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After-Action Review

2023 Nova Scotia Wildfires

After-Action Report

Submitted to:

Department of Natural Resources
and Renewables
Government of Nova Scotia

Submitted by:

Calian Group
March 8th, 2024

Executive Summary

Between May and June 2023, wildfires affecting Barrington Lake, Shelburne County and Tantallon, Halifax County reached unprecedented levels resulting in evacuations, damaged areas of over 25,000 hectares, and more than 200 homes lost. The wildfire in Shelburne County became the largest wildfire in recorded history in the province of Nova Scotia. The Department of Natural Resources and Renewables (DNRR) promptly activated the Provincial Wildfire Coordination Centre (PWCC), and with the collective and supportive efforts from DNRR staff, volunteer firefighters, municipal and out-of-province fire departments, government, and non-government organizations, the wildfires were well under control by June 11, 2023.

As part of a continual improvement model, DNRR engaged an independent third party, Calian, to prepare a comprehensive After-Action Review (AAR) to examine how the department, supporting government and non-government agencies, and fire departments (including volunteer firefighters) responded to the incident, and to identify areas that could be improved through the modification / addition of procedures, resources, skills, capabilities, or other corrective actions.

The AAR process involved a thorough review of documentation including status reports, department and provincial plans, and any other available references provided by DNRR. Additional data was collected from DNRR staff and agencies / responders through on-line surveys, followed by a series of one-on-one interviews and facilitated focus groups with key stakeholder representatives. Data was analyzed to identify strengths and opportunities for improvement in the response and early recovery. Findings were compartmentalized into six (6) key functional areas of response: Resource Management, Training and Exercises, Information Management, Concept of Operations, Business Continuity, and Decision Centre Tools.

Despite the challenges of the response due to the size and scope of the wildfires, there were many successful aspects of the response and early recovery that should be noted. While homes were lost and many hectares of land were burned, there were no lives lost and many homes were spared. Staff and volunteers worked tirelessly to provide support as needed and minimize the negative effects (sometimes in roles that were not their normal responsibility; decisions were made expeditiously to enable this). Working relationships were strengthened; the willingness of all fire departments across the province to come together to help was exceptional. Organizations demonstrated flexibility and adapted to changes quickly while working in a team environment. Of special note, the level of effort expended to fight the wildfires has resulted in many organizations revisiting their own response plans to ensure that processes, procedures, and resource capacity are current and reflect the response requirements for a large-scale wildfire.

Strengths

Overall, the response to the wildfires was successfully coordinated and conducted. There were twelve (12) strengths identified across the six functional areas of response. Below are the most significant strengths that should be sustained:

- The DNRR model to send an experienced team of professionals into the Incident Command Post (ICP) was extremely beneficial. The majority of the Incident Management Team (IMT) are highly trained and experienced in aspects of Incident Command and role function training.
- Current equipment distribution practices carried out by the DNRR to all 27 regional offices ensures regional capacity is regularly maintained across the province.
- The DNRR were able to source wildfire specific equipment through the PWCC by using effective and robust mechanisms already in place.
- DNRR has excellent capability to extend wildfire behavioral training across the province to volunteer and paid firefighters. Those that had participated in training and / or exercises prior to the wildfires were better prepared for the response and recovery.
- Existing relationships with HRM resources were a positive and influencing factor on the initial response to the Tantallon area fire.
- Command teams consistently demonstrated an understanding that DNRR was the lead agency for wildfire containment.

Opportunities for Improvement

There were 20 opportunities for improvement and 63 recommendations identified across the six functional areas of response. Below are the most significant findings in three (3) themes:

Increase Training and Exercises

While training is available across the regions, it is not uniformly provided, and exercise opportunities are not currently optimized to maintain service capability in a multi-agency response effort. As a result, roles and responsibilities were not always well understood and there was a heavy reliance on the expertise of the Incident Management Team (IMT) members for decision making and response function; a team that already has limited capacity. It is recommended that DNRR:

- Develop and implement a well-defined training strategy for each region with a set schedule to serve as a guideline for volunteer firefighters and DNRR staff.
- Ensure that all department staff have ICS Level 100 training at a minimum. New staff should receive this training withing the first month of employment as part of the onboarding process.
- Increase overall awareness of training opportunities across the department and with volunteer firefighters.
- Provide cross-training opportunities to DNRR staff to ensure confidence in roles and build staffing capacity in other roles with limited availability.
- DNRR should host a multi-agency tabletop exercise to better understand the various agencies' needs and requirements for initial call out and deployment.

Improve efficacy of PWCC and department response plans

The PWCC does not currently apply some ICS functions typically implemented in EOCs/Department Operations Centres (DOC) that would create efficiencies in communications and command and control. Further, some agency/municipal plans are outdated, inflexible, and do not adequately address

the growing risks and response requirements of wildfires; knowledge and promotion of awareness of departmental plans could also be improved. It is recommended that DNRR:

- Adopt some core ICS / EOC principles within the PWCC including defined activations levels and associated protocols / processes to assist with clarification, guidance, and preparation with the PWCC staff. Ensure overarching clarity on the responsibilities and capability of the PWCC at various stages of activation for the wildfire season or other high-risk events.
- Clearly identify triggers and mechanisms to activate stakeholder involvement in a coordinated response effort.
- Review the current capability for wildfire investigations, prosecution, file preparation within the DNRR and establish the required training for personnel utilized in the process.
- Conduct reviews of current Memorandums of Understanding (MOUs), policies, and agreements with other agencies for clarification on roles / responsibilities for structure protection.
- Conduct a review and update of the DNRR Department Plan to incorporate recommendations from this review.
- Review and update the Forest Protection Wildfire Manual.

Optimize Air Support

Protocols related to the use of air support for wildfire response can be improved. It is recommended that DNRR:

- Conduct annual meetings with private aircraft companies and other provinces that provide air support to ensure alignment in understanding of capabilities, processes, collaborative capacity.
- The air operations manager should identify personnel that can be activated to assist with the role during an extended period of operations (currently this is dependent on one person).
- Procedures around radio communications, fueling aircrafts, pilot briefings, and the provision of fire mapping capabilities with air support should be clarified and built into existing agreements accordingly.
- DNRR staffing that manages the air response from the hanger, including command and control, requires additional support from the PWCC. Processes should be reviewed to ensure that staff understand how the PWCC can support the air response (e.g., coordinate with fuel movement and supply), and that the support is available and can be provided when needed.

Additional findings and recommendations were provided related to the management of resources (including people, equipment, supplies) as well as business continuity and the provision of technical support and tools that can support decision making and response activities.

DNRR is committed to working with its partners to optimize interoperability and enhance overall collective response to large scale events that require multi-agency collaboration. While some actions to improve emergency response and recovery have already been taken by the department, a corrective action plan based on the findings from the final AAR will continue to mitigate issues in future responses and will serve to support a model of continual improvement moving forward.

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1 Introduction

1.1 Background

The wildfire season in Nova Scotia hit unprecedented levels between May and June of 2023. Fires affecting Barrington Lake, Shelburne County and Tantallon, Halifax County were extremely complex in nature and resulted in evacuations and numerous structure losses and damage. Thousands of Nova Scotians were evacuated from their homes for an extended time, major highways, secondary roads and numerous other roads and streets were closed. The wildfire in Shelburne County became the largest wildfire in recorded history in this province. On May 28th, 2023, the Department of Natural Resources and Renewables activated the Provincial Wildfire Coordination Centre (PWCC) to manage the wildfire response activities and provide support to assisting agencies.

A key step to continually improve emergency programs is to assess the overall response to major incidents. Subsequently, the Department of Natural Resources and Renewables (DNRR) PWCC engaged an independent third party, Calian, to prepare a comprehensive After-Action Review (AAR) to examine the response to the incident, and to identify areas that could be improved through the modification / addition of procedures, resources, skills, capabilities, or other corrective actions.

1.2 Purpose

The purpose of this AAR is to assess the collective response and early recovery activities of DNRR, PWCC, and their interactions with provincial, municipal, and non-government organizations (NGOs) through the identification of strengths, deficiencies, and gaps related to the 2023 wildfires in Nova Scotia. The findings contained in this report are derived from observations obtained from participating provincial departments, municipalities, responders, and NGOs who had a role in the response or recovery phases of this situation. Findings contained within this AAR will serve to assist in the development of a corrective action plan designed to further optimize wildfire response capabilities, improve public safety, and enhance resiliency across the province.

1.3 Event Overview

On Friday May 26th, 2023, a wildfire started near Barrington Lake Shelburne County and was actioned by 14 DNRR staff that evening; operations continued the following morning. Helicopters supported the firefighting efforts; however, conditions worsened throughout the day and additional resources would be required.

The DNRR mustered their Incident Management Team (IMT) in Liverpool on the evening of May 27th before moving to Shelbourne on May 28th. In the interim, the wildfire escalated overnight with significant growth. The NRR Incident Command Post (ICP) was established at the Churchover Office on May 28th, and the IMT attempted to contain the fire and coordinate local firefighting efforts. Structural firefighters from the local volunteer fire departments began deploying to the fire hot spots to suppress the fire and protect homes. Numerous mutual aid activities were activated locally, and command positions and coordination continued throughout the day to protect homes from the interface fire.

Homes were lost and evacuations were ongoing as the fire spread and triggered further ignitions that exhausted firefighters' capability and resulted in the need for additional resources. On May 30th, another fire ignited in East Pubnico requiring significant coordination and resources.

At 15:28 on May 28th, 2023, Halifax Regional Municipality (HRM) Fire Dispatch issued a Computer Aided Dispatch (CAD) to the Tantallon Fire Department regarding an open fire. This report was corroborated at 15:31 hours by additional calls confirming that two houses were on fire. The CAD response was upgraded by en-route fire crews and at 15:36, divisional incident command arrived and deployed firefighting measures. All available resources were called, and helicopter support was requested as the fire spread. Initial fire crews quickly established an Incident Command Centre and staging area at St Margarets Centre, and as the fires continued to expand, extensive evacuations took place.

With two significant Type 1 wildfires burning, and interfacing several communities, the PWCC in Shubenacadie was charged with coordinating the response. Outside assistance was garnered from the Canadian Interagency Forest Fire Centre (CIFFC) and out of province resources including air support, equipment, and firefighting teams.

The wildfires burned for over two weeks, reaching unprecedented levels in recorded provincial history. Extraordinary firefighting measures and committed efforts from those involved were relieved by the delivery of sustained rain. The fires were eventually extinguished leaving behind area damage of over 25,000 ha and more than 200 homes lost. Figure 1 illustrates the timeline of events.

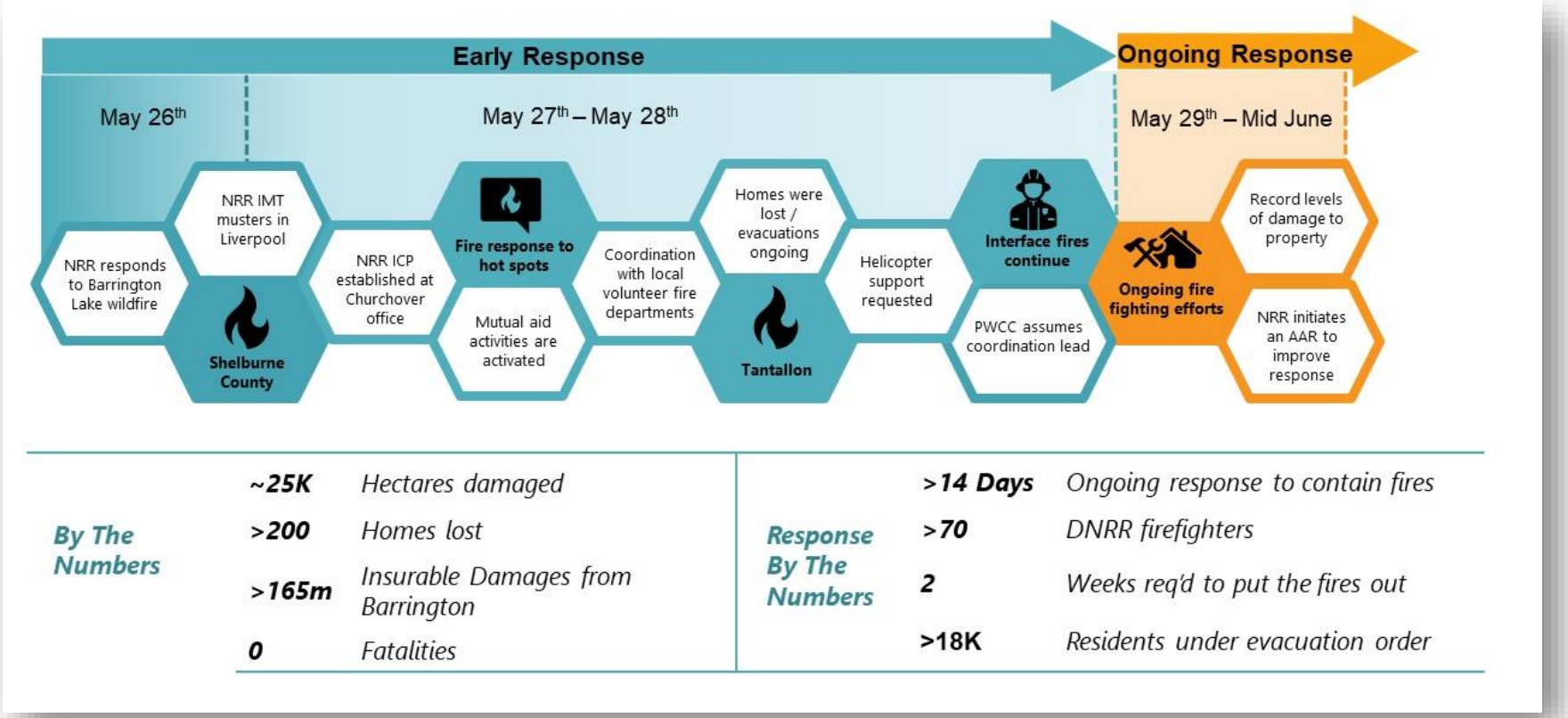


Figure 1: Event Timeline and By The Numbers

2 Methodology

2.1 General

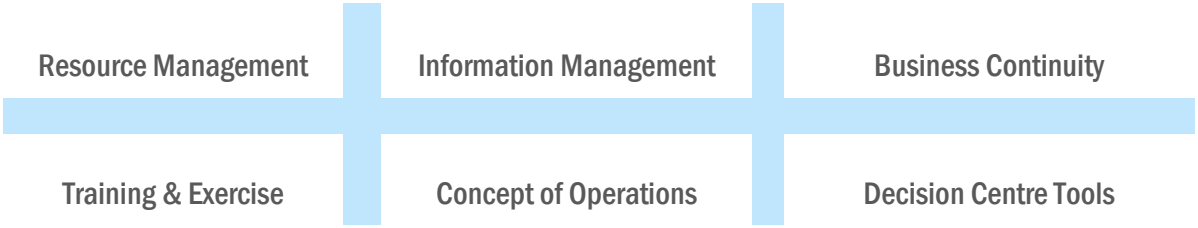
Conducting an AAR revolves around the learning objectives that emerge through the planning and preparation phases. The objectives for this review were four-fold:

- Enhance capacity for a coordinated wildfire response.
- Validate multi-organizational and multi-stakeholder communication and coordination processes.
- Identify strengths, gaps, and opportunities for improvement within each organization's emergency plans.
- Validate the interoperability of stakeholder emergency plans and processes.

The data collection and analysis methodology enabled the collection of both quantitative and qualitative information. As part of this process, numerous plans and guidelines were considered that served as a baseline for expected actions including [1][2][3][4][5]:

- Provincial Wildfire Coordination Centre Operations Manual
- Various Incident Action Plans (IAPSs) for Tantallon and Barrington Lake
- Maps of burnt areas, evacuation zones and road closures.

Through consultation with DNRR, and after analyzing initial feedback from AAR participants, several key themes emerged that reflected the most common functional areas of response.



- **Resource Management**: Considers the ability of supporting agencies to sustain long-term operations through the provision of adequately trained resources, appropriate equipment, and required support mechanisms to ensure an effective response and early recovery effort.
- **Training and Exercise**: Considers the knowledge and experience available to staff required to fill emergency management functions and positions.
- **Information Management**: Considers the effectiveness of the exchange of information between supporting agencies and Emergency Operations Centres (EOC), and the quality of messaging to the public.
- **Concept of Operations**: Considers governance, policies, plans, processes, and procedures in place to support coordinated emergency response and recovery operations.

- **Business Continuity**: Considers the ability of the DNRR PWCC and each respective agency to continue essential operations during a response to an emergency through adequate planning, processes, equipment, and resources.
- **Decision Making Tools**: Considers the effectiveness of the tools available to support information exchange, coordination, decision making and situational awareness in an emergency.

2.2 Data Collection

Surveys

Data collection involved two key phases; each designed to gather specific types of data. The first phase was the administration of two web-based surveys; one survey for DNRR staff and another for responders, provincial and municipal governments, NGOs; details are noted below in Table 1.

Table 1: Survey Results

Survey	Method of Distribution	Distribution Period	Total Completed
DNRR Staff	Emailed survey link to 275 DNRR staff	May 23 – June 6, 2023	113 (41%)
Agency and Responder	Emailed survey link to 93 recipients; however, the true distribution is unknown beyond those identified by DNRR.	May 29 - June 9, 2023	98 (105% based on initial distribution list)

The online surveys were comprised of various types of questions including rating scales, multiple choice, and open-ended.

Survey Demographics

Agency & Responders

A total of 98 agency/department/municipal representatives completed the online survey with a 73% response rate. When asked what area of response and/or early recovery they were associated with during the 2023 wildfires, 38% noted EOC followed closely by 23% Municipal Fire Department.[1] Table 2 shows a breakdown of representation across the various response areas. It should be noted that some respondents conducted multiple activities and subsequently selected more than one category.

[1] Based on 96 Agency and Responder survey respondents who answered Q1. *What area of response and / or recovery were you associated with during the 2023 wildfires? (Check all that apply).*

Table 2: Agency & Responder Survey Demographics

Area of Response	% of respondents	# of respondents
Emergency Operations/Coordination Centre	38.54%	37
Municipal Fire Department	22.92%	22
Law Enforcement	4.17%	4
Air support (airport, flying clubs, etc.)	13.54%	13
Communications	8.33%	8
Transportation, Infrastructure	3.13%	3
Community and/or Social Services including reception centres	0.00%	0
Utilities, Energy, or Telecommunications	2.08%	2
Health Services	5.21%	5
Environment / Agriculture / Aquaculture	5.21%	5
Municipal Affairs	1.04%	1
NGO (Canadian Red Cross, Samaritan's Purse, etc.)	2.08%	2
First Nations	0.00%	0
Military	2.08%	2
Other	21.88%	21

DNRR Staff Respondents

A total of 113 members of the DNRR Staff completed the survey with a 71% completion rate. When asked what area of response and/or early recovery they were associated with during the 2023 wildfires, 43% noted active field operations followed closely by nearly 29% who stated IMT Command and General Staff.[2] Table 3 shows a breakdown of representation across the department.

Table 3:DNRR Staff Survey Demographics

Area of Response	% of respondents	# of respondents
Provincial Wildfire Coordination Centre (PWCC)	8.04%	9
Incident Management Team Command and General Staff	28.57%	32
Logistical and Administrative Support Staff	9.82%	11
Active field operations	43.75%	49
DNRR Management	19.64%	22
Other (please specify)	14.29%	16

Results from the surveys provided guidance on preparation for phase two of data collection; in-person focus groups and virtual / in-person interviews.

Interviews and Focus Groups

[2] Based on 112 DNRR Staff survey respondents who answered Q1. *What area of response and / or recovery were you associated with during the 2023 wildfires? (Check all that apply).*

A total of eight (8) interviews and ten (10) focus groups were conducted. Interviews lasted up to 60 minutes and focus groups were an average of two hours in duration. To ensure anonymity, individuals are not identified; however, input was provided from the following areas of response:

- Responders from Tantallon
- DNRR Active Field Operations Tantallon
- DNRR Active Field Operations Barrington
- Responders from Barrington Lake
- DNRR Management
- DNRR IMT
- DNRR PWCC
- Aviation Services
- Provincial Emergency Management Office (EMO)
- Wildfire investigations
- Forestry Protection
- Support Agencies

2.3 Data Analysis

Data extracted from the online surveys, interviews and focus groups were analyzed to address common themes and similarities that indicated trends in each area of response and recovery. To be considered a theme or key finding, supporting observations were required to validate the finding. For each of the six categories, findings are identified accordingly as a strength or area for growth. Recommendations are also provided for each finding.

Definitions

Strength:	An activity, procedure, or process that consistently enhances performance and excels from current standards. It is appropriate to single this out as a good practice for consideration for implementation elsewhere.
Opportunities for Improvement:	Issues that reflect a weakness that caused or had the potential to cause a negative impact on the effectiveness of a response activity. Identified opportunities for enhancement could be related to existing procedures, training, concept of operations, etc.
Recommendation:	A suggestion that is considered a best course of action, based on industry leading practices, which may address any identified shortcomings in response, or perpetuate high standards of performance moving forward to optimize response.

3 Findings

Successful Highlights of the Response

The unprecedented demands of the 2023 wildfire season in Nova Scotia surpassed many thresholds, challenged organizations at a level never experienced, and served as a benchmark for future wildfire seasons to come. Despite the many challenges, many successful aspects of the response and early recovery to the 2023 wildfire season should be noted.

- Although 25,000 ha of land burned and more than 200 homes were lost, there were no lives lost or any major injuries reported. In the end, many homes were spared.
- The level of multi-agency coordination and collaboration led to a solutions-based approach to a very fluid situation. Partnerships and collaborative working groups were formed to combine authorities under applicable legislative act(s), to expedite decision making when there was a shared accountability for some areas within a mandate. Establishing a working group was important to clarify roles, enhance collaboration, stay coordinated and avoid gaps.
- Organizations demonstrated flexibility and adapted to changes quickly while working in a team environment.
- Staff and volunteers worked tirelessly to provide support as needed and minimize the negative effects (sometimes in roles that were not their normal responsibility; decisions were made expeditiously to enable this). Extra crews were brought in from other provinces and countries. The level of commitment and individual sacrifice was unparalleled in Nova Scotia.
- Working relationships were strengthened; the willingness of all fire departments across the province to come together to help was exceptional. The training and deployment of the IMT on previous large incidents in the province had allowed networking with other emergency partners. As a result, those relationships and knowledge of each entities' roles allowed for a smooth, coordinated response from the onset.
- Leadership and subject matter expertise were prevalent throughout the response.
- Mobilization of DNRR staff across the department was impressive. DNRR was highly organized internally and the willingness of staff to join the front lines and get tested by the Occupational Health and Safety (OHS) team quickly and suited up was excellent.
- The level of effort expended to fight the wildfires has resulted in many organizations revisiting their own response plans to ensure that processes, procedures, and resource capacity are current and reflect the response requirements for a large-scale wildfire.

3.1 Resource Management

The 2023 Nova Scotia wildfires was an exceptional event and placed significant strain on the availability and sustainability of required resources. Although the need for resources can vary for large-scale responses, the focus for this review addressed resources that included the availability of staff, equipment, and supplies.

3.1.1 Human Resources

The need to maintain staffing capacity is always a challenge for large-scale prolonged response efforts; the 2023 Nova Scotia wildfires were no exception. Approximately 45% of agencies/responders who were surveyed had adequate capacity and capability to meet staffing needs for the Barrington Lake wildfire; however, 29% did not agree that they had what they needed to meet the requisite staffing needs for that wildfire. Similarly, 30% of surveyed DNRR staff felt that they had capacity to meet staffing needs for the Barrington Lake wildfire; however, 37% did not think that resources were adequate (see Figure 2).[3]

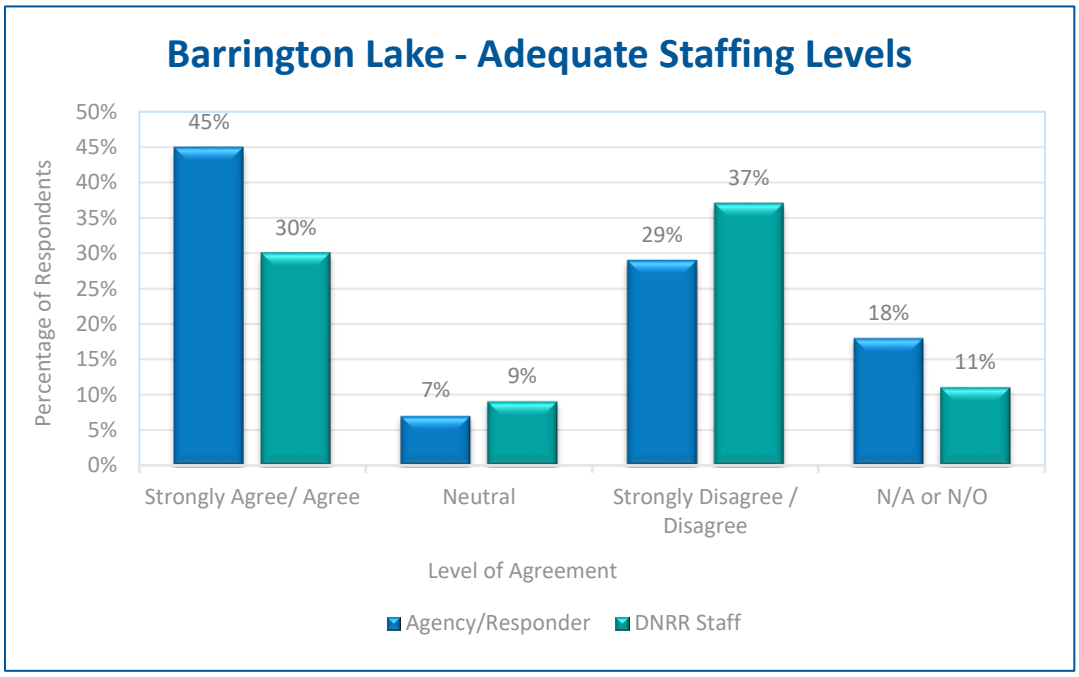


Figure 2: Barrington Lake Staffing Capacity

While the ability to meet staffing needs seemed to improve for surveyed agencies/responders for the Tantallon wildfire, DNRR staff were more challenged at meeting capacity (see Figure 3).[4]

[3] Based on surveyed agencies/responders (N=82) and DNRR staff (N=103) who responded to Q2: Please rate your agreement with the following statement. "My agency had adequate capability and capacity to meet staff levels needed for Barrington Lake, Shelburne County."

[4] Based on surveyed agencies/responders (N=74) and DNRR staff (N=92) who responded to Q2: Please rate your agreement with the following statement. "My agency had adequate capability and capacity to meet staff levels needed for Barrington Lake, Shelburne County."

Table 4: Tantallon Staffing Levels

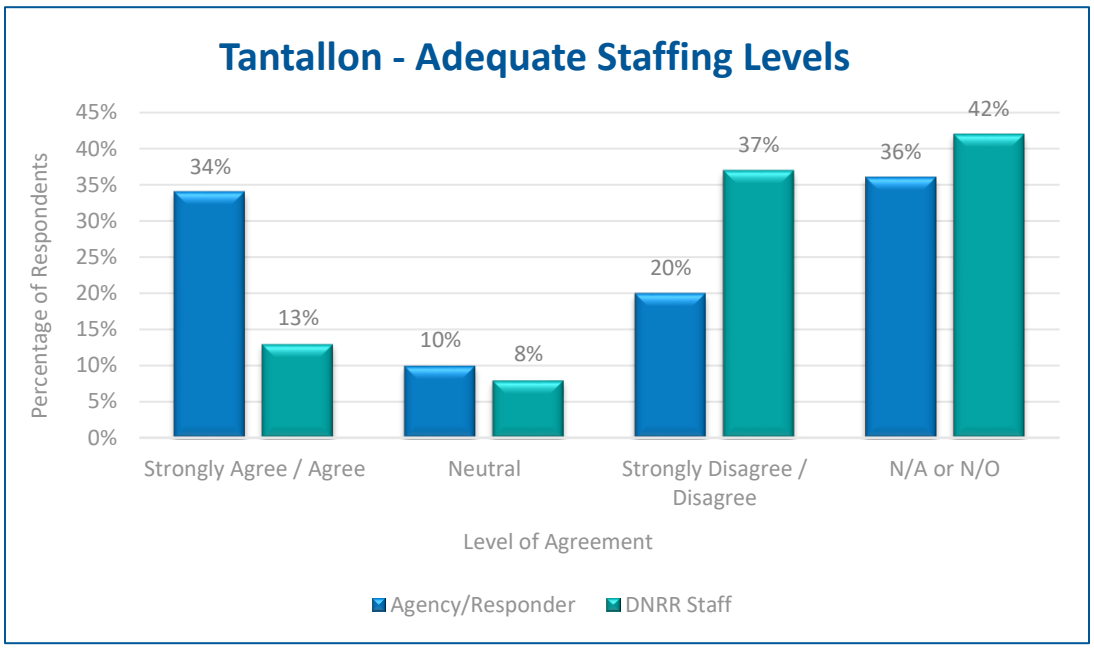


Figure 3: Tantallon Staffing Capacity

Locating staff to fill requirements becomes especially important at decision making locations, such as Site Command, EOCs, and PWCC where the Incident Command System (ICS) has been implemented. Approximately 73% of surveyed DNRR staff and 67% of agencies/responders were located at a location where the ICS was implemented.[5] Of those, 70% of DNRR staff have plans and procedures in place to request and mobilize additional support staff if needed.[6] While there were shortages in some areas, such as transportation and refueling drivers, the mechanisms were in place to augment staff when needed. Similarly, 66% of surveyed agencies/responders have plans in place to augment staffing capacity; however, this applies more for operational resources and less so for support staff.[7]

3.1.2 Physical and Mental Health Supports

The provision of physical and mental health supports for staff can positively impact productivity and overall health and wellness, particularly during prolonged events. Approximately 63% of surveyed DNRR staff feel that they have adequate physical and mental health supports available when

[5] Based on surveyed DNRR staff (N=104) and agencies/responders (85) who answered 'yes' to Q3: During the response to the wildfires, were you located at a location where the Incident Command System (ICS) was implemented (e.g., Site Command, Emergency Operations Centre, PWCC, etc.)?
[6] Based on DNRR Staff survey responses (N=99) who answered, 'yes' to Q5: My agency has plans and procedures in place to request and mobilize additional support staff if needed."
[7] Based on agency/responder survey responses (N=82) who answered, 'yes' to Q5: My agency has plans and procedures in place to request and mobilize additional support staff if needed."

needed.[8][9] More than 42% of surveyed DNRR staff were satisfied with the level of recognition and reward they received for their contributions to the wildfire response; 20% were dissatisfied.[10] Most don't require additional recognition beyond the satisfaction they receive intrinsically in helping communities, building relationships, and protecting the public and environment. For front-line staff, there are also benefits tied to increased compensation for specific roles and overtime; however, some surveyed staff noted that there are some underlying discrepancies in recognition for clerical / administrative staff who are not mobilized or for some Commanding Officers. Compensation rewards are not applied for significant hours invested which presents a challenge in ensuring fair acknowledgment for the additional workload.

The provision of physical support to DNRR staff is equally important to sustain staffing capacity and optimize efficiency. Approximately 56% of surveyed DNRR staff agree that the layout of their location was functional and enabled staff to carry out roles effectively and efficiently.[11] Work locations included EOCs, vehicles, and airports among other areas; each with their own functional or logistical limitations.

Strengths

#1 –The DNRR model to send an experienced team of professionals into the ICP was extremely beneficial.

- DNRR was able to pre-train the team and have confidence that the right people were properly assigned with the correct level of experience and training.
- Within the DNRR, there is a resounding confidence that the IMT are the most trained and 'expert' group within the organization; they represented the DNRR reputation and capability during fire season. Their staff members were often described by others as the experts and professionals during the interviews and focus groups.
- Interview and focus group respondents noted that questions were frequently deferred and referred to the IMT group as the best source of information.
- The IMT members were self-sufficient and had prior experience and understanding of their key objectives. Surveyed DNRR staff noted that IMT leaders provided support and encouragement to seek help if needed.
- Essential communication processes, such as the IAPs, were generated from the ICP as a best practice of ICS and assisted greatly in communication.

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[8] Based on DNRR Staff survey responses (N=99) who answered, 'yes' to Q6: "Do you feel you have adequate physical and mental health supports available to you if needed?"
[9] It should be noted that agencies/responders were not asked about the provision of physical and/or mental health supports offered by their respective organization as that falls outside of DNRR control and responsibility.
[10] Based on DNRR Staff survey responses (N=99) who rated their level of agreement to Q7: "How satisfied are you with the level of recognition / reward you have received for your contributions to the 2023 wildfire response?"
[11] Based on DNRR Staff surveyed (N=100) who responded, 'Strongly Agree' or 'Agree' to Q9: Please rate your agreement with the following statement: "The layout of my location was functional and enabled staff to carry out their roles effectively and efficiently".

#2 – A clear delineation of authority enabled DNRR to meet the needs of organizations and effectively process equipment and Human Resource requests from the front lines.

- The PWCC received IAPs and were in direct communication with the ICP. Requests for human resources enabled the DNRR to organically establish a new process for registering out-of-area volunteer firefighters. This process included the assurance that the processed volunteers received mandatory Performance Analytics & Conditioning (PAC) Fitness tests and had pre-requisite qualifications to join DNRR teams.

- The essential understanding of wildfire resource coordination ensured that the request for wildfire firefighting staff and equipment was channeled to the CIFFC in Winnipeg.

- Predetermined agreements with the HRM assisted the Tantallon fire response and helped the operational teams establish command and control while determining responsibilities and communication. An ICP was established quickly, some unified command principles were embraced, and delineation of command areas established.

- In the Barrington Lake area fire, the volunteer firefighters were fully aware and had an expectation that the DNRR teams would provide expertise and command oversight once they were on scene.

Opportunities for Improvement

#1 – Communication and information processes that foster better management of staff, responders, and workload could be improved.

- The DNRR model for staffing relies heavily upon human resources drawn from daily positions and personnel that are added to the firefighting efforts. The concept is an essential component of the business plan for the DNRR; however, this had impacts on communications for managers releasing staff.
- Managers were unsure of how long their staff would be engaged and did not monitor their location or hours worked. Many managers relied upon self-reporting or assumed that the PWCC or ICP were conducting this activity.
- Managers stated that staff returned to the home office unannounced, one with injuries that were not reported. This caused some business continuity issues and additional effort to locate the correct paperwork for the purpose of injury reporting. Managers reported that these records were not always located.
- If the DNRR send personnel to areas outside of the province, they abide by a 14-day deployment mandate. This mandate was not implemented consistently with resources who were sent to the fires within the province. Some managers believe this would have helpful to know that this mandate should have been implemented.

- Operations staff on scene stated their managers sought to release them from the fire fight due to perceived liability issues related to their hours and deployment roles. Staff perceived that some managers did not fully understand the personal attachments to firefighting resulting in a breakdown of coordination and support at the managerial level. In turn, many of the managers stated they worked from home and were unable to get the communications they needed from the PWCC in a timely way.
- Some PWCC administrative staff noted the volume of calls, emails, meetings and taskings were high for a prolonged period. They set up protocols and procedures as they did what they could to field questions.
- Pubnico fire was deemed low priority; however, there was insufficient staff available. Requests were made and denied from the other incidents. As many as 50 Type 1 firefighters were on standby for days at safety zones and from a distance. Eventually, this wildfire was added to the Barrington Lake Complex to help manage resources more effectively.

#2 – Pre-event planning processes to deploy regional firefighters and specialized services to assist and augment DNRR capability could be improved.

- The DNRR made substantial efforts to augment firefighting teams with regional volunteer firefighters (VFF). This process was intended to establish these resources as deployable NRR team members. An opportunity is available to incorporate the concept for future deployments.
- The volunteer firefighters made connections with the DNRR to assist; it was decided that PAC Fitness testing and qualification checks were required. Testing was set up; however, many of the volunteers arrived without the prerequisite paperwork, delaying their enrollment.
- DNRR testing and qualifications for VFF are available and centrally held at the PWCC; this was not widely known at regional offices when firefighters were instructed to produce their own records. These records are stored on an old system database and not available to those in the regional areas doing the PAC testing and qualification checks for volunteers. PWCC administration staff were required to spend considerable effort to help establish individual qualifications when requested. All the courses taken with the DNRR were sent to the home agencies, but the dependency was on the PWCC administration to ultimately locate the historical qualifications.
- Volunteer fire department Chiefs expressed concern that efforts to fill seasonal firefighting positions and enhance staffing levels for the DNRR directly affects the ability for the volunteer fire departments to maintain their own capacity. The DNRR draw the younger and more physically abled firefighters, leaving some departments with inadequate capability to maintain their own fire services. They appreciate the human resource requirement; however, there remains a demand that cannot be replaced at the volunteer departments.

#3 - The provision and promotion of appropriate mental and physical health support to DNRR staff throughout the response could be improved.

- While DNRR staff have access to an Employee and Family Assistance Program (EFAP); many staff were unaware of any additional support mechanisms that could be readily available during an emergency. Some staff feel that the EFAP falls short of the needs of many of the staff who have high-risk positions or are personally impacted by the emergency (i.e., the plan is not personalized). Approximately 19% of surveyed DNRR staff did not feel that adequate physical and mental health supports were available, and 18% were unsure or did not know.[12]
- Some DNRR staff did have access to a councilor on site; however, the time and location of this support were not ideal for the front-line firefighters. The available support was often only provided in the morning before staff deployed. It was noted the support was more essential at the end of the day after mental and physical tolls had set in with the workers. A tactical debrief was not provided.
- Some staff did not feel that the appropriate physical supports were provided at their work location. During busier periods, the inefficiency of the PWCC layout (as described by some staff) and the available furniture was limited; some felt this impacted efficiency.
- Additional physical support like workout equipment, rest areas, food, and transport, etc. which are considered an industry leading practice were not available or were limited to staff to alleviate stress. Further, there were no additional services or items of comfort beyond a cot and blanket offered to firefighters who had to rest in arenas.

3.1.3 Equipment and Supplies

In general, agencies/responders and DNRR staff had most of the equipment that they needed to carry out their response; however, there were some noted exceptions. Approximately 42% of agency/responder survey respondents agreed that they had adequate equipment to support response/recovery operations; 34% did not have adequate equipment.[13] Shortages in vehicles (i.e., pick-up trucks and All-Terrain Vehicles (ATVs)), forestry nozzles, aging gear, and field maps were the most cited issues amongst agencies and responders.

The majority of DNRR staff had access to required equipment/resources for them to effectively carry out the role.[14] Table 5 provides a breakdown of DNRR Staff responses that indicate some shortages with vehicles (i.e., personal vehicles were frequently used to support staff), deployment kits, supplies,

[12] Based on DNRR Staff survey responses (N=99) who answered 'No', 'Unsure', 'I don't know' to Q6: "Do you feel you have adequate physical and mental health supports available to you if needed?"
[13] Based on agency/responder survey participants (N=81) who answered 'Strongly Agree' or 'Agree' to Q6: "My agency had adequate equipment to support response / recovery operations (e.g., computers, personal protective equipment, vehicles, deployment kits, etc.)"
[14] Based on surveyed DNRR staff (N=100) who answered Q8: "Please rate your agreement with the following statement: "The following resources were readily available for me to carry out my role effectively"

and wildfire fighting equipment as showing the highest noted deficiencies. It was noted that amongst DNRR staff, more districts need to free up trucks from offices when needed for a fire. With vehicles in demand, locating transportation for crews during the fires was a logged issue.

Table 5: DNRR Staff Equipment Availability

Equipment	Strongly Agree / Agree	Strongly Disagree / Disagree	Neutral N/A Don't know
Computers (N=100)	59%	11%	30%
Furniture (desks, chairs, tables) (N=99)	46%	9%	45%
Display boards (N=99)	43%	8%	49%
Personal Protective Equipment (PPE) (N=100)	59%	10%	31%
Vehicles (N=100)	52%	24%	24%
Deployment kits (N=98)	22%	17%	61%
Supplies (N=100)	57%	16%	27%
Wildfire fighting equipment (N=100)	32%	16%	50%

Strengths

#3 – Current equipment distribution practices carried out by the DNRR ensures regional capacity across the province.

- The DNRR has three (3) regions and 27 districts. There have been concerted efforts to ensure that wildfire specific equipment is distributed amongst the offices, deployed to volunteer departments, and that reserve equipment is held centrally at the PWCC. These continued efforts are intended to ensure that firefighters have access to the equipment they need and to recognize the relationship with the volunteer units that are often the first responders to fires.
- Volunteer fire department Chiefs noted that wildfire equipment is delivered by DNRR prior to fire season and collected at the end of the season. The Chiefs understand that there is an expectation to maintain the equipment and appreciate this process as it augments their equipment supply. With regional deployment in mind, the equipment is pre-deployed by DNRR to save time and support the front lines.
- There is additional equipment held at the central location at the PWCC in Shubenacadie which is known by the staff at regional offices should they require additional stock. This note was confirmed by an equipment officer who participated in the AAR process.
- The HRM has its own pod of wildfire equipment located in Bedford, and they understand that the DNRR does not supply their equipment. Although front-line HRM firefighters spoke of equipment shortages, they know of the pre-existing mutual aid agreements that can provide access to additional equipment if required.

#4 – The DNRR were able to source wildfire specific equipment through the PWCC by using effective and robust mechanisms already in place.

- Utilizing their cache at Shubenacadie, the PWCC was able to fulfill requests by the site ICP for equipment in a quick and efficient manner.
- The equipment officer at Shubenacadie stated that when he ran out of specific equipment (e.g., hose, links, etc.,) he was aware of how to source it either locally or out of province (due to prior connections). He also utilized CIFFC and did not have to rely on the province for equipment. The province also stated that the PWCC staff are best placed for knowing their equipment needs and had the necessary contacts within the province to gain access to equipment through the CIFFC.
- The only equipment sourced outside of the DNRR PWCC team was a large tent that the Provincial Emergency Operations Centre (PEOC) assisted with.

Opportunities for Improvement

#4 – The current practices of use for equipment placement and management around the region are not well understood and could be improved.

- Volunteer fire department staff believe that the equipment they receive annually from the DNRR is essential to carry out their functional roles in support of wildfires. Volunteer fire department staff noted inconsistencies related to the delivery, serviceability, and maintenance of such equipment. They also described difficulties in operating some of the hoses because of the differences between the connection systems of structure and wildfire hoses. This highlights some unfamiliarity with the equipment.
- The PWCC centrally issues equipment in serviceable condition and with clear labelling and seals to 27 offices. These offices maintain local and regional control of that equipment and are essential in the upkeep, serviceability, and delivery of the equipment. However, the centralized equipment inventory is not readily available at the office level and there is uncertainty about how equipment is maintained, discarded, or distributed. The desire for equipment to be returned to the PWCC for maintenance is not consistently upheld, placing further demands on equipment purchasing. While these events were unprecedented, the availability of hoses, connectors, pulaskis, and other tools, working and up-to-date pumps were very limited and in short supply.
- The ability to clean, dry, and roll hose at a central location was identified as a gap in efficiency as there is currently no identified location within the DNRR. As a result, the 27 offices must ensure that hoses are cleaned and not left in a wet used condition; a scenario that was described as a major cause of damaged hoses. An equipment specialist recommended that a hose plant facility be introduced at the PWCC. While this was accepted as a draw upon current resources, and would be at a considerable expense, it would provide a consistent and efficient process to improve longevity of equipment.

- Both DNRR and HRM staff noted that large amounts of equipment were left at the fire scenes as crews withdrew or were redeployed. This equipment was either returned by community members or was not recovered and remains at the fire scenes.
- Equipment needs and requests are not always delivered efficiently to the PWCC (logistics team and supply unit) as crew leaders reported that they were looking for specific equipment to complete tasks assigned but the equipment was not available in the supply unit which resulted in changes that were not included on the IAP.
- Overall, stores of some equipment, like stranglers/ gated wyes etc., are below what may be needed (especially at district levels). It was noted that available kits were aging, kits were incomplete, and/or in disrepair. Outside resources that were required, such as air tankers, firefighters, and heavy equipment are also in short supply.

3.2 Training and Exercises

This section addresses how previous training and/or experience impacted staff understanding of their role during the response, confidence in their ability to carry out their role, and identification of any additional training requirements that could help them in future response efforts.

3.2.1 Roles and Responsibilities

Approximately 60% of surveyed agencies/responders who responded to the Barrington Lake wildfire had good or excellent understanding of their assigned role during the response. The 5% of agencies/responders who did not have a good understanding of their role noted that they did not get the appropriate direction or DNRR supervisors, or representatives were not available at their location to ensure that direction was provided.[15] There were also conflicting messages provided from Nova Scotia EMO and other channels which made it somewhat challenging for staff at times. Similarly, 58% of DNRR staff had excellent or good understanding of their role for the Barrington Lake wildfire; however, 14% did not.[16] Some staff noted that their roles kept changing and there was limited direction from their supervisors resulting. For others, it was their first wildfire and would have welcomed more timely direction regarding their roles and responsibilities. The composition of survey results for Tantallon mirrored the results stated for Barrington Lake.

As would be expected, especially when human resource capacity is limited, staff take on roles for which they may not be trained. While 26% of agencies/responders noted that they took on new roles, more than 43% of DNRR staff stated that they were not trained for some additional roles that they acquired.[17][18] Some responders did not have wildfire training, while others who were placed in a liaison

[15] Based on surveyed agencies/responders (N=77) who responded 'Excellent' or 'Good' to Q7: Please rate your understanding of your role and assigned responsibilities during the response and early recovery efforts for each wildfire.
[16] Based on surveyed DNRR staff (N=93) who responded 'excellent' or 'good' to Q10: Please rate your understanding of your role and assigned responsibilities during the response and early recovery efforts for each wildfire.
[17] Based on surveyed agencies/responders (N=80) who responded 'yes' to Q8: During the response and / or recovery period, I carried out tasks that are not normally my responsibility or for which I had not been trained.
[18] Based on surveyed DNRR staff (N=94) who responded 'yes' to Q11: During the response and / or recovery period, I carried out tasks that are not normally my responsibility or for which I had not been trained.

or observer position had no experience. Some DNRR staff were engaged in road closures, evacuations, or providing escorts for which they had not been trained. Both survey audiences felt that more wildfire training was required for large-scale events with complex coordination requirements.

In general, most surveyed agencies/responders (80%) and DNRR staff (73%) felt confident in their role during operations.[19][20] Responders who did not feel confident in their role attributed it largely to a lack of information, updates, and/or guidance which compromised their ability to comfortably carry out their role. DNRR staff reported similar contributing factors to diminished levels of confidence in their respective roles and responsibilities.

3.2.2 Training Requirements

While the requirement for more training opportunities was identified, most of the surveyed DNRR staff (74%) and agencies/responders (65%) felt as though prior training prepared them for their response role.[21][22] Approximately 83% of agencies/responders have participated in previous training or exercises focusing on emergency response/recovery to a widespread incident.[23] That number drops to 70% for surveyed DNRR staff.[24]

Table 6 illustrates the nature of training that survey respondents have received to date. The ICS level series is listed as the most common training, followed closely by department/organization-specific emergency procedures.[25][26] Other notable courses that were mentioned include ICS 400 levels, ICS position specific training, wildfire mapping, and IMT Command and General Staff.

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[19] Based on surveyed agencies/responders (N=81) who answered, 'yes' to Q9: Please rate your agreement with the following statement: "I felt confident and comfortable in my role and responsibilities during operations."
[20] Based on surveyed DNRR staff (N=95) who answered, 'yes' to Q12: Please rate your agreement with the following statement: "I felt confident and comfortable in my role and responsibilities during operations."
[21] Based on surveyed DNRR staff (N=81) who answered, 'strongly agree' or 'Agree' to Q11: Please rate your agreement with the following statement:" I feel as though prior training prepared me to fulfill my role during this response."
[22] Based on surveyed agencies/responders (N=95) who answered, 'strongly agree' or 'Agree' to Q14: Please rate your agreement with the following statement:" I feel as though prior training prepared me to fulfill my role during this response."
[23] Based on surveyed agencies/responders (N=81) who answered 'yes' to Q12: Have you participated in previous training or exercises focusing on emergency response / recovery to a widespread incident?
[24] Based on surveyed agencies/responders (N=94) who answered 'yes' to Q15: Have you participated in previous training or exercises focusing on emergency response / recovery to a widespread incident?
[25] Based on surveyed agencies/responders (N=63) who answered Q13: What emergency management-specific training have you taken? (Check all that apply)
[26] Based on surveyed DNRR staff (N=65) who answered Q16: What emergency management-specific training have you taken? (Check all that apply)

Table 6: Emergency Management Specific Training

Emergency Management Specific Training	Agencies / Responders (N=78)	DNRR Staff (N=91)
Incident Command System 100	76.19%	90.77%
Incident Command System 200	60.32%	78.46%
Incident Command System 300	38.10%	60.00%
Emergency Operations Centre Management (EOCM)	17.46%	7.69%
Basic Emergency Management (BEM)	36.51%	18.46%
Emergency Public Information (EPI)	9.52%	4.62%
Simulated emergency exercises	63.49%	55.38%
Department/Organization-specific emergency procedures	73.02%	52.31%

When asked what future training opportunities DNRR staff would like to help them carry out their duties more effectively, 63% requested more simulated exercises, followed closely by both role specific (57%) and job-specific training (57%) (See Table 7).[27] Agencies/responders who were surveyed indicated additional training on the provincial/local plans, procedures, and processes (of other organizations) as the highest priority.[28] Other notable mentions included air operations, communications, and training between DNRR, VFFs and EMO.

Table 7: Future Training Requirements

Future Training Requirements	Agencies / Responders (N=78)	DNRR Staff (N=91)
Role / Function-specific training	34.62%	57.14%
Job-specific training (e.g. Incident Command Post, departmental responsibilities, Emergency Operations Centre, Liaison Officer)	35.90%	57.14%
Training on departmental/organizational emergency plans, procedures, and processes	37.18%	50.55%
Training on the provincial / local plans, procedures, and processes (of other organizations)	52.56%	48.35%
Wildfire training	35.90%	39.56%
Administrative software (e.g., Microsoft products)	7.69%	21.98%
Simulated emergency exercises	39.74%	62.64%
Volunteer roles and responsibilities	14.10%	35.16%
None	8.97%	7.69%

[27] Based on surveyed DNRR staff (N=91) who answered Q17: What future training would help you to carry out your duties more effectively in another situation? (Check all that apply)
[28] Based on surveyed agencies/responders (N=78) who answered Q14: What future training would help you to carry out your duties more effectively in another situation? (Check all that apply)

Strengths

#5 - The majority of the IMT are highly trained and experienced in aspects of Incident Command and role function training.

- Most Command and General Staff are trained to the highest national and international standards that includes positional training, high level simulation training, as well as ICS 300 or 400 as appropriate.
- The IMT members stated they had received training on roles and responsibilities in both Canada and the United States, and felt training and qualifications were well supported throughout the team.
- The department has a dedicated wildfire training officer whose role is focused specifically on the planning, coordination, and delivery of wildfire and incident management training. This is in addition to a departmental technical training coordinator. The wildfire training officer also helps to coordinate the training qualifications and development specific to the IMT.

#6 - DNRR has excellent capability to extend wildfire behavioral training across the province to volunteer and paid firefighters.

- DNRR has 27 offices around the province with capability to extend training at no charge which increases the likelihood that firefighters will partake.
- Managerial staff and VFF in focus groups both noted that training was available and considered extremely valuable.
- IMT members stated that wildfire firefighting strategies are risk managed. Interoperability and communication of such strategies with volunteer firefighters was enhanced as many volunteers had previous training. Structural and wildfire firefighting concepts and tactical deployments often misalign so the pre-training was considered essential and continues to be an industry leading practice.
- HRM fire teams noted that the training was beneficial and had been completed in their region. The strong ongoing relationships between HRM and DNRR was highlighted as a positive reason for understanding each other's responsibilities.

#7 - Those that had participated in training and / or exercises prior to the wildfires were better prepared for the response and recovery.

- Agencies, responders, and DNRR staff who had participated in previous training and/or exercises leading up to the wildfires felt better prepared to handle the response and recovery

functions. This highlights the importance of continued and regular training opportunities in between fire seasons.

Opportunities for Improvement

#5 – The Emergency Firefighter Course exists for volunteer firefighters but is not uniformly provided.

- While a top priority for most volunteer departments to take wildfire awareness training, it is not regularly conducted in their respective region. Many fire team leaders who participated in the focus groups did not have the training (noting their teams did not either).
- DNRR senior management also recognize this training as a beneficial need and state that it is widely available, but not always conducted.
- While the 27 DNRR offices can provide the training packages free of charge, this has not been widely communicated. As a result, regional training has not been completed to the satisfaction or needs of the volunteers.

#6 – Reliance on the expertise of the IMT has led to a diminished level of training for other team members across DNRR.

- The IMT members have training in place; however, there were still some positions that were deployed without essential training in ICS or role specific responsibilities which created some challenges for individuals to quickly integrate into the team and pressured response.
- If a DNRR employee was not in the IMT, some felt they were not considered as a required resource for training or exercising. The reliance upon the IMT was so great that they were exclusively trained. As a result, the untrained staff were not fully appreciative of site coordination and felt they were not as effective as they could have been.
- In most interviews and focus groups, staff noted the need for involvement in exercising. These exercises should focus on roles and interoperability both internally and externally. There were many concepts considered, and dependent upon the focus group, or work area, the focus of training varied. The responses highlight a staff appetite for a coordinated exercise training program that is carefully constructed and implemented.
- The DNRR management system lacks outside agency/business participation in pre-fire planning for the commanders to be able to assign taskings to sub-commanders or outside agency/business managers.
- Some surveyed staff feel that the current model stretches the IMT too thin to be able to provide adequate logistical planning to everyone on the ground.

#7 - Training and exercise opportunities are not currently optimized to ensure service capability and experience in a multi-agency, dynamic and fluid event.

- Given the complexity of the response, staff were utilized from across the province to assist with staffing and function requirements. As a result, some of the DNRR staff stated they were not trained in ICS or EOC functions. and were unsure who may represent them across the DNRR staff pool.
- Many staff stated their managers were not able to understand their needs as their managers were not trained in the principles of emergency management. DNRR staff felt unsupported for training needs and as a result, some did not have confidence in their deployments.
- Roles before and while deployed were not always established. Many responders who had an appreciation of ICS site control looked for jobs to stay productive.
- 31% of surveyed DNRR staff and 31% of agencies/responders did not feel that their respective organization was prepared for the size and scope of the wildfires.[29]
- Some crews were not prepared for the use of infrared scanning technology and other remote sensing tools that are available for assessing large-scale wildfires; fortunately, they had access to resourceful staff that were able to assess and source services through leveraged networks.
- From an OHS perspective, there may have been near misses and safety observations that occurred during the wildfires that were not reported in the Environmental Health and Safety Management (EHSM) incident management system. These reports are very important for the prevention of injuries/illness, damage or loss, environmental releases. Following up with review, investigation, root cause determination and corrective action(s) by managers to near misses and safety observations prepare them for future events and keep our staff healthier and safer. Promotion of reporting in EHSM could be improved.
- Fitness Testing for VFF was coordinated very quickly due to amazing teamwork. There could be improvement in this process, so that VFFs are aware of all requirements of them before arriving to fitness test.

#8 - Roles and responsibilities were not always well defined or understood within and between agencies, responders and DNRR staff.

- 37% of surveyed DNRR staff observed staff in other positions who did not appear to understand their role, or their agency's role, with respect to their response function.[30] Some

[29] Based on surveyed DNRR staff (N=88) and agencies/responders (N=79) who answered, 'Very Poor', 'Poor' to Q30/Q28 respectively: Describe your organization's level of preparedness for the size and scope of the wildfires that you faced?
[30] Based on surveyed DNRR staff (N=95) who answered, 'Strongly agree' or 'Agree' to Q13: Please rate your agreement with the following statement: "I observed staff in other positions or agencies who did not appear to understand their role, or their agency's role, with respect to their response function."

staff were placed in positions without prior training or tasked with activities that were beyond their knowledge (e.g., knowing where to place harvested vegetation, how to handle the tactics and methods to work in complex campaign incidents, or staff that became involved despite not being assigned to the incident). In each case, there was confusion noted at the site (at times) which created some challenges for others who were properly trained for their assigned activity.

- 44% of surveyed agencies/responders observed staff in other positions who did not appear to understand their role, or their agency's role, with respect to their response function.[31] Some VFFs were not trained in how to extinguish hotspots while others were assigned ICS roles for which they had no training or experience. Early in the response, there was some confusion as to which organization (DNRR, Royal Canadian Mounted Police (RCMP), municipalities) would take ownership of certain aspects of the wildfire (i.e., evacuations, etc.). The formal Environmental Health program in the province is structurally unique in Canada as there is shared responsibility for legislated/regulatory functions between two departments. Lack of role clarity as it related to approval mechanisms for response work between departments created inefficiencies.
- Many staff involved in the wildfire response, both during and after, were required to carry out roles for which they lacked formal training. While the tasks were carried out effectively, this affected confidence levels and identified future training requirements for many positions within the department.
- The ability to staff the PWCC during a large event and maintain 24/7 coverage was not possible with the staff identified from normal duties. The Duty Officer continued to receive calls from home throughout the evening. It was suggested that the concept of operations of the PWCC would be enhanced if there were formal levels of activation with defined staffing requirements. This would enable more effective planning for staffing during emergencies.
- The IMT are a key component of the response and are self-functioning once deployed; however, when not deployed, members are separated geographically which creates challenges with coordination and communication. While the DNRR Training Officer provides essential support to the IMT, some were unsure of the chain of command in place during the event, which indicates a requirement for additional training and/or clarification of incident management processes. There was significant reliance on the DNRR Training Officer for direction.
- Surveyed DNRR staff want more flexibility of using staff for what roles they excel in when activated for a response. It was noted that some DNRR leaders who are operationally sound, efficient, and experienced staff and are in management roles, are not used effectively to maximize capability when response activities are required.
- Further clarity or role definition is required regarding the coordination of key activities that are not fire suppression (e.g., fuel distribution, evacuation, shelters, cooling centres, pet rescue,

[31] Based on surveyed agencies/responders (N=81) who answered, 'Strongly agree' or 'Agree' to Q10: Please rate your agreement with the following statement: "I observed staff in other positions or agencies who did not appear to understand their role, or their agency's role, with respect to their response function."

Emergency Social Services needs, etc.). While members of the ICP (comprised of the IMT) recognize these activities are their responsibility, their focus is on fire suppression and may not have the support of the EOC network to assist with coordination.

#9 - Some staff were not properly trained for their response role which affected confidence levels and task efficiencies.

- Lack of training for some new staff may have impacted their ability to carry out their role efficiently and with diminished confidence. At that time, some newer VFF were not aware of available training or had not had the ability to receive prior training.
- Some surveyed staff indicated that they were not aware of available training or had not been offered any training opportunities in preparation for wildfire season. Lack of regularly scheduled training, education, and exercises (due to the interruption of training cycles caused by COVID-19) impacted confidence levels, particularly when staff were assigned new tasks.
- The Conservation Officers recently returned to the authority of DNRR after having spent several years with another government department. Many of the roles and expectations had since been removed, and none of the officers were trained in ICS or EOC functionality. They did not understand their role once deployed; however, once at the ICP, were assigned utilizing their peace officer status to assist with traffic and security. Conservation Officers were required to conduct some activities for which they were not trained or not comfortable performing (e.g., kicking in doors for animal and welfare checks). Management awareness of what these officers used to do was limited.

3.3 Information Management

Information is the most valuable commodity during emergencies. It is an essential aspect in an organization's ability to make decisions and gain (or lose) visibility and credibility. Above all, it is necessary for rapid and effective assistance for those affected by the emergency. This section addresses the effectiveness of information management between responding agencies, and DNRR staff.

Overall, information exchange was effective as 84% of agency/responder survey respondents and 92% of DNRR staff reported an average or above average level of situational awareness.[32][33] While there were noted gaps in information in the early stages as communication strategies were evolving, information exchange improved quickly and effectively once IMT members were situated and provided daily updates. The rapidly changing fire behavior and growth contributed to challenges establishing

[32] Based on 79 agency/responder survey respondents who answered average or better to Q15. *Within your area, what level of situational awareness did you have during your time supporting emergency operations?*
[33] Based on 92 DNRR staff survey respondents who answered average or better to Q18. *Within your area, what level of situational awareness did you have during your time supporting emergency operations?*

situational awareness in the early hours. Once DNRR representatives were on-site, information flowed more readily for some response organizations.

Communications between the PWCC and other departments/organizations was excellent for some but could be improved for others. Those organizations that are embedded within the PWCC had excellent situational awareness; however, for other organizations, information was not always provided in a timely manner. Only 42% of surveyed agencies/responders thought that documentation, such as Situation Reports, Activity Logs, or Status Boards, were appropriately developed and maintained at their location during operations; this number was significantly higher with surveyed DNRR staff at 62%.[34][35]

Knowing who to consult to obtain information is key for responders when the development of a large event is fluid. Responders and DNRR staff need to be 'in the know' for decision making purposes, and to ensure that any information relayed to the public is accurate and timely. Approximately 83% of surveyed agencies/responders and 82% of DNRR staff had knowledge of where to go or who to consult when there were issues with the wildfires.[36] Similarly, 57% of surveyed agencies/responders and 53% of DNRR staff knew who to consult to obtain information regarding evacuations; more than 10% of agencies/responders did not know where to go for information related to evacuations.[37]

Information flow through the correct chain of command was generally good or excellent in most locations; however nearly 18% of surveyed agencies/responders thought that communication flow through proper channels could be improved.[38]

Most survey respondents had good knowledge of how to reach other organizations for information; however, nearly 18% of surveyed agencies/responders did not know how to contact key organizations for information updates.[39] This resulted in 16% of agencies/responders unable to access critical information that they required for their role.[40] While DNRR staff did report some issues in acquiring information, the survey results were much lower.

Overall, agencies and responders did experience greater challenges in acquiring information compared to DNRR staff. Most notably, 20% of surveyed agencies/responders had difficulties

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[34] Based on surveyed agencies/responders (N=79) who answered, 'Strongly agree' or 'Agree' to Q18: Please rate your agreement with the following statement: "Documentation, such as Situation Reports, Activity Logs, or status boards, were appropriately developed and maintained at my location during operations."

[35] Based on surveyed DNRR staff (N=91) who answered, 'Strongly agree' or 'Agree' to Q21: Please rate your agreement with the following statement: "Documentation, such as Situation Reports, Activity Logs, or status boards, were appropriately developed and maintained at my location during operations."

[36] Based on surveyed agencies/responders (N=80) who answered 'Average' or above to Q17a/Q20a: Please provide a rating on the following items based on your experience: Knowledge of where to go / who to consult when there were issues with the wildfires.

[37] Based on surveyed agencies / responders (N=80) and DNRR staff (N=91) who answered 'Average' or above to Q17b/Q20b: Please provide a rating on the following items based on your experience: Knowledge of where to go / who to consult when there were issues with the evacuations.

[38] Based on surveyed agencies/responders (N=80) who answered 'Very Poor' or 'Poor' to Q17c: Please provide a rating on the following items based on your experience: Information flow through the correct chain of command

[39] Based on surveyed agencies/responders (N=80) who answered 'Poor' or 'Very poor' to Q17d: Please provide a rating on the following items based on your experience: Knowledge of how to reach other organizations for information

[40] Based on surveyed agencies/responders (N=80) who answered 'Poor' or 'Very poor' to Q17e: Please provide a rating on the following items based on your experience: Provision of critical information you required for your role (i.e., accuracy, consistency)

accessing required information when needed as updates were not stored in an organized manner in their respective locations.[41]

Strengths

#8 - The Incident Action Plans and daily meetings provided by the IMT were essential information sources for staff.

- The PWCC staff stated they received the IAPs via email into their central email account and they joined the daily 1:00 pm meeting for updates. This greatly assisted them to understand the common operating picture.
- The IAP was shared where the relationships existed and where liaisons were present.
- The morning briefings were crucial to understanding the plan for each day and it was an opportunity to ask questions if needed. These briefings were opportunities to understand what other agencies were involved with in this incident.

Opportunities for Improvement

#10 - Some aspects of ICS are not standardized in the ICP and PWCC processes.

- The PWCC staff did not create an IAP for the more supportive and strategic tasks that may have assisted information flow across other EOCs to the province or to the site.
- The ICP or PWCC did not produce formalized Situation Reports that could be utilized as external facing information that would assist in situational awareness across the provincial response; potentially streamlining the need for information from others.

#11 - Record keeping practices could be improved to ensure that accurate information is captured and communicated.

- The PWCC staff did not take minutes during the 13:00 daily briefing where key communications with the sites occurred. Phones and radios were not recorded so meeting contents were not captured unless notes were taken.
- Position logs are not kept in the PWCC, and roles are not formalized.

[41] Based on surveyed agencies/responders (N=80) who answered 'Poor' or 'Very poor' to Q17g: Please provide a rating on the following items based on your experience: Accessibility of required information (stored in organized manner and easily accessible when needed).

- The IMT team utilize notepads which were kept by the individual staff when the event closes.

#12 – Information exchange between the PWCC, departments, and other responding agencies could be improved.

- Some surveyed responders stated that they had no contact with DNRR for numerous days and communications were not optimal. The incident covered multiple municipal jurisdictions; information was not passed efficiently at times. Several noted that there was no communication with the PWCC at all until after the fire had spread to their own area. Communication between the VFF and DNRR or any command post did not meet expectations within some areas.

- There were some delays in response from the PWCC when requesting contact information of key individuals/organizations for which some departments providing services/goods could support (e.g., provision of respirators to affected municipalities).

- Some fire departments expected check-in calls/emails/radio from the PWCC in the early stages of the wildfires to ensure that they had what they needed. Some departments did not receive any communication within the first week (e.g., Ingomar-Roseway Fire Department). There was a misalignment in understanding of what outreach the PWCC should conduct in the early stages of a large-scale wildfire.

- Some crews did not get daily direction until 10:00 am (considered late by some) which created coordination and planning issues.

- Several weather stations were either not reporting or had instruments that did not work. There were no working quick deploys that could be established for accurate on-site weather.

- There were no/limited communications from the ICP to some responders on what to expect for demand for aircraft requirements, who would be using their facility, where air support was coming from, how many aircrafts were expected, frequency and duration of drop ins, fuel requirements, or what type of aircraft it would be. It was also unclear on who to charge for the fuel delivered. Staff and responders were unable to forecast demand and manage their hold capacity limitations.

3.3.1 Public Information

Information exchange is essential to ensuring public safety. While public communications were out of scope for this assessment, it is important to understand how and from what source agencies, responders, and DNRR staff obtain information that can be passed through their interactions with the public throughout the response, especially when some have been personally impacted themselves. Only 4% of DNRR staff were personally impacted by the wildfires; however, 19% of agencies/

responders were directly affected (i.e., 1 in 5 responders were dealing with their own losses while assisting other members of the public).[42][43]

As would be expected, members of the public may have challenges in obtaining information they need for their own decision making. At times, there were discrepancies in levels of situational awareness between members of the public and responders/DNRR staff (see Table 8). DNRR staff who interacted with the public felt that the public level of awareness was aligned with their own most of the time.[44] Some surveyed DNRR staff noted that there was misinformation communicated on social media resulting in public misperceptions of what was happening (e.g., believing they would be allowed to return to their homes when that had not been authorized). DNRR staff also noted that the number of available resources to answer phones and provide updates to the public at their office was limited. Agencies and responders who did interact with the public experienced more misalignment in the public's level of situational awareness compared to their own than did DNRR staff. Many responders were asked for information by members of the public; however, it was often not available to provide. While not in scope, it is still critical to highlight the importance of ensuring that responders in the field are positioned to correct misinformation when interacting with the public.

Table 8: Public Situational Awareness

Did the public have good situational awareness?	Agencies / Responders (N=79)	NRR Staff (N=82)
Yes	7.59%	25.61%
Sometimes, but not always	39.24%	68.29%
No	12.66%	6.10%
Not applicable	40.51%	0%

Information sources for updates on the wildfires and/or evacuations were many, ranging from social media and news, PWCC and other departmental briefings, media releases, emails, on-scene staff, employees, and other internal sources. Moving forward, the province may wish to work more closely with DNRR and other departments to consolidate information into a single repository to reduce confusion, misinformation, and streamline the provision of critical information by having a primary source.

3.4 Concept of Operations

Responding to emergencies involves a coordinated, co-operative process of matching essential needs with available resources. Overall, 73% of surveyed agencies/responders and 67% of DNRR staff felt

[42] Based on surveyed DNRR staff (N=86) who answered 'yes' to Q23: Where you personally impacted by the wildfires?
[43] Based on surveyed agencies/responders (N=80) who answered 'yes' to Q20: Where you personally impacted by the wildfires?
[44] Based on surveyed DNRR staff (N=82) who answered 'yes' or 'Sometimes but not always' to Q22: In your interactions with members of the public, including evacuees, did you feel that they had good situational awareness (i.e., it was aligned with your understanding of events)?

that response operations were conducted effectively by their organization.[45] Of those who did not think that the response was carried out effectively, insufficient staffing, lack of training, lack of plans, and inadequate equipment were the leading contributors to ineffective response operations within their organization (see Table 9).

Table 9: Contributing Factors that Affected Response

Reasons for ineffective response	Agencies / Responders (N=6)	DNRR Staff (N=13)
Insufficient staffing	100.00%	61.54%
Inadequate equipment	66.67%	69.23%
Lack of chain of command	50.00%	15.38%
Poor communication (due to infrastructure failure)	33.33%	23.08%
Poor communication (breakdown in procedures)	33.33%	53.85%
Lack of training / experience	83.33%	76.92%
Lack of plans/procedures in place	83.33%	53.85%

Ensuring that a strong chain of command is in place is essential to an effective response. Only 7% of surveyed DNRR staff did not think that there was a clear chain of command between their organization and other responding agencies.[46] However, 21% of surveyed agencies/responders did not feel that a clear chain of command was in place. The primary reasons provided for challenges related to a proper chain of command were lack of understanding of a chain of command (i.e., training) and lack of plans/procedures in place that outline authorities and chain of command (see Table 10).

Table 10: Factors that Affected Chain of Command

Reasons for ineffective response	Agencies / Responders (N=16)	DNRR Staff (N=6)
Insufficient staffing	50.00%	33.33%
Lack of understanding of chain of command	75.00%	33.33%
Poor communications (due to infrastructure failure)	43.75%	33.33%
Poor communication (breakdown in procedures)	68.75%	50.00%
Lack of plans/procedures in place	75.00%	66.67%

Most participants who were surveyed had a good or excellent understanding of their agency/organization/municipal role and assigned responsibilities during the response for both wildfires (see Table 11). DNRR Staff had a much higher understanding of their role during the Tantallon

[45] Based on surveyed agencies/responders (N=77) and DNRR Staff (N=89) who answered, 'Strongly agree' or 'Agree' to Q29/Q31 respectively: Please rate your agreement with the following statement: "I felt that response operations were conducted effectively by my organization."
[46] Based on surveyed DNRR staff (N=89) who answered 'Disagree' or 'Strongly Disagree' to Q33: Please rate your level of agreement with the following statement: "There was a clear chain of command between my organization and other responding agencies (e.g., Provincial Departments, NGOs, etc.)

wildfire compared to the Barrington Lake wildfire, whereas surveyed agencies and responders were consistent across both wildfires.[47]

Organizational roles and responsibilities should always be clearly outlined and defined within department/agency emergency response plans. Approximately 73% of surveyed agencies / responders currently have a plan in place[48], of which, 57% feel that their department/municipal plan is effective in its current version.[49]

Table 11: Understanding of Department Role

Barrington Lake, Shelburne County				
Rating	Agency / Responder[50]		DNRR Staff	
	N=76	N-65	N=88	N=83
Excellent / Good	69.74%	81.53%	74.32%	78.31%
Average	11.84%	13.84%	14.77%	16.66%
Very poor / Poor	3.95%	4.61%	5.69%	7.22%
Not applicable**	14.47%		5.68%	
Tantallon, Halifax County				
Rating	Agency / Responder		DNRR Staff	
	N=67	N=43	N=81	N=45
Excellent / Good	56.71%	88.37%	41.98%	94.44%
Average	5.97%	9.30%	7.41%	13.33%
Very poor / Poor	1.49%	2.32%	6.17%	11.11%
Not applicable**	35.82%		44.44%	

** Percentages are displayed including Not Applicable and excluding Not Applicable

In general, surveyed DNRR staff and agencies/responders felt that their organization was prepared for the size and scope of the wildfires; however, there is always room for improvement (see Figure 4). Approximately 70% of DNRR staff and 64% of agencies/responders describe their organization's level of preparedness as average, good, or excellent.[51] While this represents a majority in both survey

[47] Based on surveyed DNRR staff who rated their level of organization role in Q24: Please rate your understanding of your agency / organization / municipality's role and assigned responsibilities during the response and early recovery efforts for each wildfire.
[48] Based on surveyed agency/responder (N=78) who answered 'yes' to Q25: Does your organization / department / municipality have an emergency response plan?
[49] Based on surveyed agency/responders (N=58) who answered 'yes' to Q26: Do you feel that your department / municipal plan is effective in its current version?
[50] Based on surveyed agency/responder (N=76/67) who rated their level of understanding of their agency's role in Q24: Please rate your understanding of your agency / organization / municipality's role and assigned responsibilities during the response and early recovery efforts for each wildfire"
[51] Based on surveyed DNRR staff (N=88) and agencies/responders (N=79) who answered 'excellent', 'good', or 'average' to Q30/Q28 respectively: Describe your organization's level of preparedness for the size and scope of the wildfires that you faced?

audiences, the number of respondents who do not feel that their organization was prepared warrants further investigation.[52]

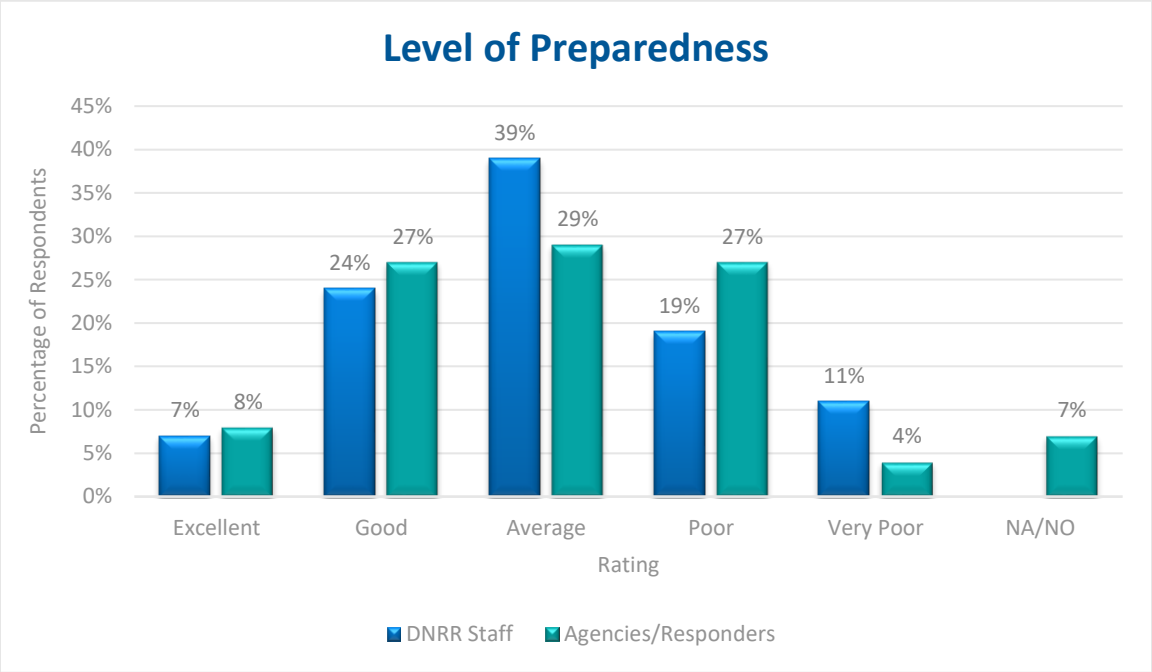

Figure 4: Level of Preparedness for Wildfires

Strengths

#9 - Command teams consistently demonstrated an understanding that DNRR was the lead agency for wildfire containment.

- The Provincial EMO Coordinator understood that the lead agency was DNRR, and his role was to help obtain resources and coordinate support across the province if required.
- While the HRM teams understood that they are structural firefighters, they also recognize the different skill sets, experience, training, and equipment that DNRR provides to lead a response if an interface fire begins. In most cases, HRM teams are invited into a form of unified command given certain circumstances. They believe their Memorandum of Understanding (MOU) outlines this dynamic very clearly.

[52] Based on surveyed DNRR staff (N=88) and agencies/responders (N=79) who answered, 'Very Poor', 'Poor' to Q30/Q28 respectively: Describe your organization's level of preparedness for the size and scope of the wildfires that you faced?

- The Executive, Directors, and Managers of the DNRR, as well as the frontline operational teams all were succinct in their command expectations.

#10 - Existing relationships with HRM resources were a positive and influencing factor on the initial response to the Tantallon area fire.

- HRM fire officers confirmed that an ICP and staging area was set up at St Margarets Centre within two hours (despite some initial operational response confusion). Upon arrival, the IMT were able to attend the centre and took overall command.
- Realization that there were two major fires in one location at Tantallon enabled a secondary ICP to be established. This was utilized for HRM fire response, and an integrated unified command model was adopted to assist the coordination across the HRM and DNRR. The DNRR mandate of command was maintained, and the required resources were shared.

Opportunities for Improvement

#13 – The PWCC does not currently apply some ICS functions typically implemented in EOCs/Department Operations Centres (DOC) that would create efficiencies in communications and command and control.

- The command for the fire event was firmly with DNRR, and that responsibility is afforded to the IMT. The command structure can be improved to better support the ICP and the embedded IMT. The PWCC is a key to coordination, command and support structure, activation levels, roles, and responsibilities that could mirror that of an EOC/DOC. ICP staff utilize and maximize ICS principals; it would be beneficial if such principles were continued into the PWCC to assist command and control, and communications.
- The PWCC staff were obtained from the administrative positions of the PWCC daily work roles. While they effectively supported teams on the ground, they were unaware of divisions once they assumed their new role which created confusion and some stress; however, most issues were resolved as the event progressed. For example, the ICP finance staff were conducting a lot of the activities that would normally be carried out by the PWCC finance officer.
- Initial lack of clarity of roles and divisions with the administrative staff resulted in duplication of effort. Emails were sent to a centralized account and the designation of a champion to respond was decided from there. It took some time to understand needs, and some staff felt their collective effort and support for each other were more significant factors of success rather than their training and understanding of the complex situation unfolding.
- The Director and Manager of the PWCC were both drawn into pressing political and administrative work and were not always available to the staff that needed authorizations or advice in the PWCC.

- The PWCC Duty Officer was unable to make decisions and felt they had to consult a Fire Operations Committee or a senior manager for most decisions.
- Overall, the staff at the PWCC collectively feel that if the EOC principles and training were introduced, it would improve their productivity. To achieve this, the DNRR would have to identify and train people beyond the small office staff.

#14 – Knowledge and awareness promotion of departmental plans could be improved.

- Approximately 9% of surveyed agencies/responders noted that they don't have a plan; 18% were unsure.[53] DNRR staff were not asked if they had a plan; however, when asked to comment on the effectiveness of the department plan, many had no knowledge of a plan, or had not seen it.
- Approximately 14% of surveyed agencies/responders who do have a department plan did not think that the plan was effective in its current version; 29% were unsure.[54] Only 35% of surveyed DNRR staff think that the department plan is effective in its current version; 26% said the plan was ineffective and 39% were unsure.

#15 – Preparedness strategies to optimize capability require a review.

- Some surveyed DNRR staff noted that the department takes a more reactive approach to preparedness instead of proactive approach based on how the department plan is structured. The use of experienced DNRR area managers is not optimized and operational plans are more suited for smaller, frequent events but not larger more complex events. Other staff noted that the department plan does not clarify how to scale up procedures for large-scale events or outline how to optimize resource capabilities and allocations.
- The pre-planning for additional resource requests and equipment was not optimized. While there was a fire barrier warning issued that created challenges with the deployment of resources, it was noted that additional resources would have been advantageous in containing the wildfires.

#16 – Protocols related to the use of air support for wildfire response can be improved.

[53] Based on surveyed agencies/responders who answered 'no' or 'unsure/I don't know' to Q25: Does your organization/department / municipality have an emergency response plan?
[54] Based on surveyed agencies/responders who answered 'no' or 'unsure/I don't know' to Q26: Do you feel that your department/municipal plan is effective in its current version?

- Many respondents noted a lack of air support (i.e., water bombers) to help control the fire along with DNRR helicopters. A bomber stationed in the province could have been helpful to contain the wildfire.
- The foundation of aircrew/air operations support during the Shelburne area fires was problematic. Aircrews were inconsistently provided necessitates such as meals, cold drinks, and or restroom access.
- Air crews were not included in morning briefings and not provided a daily action plan.
- DNRR pilots were not made aware of DNRR mapping software used by fire staff. Crews requesting helicopter pick up, drop off, or identification of hot spots etc., did so with the expectation that pilots were using "Field Maps".
- Airspace over the fire was confusing and posed some additional risks. Lack of organized airspace structure created multiple response delays.
- Aircraft arriving from out of province did not communicate with rotary aircraft on designated VHF networks and chose unofficial side channels to avoid frequency congestion. Rotary wing pilots were therefore not informed of fixed wing presence or traffic actions over the fire.
- Provincial air support was quickly exhausted, and organizations then had to rely on the availability of other agencies for the response. Organizations external to DNRR have limited agreements in place that can quickly muster air support (fixed wing aircraft) for direct attacks. Similarly, agreements with forestry operations companies around the province to provide heavy equipment for indirect attacks is limited. There were also issues coordinating the proper paperwork filed to acquire aircraft support to help some areas.

#17 – Some agency/municipal plans are outdated, inflexible, and do not adequately address the growing risks and response requirements of wildfires.

- Generally, plans were considered robust and flexible; however, there is room for improvement. Figure 5 indicates that the majority of surveyed DNRR staff and agencies/responders think their plan is somewhat flexible but could be improved, or not flexible at all.[55]

[55] Based on surveyed agencies/responders (N=78) and DNRR staff (N=89) who answered, 'somewhat but could be improved' or 'no' to Q33/Q35 respectively 'Please rate your level of agreement with the following question: "Do you think your current plans, procedures and protocols are flexible and robust enough that there was little to no interruption in your ability to carry out your response function?'

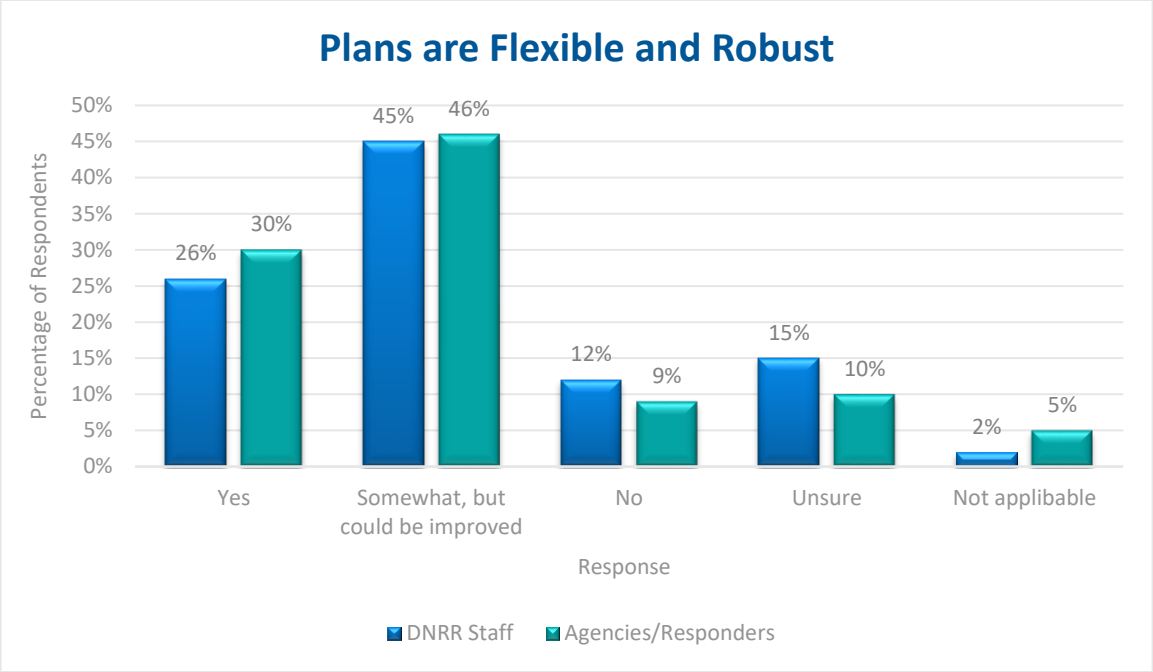

Figure 5: Flexibility and Robustness of Plans

Identified procedures that outline how organizations communicate and coordinate together could be better defined; especially for interface fires where protocols were not always clear.

- Provincial preplanning for additional resources and equipment could be improved. There is concern that while the 2023 wildfires will increase the level of wildfire preparedness for the next year or two, historically, the effort put into provincial preparedness tends to reduce.
- Some DNRR staff noted that the department's wildfire management manual is outdated and does not adequately define roles and responsibilities for certain activities or organizations (e.g. what responding agency is responsible for structure protections and setting up sprinklers?) Table 12 highlights the extent to which surveyed DNRR staff and agencies/responders think that their respective plans correctly define roles and responsibilities of other entities. Approximately 14% of surveyed DNRR staff do not think that provincial and municipal roles are clearly defined within the department plan.

Table 12: Role definition within Plans

Roles clearly defined within dept plans	Yes		No		Unsure	
	DNRR Staff	Agy/ Resp	DNRR Staff	Agy/ Resp	DNRR Staff	Agy/ Resp
Provincial[56]	57.64%	76.92%	14.12%	5.77%	28.24%	17.31%
Municipal[57]	21.80%	66.67%	14.10%	5.55%	64.10%	27.78%
Agency/Org/Dept[58]	36.85%	83.33%	10.52%	2.39%	52.63%	14.28%
Other[59]	19.45%	55.18%	9.72%	10.34%	70.83%	34.48%

- The Conservation Officer Service (COS) does not have a plan in place for activities related to wildfires except for the provision of a liaison with local fire staff. While COS has a role, they are not considered part of the ICS/IMT model for Nova Scotia. As a result, their role is often downplayed by Forest Protection and by the DNRR for activities like fire suppression and fire investigation.
- The municipalities have an integral role; however, most do not have a plan at all, or it is outdated. Available resources and how to leverage or source them are not accurately identified within community plans. Plans to house and feed firefighters (i.e., locations, equipment, and essential supplies) are also not clearly defined by municipality. The Curling Centre and Shelburne County Arena were utilized; however, these were the only resources offered by the respective boards.

3.5 Business Continuity

The response to the 2023 wildfires was a prolonged event that challenged departmental capacity to staff roles for the entire duration of the emergency. For some departments, the duration of the response caused other work priorities to be shelved or re-distributed. Overall, it was found that business continuity was well-maintained, and the availability of most services were maintained.

Approximately 36% of DNRR staff and 43% of agencies/responders discussed or considered business continuity within their organization during response operations.[60] While business continuity was not considered by 15% of DNRR staff, nearly 26% of agencies/responders did not consider day-to-day

[56] Based on surveyed DNRR staff (N=85) and agencies/responders (N=52). Respondents who answered Not applicable were excluded from the statistics.
[57] Based on surveyed DNRR staff (N=78) and agencies/responders (N=36). Respondents who answered Not applicable were excluded from the statistics.
[58] Based on surveyed DNRR staff (N=76) and agencies/responders (N=42). Respondents who answered Not applicable were excluded from the statistics.
[59] Based on surveyed DNRR staff (N=72) and agencies/responders (N=29). Respondents who answered Not applicable were excluded from the statistics.

[60] Based on surveyed DNRR staff (N=88) and agencies/responders (N=77) who answered 'yes' to Q36/Q34 respectively *"Was business continuity discussed / considered within your organization during response operations*?

operations.[61] Some organizations were proactive in the activation of their Business Continuity Plan (BCP) to minimize disruption in day-to-day operations. Approximately 42% of surveyed agency/responders and 35% of DNRR staff felt that their service area had enough resources and/or equipment to maintain regular day-to-day operations throughout the duration.[62]

In general, most available resources were allocated to a wildfire and regular day-to-day field function for some, like the Office of the Fire Marshal, could not be continued at the full level. It was noted that staffing levels were much lower than in previous years; however, the staff that remained at some home districts were well supported by their Area Manager. Overall, staffing numbers were thin but were able to cope with operations by focusing on critical operations only.

Strengths

#11 - The DNRR staffing model enables a cross-trained personnel positioned to fulfill regular operations as well as seasonal firefighters to combat forestry fires.

- The DNRR have a staffing model that enables them to utilize cross trained personnel that fulfill yearly roles but are made available seasonally to fight forestry fires. There is also an additional seasonal hiring of trained firefighters and additional mechanisms that are introduced to onboard volunteer firefighters when needed. This model provided the backbone to the deployment of DNRR staff/volunteers for the wildfires.
- In the focus groups and interviews, executives, directors, and senior managers explained the process and how it supports the provincial firefighting ability. Being adaptable and flexible in their daily roles assisted the ability to maintain a seasonal fire crew response.
- Operational staff that are called from their daily duties are attracted to working for the DNRR and enjoy the seasonal firefighting work.

Opportunities for Improvement

#18 – The approach to business continuity did not always consider the personal impact that some personnel experienced which created a divide between management and staff.

- There are existing organizational agreements in place that drew staff from daily roles and into the firefighting efforts. The managers accepted the challenge it presents to their area of work

[61] Based on surveyed DNRR staff (N=88) and agencies/responders (N=77) who answered 'no' to Q36/Q34 respectively *"Was business continuity discussed / considered within your organization during response operations*?
[62] Top two score (agree and strongly agree) based on 77 agency/responder survey respondents and 88 DNRR staff who answered Q35/Q37 respectively *"I felt that my service area had sufficient resources and / or equipment to maintain regular day-to-day operations throughout the situation."*

but there was an apparent disconnect to the levels of consistent support for the employees as they are pulled from their day-to-day role and deployed to a fire.

- Managers did not always have a full understanding of the personal impact of the fires on deployed staff which impacted their overall awareness of where staff were located. There were some notable instances whereby staff were defending their own homes while their families were evacuated, or other staff who were protecting property for neighbours or family members. The location of deployed staff who were personally affected was not always readily known by line managers.

3.6 Decision Centre Tools

Approximately 51% of surveyed agencies/responders and 55% of DNRR staff agreed that technology and applications used to support the response were sufficient.[63] When asked what additional technology, applications, or tools would have better supported their response activities, computer-based documentation capability and electronic emergency response procedures had the highest rating among survey participants. Table 13 illustrates a breakdown of additional technology / applications / tools that would have better supported response activities.[64]

Table 13: Additional Technology / Applications / Tools

Additional Tools / Applications	Agency/Responder (N=45)	DNRR Staff (N=60)
EOC Common operating picture capability	37.78%	33.33%
Social Media management tools	31.11%	36.67%
Electronic emergency response procedures	53.33%	46.67%
Additional computing power	33.33%	36.67%
Computer-based ICS forms	37.78%	46.67%
Computer-based documentation capability	51.11%	53.33%

When asked to specify the technology more precisely, survey respondents noted the items listed in Table 14.

Table 14: Requested technology

DNRR Staff Requests (N=60)	Agency/Responder (N=45)

[63] Based on surveyed agencies/responders (N=76) and DNRR staff (N=88) who answered, 'Strongly agree' or 'Agree' to Q36/Q38 respectively "Please rate your agreement with the following statement: "The technology and applications used to support response operations were sufficient."

[64] Based on surveyed agencies/responders (N=45) and DNRR staff (N=60) who answered Q37/Q39 respectively "What additional technology / applications / tools would have better supported your response activities? (Check all that apply)"

Phones, iPads	Phone (more memory to store maps)
ESRI licenses	ESRI licenses
Field map / onsite mapping capability	Avenza / QR codes and programs /ArcGIS online for all personnel
Generators (to power technology)	support trailer/command trailer for aviation ops
Small drones	WebEOC
App based daily action plans	App based daily action plans

Strengths

#12 - The use of new mapping technology (i.e., Field Mapping) significantly improved situational awareness at all levels of the DNRR response for those who had access.

- The IMT in the ICP stated the fire mapping aspects of 'Field Mapping' assisted them to coordinate the various fire teams at the numerous locations. Staff stated the program came with other capabilities they may be able to utilize now and, in the future (e.g., Survey 123).
- Some of the volunteer Fire Chiefs were sent screenshots of some of the maps and information which increased their situational awareness.
- Field Mapping provided insight into future capability; this technology has potential to revolutionize fire response to large scale wildfires. If other agencies were to purchase this interoperable tool, it can enhance mapping communications further afield and across agency response borders.
- Field Mapping also provided a live overwatch of resources and fire behavior and was a safety enhancer for the teams deployed.

Opportunities for Improvement

#19 – The availability of Field Mapping data was limited or not available to some organizations and key DNRR staff which affected their level of situational awareness.

- Seasonal fire staff, including some in command positions, did not have access to the mapping application (i.e., Field Mapping). Some explanations for restricted access included cost due to license agreements, and limitations of installing the program on personal phones due to security and information sharing concerns.

- Operational users liked the Field Mapping Program and said to some degree it was intuitive; however, they were not trained to access some additional functionality that was available. Several users wanted to see some form of training, in person or online, to optimize the use of the program features.
- Some on-scene DNRR staff were disappointed that their management had not advocated for them to be on the field mapping deployment list. They were fulfilling jobs and roles at the fires edge and were in dangerous locations; however, they were without mapping capability.
- Licensing and funding are two major concerns expressed by those that work with Field Mapping that may cause barriers to extend access to the program.
- The Field Mapping Program is a purchase made and administered to the DNRR. Its use was instrumental in providing situational awareness but was not available to partnering agencies.
- Volunteer Fire Chiefs who were situated with a DNRR liaison who had access to the mapping technology confirmed that the added situational awareness was essential. Some asked for an emergent access to iPad or phones but were unable to obtain permissions or passwords. For building fire breaks or other operations, having detailed hill shade maps in field maps would be ideal.
- There was some confusion within DNRR staff regarding access to the Field Mapping application that was displayed within the PWCC by the Provincial EMO. While DNRR staff do have access to the application, there were some barriers as to how to access the information. It was agreed that the ability to have the Field Mapping in every EOC, DOC and ICP would be a significant asset; however, there may be confusion as to how that Field Mapping information was viewed at the provincial level and what access the province has to the Field Mapping Program successfully utilized by the DNRR.

#20 – Available tools to effectively track resources could be improved.

- Some agencies cited difficulties in tracking resources more efficiently.
- It was noted that the current financial tracking system for the province is sufficient for small scale fires; however, it is not suitable for events that last greater than seven days. DNRR staff noted that an improved excel spreadsheet or different accounting software would greatly improve their ability to track finances.
- Situational awareness tools would have been useful to provide information on Reception Centres, power outages, road closures, damage assessments, and key issues within the province.
- DNRR staff noted that a mechanism or application to better control time sheets and monitor hours worked in real time is needed.

4 Recommendations

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
Human Resources	Communication and information processes that foster better management of staff, responders, and workload could be improved.	• Identify additional IMT resources to provide further team capability and personnel identified for shadow opportunities as current personnel do not have replacements. • Review the DNRR IMT managerial oversight and investigate how to increase and enhance the visibility and support offered to the IMT by management. • Ensure that IMT staff have the tools and training to identify and track required staff that can work in the PWCC during an activation to extend the capability of resources.	3-6 months	DNRR IMT
	Pre-event planning processes to deploy regional firefighters and specialized services to assist and augment DNRR capability could be improved.	• Expand the positions of the IMT to include resources outside of Command and General staff to augment capability during the first 24/48 hours until the IMT is fully assembled.	3-6 months	DNRR Management
		• Implement a commitment minimum of 5 days and maximum of 14 days of service for in-province deployment to increase accountability for all divisions and resources, better regulate hours for firefighters, and improve safety of responders.	3-6 months	DNRR Management
		• Develop and maintain a provincial firefighter crew availability report during high hazard events. Each DNRR office should submit a daily firefighter availability report during periods of high fire danger.	3-6 months	DNRR Management
Mental Health and Wellness	The provision and promotion of appropriate mental and	**Within the PWCC:** • Create dedicated spaces where staff/volunteers can	3-6 months	DNRR Management

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
	physical health support to DNRR staff throughout the response could be improved.	have a quiet place away from the demands of the response. • Implement plans and practices around provision of showers, meals, and access to laundry. • Post “box breathing” visuals and other stress reduction techniques around to encourage healthy coping mechanisms. • Identify free mental health and wellbeing supports which are communicated to staff, responders, and volunteers, well in advance of emergency situations. • Set a schedule for regular check-ins with staff during an activation. • Train PWCC Management on staff care and mental health first aid. • Obtain specialized services from health care professionals and / or access to mental health supports. • Create an effective staff rotation schedule spanning multi-days, which can realistically be maintained for longer duration events.	(before next wildfire season kicks off)	(PWCC Manager)
		Health and Safety of Firefighters: • Ensure councilor support is available to firefighters at the end of the day, in addition to the beginning. • Ensure that firefighters m have a clean air environment to recover in (i.e., not close to the fire). Where possible, find lodging for responders and only use tents as a backup resource if unavailable. • Provide face masks for firefighters because of Wildfire Urban Interface, where homes and other humanmade toxic materials are burning. • Conduct a review of leading industry practices related	3 months (before next wildfire season kicks off)	DNRR IMT

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
		to health and safety of firefighters and methods for critical incident debriefing for incoming workers/staff/visitors and staging areas to ensure that debriefings are prioritized.		
Equipment and Supplies	The current practices of use for equipment placement and management around the region are not well understood and could be improved.	• Conduct an operational and financial review into the establishment of a central hose cleaning and drying facility to enable a more efficient and effective maintenance routine for the DNRR offices across the region.	12 months	DNRR Management
		• Review the current process for equipment maintenance and distribution across the region. Establish standardized procedures and better accountability at the 27 offices and implement a tracking and central reporting system beck to PWCC logistics and supply. Ensure that there is clear policy in place that outline regional expectations related to equipment maintenance and repair.	6-12 months	DNRR and Regional Offices
		Additional Equipment Recommendations: • Supply aerial detection spotters with iPads so that a detection message and initial assessment with photos can be uploaded in Field Maps in real time. • If financially feasible, purchase an Incident command trailer for a quicker set up of IMT not restrained to an existing facility.	3 months	DNRR
Training and Exercises	The Emergency Firefighter Course exists for volunteer firefighters but is not uniformly provided.	• Develop and implement a well-defined training strategy for each region with a set schedule to serve as a guideline for volunteer firefighters. • Increase overall awareness of training opportunities across the department and with volunteer firefighters.	3 – 6 months	DNRR Training Officer
		• Invest in targeted e-learning and/or online videos to augment current training availability.	12-18 months	DNRR Training Officer

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
	Reliance on the expertise of the IMT has led to a diminished level of training for other team members across DNRR.	• Increase awareness of the available training to staff. • Provide cross-training opportunities to DNRR staff to ensure confidence in roles and build staffing capacity in other roles with limited availability. The district offices can provide training and pre-arranged equipment throughout the province; generally, this arrangement is utilized well and helps to maintain the relationship between the volunteer fire teams and the DNRR.	6-12 months	DNRR Training Officer
	Training and exercise opportunities are not currently optimized to ensure service capability and experience in a multi-agency, dynamic and fluid event.	• Ensure that all department staff have Level ICS-100 training at a minimum. New staff should receive this training within the first month of employment as part of the onboarding process.	1-3 months	DNRR Training Officer
		Additional Training Recommendations: • Develop quick reference guides for PWCC staff that provide an overview of the roles and responsibilities of various functions and position profiles when activated. • Training and exercise staff on processes for which they are responsible to ensure efficient and effective facilitation of response activities. • Implement a shadow process with more experienced staff or have a buddy system where a more experienced staff member mentors a newer staff member. Shadowing can occur with partner organizations that operate a similar EOC.	6-12 months	DNRR Training Officer
	Roles and responsibilities were not always well defined or understood within and between agencies, responders and DNRR staff.	• Conduct a review of the current role of Conservation Officers in deployment to wildfires. Consider their previous and potential roles as peace officers and provide suitable instructions and training so that resources can be utilized more formally.	3-6 months	DNRR IMT
		• Ensure that duty officers have advanced fire behaviour training and can complete a Fire Behaviour Forecast.	6-12 months	DNRR Management

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
		Clearly clarify the role of the duty officers, identify training qualifications and needs, and confirm expectations of the position responsibilities. Standardize the skill requirements and ensure that training opportunities are presented to maintain this skillset.		
	Some staff were not properly trained for their response role which affected confidence levels and task efficiencies.	• Ensure that all staff have Level ICS 100 training within the PWCC. Cross-train EOC staff for other ICS functions to ensure and/or augment capacity once activated. • Develop and implement a well-defined training strategy for all DNRR staff with a set schedule to serve as a guideline for meeting training requirements. • Generate awareness campaigns on training opportunities within the department. • Develop targeted e-learning and/or online videos. • Develop and distribute printed material including posters and cheat sheets. • Conducting multi-agency, multi-jurisdictional exercises. DNRR should champion the development of a large-scale exercise that includes provincial departments, partner agencies, NGOs, and municipalities to stress test any revisions made to existing plans / procedures resulting from this review. **Considerations for new staff should include:** • Receive emergency management training in the first month of employment as part of the onboarding process. Specific courses should be identified which should be completed as part of basic training. • Regularly exercise staff on processes both internally and with other agencies for which they are responsible. • Develop quick reference guides that provide new staff	6 months	DNRR Management

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
		with an overview of the roles and responsibilities of various functions during an emergency. • Implement a shadow program with more experienced staff or have a buddy system where a more experienced staff member mentors a newer staff member.		
Information Management	Some aspects of ICS are not standardized in the ICP and PWCC processes.	• Adopt ICS practices for managing and storing information during an activation. This includes the collection, organization, control, processing, and delivery of information in a systematic manner to ensure that all staff, responders, and partner organizations have access to information for decision making.	3-6 months	DNRR IMT
	Record keeping practices could be improved to ensure that accurate information is captured and communicated.	• Activity logs and briefing notes should be regularly updated to ensure optimal situational awareness for incoming staff. A dedicated scribe should be assigned to take notes from every daily briefing and disseminated accordingly. Staff responsible for updates should be identified and communicated to other staff to avoid confusion.	6-12 months	DNRR
	Information exchange between the PWCC, departments, and other responding agencies could be improved.	• The PWCC should incorporate ICS principles into communications practices to align expectations on when information updates / situational reports will be shared.	3 months	DNRR IMT
Concept of Operations	The PWCC does not currently apply some ICS functions typically implemented in EOCs/Department Operations Centres (DOC) that would	• Adopt some core ICS / EOC principles within the PWCC including defined activations levels and associated protocols/processes to assist with clarification, guidance, and preparation with the PWCC staff. Ensure overarching clarity on the responsibilities and capability of the PWCC at various stages of activation for the wildfire season or other high-risk events.	3-6 months	DNRR IMT

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
	create efficiencies in communications and command and control.	• Clearly identify triggers and mechanisms to activate stakeholder involvement in a coordinated response effort.		
	Knowledge and awareness promotion of departmental plans could be improved.	• DNRR should host a multi-agency tabletop exercise to better understand the various agencies' needs and requirements for initial call out and deployment.	6-12 months	DNRR IMT
	Preparedness strategies to optimize capability require a review.	• Review the current capability for wildfire investigations, prosecution, file preparation within the DNRR and establish the required training for personnel utilized in the process. • Conduct reviews of current MOUs, policies, and agreements with other agencies for clarification on roles/responsibilities for structure protection (e.g., sprinkler set up).	4-6 months	DNRR Management
	Protocols related to the use of air support for wildfire response can be improved.	• Conduct annual meetings with private aircraft companies and other provinces that provide air support to ensure alignment in understanding of capabilities, processes, collaborative capacity. • The air operations manager should identify personnel that can be activated to assist with the role during an extended period of operations (currently this is dependent on one person). • Procedures around radio communications, fueling aircrafts, pilot briefings, and the provision of fire mapping capabilities with air support should be clarified and built into existing agreements accordingly.	6 months	DNRR Management
		• DNRR staffing that manages the air response from the hanger, including command and control, requires additional support from the PWCC. Processes should be reviewed to ensure that staff understand how the	6-12 months	DNRR Management and Air Support

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
		PWCC can support the air response (e.g., coordinate with fuel movement and supply), and that the support is available and can be provided when needed. The air ops manager and the PWCC should consider the best location and communication method to help support the air ops as it was apparent during the fire that the communication from air ops to the sites and to the PWCC were challenging.		
		• The PWCC should assist with the coordination of food and lodging for incoming pilots and maintenance crew.	6-12 months	DNRR Management and Air Support
	Some agency/municipal plans are outdated, inflexible, and do not adequately address the growing risks and response requirements of wildfires.	• Conduct a review and update of the DNRR Department Plan to incorporate recommendations from this review. • Review and update the Forest Protection Wildfire Manual.	6-12 months	DNRR Management
Business Continuity	The approach to business continuity did not always consider the personal impact that some personnel experienced which created a divide between management and staff.	• DNRR should review processes in place that address situations where DNRR staff are personally affected by an emergency. Additional staffing arrangements should be readily available to fill any gaps in capacity should any staff be pulled from the response for personal reasons.	6-12 months	DNRR Management
Decision Centre tools	The availability of Field Mapping data was limited or not available to some organizations and key DNRR staff	• DNRR should identify who within the organization requires access to remote field mapping capability and arrange the appropriate licenses (this includes air operations personnel). If licensing cannot be arranged,	3-6 months (before the start of wildfire season)	DNRR Management

Functional Area	Finding	Recommendations	Implementation Timeline	Responsible Party
	which affected their level of situational awareness.	DNRR should find alternate means of providing field mapping capabilities or awareness where required. • Ensure that all DNRR staff who require access to mapping technology are properly trained on any available application.		
	Available tools to effectively track resources could be improved.	• Investigate tracking tools that will assist staff in managing resources more efficiently (this includes financial tracking platforms). • DNRR may wish to investigate a more robust and unified Common Operating Picture between the department and the ground truth. Leveraging Incident Management software, GIS mapping systems, and other data management and visual tools would allow information to be shared effectively between DNRR and other agencies and would better support the consolidation of essential information into a Common Operating Picture.	6-12 months	DNRR Management

5 Conclusion

The 2023 wildfires in Nova Scotia were historic in nature; however, DNRR along with other government and non-government agencies, volunteers, and communities managed a well-coordinated response with no lives lost. Two on-line surveys were developed and distributed to collect information on the response from both DNRR staff and Agencies / Responders. Results from the surveys were analyzed and used to inform the development of questions for in-person interviews and focus groups, which were conducted between January 22nd to 31st. Qualitative and quantitative data were both considerations in the overall findings presented in this report.

The duration of the response was prolonged; however, the level of multi-agency coordination and collaboration was exceptional and led to a solutions-based approach to a very fluid situation. Working relationships between DNRR and other agencies were strengthened and the willingness of all fire departments across the province to come together to assist was extraordinary. The level of commitment and individual sacrifice was unparalleled in Nova Scotia.

While the overall response was successful, there were opportunities for improvement identified in each of the six categories used to guide data collection and analysis: resource management, training and exercise, information management, concept of operations, business continuity and decision centre tools. The strain on staffing capacity to sustain operations was significant and many DNRR staff assumed new roles to ensure continuity of operations. Ensuring continued ICS/EOC training for current and new staff will aide in augmenting capacity, increase confidence, improve clarity of roles and responsibilities, and enhance interoperability and coordination efforts when working with other organizations. Adopting an ICS model for the PWCC will also rectify many of the communication challenges that some staff faced in obtaining situational awareness.

While DNRR could improve the coordination of some response activities, the collaborative approach to emergency management worked well. The level of dedication displayed by DNRR staff, responders, volunteers, and other agencies was outstanding. By actioning the lessons learned identified within this report, DNRR and its partner agencies will continue to improve overall response and recovery efforts in the future.

References

[1] Department of Natural Resources and Renewables. Provincial Wildfire Coordination Centre Operations Manual. Year unknown.

[2] Municipality of the District of Barrington. 2023. Barrington Lake Wildfire After Action Review and Work Plan

[3] Department of Natural Resources and Renewables. Provincial Fire Centre Duty Officers Operations Manual. Year unknown.

[4] Department of Natural Resources and Renewables. 2022. Air Attack Briefing Manual. VER. 05-20-2022

[5] Department of Natural Resources and Renewables. 2021. Nova Scotia Agency Briefing Manual 2021. Forest Protection Nova Scotia.

Acronyms

AAR	After Action Review
ATV	All-Terrain Vehicle
BEM	Basic Emergency Management
CAD	Computer Aided Dispatch
CIFFC	Canadian Interagency Forest Fire Centre
COS	Conservation Officer Service
DNRR	Department of Natural Resources and Renewables
DOC	Department Operations Centre
EFAP	Employee Family Assistance Program
EMO	Emergency Management Office
EOC	Emergency Operations Centre
EOCM	Emergency Operations Centre Management
EPI	Emergency Public Information
HRM	Halifax Regional Municipality
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
MOU	Memorandum of Understanding
NGO	Non-Government Organization
OGD	Other Government Department
OHS	Occupational Health and Safety
PAC	Performance Analytics & Conditioning
PEOC	Provincial Emergency Operations Centre
PWCC	Provincial Wildfire Coordination Centre
RCMP	Royal Canadian Mounted Police
VFF	Volunteer Firefighters