from that training the skills necessary to perform their jobs safely and effectively. In October 2005, the Ministry prepared a request for proposals for the design, development, and delivery of a method for evaluating individuals in its training courses. The identified benefits were to include assurance that all testing and evaluation conformed to accepted methodologies and techniques; identification of appropriate time intervals for providing refresher training; and a process that allowed individual workers to identify and work on skills that they believe require improvement. However, at the conclusion of our audit, we were advised that the project had not moved forward due to funding limitations.

RECOMMENDATION 6

To help improve the training of its firefighters and further develop its worker safety initiatives and reporting, the Ministry of Natural Resources should:

- enhance the usefulness of its safety reports by analyzing trends in firefigher injuries in relation to the number and severity of forest fires and number of firefighter days worked; and
- address the identified need for an evaluation methodology to help improve the effectiveness of its training courses for firefighters.

Fire Management Costs, Revenue, and Inventory

Ministry costs for firefighting vary substantially depending on the number and severity of forest fires during the fire season. However, as noted in Figure 1, fixed costs (infrastructure and full-time staffing costs) have been relatively stable for the past 10 years and, as would be expected, extra costs for firefighting (contracted aircraft and helicopters, part-time staffing) account for most of the variability in program costs.

At the end of the 1998 fire season, the Ministry began a project to determine the optimal cost for fire management. Simulation modelling was done to analyze the relationships among levels of protection, requirements for suppression resources, and overall costs. The model analyzed eight years of historic information on firefighting to predict future needs and to determine an optimal number of seasonal helicopters to contract and the optimal number of firefighters for initially attacking forest fires. The Ministry determined that additional savings could be found through implementing an information system to manage equipment for firefighting and another information system to minimize unused hours on aircraft hired for periods of elevated fire risk. A desired level of protection was determined, and management was charged with delivering that level of protection while minimizing costs.

Because of the annual variability of fires, savings targets set for the program for total cost management were to be evaluated over five-year periods. Reporting was prepared for each year up to 2003 and a final report was prepared in 2006. That report indicated that from the beginning of the program up to the 2005 fire season, the Ministry had achieved savings of $23.6 million. The Ministry calculated that $20 million was attributable to the optimization of contracted helicopters and seasonal staffing while $3.6 million was due to efficiencies derived from the implementation of an equipment inventory control system. The 2006 report was a final summary of the original initiatives designed to optimize costs for fire management.

In respect of program revenue, under the *Forest Fires Prevention Act*, the Ministry can recover the costs of suppressing forest fires that occur on Crown land and are caused by individuals disobeying or neglecting to carry out the provisions of the Act. It can also recover costs for fighting fires on First

Nations lands, on railway lands, and in municipalities where there is no agreement with the Ministry for firefighting.

We reviewed revenue collection practices at one fire region office and noted that, in 2005, the office invoiced individuals and companies for 65 fires to recover over $1.6 million in costs for fire suppression. Although most companies had paid the Ministry by the end of our fieldwork, we found that the office normally did not issue invoices until four to six months after an activity to suppress a fire had taken place.

One railroad company accounted for 36 fires in 2005. The company had been invoiced for a total of more than $1 million in fire-suppression costs. At the time of our audit, the Ministry was having difficulty collecting payment from this company. This same company still owed $97,000 in fire-suppression costs incurred for forest fires in 2003. In 2002, the Ministry reached an out-of-court settlement with another railway company that it had difficulty recovering costs from in the past. The settlement required that an amount of $500,000 be deposited into an account for the Ministry to fund fire-suppression costs that were incurred where the railway was deemed responsible. Similar or more severe action may be required to improve efforts to collect from the railroad company with more than $1 million owing for the cost of forest fire suppression.

The Ministry's inventory system is used to manage the issuance of firefighting tools, equipment, and supplies such as generators, hoses, and chainsaws. During the fire season, items from the warehouse are loaned to areas throughout the fire regions as needed. At the time of our audit, the inventory system recorded 259 different items valued at $27 million. One facility we visited had an inventory of 129 different items valued at $3.8 million. We reviewed the inventory at that facility and found only minor discrepancies in a number of items tested but noted a number of obsolete items.

RECOMMENDATION 7

To help ensure that forest fire management is operated in the most economical manner, the Ministry of Natural Resources should:

- review the costs and benefits of formally continuing with its cost-management program and reporting annually on the achievement of any cost-saving initiatives;
- establish a shorter timeframe for invoicing costs for fire suppression and assess the merits of alternative courses of action to help improve the collection of outstanding invoices; and
- dispose of obsolete inventory on a timely basis.

AVIATION SERVICES

The primary function of aviation services is to support forest fire management, which accounts for three-quarters of its activities. Aviation services provides, for example, transport for firefighters and for the dropping of water or fire retardant on fires. Support is also provided for other ministry resource-management activities, including distribution of rabies bait, stocking of fish, and aerial surveying of wildlife. Aviation services also provides non-scheduled air transport for senior government officials.

Aviation services employs 160 full-time and seasonal staff, including 60 pilots, and spends about $20 million annually to maintain its air fleet and seven year-round air bases in Northern Ontario. Aviation services spent an additional $20 million in the 2004/05 fiscal year to augment its capacity during peak periods with private-sector aircraft services. The Ministry's fleet was estimated to have a value of about $270 million in the 2004/05 fiscal year. It consists of 33 aircraft as shown in Figure 8.

Figure 8: Ministry Air Fleet as of April 2006
Source of data: Ministry of Natural Resources

Number	Type	Aircraft Model	Primary Functions
9	airplane	CL-415	fire (heavy water bomber)
6	airplane	DHC-2 Turbo Beaver	fire & resource management
3	airplane	Twin Otter (newer)	fire (water bomber) & resource management
3	airplane	Twin Otter (older)	fire (water bomber) & resource management
2	airplane	King Air 350	passenger transportation
2	airplane	Maule M7	resource management
1	airplane	Navajo	aerial photography
3	helicopter	AS350-B2	fire & resource management
3	helicopter	Bell 206 L-1	fire & resource management
1	helicopter	EC 130	fire & resource management
33 total aircraft			

Aviation Services Costs

In October 2005, a consulting firm reviewed the Ministry's aviation services and determined what aircraft and services should be provided, who should provide them, and what organizational options were appropriate. The firm used the total cost of the aviation services program in 2003/04 in preparing its study. The cost that year, including capital depreciation and the hiring of commercial aircraft, was estimated to be $95.5 million: aviation services were $25 million; capital depreciation was $18.5 million; and hiring commercial aircraft $52 million. The consulting firm recommended a "retain and improve" strategy and cited the delivery model then in use to be the best value in terms of costs and meeting the needs of the Ministry's various clients.

The consultant's report included a number of suggestions for improvements, the most significant of which was to sell off three unused aircraft estimated to be worth about $700,000. Two of the aircraft were originally used in support of a flying conservation-officer program but were removed from service as they did not meet mission requirements, were expensive to maintain, and had ongoing maintenance problems. Neither of these two planes had been flown since 2002, and the third aircraft was last flown in the year 2000. At the time of our audit, the Ministry still owned these aircraft. Surplus assets such as these could be sold to realize cash or traded for useful equipment upgrades for other aircraft.

In order to keep its utilized aircraft in good repair, aviation services employs 34 full-time aircraft maintenance engineers and maintains a supply of aviation parts valued at $13 million. In addition to direct maintenance costs, any aircraft downtime for maintenance may require aircraft replacement services to be purchased from outside contractors. In our 1995 audit of the program, we reported that the Ministry was unable to allocate maintenance costs to individual aircraft. We had the same concern during our current audit in that maintenance costs, which are over $2 million annually, were not tracked by individual aircraft or by aircraft type. Also, the Ministry's system for allocating the cost of parts to aircraft was not fully operational, for only half the inventoried items had been costed and entered into the system. As a result, the Ministry could not accurately monitor the operating costs of individual aircraft and could not identify when downtime and maintenance costs would make replacing aging aircraft a more economical

alternative. For example, the Ministry has three helicopters that are 25 years old—five years past their estimated useful economic life. The Ministry has tried unsuccessfully to get high-level government approval to replace these helicopters using subjective rationale such as its need for greater capacity and better performance. Objective maintenance costing information may provide more tangible information for making well-informed fleet-replacement decisions.

One of the Ministry's other major aviation operating expenses for the 2005/06 fiscal year was the purchase of aviation fuel for $4.7 million. The Ministry had negotiated a favourable price for aviation fuel purchases with two suppliers with various locations throughout the province. Under each of the two contracts, the price was reviewed each month and a new price set at a discounted rate compared to established pricing. However, we found that the Ministry often had not received credit for the reduced fuel prices and was not able to verify that it was being billed correctly.

RECOMMENDATION 8

To help improve its operational efficiency and deliver aviation services in the most cost-effective manner, the Ministry of Natural Resources should:

- dispose of unused aircraft through sale or trade;
- track cost of maintenance downtime, engineering, and parts by individual aircraft to help objectively determine fleet-replacement requirements; and
- implement procedures to ensure it pays the negotiated price for aviation fuel.

Aviation Safety Inspections and Audits

Transport Canada is the regulatory agency in charge of aviation operations throughout Canada. Transport Canada and the Canadian Business Aviation Aircraft Association approve and issue certificates authorizing both flight and aircraft maintenance operations. The Ministry holds three operating certificates: one for fixed-wing executive and passenger operations, one for aerial work for specialty fire and resource operations, and a third for passenger transport by helicopter. The Ministry also holds a certificate as an approved maintenance organization. Aircraft maintenance is highly regulated and follows rigid maintenance cycles.

Transport Canada and the Canadian Business Aviation Aircraft Association have performed nine audits of various aspects of the Ministry's aviation services since 2002. Complete compliance was found in six of the audits, and for the other three, where non-compliance was reported, inspectors noted that the Ministry took adequate corrective actions within the required time periods.

Commercial aircraft operators that provide contracted flight services to the Ministry must meet provincial requirements in addition to those imposed by Transport Canada to ensure aviation services are delivered safely and that risks to ministry staff and clients are minimized. These additional requirements give the Ministry the right, for example, to audit or inspect any of the operator's aircraft, verify pilot licences and qualifications, review medical and immunization certificates, perform criminal record checks, confirm the adequacy of the operator's insurance, inspect aircraft maintenance facilities, and review training programs.

Ministry safety officers oversee the delivery of flight operations by commercial aircraft contractors and the Ministry's own aircraft. When aircraft contractors apply to provide services to the Ministry, a safety officer reviews the application and inspects the applicant's operations prior to granting eligibility for hire. The applicant signs a form agreeing to ongoing compliance with the province's standards and provides a certificate of insurance to demonstrate that it meets the required minimum coverage.

These two documents are retained and, if approved, information on the applicant is entered into the Ministry's database.

We could not test the accuracy of the database of approved aircraft contractors at the regional office we visited because, once information had been entered into the database, the paper records were destroyed. Therefore, we could not determine the basis upon which safety officers approved eligible contractors, and we could not assess whether additions, deletions, and changes to contractor information were timely, accurate, complete, and properly authorized.

In addition, the regional office we visited was unable to provide any documentation relating to audits that had been performed in the past three years. We also noted that there were no criteria for selecting audit candidates or for minimum audit coverage in a given year. We were informed that commercial carriers were not required to advise the Ministry of changes to their operations such as aircraft purchases, or the hire of new pilots. Such events might warrant assessments by safety officers. Without periodically inspecting approved contractors and obtaining notice of changes to their operations, the Ministry cannot be assured that its approved contractors continue to meet provincial requirements.

RECOMMENDATION 9

To ensure that all commercial aircraft contractors meet and continue to meet provincial requirements for aviation safety, the Ministry of Natural Resources should:

- implement record retention policies for documentation related to commercial carrier inspections, audits, and information updates;
- outline circumstances that require commercial carriers to submit information regarding significant changes to their operations; and
- consider a risk-based program of periodic contractor safety inspections.

EMERGENCY MANAGEMENT

Pursuant to the *Emergency Management Act*, the Ministry is required to formulate an emergency plan governing the provision of necessary emergency services; conduct training programs and exercises to ensure the readiness of its employees to react to an emergency; and review and revise its emergency plan every year. In 2004, the Ministry was assigned responsibility for seven of 37 specific types of emergencies that have been identified by the Ontario goverment: forest fires, floods, drought/low water, dam failures, erosion, soil/bedrock instability, and other emergencies related to crude oil and natural gas exploration, production, and underground storage, as well as salt-solution mining. Together, these types of emergencies represent almost 50% of the emergencies declared within Ontario in a typical year.

Municipalities are responsible for the first response to emergencies and must implement programs to deal with all types of emergencies. In 2002, the Act was amended to require the appointment of a Chief, Emergency Management Ontario, to monitor, co-ordinate, and assist in the development and implementation of emergency management programs at the municipal and provincial levels. When requested, Emergency Management Ontario will co-ordinate requests for assistance to municipalities with provincial ministries such as the Ministry of Natural Resources.

Emergency Management Ontario has instituted a phased implementation of ministry and municipal emergency programs beginning with an essential introductory level to have been completed in 2004, an enhanced level in 2005, and a comprehensive level in 2006. In 2005, the Ministry completed the essential introductory level by identifying hazards

and assessing the risk associated with the seven types of emergencies assigned. In doing so, the Ministry determined that certain situations were high-risk.

For example, the Ministry assessed dams in Ontario and found over 300 dams that, if breached, could cause extensive damage. The Ministry noted that the absence of a comprehensive and uniform dam-safety-oversight strategy has resulted in inconsistent and, in some cases, minimal levels of protection for persons and property. To deal with this particular risk, the Ministry has proposed an enhanced dam-safety program. In another example, the Ministry estimated that there may be as many as 50,000 abandoned natural gas and crude oil wells in the province, many of which are poorly sealed and pose a range of threats to the public and the environment, including a build-up of explosive gas and contamination of groundwater. To mitigate this threat, the Ministry received funding in 2005 for an abandoned-works program with provisions for monitoring and inspecting potential hazards.

Although the Ministry has completed some of the tasks associated with the enhanced and comprehensive levels of emergency planning, and has even begun to implement procedures to mitigate risks, at the end of our fieldwork, the Ministry had not completed the enhanced-level planning. Such planning would outline the Ministry's role and responsibilities in the event of an emergency. The Ministry noted that it was awaiting guidelines from Emergency Management Ontario related to the enhanced and comprehensive levels of emergency planning. However, the Ministry needs to work with Emergency Management Ontario to ensure that its legislative responsibilities have been fulfilled.

The Ministry had six employees qualified to train staff in emergency management, and more than 200 front-line staff have received basic training. However, an enhanced comprehensive emergency-management program would help form the basis for conducting the legislatively required exercises to ensure the readiness of ministry employees to provide the necessary services in the event of an emergency. Such exercises can uncover weaknesses in planning and highlight unexpected problems.

For example, the Ministry participated in two emergencies that required the provision of aircraft for the evacuation of residents in a northern community. A misunderstanding regarding the roles and responsibilities of the Ministry, the local government, and the evacuees unexpectedly hindered the first evacuation in 2005. The Ministry participated in a post-emergency review and identified areas for improvement. We were informed that a second emergency evacuation in the spring of 2006 proceeded much more smoothly because of lessons learned the previous year. The Ministry has performed some exercises, but without a comprehensive plan in place outlining the roles and responsibilities of all parties involved in an emergency, it may be difficult for the Ministry to realistically simulate actual emergencies.

RECOMMENDATION 10

To ensure that its legislative responsibilities for emergency management are being fulfilled and to protect people, property, and the environment from the natural and human-caused hazards for which it has been assigned responsibility, the Ministry of Natural Resources should:

- work with Emergency Management Ontario to complete the required enhanced and comprehensive levels of emergency planning; and
- develop a comprehensive emergency-simulation program to test the effectiveness of various components of its emergency plans.

MINISTRY OF NATURAL RESOURCES RESPONSE

The Ministry appreciates the audit observations and recommendations from the Auditor General and will work to address them.

The Ministry is dedicated to providing integrated and efficient services through the effective use of its expertise and resources to protect Ontario's people and manage its natural resources in an ecologically sustainable manner. Escalating costs, exacting service-level standards, the dynamic forest fire regime (for example, changing conditions based on climate), and increasing demand from the public and industry for protection from fire are some of the challenges in developing an action plan to address the audit recommendations.

Recommendation 1

The Ministry acknowledges that fire prediction and detection can always be improved, and an initiative to improve fire prediction is being tested this fire season. It should result in a refined decision-support tool, improving forest fire prediction results.

Forest fire detection factors in many variables. Lightning fires frequently smoulder undetected for several days until high winds and other weather conditions create enough smoke for random or organized detection methods to work. The weather that makes fires detectable also makes them difficult to suppress within initial attack standards. The Ministry is developing forest fire detection standards and performance targets for testing during the 2007 fire season. A gap analysis for identifying fire detection capability trends will be conducted. The Ministry will report in 2007 on its success in predicting and detecting fire.

Recommendations 2 and 3

The Ministry is formalizing the use of fire-assessment reports (FARs) to track performance under the new Forest Fire Management Strategy and improving processes to capture and summarize relevant information from FARs, as recommended. The information from FARs will be used to develop meaningful reporting on the sustained-action and response-times performance measures by 2007.

The 2004 Forest Fire Management Strategy for Ontario included a project to identify areas where fire is necessary for hazard reduction and ecological renewal. Local planning and identification of targets are under way. New guidelines, issued in 2005 and 2006, will help the Ministry achieve the goals highlighted in the audit. Before 2008, fire management and Ontario Parks staff will develop a strategic plan for fire management activities in parks that will consider the capacity of the Ministry and the planning priorities of Ontario Parks.

Recommendation 4

Techniques for identifying the exact cause of a forest fire are complex and involve a process of elimination to rule out possible causes. As part of regular business, when weaknesses in any training, documentation, or evidence-gathering processes are identified, the Ministry takes a "lessons-learned" approach to address them. The Ministry agrees that continuous improvement is essential to fire investigations.

The Ministry is also instituting a lessons-learned process flowing from the content of all fire reviews it conducts. The Ministry agrees that the decision-making criteria for provincial-level reviews, as well as the form and content guidelines for provincial and regional fire reviews, need clarification. New policies and criteria for fire reviews will be in place before the 2007 fire season.

Recommendation 5

An analysis to guide the development of a prevention-and-compliance strategy for the major human-caused fire types is under way. Part of this will include developing a set of prevention-related performance measures. Predicting what might have occurred in the absence of specific action, coupled with the seasonal variability in weather, is a challenge for prevention programs. The new strategy will guide development and testing of prevention-related results-reporting methods in 2007, and these will be implemented in 2008.

Recommendation 6

The Ministry agrees with this recommendation and appreciates the Auditor General's recognition that safety-reporting processes have shown continuous improvement over the last three years. The Ministry has a project under way to enhance the usefulness of safety reports by analyzing trends in firefighter injuries relative to the number of days worked and the number and severity of forest fires and will implement recommended changes starting in the fall of 2006.

The Ministry is developing an evaluation methodology to improve the effectiveness of firefighter training, although funding pressures have caused delays and continue to create challenges. Improvements to the evaluation of training will be launched this year and completed by 2008.

Recommendation 7

The Ministry is pleased the Auditor General recognizes the value of the Total Cost Management (TCM) concepts it uses to ensure that the overall value to the taxpayer is considered in every decision, and it will continue to improve the TCM program.

The Ministry believes the time frame for issuing an invoice for fire suppression costs is reasonable, given staff availability during the fire season and the complexity of the invoices. It takes time to analyze and ensure an invoice is correct before it is paid. The outstanding invoices mentioned in the audit have been paid. There is an initiative under way to develop and implement enhanced protocols/agreements with companies to improve the recovery of expenditures.

The Ministry will continue to regularly evaluate equipment levels and dispose of obsolete equipment. Another review before the 2007/08 fiscal year will ensure inventories are current and accurate.

Recommendation 8

The Ministry acknowledges the recommendation. Plans are in place to dispose of four underutilized aircraft identified in the Aviation Services Review. Two have been disposed of, Ontario Shared Services has identified a broker to sell the third, and the fourth will be disposed of before April 2007.

The Ministry is implementing a system to assist with the requirements for tracking aircraft maintenance. It will track repair and part costs to specific aircraft. In 2007, the Ministry will report on cost-effective ways to track air engineer time for specific aircraft.

The Ministry and its fuel suppliers are collaborating to improve billing procedures so Ministry departments can verify and approve their invoices, thus reducing potential errors. A database to improve the reconciliation of invoice payments will be implemented during the 2006/07 fiscal year. An audit procedure to validate the process and accuracy will be introduced in 2007.

Recommendation 9

The Ministry supports the recommendation. A Health, Safety and Security Coordinator position will be recruited in 2006 to supervise Aviation Safety Officers and increase capacity.

The Ministry will establish record retention schedules for documentation relevant to commercial carrier inspections, audits, and information updates. In fall 2006, a document will be produced that outlines policy requirements for aircraft operators applying to be on the Ministry's aircraft carrier eligibility list, and a risk-based program to audit currently approved commercial aircraft operators.

Recommendation 10

Emergency Management Ontario advised the Ministry that there were no required enhanced levels of emergency planning or deadlines for 2005 and 2006. Rather, Emergency Management Ontario has advised ministries that the approach they should now follow is to develop and integrate components of a comprehensive-level Emergency Management Program into their own emergency management programs over a number of years, without a targeted completion date. The Ministry acted accordingly, working towards the comprehensive level of planning in accordance with international standards. The Ministry will continue to work with Emergency Management Ontario to ensure its legislative responsibilities are fulfilled.

The Ministry has the capacity to develop exercises and realistically simulate actual emergencies. Emergency Management Ontario advised ministries to perform table-top exercises to test their plans pending a complex exercise program. The Ministry responds in actual emergency situations and takes lessons from these real activities to enhance various aspects of its program, including planning and training.