

New Brunswick Preparedness and Response Spring Freshet 2018 Flood After Action Review - Advice to Minister



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Calian is pleased to present this report to the Province of New Brunswick to outline the preliminary findings (best practices and areas of improvement) of the provincial and local preparedness and response to the Spring Freshet 2018 Flood event.

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EXECUTIVE SUMMARY

The spring freshet of 2018 saw a combination of several factors that created dangerous flooding conditions for communities across the Province of New Brunswick. In late April 2018, persistent warm temperatures, heavy rainfall and high tides in the Bay of Fundy, caused water levels to quickly rise throughout the Saint John River basin affecting numerous communities, businesses and residences. As a result, the Provincial Emergency Operations Centre (PEOC) activated to Level 2 – Partial Activation. In addition to the PEOC, five Regional Emergency Operations Centres (REOC) and several municipal Emergency Operations Centres (EOC) were also activated to support response activities taking place at the local level.

The emergency response was well conducted, and no fatalities were suffered as part of this flooding event. Although the response was successful, several improvements can be made to plans, processes, and capacities within various response agencies to ensure that future flood responses are conducted in a timely and coordinated fashion.

The main finding from this After-Action Review (AAR) was the absence of an official government program to support the annual River Watch preparedness, planning, response and recovery activities. There is cooperation between the participants of River Watch however, they support it through existing budgets and priorities. The implementation of an official Program could serve to support the main elements of the preparedness and response including budgets, structured public education curriculums and formalization of processes in support of inter-agency communication and information exchange. The formalization of the River Watch Program could also support year-round preparedness and prevention activities.

Information was managed, and response activities were coordinated amongst multiple response agencies although the coordination of activities amongst some levels of government require modifications to improve their efficiency. Formalization and modifications to processes such as the donation management processes should be implemented to support an efficient and consistent approach amongst all involved response agencies.

Efforts were taken to ensure consistent and accurate messaging for the public. The implementation of public alerting tools and flood mapping software could be used to further support available information for the public. Additional visual images of flood waters and gauge data were also identified as possibilities to be included in public information websites. Guidance in understanding the forecasting results and additional information regarding long-term health effects were also identified as being important in terms of information sharing with the public. Leveraging public meetings and distribution of paper-based flyers should be considered in addition to the social media tools and government websites.

Along with improvements already undertaken as a result of the 2018 Freshet, the recommendations within this report provide a detailed roadmap that the province can follow to begin to address gaps, and amplify the best practices identified through this review process.



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1. INTRODUCTION

1.1 Background

Parts of New Brunswick experienced historic flood levels in late April and early May 2018. Areas including Fredericton, Maugerville, Sheffield, Jemseg, Gagetown, Oak Point, Quispamsis, Rothesay, Hampton and Saint John were severely impacted due to heavy rainfalls and rising levels of the Saint John River from the spring thaw. Evacuations of residents occurred along the Saint John River and several businesses were forced to close. Key infrastructure was impacted including the closure of several roads and communities and single access routes became isolated, increasing the risk to residents.

The risk of flooding resulted in the activation of the Provincial Emergency Operations Centre (PEOC) to Level 1 – Enhanced Monitoring status on April 16th with an increase to Level 2 – Partial Activation on April 27th as a result of the increased risk of flooding. In addition to the PEOC, five Regional Emergency Operations Centres (REOC) and several municipal Emergency Operations Centres (EOC) were also activated to support response activities taking place at the local level. Local response agencies and specialized teams were deployed to assist those in need and volunteers were called upon to support evacuees and provide logistical support to the affected communities.

The development of this After-Action Report (AAR) report was initiated by the New Brunswick Emergency Measures Organization (NBEMO) and serves to support the identification of opportunities for improvement of current capacities, and to build on the best practices implemented during the response to the spring 2018 floods.

1.2 Purpose

The purpose of this AAR is to provide an assessment of the provincial and local preparedness and response activities initiated as a result of the flooding in the Spring of 2018. Specifically, this evaluation process focused on identifying strengths, weaknesses and gaps in existing emergency preparedness and response capabilities at the provincial, regional and local levels. The effectiveness of the available emergency management programs was also reviewed along with the integration of government departments, municipalities, private sector and non-governmental organizations (NGO) in responding to these types of large-scale events.

This report provides a detailed summary of the key findings emerging from the assessment conducted as part of the AAR process. The recommendations contained within this AAR will aim to assist the Province in rectifying the lessons that emerged from the evaluation process and will provide a starting point for developing an action plan to continue to improve public safety, security and resiliency across the Province.



2. EVENT OVERVIEW

Evidence of flooding due to spring freshet has been recorded since the late 1600s [1]. While the Saint John River experiences flooding to some degree most years during the spring freshet, the 2018 flooding season involved higher than normal snow levels in the northern areas of the Province. The 2018 freshet was amplified by unseasonably high temperatures, high rainfall leading to faster than normal snowpack melt, and higher than usual tides in the Bay of Fundy. The increased levels of water within the Bay of Fundy caused a bottleneck at the mouth of the river which caused the inability of floodwaters to drain, trapping water upstream.

New Brunswick Emergency Measures Organization (NBEMO) began risk assessments as part of the River Watch program on March 12, 2018. This enabled more detailed monitoring of water levels, and flow values associated with data received from river gauges. Additionally, officials monitored ice conditions along the river, identifying breakup and potential jams along the course of the river. Information and applicable public alerts were issued based on the information being gathered.

The PEOC was activated to Level 1, Enhanced Monitoring, as of April 16, 2018. The activation was a result of monitoring a freezing rain and significant rainfall forecast as well as to monitor the evolving river conditions as the spring freshet season continued.

Environment and Local Government's (ELG) Hydrology Department began producing flow forecasts for the Saint John River basin in March. The forecasts were based on a model of the Saint John River, divided up into 66 different basins. The forecasts were produced using the Streamflow Synthesis and Reservoir Regulation (SSARR) hydrologic model with numerous meteorological and hydrological inputs. Forecasts were produced on a daily basis, detailing multi-day water level predictions.

In addition to the ELG forecasts, additional data concerning the developing situation was gathered. Ice observers were stationed and monitored the river and ice conditions, as required.

Information moved through the various levels of government and responding agencies as the situation evolved. Regional Emergency Management Coordinators (REMC) made contact with the potentially impacted municipalities within their region, as required. The Office of the Provincial Security Advisor (OPSA) also made contact with critical infrastructure owners and operators, as required.

Public advisories were issued as the situation advanced and new information was received. Advisories identified when the basin was nearing the flood stage and included relevant preparedness guidance. [2] Information concerning the potential flooding situation was also shared with the public via the River Watch Line, Facebook and Twitter. Media scrums started on April 25 and served as opportunities for NBEMO to share information regarding the flooding event with members of the media. Information concerning public safety, health, response and



prevention activities were provided at these media scrums where applicable government officials, including a member of the Hydrology Department, also contributed. These continued throughout the response.

Information was shared with the public through additional means as well. The Oromocto Fire Department developed and distributed flyers to the public, providing flood contact information, preparedness messaging and other important sources of information.

Efforts were put into place to ensure adequate monitoring of the situation. Staffing adjustments were made as necessary to accommodate the response and NBEMO Duty Officers started night shifts in order to monitor the river conditions.

Forecasts produced on April 26, indicated that several communities would reach flood stage by April 27 or 28 [3]. The public was advised that flood stage conditions were to be expected within 48 hours. The communities of Maugerville, Jemseg and Fredericton surpassed flood stage by 12:00pm on April 27. The rapid change in weather conditions resulting in a more rapid rise in the river than forecasted caused many residents to be unprepared for the flooding and unable to adequately evacuate or take appropriate mitigation measures.

Additional regions were predicted to be at risk of flooding and several were ultimately impacted by rising water levels by the end of the response. These areas included:

- Saint François;
- Clair / Fort Kent
- Saint-Hilaire;
- Grand Lake;
- Sheffield-Lakeville Corner;
- Oak Point; and
- Quispamsis-Saint John.

As water levels began to rise and forecast data identified the potential for substantial flooding in affected areas, the PEOC was activated to Level 2, Partial Activation starting April 27. Several other EOCs were activated including nine (9) out of 12 REOCs and ten (10) municipal EOCs. EOCs were activated at the applicable activation level (i.e., Level 1 – Enhanced Monitoring, Level 2 – Partial Activation, Level 3 – Full Activation) based on local requirements.

Communications between the PEOC, REOC, municipal EOCs and other responders took place on an ongoing basis, based on determined briefing schedules or ad hoc, as required. With 9 of the 12 regions impacted and only 6 REMCs hired at the time to manage these regions, REMCs from non-affected areas were called in to support. REMCs were brought in to ensure the REOCs most affected by the flooding events had the necessary supported and a dedicated resource to manage the required response operations. The PEOC coordinated with the Government Operations Centre



(GOC) for federal assistance as required, including the production of satellite imagery and the provision of resources to perform air surveillance imaging.

NGOs, including the Red Cross, were engaged in the response. The Red Cross began sheltering evacuees, as required and supported potable water distribution. Boats and operators were staged in multiple locations to support rescue operations, wellness checks, enhancement of situational awareness for responders, damage assessments and security patrols.

Roads and other infrastructure were impacted by flood waters, with more than 150 roads being impacted or closed as the flooding situation persisted. Wildlife were displaced by the flood waters and significant economic losses were observed through damage to houses, businesses and municipal property.

Contingency plans were put into place to support contingency of operations during the multi-day flooding event, including transportation and mail delivery. Power disconnects of residences took place, as required.

Following nearly three (3) weeks of response operations, flood waters began to recede, and forecasts began to predict stable water levels. Recovery contingency planning began during the response to support a smooth transition for residents and responders once the flood waters subsided. Demobilization plans were developed as the response ramped down and activation levels of EOCs decreased. Information and supplies started to be provided to residents affected by the flooding including flood clean-up kits. Inspections commenced, and closed roads began to re-open to begin the return to normal operations. The PEOC deactivated and transition to recovery started on May 14.

A poll conducted by the Corporate Research Associates in late May 2018 found that 77% of New Brunswick residents were completely or mostly satisfied with the emergency response to that year's flooding event. [4]



3. EVALUATION METHODOLOGY

3.1 General

This AAR explores the preparedness and response to the New Brunswick Spring Freshet 2018 Flood event at the provincial, regional and local levels. It investigates whether the emergency response activities initiated during this event were appropriate based on the needs of the emergency and relevant guidelines. The Province's Emergency Measures Plan [5], Provincial Contingency Plan for a Flooding Event [6] and other related documentation were considered in this assessment.

This report does not evaluate the individual performance of any person or group and does not propose a timeline to address the recommendations provided.

3.2 Data collection

To consider the effectiveness of the preparedness and response actions taken, evidence of these actions and detailed accounts of the activities which took place were required. Data collection was performed through four mechanisms: review of event documentation (e.g., SITREPS, briefs, reports, advisories), a web-based survey, individual interviews and public consultation sessions.

Data was collected in a semi-anonymous fashion. Web surveys were completed anonymously and while interviews were completed face to face, interviewees were informed that information being collected would be aggregated and considered in a general context, rather than focusing on any one individual's or organization's performance.

A review of available documentation created and shared during the flooding event was performed. This documentation served as a starting point for determining the series of response actions, inter-agency communication and communication with the public. The documentation provided evidence in terms of timing and coordination of responding agencies.

Following the document review, a series of questions was developed to collect quantitative data. This data was collected through a web-based survey which was sent to and completed by members of the Provincial Emergency Action Committee (PEAC), other provincial and regional responding government agencies, local and municipal responders and other non-governmental organizations that participated in the flood response. The questions (Annex B) were developed to determine the effectiveness of the implemented response actions during the flood operations. The questions were also used to explore the preparedness of the responding agencies prior to the event and what could be or has been done to improve the preparedness of the responding agencies and the public for future events. A total of 31 completed surveys were received. The number of participants from each location / functional role can be found in Figure 1 below.



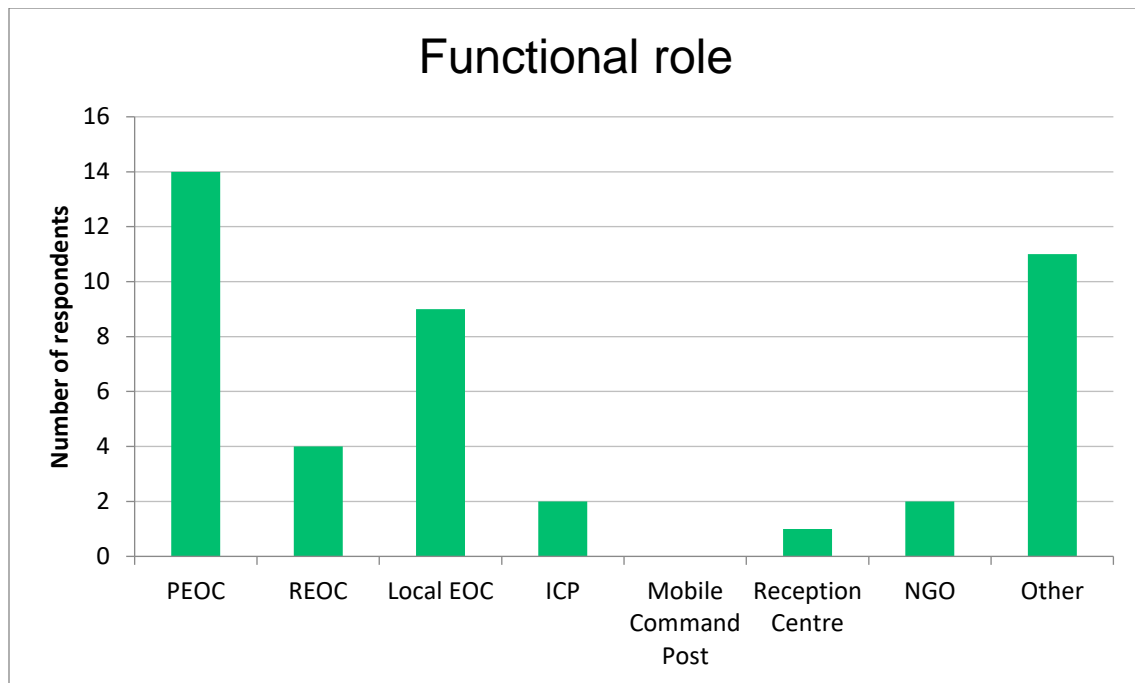


Figure 1: Functional role of survey participants

The results of the collected quantitative data helped guide the development of the individual interview questions (Annex C). Interview questions were developed to gather qualitative evidence of the actions taken during the emergency response operations and to further investigate areas of concern or best practices as identified by the quantitative results. The interviews also provided respondents with the opportunity to discuss, in detail, issues or best practices that they observed during the response as well as identify potential recommendations to close these gaps or improve operations in the future.

A total of 21 interviews were conducted with key NBEMO staff, municipal responders, regional coordinators and individuals responsible for collecting and sharing technical information required for flood forecasting, including members of the New Brunswick ELG's Hydrology department. Participants for these interviews were selected based in their involvement in the flood response. These semi-structured interviews were conducted either in-person or over the phone, were approximately one hour in length and employed the same pool of questions for each.

The final data collection method used for this assessment was through the conduct of public consultation sessions. A total of five (5) public consultation sessions took place in various communities across the Province which were affected by the 2018 spring freshet floods. These sessions were used for members of the public who were affected by the flooding event to provide input on their experiences and perspective on the government's response to the emergency. The questions used for these sessions provided the opportunity to gather

information on public perception of the emergency preparedness and its response. Data was gathered on what the provincial, regional and local governments did well and where future response operations could be improved.

3.3 Data analysis

Five categories were identified through the planning process to support analysis of the available data. The categories were determined based on the preliminary findings of the emergency response and were supported through the first phase of data collection which included a document review. The identified categories include:

- Processes: Considers governance, policies, plans and procedures and an overall emergency management program in place to support emergency response operations;
- Inter-agency coordination: Considers the effectiveness of the exchange of information between involved operations centres to deliver consistent messaging and have alignment in decision making;
- Critical infrastructure: Considers the involvement of critical infrastructure owners / operators and their awareness of the potential impact to their infrastructure, the mitigation of these risks and their collaboration with the government;
- Communications: Considers the exchange of information between supporting agencies and to the public and the quality of this information in terms of its consistency, timeliness and ability to deliver an effective message; and
- Preparedness: Considers the preparedness and training of emergency operators as well as the health of the public emergency preparedness public education program.

The categories were then used to shape the subsequent data collection and analysis opportunities. The categories provided the framework for the development of the web survey questions. Questions were grouped together within these categories based on the information that was being sought.

These categories also allowed collected data to be grouped into themes and analyzed qualitatively. Common findings within the themes were considered and investigated further.

From these findings a key finding was identified and supporting observations were obtained from the relevant data collection opportunities. Conflicting results were considered, and additional evidence was obtained as necessary. Key findings were categorized as either a best practice or an opportunity for improvement, dependent on the impact to the event response.

Recommendations were compiled to address each of the key findings. Recommendations were determined to resolve the key findings and based on supporting evidence from the collected data.





4. EVALUATION DATA

The following key themes emerged from the data collection process (Table 1). The results indicated below were extracted from the results of the web survey and indicate the percentage of respondents that agreed or *disagreed* with the various themes. Each of the key themes identified through the web survey were then corroborated with the qualitative results of the interviews and the public consultations.

Table 1: Key themes from web survey

Criteria	%
Processes	
Individual operations centres were activated to an appropriate level within a timely manner	75%
Individuals were located within an operations centre where ICS was implemented	64%
Local emergency plans aligned with the provincial Emergency Measures Plan	28%
Affected communities had the required emergency plans in place to support emergency operations	36%
Respondents <i>disagreed</i> that the transition from response activities to recovery activities was handled in accordance with plans and procedures	24%
Inter-agency coordination	
Emergency operations were appropriately coordinated between the Province and individual operations centres	78%
Respondents level of situational awareness during the operations was 'above average' or 'exceptional'	79%
Sufficient technical information was available at operations centres	75%
Critical infrastructure	
Information was shared between critical infrastructure operators and response agencies to coordinate response actions	65%
Communications	
Information concerning the situation was freely shared amongst responding organizations and the Province	91%
Information concerning the situation was freely shared amongst responding organizations and municipal EMOs, regional emergency action committees (REAC), and critical infrastructure (CI) partners	77%
Information was exchanged using common terminology	77%
Information was delivered at regular and expected intervals within operations centres	82%



Respondents <i>disagreed</i> that objectives, strategies and tactics were well defined and communicated between operations centres	27%
Respondents <i>disagreed</i> that objectives, strategies and tactics were well defined and communicated to responders and to other response agencies, including NGOs	23%
Information concerning the severe weather and immediate danger was shared with the public	91%
Preparedness	
Respondents <i>disagreed</i> that response agencies had appropriate personnel to maintain long-term operations	45%
Respondents <i>disagreed</i> that response agencies had appropriate personnel to maintain day-to-day services during the emergency	32%

Detailed results of the findings related to these key themes, including supporting evidence from qualitative interviews and public consultations, can be found in Section 5 below.

5. FINDINGS

5.1 General

This section provides a complete breakdown of the findings that emerged from the data analysis. Each of the findings are presented as either an Opportunity for Improvement (OFI) or Best Practice (BP). Each Key Finding is further validated by Supporting Observations (SO) comprised of examples or statements provided by the participants and / or quantitative results from the web survey and / or input from the public through the public consultations.

The findings each fall into one of the defined categories based on the nature of the finding and the specific component of emergency response / recovery that it relates to.

5.1.1 Evaluation terminology

For the purposes of this AAR, an OFI is an area where the Province, Region or Local Municipality can develop / improve plans and procedures, provide training, purchase a solution, or otherwise obtain a solution to address an issue that occurred during the response.

OFIs are numbered OFI #1, OFI #2, etc. Recommendations (Section 6) related to opportunities for improvement are identified by a number (and letter where appropriate, e.g., 1a).

A BP is something that was done during this emergency response that was effective in supporting the emergency response and should be carried forward into future emergency response / recovery operations. Best practices can be plans, processes, tools, resources, strategies or solutions.

Best practices are numbered BP #1, BP #2, etc. Recommendations (Section 6) related to the implementation, formalization, and continued use of these best practices are provided. To avoid confusion in the numbering of the recommendations, those related to best practices are identified with a capital letter (e.g., 1A).

5.2 Processes

BP #1 The ability of the Province to manage an evolving event was successful, especially in consideration of the differing levels of activation amongst provincial, regional and municipal EOCs

SO1: Regions were successful in tracking the activation level of each of their involved municipalities.

SO2: The PEOC was aware of and able to support the different operational priorities as regions experienced different effects of the emergency at various times. The needs of the regions still in



preparedness mode were considered equally to those in full response as well as those transitioning to recovery. This was managed through the effective use of the Regional Emergency Management Coordinators.

SO3: The activation of an EOC being the responsibility of the applicable municipality or region ensures there is no delay in the EOC activation and subsequent response.

SO4: Regions identified that the coordination of response operations was very effective despite varying activation levels across the Province.

SO5: A total of 75% of individuals participating in the online survey indicated that their EOC was activated to an appropriate level in a timely manner (Figure 2).

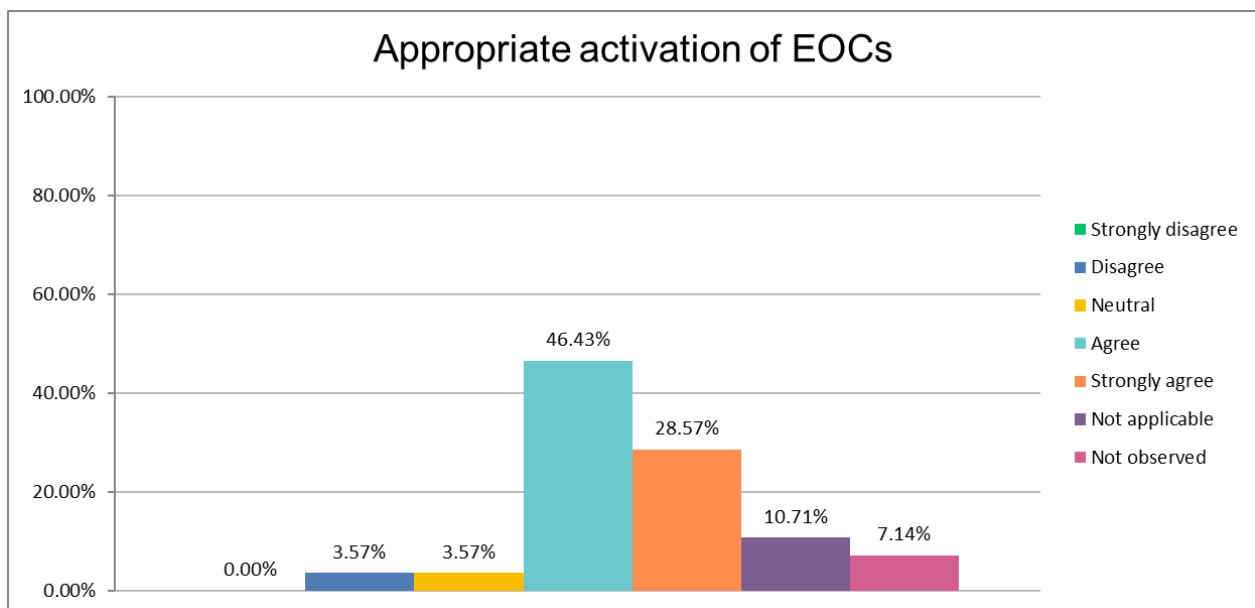


Figure 2: Activation of EOCs

OFI #1 Numerous individuals, agencies and departments are involved in responding to the spring freshet on an annual basis, yet no formal River Watch inter-agency program is in place

SO6: Through the conduct of interviews it was identified that the lack of a River Watch line item on many provincial departmental budgets, including ELG, means that not all required positions can be filled, or equipment purchased.

SO7: The cost of the hydrometric agreement between Environment and Local Government (ELG) and Environment and Climate Change Canada (ECCC) is rising but there is currently no formal budget within the ELG department in which to plan for these costs.



SO8: The River Watch team consists of multiple agencies including NBEMO, NB Power, ELG, ECCC and partners in Maine, however there is no River Watch coordinator who is formally assigned for coordinating this response amongst all partners.

SO9: There are no Standard Operating Procedures (SOP) in place to support the collation, analysis and dissemination of River Watch data to decision makers and the public.

SO10: Currently there are no measures in place for monitoring the public education program(s) related to flood preparedness (e.g., 72-hour preparedness). There are no metrics in place to identify the success of a campaign in increasing the public's preparedness or planning for these types of flood events.

OFI #2 It was not evident that modifications to the Incident Command System (ICS) structure made by some of the involved operations centres allowed them to fully respond in accordance to ICS requirements

SO11: Only 64% of respondents (Figure 3) indicated that they were located at an operations centre where the Incident Management System or ICS was implemented.

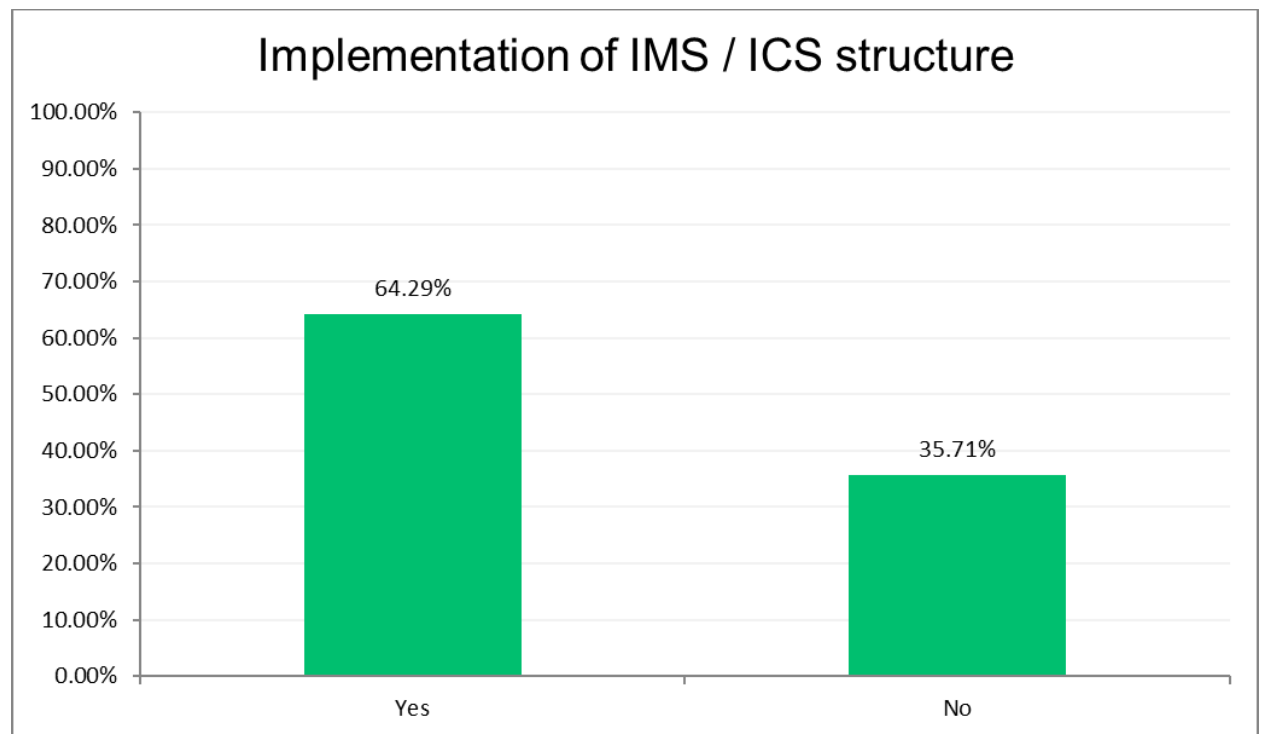


Figure 3: IMS / ICS implementation

SO12: Although the resources were available, no formal Planning Section was implemented within the PEOC but rather was carried out at Area Command with Incident Action Plans submitted to



the PEOC. Planning in the PEOC during the emergency was performed as a non-dedicated role while still interacting with multiple agencies and departments in order to fulfill the planning function. No dedicated desk is available in the PEOC for the Planning Section Chief.

SO13: Some municipalities identified that the ICS works well to support smaller incidents but were unsure how to fully leverage it during long-term incidents requiring cooperation with numerous agencies. These municipalities also identified having received limited ICS training prior to this event.

SO14: Many of the municipalities identified a challenge in coordinating with the province when the local level response was being managed through a formal ICS structure and the provincial response was being managed through a system using the tenets of the ICS, modified to fit the needs of the PEOC.

OFI #3 The floodplain maps used to support land-use planning along the river are outdated and are inadequate in supporting current building activities

SO15: The Province has identified the need for flood-hazard mapping as part of the Climate Change Action Plan. [7]

SO16: The current provincial floodplain maps in use for building and permit purposes were produced decades previously. Since these maps were produced, a number of factors have changed including, but not limited, to topography, land use, river flows, erosion and tree coverage.

SO17: Land-use planning rules and regulations within the Province are inconsistent and still allow individuals to build houses where known flooding occurs.

SO18: Businesses that are being built within the floodplain in some municipalities are required to develop, submit and adhere to a plan for mitigating flooding effects as a condition for building in these affected areas. However, no evidence of a similar system was discovered for building residential structures.

SO19: There does not appear to be a consistent approach in identifying and determining floodplains within municipalities across the Province. Municipalities are responsible for managing and mitigating future damage to floodplain properties and this may, at times, be inconsistent in its approach.

OFI #4 Flood maps are developed and used on a case-by-case basis by larger municipalities and limited coordination between responding agencies for sourcing and use often leads to duplication of effort



SO20: Several municipalities used flooding maps that provided a visual representation to emergency management officials as well as the public of the anticipated affected areas. This was a valuable resource to identify which areas would be affected (and to what degree) by the rising water levels. These were organized and developed on an as-needed basis at the municipal level and were not necessarily shared with or leveraged by neighbouring communities.

SO21: Most municipalities that used flood maps in 2018 shared this information with the public, providing a clear understanding of the expected effect of the flooding and to support them in personal decision making.

SO22: Municipalities often don't have the resources or expertise needed to source applicable emergency management software. The implementation of relevant training programs for the software is also difficult at a municipal level due to the associated costs. By sourcing emergency management software and developing applicable training programs on a provincial level rather than a local level, it eliminates the duplication of these efforts by individual municipalities.

SO23: A lot of the smaller municipalities, as well as local service districts (LSD), don't have the resources required to generate and analyze their own data and rely on data provided by provincial agencies to support their emergency response planning.

SO24: Individuals at the provincial level also identified the need for visual representations of the forecasted numbers in order to have a better understanding of what the water levels mean and to interpret their potential impact on the shoreline and at-risk infrastructure (e.g. homes, businesses, schools, etc.). Changes have been made to the River Watch Mobile site in 2019 to provide visual representations (i.e., bar heights) of the forecasted water levels in comparison to advisory, watch, warning and historical flood levels.

SO25: Residents attending the public consultations indicated the desire to have flood risk mapping available to them to support personal decision making.

OFI #5 The interaction between municipalities, LSDs and REOCs is unclear and, at times, inconsistent

SO26: Many of the response operations performed to support LSDs during the flooding was performed by neighbouring municipalities, not by the REOC. There is no clear guidance as to how support from a neighbouring municipality should be sought, managed or compensated for.

SO27: There was, at times, inconsistency in the actions of local service managers (LSM). For many individuals this is a secondary position resulting in differing priorities during an emergency compared to dedicated emergency management staff such as REMCs or other provincial staff.



5.3 Inter-agency coordination

BP #2 An informal network of municipal emergency management coordinators exists that share lessons identified and work to share best practices amongst participants to further enhance preparedness within their communities

SO28: This peer support system allows municipalities to provide more support to neighbouring communities and other municipalities and reduces their reliance on REMCs for the dissemination of this information.

SO29: Several municipalities implemented successful response operations to respond to the flooding, however no formal mechanism is currently in place to capture these best practices and share these findings with other affected communities. The relationships forged through this network of municipal emergency management coordinators supported informal information exchange during the flood response. Water levels and comparisons to the flood forecasts were shared when possible. With the delay in updates from the flood models, this real-time sharing of information proved to be very beneficial.

OFI #6 The transition from response to recovery does not adequately support the coordination of immediate / early recovery activities

SO30: Although a Recovery Team was put in place, staffing levels at the PEOC following the transition to recovery were reduced, and this caused a reduced capacity for support at the provincial level.

SO31: Following deactivation of the REOCs upon completion of response operations, municipalities felt they lost the support of the REMC and were unable to coordinate recovery operations using the same coordination process as the response. Some of the REMCs supporting response operations were also deployed from other regions, and as these individuals returned home to their normal regions, this problem was amplified.

SO32: Municipalities felt that situational awareness and coordination provided by the province was decreased following the deactivation of the PEOC once the recovery stage was reached.

SO33: Once the PEOC is deactivated and the Recovery Manager assumes responsibility for the incident, it is unclear for the REMCs how lines of communication might change and what the appropriate chain of command is. Detailed training on supporting recovery operations at the local / municipal level seems to be missing for REMCs.



OFI #7 Staffing levels within the regional operations centres was, at times, managed ineffectively

SO34: Many of the different provincial departmental resources located at the REOC were not required during off-hours but were required to maintain a presence during the entire event due to the REOC activation level. This resulted in "burn-out" of staff.

SO35: Some individuals were tasked with roles within the EOC to support the full-time operations (i.e., night-time positions) when they would have been more appropriately used in their primary role during busy daytime periods.

SO36: It was identified through the data collection process that the REOCs may have been activated at a higher level than required. It was suggested that the REOC could have increased its activation to the highest level at the height of the response, but de-escalation of the activation level could have been performed in a more timely manner.

OFI #8 A misalignment in priorities for public information dissemination exists between the response agencies and technical support agencies

SO37: There is confusion regarding the requirement for ELG to perform a forecast on the weekends. Although ELG has the required expertise and can assure NBEMO and the public that there is no anticipated change in levels or flood situation over a given period, the public relies on daily forecasting information to become resilient and take control of their own situation. Public perception is that the flood levels can change day to day which is why the daily forecast updates are requested by the NBEMO even when changes to the overall situation may not be expected.

SO38: Municipalities identified that residents and responders alike were requesting the five (5) day forecast when it was known to be available. For responders, this information helped provide guidance as to whether the situation could be expected to improve or worsen depending on the anticipated water levels.

SO39: Many members of the public indicated that the flood level predictions were inaccurate. This was primarily a result of the flood levels rising very quickly. Although the flood levels were generally accurate, the maximum heights were reached much sooner than forecasted. This created difficulties in individual resident evacuations and tremendously affected the public's planning for the flood. Additionally, this affected the public's confidence in the accuracy of the data being provided by the government.



OFI #9 The scope of the roles and responsibilities of municipal resources within regional Incident Command Posts (ICP) was not always clear and / or consistent

SO40: A Regional ICP was set up with the expectation of municipal support for command and control. When municipal resources were required to support regional command post activities this caused stress for local resources to maintain essential services within their community. This was especially true in situations where senior municipal emergency management personnel were required to fulfill a command and control function, as this resulted in resources being dedicated to this regional position, rather than being able to support municipal positions.

SO41: Municipalities supporting regional response operations identified that the procurement system that was in place to purchase resources (e.g., gas) required to sustain operations for the regional command post was unclear.

OFI #10 Varying levels of experience amongst the REMCs and vacant REMC positions within several regions in 2018, resulted in coordination issues with some of the affected municipalities

SO42: Since the 2018 Freshet, REMCs were hired and now all 12 regions have their own designated REMC.

SO43: The Province had REMCs supporting multiple regions and as a result, an REMC had to be called from a non-affected region to support response activities of an affected region. By being re-assigned from outside their region, the REMC was unfamiliar with the requirements of the municipalities and did not have pre-existing relationships with the local emergency management coordinators that are essential in building trust before emergencies occur. This resulted in an element of reactivity rather than proactivity in supporting emergency operations.

SO44: Some municipalities and smaller communities identified that NBEMO does not appear to understand their needs or requirements. The use of over-arching plans and templates provides good guidance for these communities but can be difficult to interpret or personalize with limited dedicated emergency management staff. The introduction of a dedicated regional coordinator will help bridge this gap.

SO45: The hiring of the additional REMCs has provided the capacity needed to appropriately serve all the regions and to provide advice, clarity and information at a local level as required. Allowing the REMCs to focus on one region has provided the opportunity to better understand each regions' challenges and to help them in planning and preparedness activities.



OFI #11 Liaison Officers were not fully leveraged to support emergency operations and the exchange of information between responding organizations

SO46: In previous years, an NBEMO representative has been situated within the ELG Hydrology department to support ease of access and exchange of information. The use of this Liaison Officer has been utilized less and less and was not used during this emergency. It is unclear who this representative would be.

SO47: Liaison Officers were not utilized between the local and regional levels of response. All communications taking place between municipalities and the regional level were occurring through phone calls, teleconferences or emails. Limited face to face interactions were present.

OFI #12 Information exchange between organizations was sometimes hindered, resulting in possible safety concerns for responders

SO48: Information concerning which houses were “powered” and which houses had their power cut remained confidential with the power companies. In previous years, power to entire neighbourhoods was cut, however now that individual homes are being assessed and treated as required, first responders and other responding agencies faced an increased risk when performing wellness checks on houses or preparing residents for evacuation.

SO49: The lack of information regarding which houses remained powered was also difficult in the coordination with other critical infrastructure owners and operators. OPSA was unable to inform telecommunication firms as to which houses would be safe for entry.

SO50: Similarly, it was identified that first responders are not privy to Red Cross information concerning which houses have already been evacuated and who have checked into a reception centre. The absence of this information reduces the efficiency of wellness checks by requiring first responders to visit each house, even if it has already been evacuated. This, too, poses a safety concern by forcing first responders to check every house when efforts could be focused on those requiring evacuation, if the need exists.

OFI #13 Despite concerted efforts from the Province (i.e., 72-hour preparedness public education), there is still disparity regarding the scope of responsibilities of homeowners, municipalities, regions and the Province in an emergency

SO51: During the public consultations, members of the public were asked their opinions on the responsibility of the homeowner, government and first responders in terms of evacuation following a flood. Responses varied from 100% - 10% resident responsibility and similar corresponding response for both government (70% - 0%) and first responders (40% - 0%). This wide range of responses identifies inconsistencies in the understanding of each participating member’s responsibility in these flooding events.



SO52: It was identified on multiple occasions that additional public education is required to convey the distinction between municipalities and LSDs in an emergency. A lack of education in this regard lends itself to negative public perception when neighbouring communities are receiving different resources and different levels of response.

SO53: With the provision of sandbags by the Province in 2018 as an extreme emergency management measure, residents have associated the deployment of sandbags as being a provincial responsibility. Additionally, it is still unclear for some municipalities whether sandbags are a municipal responsibility or an individual homeowner responsibility.

SO54: Municipalities identified that a lack of clear direction and guidance as to their responsibilities, those of the Province, and those of homeowners makes it difficult to plan and prepare for these types of events.

OFI #14 **Very few resources were provided to support pet owners and evacuees transporting pets**

SO55: It was identified that there are no agreements in place at a provincial level regarding who can provide services for pet owner evacuees. There is no discussion of pet care within the Provincial All-Hazards Plan.

SO56: For many residents, the decision to stay in their home despite a potential flooding impact relied heavily on having pets and not having sufficient accommodations for themselves and their pets. Saint John SPCA established a pet shelter but this was not co-located with a reception centre.

5.4 Critical infrastructure

BP #3 **The involvement of critical infrastructure owners and operators in emergency response supported an effective operation through the provision of resources and equipment**

SO57: Boats and boat operators were provided by critical infrastructure owners and operators in addition to those provided by other provincial and federal organizations. These boats assisted in response operations by assisting in patrols of neighbourhoods and transportation of resources to affected areas. The use of boats provided the opportunity to identify the scope of the damage, extent of the flooding, and to improve situational awareness amongst relevant EOCs.

SO58: Boats and trains provided by critical infrastructure owners and operations were used to support rescue operations for evacuees which were in waterlocked areas and only accessible by rail and / or boats.



OFI #15 The process for information flow from critical infrastructure owners and operators to government representatives was not always clear or efficient

SO59: Once the PEOC is activated to Level 2, the OPSA assumes responsibility for communicating directly with the critical infrastructure owners and operators. Information is then briefed back to the PEOC as part of the briefing cycle. This results in a potential lag for information exchange as well as an increased risk of information being lost or omitted through the summarization process.

SO60: Through the involvement of the OPSA, decisions may be made that affect the critical infrastructure response for a region or a municipality. It was found that these decisions were not always communicated adequately to the regional or local level resulting in an unexpected response, equipment or resources. As an example, boat resources were provided to the REOC without their advance knowledge.

SO61: Some of the regions identified a disconnect in the understanding of what OPSA required of them (and ultimately what the critical infrastructure owners and operators required of them). They were unclear of the chain of command that would be used to communicate with OPSA and how this information flow should be followed in terms of resource requests and requirements.

SO62: Municipalities have an understanding that they are supposed to exhaust their resources prior to obtaining support from the region and ultimately the Province. Due to this, many municipalities used local contacts for critical infrastructure owners and operators to request resources. At times, this caused duplication in requests as municipalities were attempting to acquire their own resources from the same suppliers and / or critical infrastructure partner(s) as were the REOC via OPSA.

SO63: Through the involvement of OPSA, many regions primarily received critical infrastructure resources, resulting in municipalities not having the same access to these resources as LSDs. This was often circumvented through the use of informal channels but this was not always efficient or effective. There was no evidence in place of a policy which dictated how the resources were to be distributed and what areas or services should be prioritized.

SO64: With OPSA's involvement relying on the activation of the PEOC, some individuals felt that their involvement was delayed due to the various timing and activation levels of the municipalities and regions.

SO65: Several instances were reported of confusion in the chain of command in terms of requests for fire services' support and resources. It was not clear if requests should be placed with the REOC or directly through the Office of the Fire Marshal. Resources available through the Office of the Fire Marshal were not clear and were not reported up through the expected chain of command.



OFI #16 Processes and plans are not widely available to support the management of donated resources

SO66: Some command posts and municipalities leveraged local knowledge and best practices to manage boat operations. Several of these best practices are based on existing linkages, partnerships and experience. However, no official Standard Operating Procedure (SOP) exists to share these best practices with other response operations and provide guidance on how donated resources can be integrated into local and / or regional response operations.

SO67: Some ICPs with limited experience managing boat operations leveraged locally available experts to develop ad hoc plans to manage the donated resources. No plans were available to support these operations, nor were the ad hoc plans formalized in an official capacity following the emergency.

SO68: Training, education and plans are lacking for the management of donated resources. A number of items need to be considered prior to engaging donated resources including safety requirements, proper personal protective equipment (PPE), insurance, cost recovery, etc. These items were not always considered prior to engaging these resources in operations.

5.5 Communications

BP #4 Public information was accurate and consistent in its messaging

SO69: Through the conduct of the web survey, it was found that 82% of respondents (Figure 4) felt that information to the public was accurate and 77% of respondents felt that information was shared with the public in a timely manner.



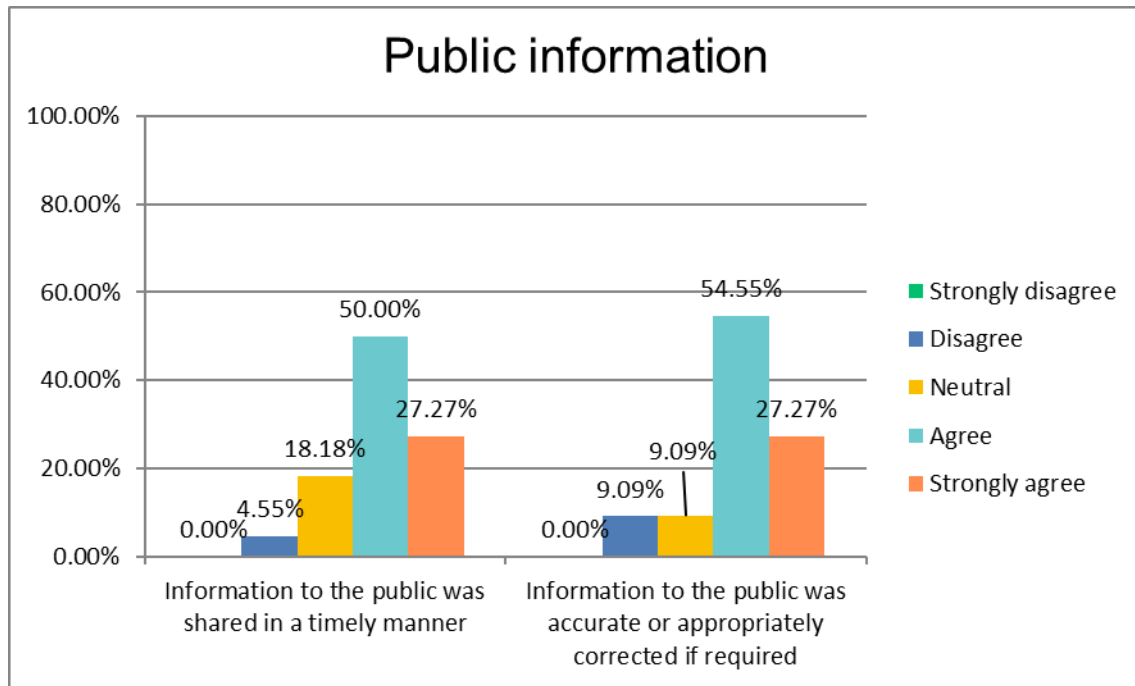


Figure 4: Exchange of public information

S070: Key messaging was included in daily situational reports. This resulted in everyone receiving the same information, including elected officials.

BP #5 The use of the Trunked Mobile Radio (TMR) system was beneficial in supporting emergency response operations

S071: Many responders felt that the use of the TMR system was extremely beneficial in supporting communications throughout the response.

S072: The TMR system supported the use of different talk groups which, when considering the number of different agencies and groups involved in the response, was invaluable.

S073: Several agencies that weren't already using TMR were equipped prior to deployment. This was quite effective in having these agencies join the relevant talk groups and respond on the same net.

S074: Resources from the Provincial Mobile Communications Center (PMCC) were available at the regional level to manage the flow of information through the TMR system.

OFI #17

Communications Staff did not leverage the Joint Information Centre (JIC) to develop and deliver consistent messaging to the public

SO75: There is a lack of awareness as to the requirements for the activation of the JIC. Additionally, activation of the JIC is not considered within the Provincial All-Hazards Plan nor the Flood Contingency Plan.

SO76: During the flood response, coordination was required amongst several departments, organizations and agencies to ensure appropriate messaging was developed for the public. Messaging was produced based on trends in public enquiries which indicated a need for public health information, food safety, crop status and more. Organizations were contacted individually when this public messaging information requirements were needed.

SO77: Questions from the public being received into the PEOC regarding CI and other applicable departments did not have a communications representative present to support that organization's official messaging or official response. All requests for public information and messaging were arranged as appropriate with applicable off-site representatives, although there was no evidence of difficulties in communicating remotely with these individuals.

SO78: Some municipalities identified a delay in receiving the official provincial public messaging. This resulted in municipalities issuing their own messaging to the public. This increased the duplication in work required to produce this messaging as well as increased the risk of misalignment between the various sources of official communications.

OFI #18

A lack of regular briefing cycles hampered the information exchange between the provincial, regional and municipal responses

SO79: During the interviews it was identified that pre-determined and scheduled calls between the municipalities and the REOC would promote consistency in attendance and support the municipalities in developing non-conflicting business cycles. Additionally, it was anticipated that the use of regular briefing opportunities between municipalities and the regional coordinators would support the proper chain of command up to the provincial level.

SO80: Some municipalities indicated that there were no regularly timed briefings with their REOC and weren't always aware of when these were expected to take place. Additionally, requests for information often came very late in the briefing cycle, leaving them very little time to prepare material to contribute during regular briefings.



OFI #19

Details on road closures and transportation routes affected by flooding were not presented to the public in an effective manner

SO81: A large volume of calls were received by the NBEMO Admin Desk concerning road closures and accessibility of transportation routes. These calls were primarily received since the 511 website is not intuitive for the user. These calls hindered NBEMO staff in taking calls related specifically to the emergency, as is the intent of the Admin Desk.

SO82: The Department of Transportation and Infrastructure (DTI) currently has a road closure map but some municipalities are looking to develop their own. These maps would provide information in real-time and be easier to use. Changes at a provincial level may replace the need to implement this at a municipal level.

SO83: Participants at the public consultations indicated that one of the most important pieces of information required during a flood event is road conditions and road closures. Communities that were isolated due to road flooding required direction on how to evacuate to non-affected areas. This information was not always readily available.

OFI #20

Use of the Ops Account as a communications tool is ineffective in a response environment

SO84: Some users of the Ops Account felt that essential information was often hard to locate due to the excess amount of information being shared.

SO85: The Ops Account is used as an all-informed network. It provides insight into what each user is doing and can be used to share best practices and lessons identified. Although a helpful tool at a command level and provides useful oversight, this amount of information is not practical at a user level when they are focused on their own response actions.

SO86: Many users of the Ops Account found the number of communications to be overwhelming. Users identified that a lot of time was spent sorting through excess correspondences to find the valuable and relevant information. This time would have been better served in operations and increased the risk of losing critical, time-sensitive information.

SO87: Operators identified that it was not possible to maintain their regular duties while reading and evaluating each message that was received. Operators often had to find other ways to more easily scan and summarize the information coming in.

SO88: The Ops Account was difficult to manage when involving OPSA, as much of their information is confidential and details cannot be widely shared. This resulted in confusion when trying to determine what information involving critical infrastructure partners had already been actioned, when only limited information was available.



OFI #21 Additional information could be shared with the public to maximize public confidence

SO89: It was identified through the interview process that additional information is available which is not currently provided on the River Watch website, including information relayed by sensors attached to barrels to monitor ice jams and water flow.

SO90: The public has a strong expectation that the military should be involved in response operations for large-scale flooding. However, the public does not always understand that the military does not necessarily have the resources or capabilities best suited to responding to flooding events. It was not evident that the public understood that federal assistance was requested and received and that this non-military federal assistance was better suited for supporting a response involving flooding.

SO91: Many municipalities rely on the messaging issued by the Province and share this information with the public by copying or re-posting. Due to the broad nature of this material, additional sources of information such as gauge levels are important to re-distribute and share.

SO92: Gauge values are available via a link on the River Watch website. However, due to the update process, the values available via the website are often several hours out of date. Due to the quick nature of the rising waters in 2018, more current information was sought and desired by both municipalities and members of the public.

SO93: Through monitoring of websites and social media sites, it was evident that the public sought information about the emergency. The City of Fredericton had a very large number of views of the City's webcams during the emergency operations.

SO94: Some municipalities also indicated that all relevant technical data was not available to them. Ice flow flood mapping was not readily available through the River Watch website nor was it shared at a municipal level. This information could have been used to support decision makers at a local level.

SO95: Many residents indicated the desire to see real-time river gauge values in order to support their personal decision making.

SO96: Participants of the public consultations indicated that the updating of the water level projections on a daily basis (i.e., 24 hours) was not frequent enough.



OFI #22 Existing tools are not conducive to sharing real-time information (reports, maps, data, pictures, etc.) among responders and multiple levels of government

SO97: A Common Operating Picture has been initially developed but is not widely deployed. It is shared at a provincial and regional level but not deployed to a municipal level yet. This is primarily due to security and privacy of information that is contained within.

SO98: It was identified that written situational reports were time consuming to produce and served only as a repository of information that was already available.

SO99: Municipalities have identified the need to have a system where task distributions, reports and resourcing can be shared Province-wide. This all-encompassing system would allow for standardization of information.

SO100: The introduction of a Common Operating Picture would support regions to see information from a top-down view. The ability to sort and filter the available information would support different levels of government in identifying and viewing the information that is relevant and important for their response.

OFI #23 Public alerting tools are applied on a case by case basis by municipalities and limited coordination between responding agencies for sourcing and use leads to duplication of efforts

SO101: Municipalities are responsible for the sourcing, purchase and maintenance of their own public alerting tools. This results in different tools being used in different areas to varying degrees of effectiveness. Additionally, implementation at a local level means not all communities receive the same constancy of alerts.

SO102: The Province currently has access to Everbridge and Sentinel alerting systems. Municipalities that are interested in using one of these systems for local alerts are required to research and source their own system, often resulting in duplication of efforts.

SO103: Some regions and municipalities would like a provincial-wide alerting system to allow the Province to track and monitor the municipalities' status.

SO104: Information (e.g., number of available sandbag suppliers) is stored and accessible on a provincial database through the Emergency Operations Centre Sentinel System. However, since there is no coordination of these systems between the Province and municipalities, the municipalities are not privy to access this information directly.

SO105: Registration for the receipt of public alert messaging through Sentinel at a municipal level is low. Registration efforts are often directed to at-risk communities.



OFI #24 Monitoring of public communications was sometimes lacking in its effectiveness for control and identification of misinformation

SO106: It was identified that social media was a medium for the distribution of false or misinformation. Scanning of social media for rumours and rumour correction were identified as priorities in the management of public information at the provincial level.

SO107: Although social media was scanned and misinformation was identified, it was indicated that not enough resources were available to correct and address each piece of incorrect information.

SO108: Sentinel has a capability to perform data mining and to pick up key words for public communications however, it was not evident that this system was commonly used.

SO109: Some municipalities found it beneficial to engage local spokespeople and community advocates on social media. By engaging with these individuals, they were able to monitor the message that was being shared with the public and provide clarity if the messaging was not aligned with the City's or the Province's.

SO110: OPSA provided resources to perform social media scans. The information from these scans was shared within the executive brief to provide elected officials an overview of public perception and the main themes that the public were expressing. However, the information garnered from these scans were not shared with the communications team participating in the response.

OFI #25 Municipalities did not receive adequate direction and guidance from the REOCs to support their response

SO111: Municipalities indicated that they did not receive adequate direction on response objectives, goals and strategies at a regional or provincial level.

SO112: Municipalities indicated that the majority of information received by the REOCs was through situational reports. However, these reports served primarily as a summary of the response activities which had already occurred rather than a strategy going forward.

SO113: Municipalities found that they were often seeking information from the REOCs that they felt should have been readily available or already provided.

SO114: Documents such as the regional Incident Action Plan were requested by some municipalities but were not provided during response operations.



SO115: Priorities of the REOC were not shared with municipalities. This resulted in municipalities not being able to align or coordinate their priorities with those of the region.

SO116: A total of 27% of participants from the online survey indicated that they disagreed with objectives, strategies and tactics being well defined and communicated between operations centres (Figure 5).

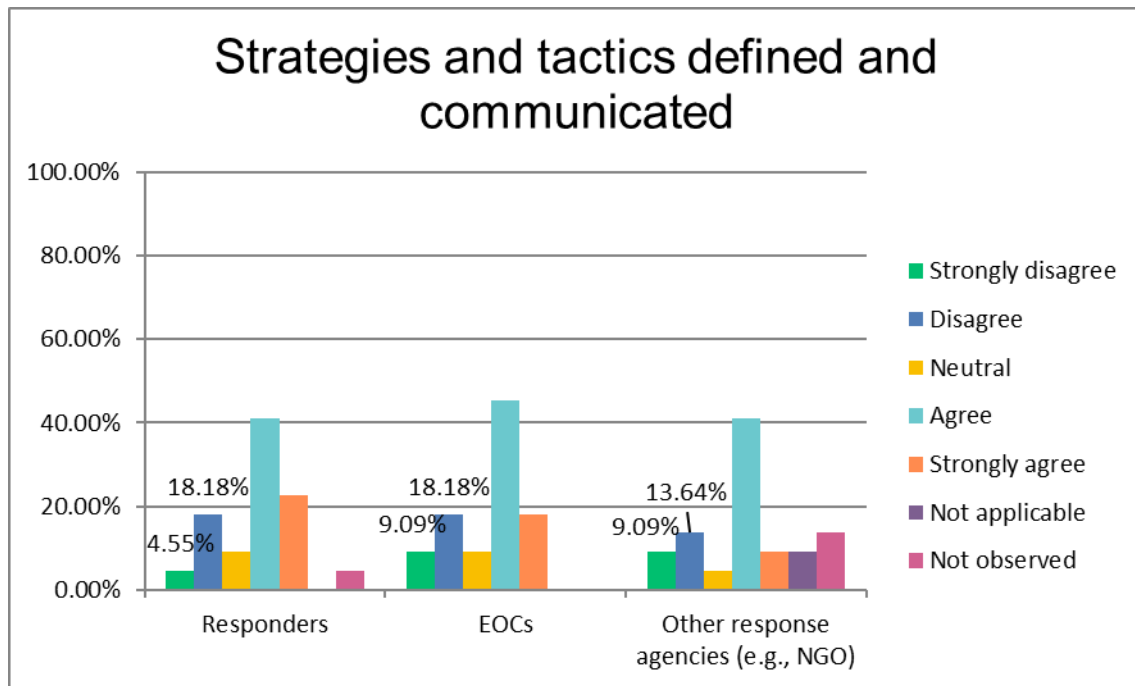


Figure 5: Strategies and tactics communicated between operations centres

OFI #26 Public education is required to develop understanding amongst the public as to the complexities involved in the development of flood forecasts

SO117: There was no evident disclaimer on the River Watch website that the four (4) and five (5) day forecasts are less reliable than the three (3) day forecasts. Additionally, the information available on the forecasting page of the website does not clearly indicate that the information being provided is a forecast, meaning it is based on predictions and does not serve as a guaranteed indication of the final water levels.

SO118: The current River Watch Mobile site (April, 2019) provides individual forecasts for the various locations monitored and modeled. As applicable, information is available either as a five (5) day forecast or as a current day forecast. There is no information available on the site that indicates why some areas are forecasted for multiple days and why others only have the immediate information or single day predictions available.



SO119: Some communities felt that not enough public education was available to the individuals who are not familiar with flood preparedness. Individuals who face the threat of flooding on an annual basis are more familiar with the tools and resources provided by the Province, but those who were new to this type of threat were not aware of what resources were available or how to interpret the information that was available.

OFI #27 Public communications regarding the potential long-term health effects of the flooding were inadequate

SO120: The Department of Health has a community outreach program with the ability to deploy resources to communities if the need exists. There was no evidence from the public consultations that this team of health officials visited the affected communities following the flood.

SO121: Only 55% of participants from the online survey indicated that appropriate information was shared with the public concerning the available psycho-social support following the flood response (Figure 6). This information could include applicable helpline contacts, support group material and general information on the importance of mental health and mental well-being following an emergency.

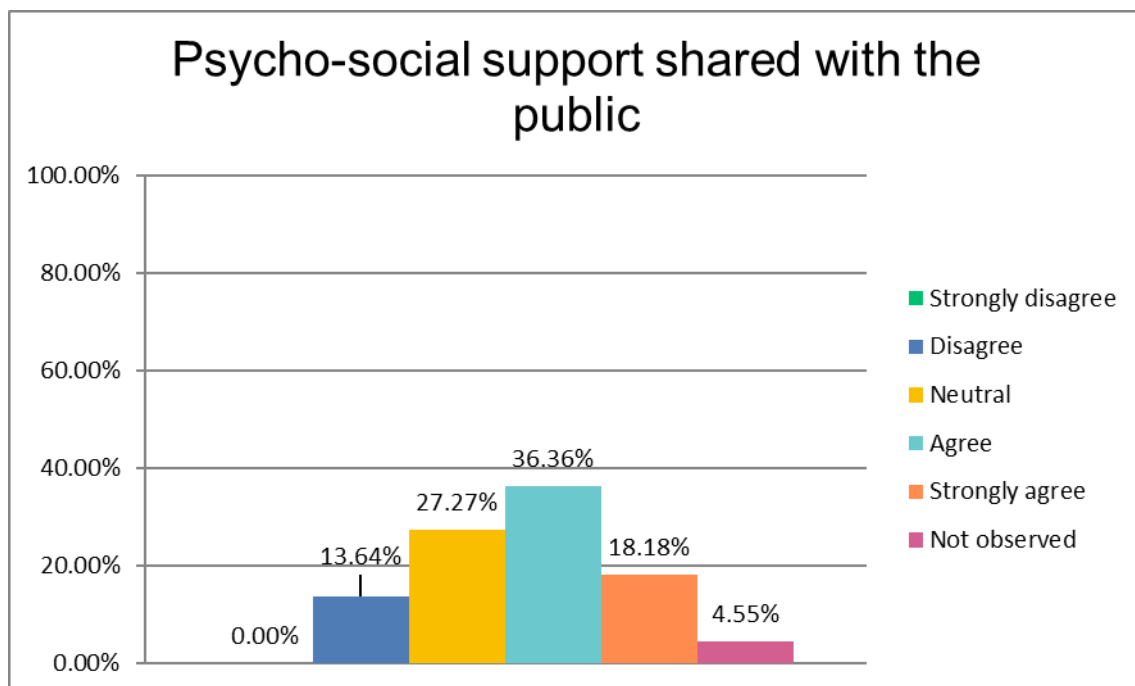


Figure 6: Public psycho-social support

SO122: Participants of the public consultations indicated a lack of information regarding the long-term health impacts of flooding including chronic conditions and mental health impacts. The importance of receiving information on how to cope with some of the stress and mental health impacts was a reoccurring theme within many of the public consultations.

5.6 Preparedness

BP #6 **The pre-identification of additional resources to support emergency operations is important to ensure sustained long-term operations**

SO123: Buy-in from senior management was provided to leverage the use of government employees in emergency operations roles as required.

SO124: A list of trained individuals capable to support the communications activities during an emergency has been developed.

SO125: Some REOCs have developed an inventory of available and trained administrative support from other government departments for use during emergency operations.

BP #7 **Development of tools such as checklists is beneficial in supporting local level response**

SO126: Based upon the reoccurring nature of the spring freshet impact, some municipalities have created a type of “Playbook” which outlines which areas are expected to flood based on the forecasted water levels and what various city departments need to do to respond to these levels. In conjunction with the effective use of flood map models, this tool is beneficial in addressing the specific needs for the communities, roadways and infrastructure that are expected to be impacted.

SO127: Tools such as a “Playbook” or other checklist or guidance document are not available for all municipalities. Respondents of the online survey identified the need for additional work and coordination of local plans. A total of 36% of the online survey respondents indicated that local emergency plans were not aligned with the Province’s overall plan (Figure 7).



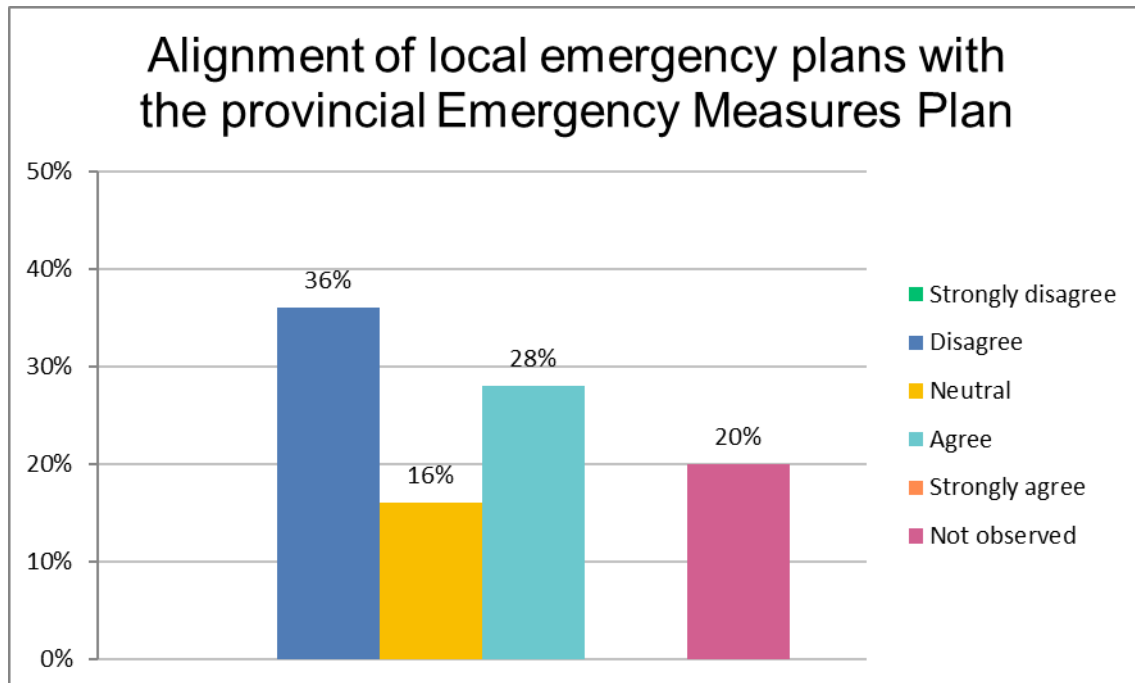


Figure 7: Alignment of local emergency plans

OFI #28

Leveraging methods of communication with the public beyond web-based methods and social media is important to raise public awareness

SO128: In several of the smaller communities affected by the flooding, residents were relying on unofficial information sources, such as informal community social media sites. These sites are not typically tied into the government information chain and thus, are delayed in receiving updated official information.

SO129: Many municipalities indicated that they did not seek traditional paper-format methods of communicating with the public. However, most respondents interviewed identified that a paper-format method of communication would be beneficial within their community.

SO130: Although the press conferences provided useful information and involved representatives from relevant departments including NBEMO, Health and ELG, many members of the public consultations indicated that they did not have enough time for listening and absorbing all this information. Press conferences were held on a daily basis and were subsequently posted on YouTube for public access. Press conferences were typically an hour in length.

SO131: The River Watch website is currently only available in a web browser format. There is no dedicated application available for download.



SO132: Residents indicated that the deployment of NBEMO personnel to support post-flood assistance and paperwork was very useful. However, no NBEMO personnel were staged at affected community centres or other local locations to support information exchange during the flood. It was anticipated that the staging of NBEMO personnel in affected communities would support real-time information exchange on the developing situation, safety concerns and other applicable information that was difficult to obtain, especially if suffering a loss of power.

OFI #29 Resourcing within the ELG Hydrology department is insufficient to support the forecasting requirements of the spring freshet season

SO133: There are very few trained staff available to support the forecasting requirements (e.g., water levels, water flow) during the freshet season and is a concern understood by both ELG as well as NBEMO.

SO134: Currently there is no formal back-up position in place to support the forecasting role and training for this position requires more time than what is available in their regular operations. There are limited opportunities to pull in staff from other departments or from other provinces due to the high requirements for training and the detailed knowledge required to make these forecasts.

SO135: The current capacity of the Hydrology department only allows for one-full time forecaster. There are not enough staff available to cover overnight or weekend shifts.

SO136: The Hydrology department would like to expand the products and services they offer, including modifications and improvements to the forecasting models. They would like to explore developing infographics and public education materials on flood forecasting as well as exploring additional models including the generation of a 24 curve which reflects the impact of the tide. However, they do not have the necessary capacity to pursue these opportunities.

SO137: A total of 23% of participants from the online survey indicated that there were not enough resources available to support preparedness activities such as monitoring, forecasting and issuing warnings and advisories (Figure 8).

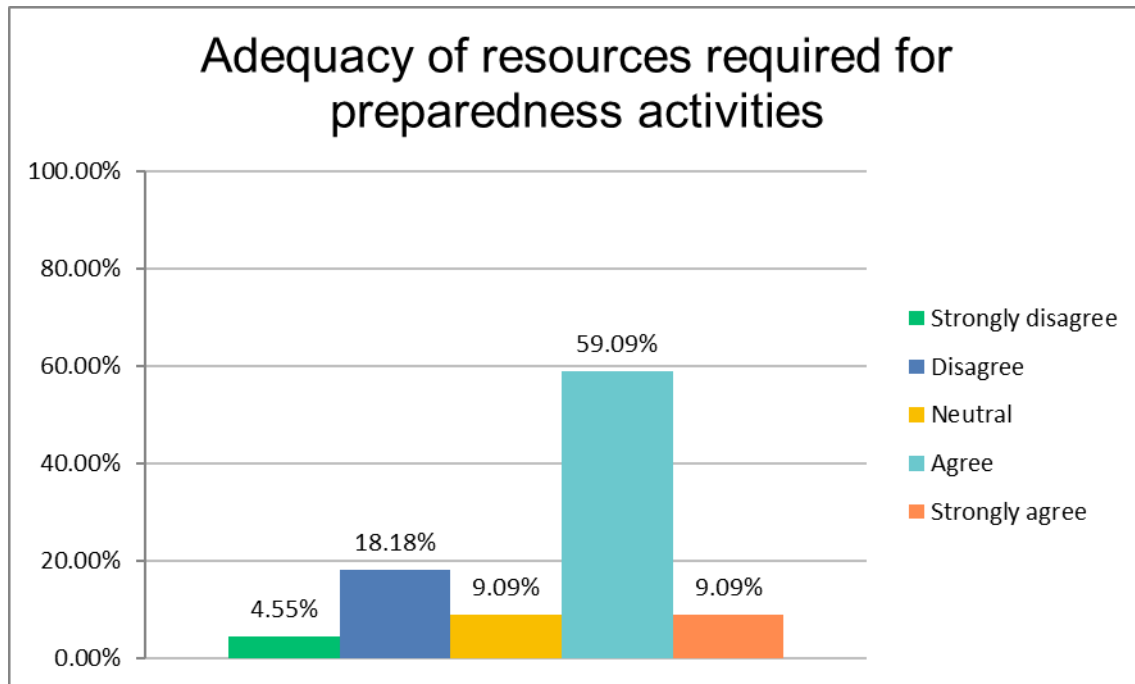


Figure 8: Resources for preparedness activities

OFI #30 Available data accessed by the ELG Hydrology department is insufficient to support the emergency operations requirements during the freshet season

SO138: Several of the gauges that support the monitoring of temperature and are required as inputs into the forecasting model are older and can only provide data once in a 24-hour period. This results in the inability to receive updated data for these monitors if running a second model each day. If staffing capacity existed to support a second daily model, the second forecast would be based on a mixture of current and outdated information.

SO139: There is an opportunity for ELG to perform more detailed forecasting that involves specifying results with a high probability and a low probability. However, the ECCC data is only received daily and is received at a time which conflicts with the production of this model.

OFI #31 Additional emergency management personnel are required at the provincial and regional level to support emergency planning and response

SO140: Dedicated logistics personnel and formalized processes are considered essential to support the emergency response and preparedness activities and were established at Area Command. This position would support the development of supply lists, coordinating purchasing of supplies with municipalities and creating pre-negotiated rates for supplies. Additional logistics personnel would also support the creation of provincial and regional stockpiles to ensure supplies



(e.g., sandbags, swift water PPE) are considered, purchased and maintained in advance of an emergency situation.

SO141: The hiring of a training and exercise coordinator would benefit regions and municipalities across the province. A consistent training and exercise program would ensure that all regions receive the training resources they require, especially smaller communities where internal budgets may not be able to provide this level of training. The conduct of provincial wide training opportunities also allows for capacity building and exercising at a local level. The lack of training opportunities was identified at a provincial, regional and municipal level.

SO142: A dedicated Planning position within the PEOC is required to work with REMCs to improve the emergency plans at a local level across the Province. Many of the municipal plans are adequate in supporting a response and require minimal updates but significant work is required in addressing local plans for smaller communities.

SO143: 45% of participants from the online survey indicated that there not enough resources available to support the long-term operations from the flooding (Figure 9).

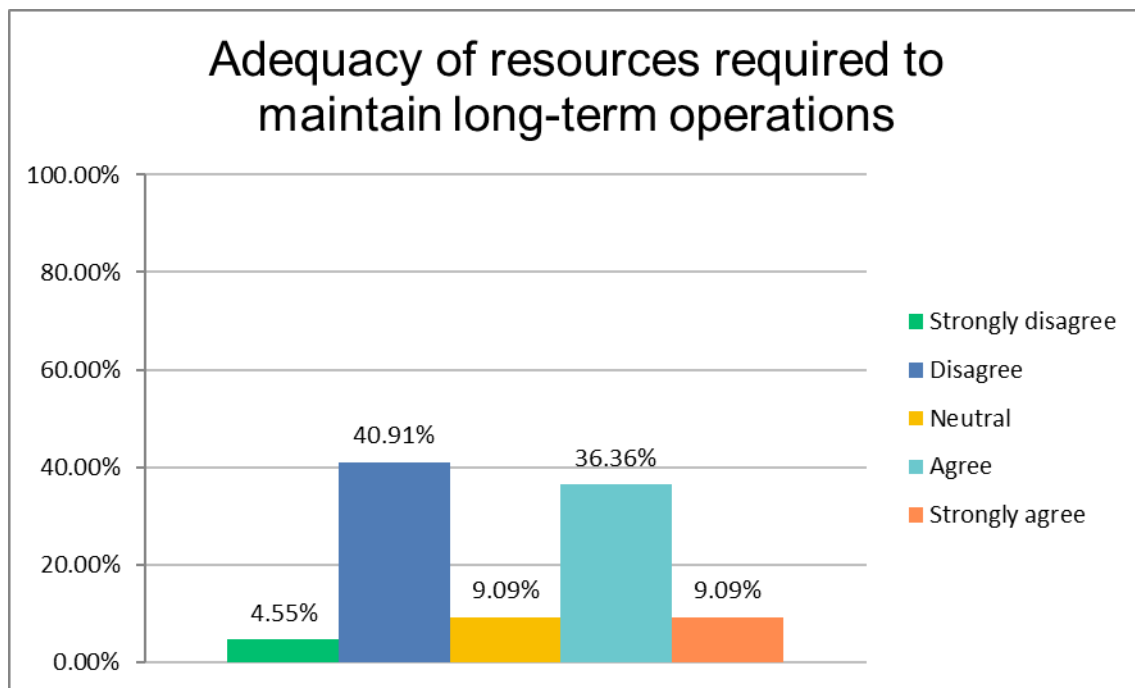


Figure 9: Resources required for long-term operations

OFI #32 Training and experience are required to allow REMCs to fully support other regions within various functional roles

SO144: Training is available to the REMCs and a training plan is in place but some REMCs are not familiar with what this plan entails.

SO145: If not fully trained on all emergency management positions (e.g., logistics, operations, planning, etc.) an REMC deployed to support another region may not have the expertise required to support the necessary supporting role.

SO146: REMCs who are familiar with other regions based on past experience, are not necessarily called upon to support the regions in which they are familiar. No pre-deployment plan based on regional knowledge and / or experience appears to be in place.

SO147: It was indicated that by not knowing in advance which region an REMC is to be deployed, it does not allow them an opportunity to familiarize themselves with the region and applicable plans. REMCs identified the need to be more familiar with the relationships of the regional partners, processes and requirements.

OFI #33 Modifications to infrastructure are required to mitigate the impact of flooding to areas that are known to be prone to flooding

SO148: In some communities, roads which are consistently flooded with rising waters are not raised or not modified at all. This results in the need for access passes, road closures and alternative routes.

SO149: Financial reimbursements are available at the provincial level for re-building efforts that consider mitigation measures, but this did not seem to be fully understood by members of the public.

SO150: It was identified during the public consultations that there is currently no government program in place that is geared towards identifying shortcomings in a home or providing advice on minimizing flood impact before a flood situation occurs. Mitigation efforts are attempted following a house being involved in a flood, but a preemptive approach is not taken in this regard.

OFI #34 Additional public education is required on River Watch, the government's involvement and available supporting resources

SO151: Some communities are not familiar with the River Watch website, nor how to access it. The Province relies heavily on the River Watch website to disseminate and share flood information with the public.



SO152: In previous years some regions, municipalities and local service districts held community meetings in potentially affected areas. These meetings served to discuss flood preparation requirements, preparedness activities and available resources. Many of these meetings were not held in 2018 or were scheduled too late in the spring freshet season.

SO153: A total of 18% of participants from the web survey indicated that sufficient information concerning immediate response efforts was not shared with the public (Figure 10).

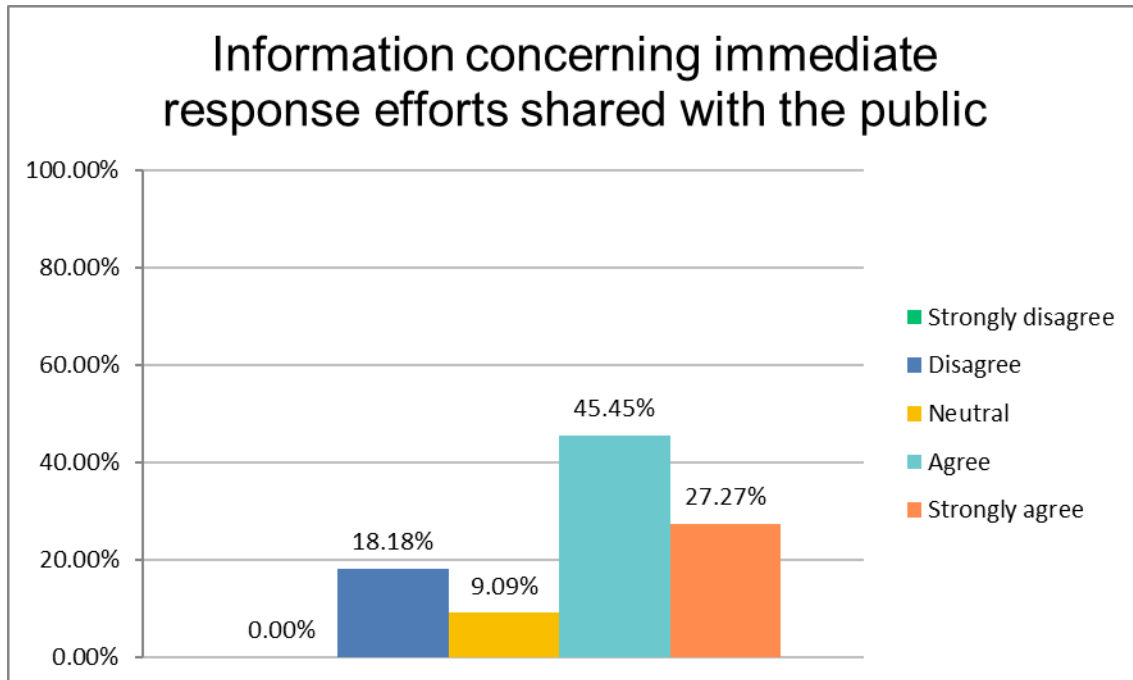


Figure 10: Information sharing with the public

SO154: Many participants from the public consultations identified the need for the government to share some of the science behind the causes for the flooding. Many theories are considered as to why the flooding is worse some years compared to others, but the public doesn't think the government provides enough information to get a clear understanding of the technical elements behind these flooding events.

OFI #35 Lessons identified from previous flood responses have not been fully leveraged or acted upon to improve future operations

SO155: Many individuals identified that some of the processes from the flood response which were identified as best practices have not been formalized for implementation into emergency plans or standard operating procedures. As an example, this includes formalizing plans for boat operations.



SO156: Many of the interview participants as well as members of the public in attendance at the public consultations identified that the timing for the procurement of this study and report was too close to the upcoming flood season and that it will be very difficult to leverage the lessons identified through this report for this year's spring freshet season.

SO157: Some preparedness activities in terms of logistics and stockpiling resources that were identified during the 2018 flood as being required for future flooding events have not been acted upon. It was recognized that the identification and purchasing of resources is being done too close to the spring freshet season in some regions and municipalities.



6. RECOMMENDATIONS

For each of the findings identified in Section 5, one or more recommendations are provided which aim to provide the Province with a clear path forward in emergency management preparedness and planning. Recommendations are provided to capitalize on the BPs (Table 2) reported and address the OFIs (Table 3). They are numbered according to the key finding and substantiation that they address.

Table 2: Best Practice Findings and Recommendations

Finding No.	Finding	Recommendation No.	Recommendation
BP #1	The ability of the Province to manage an evolving event was successful, especially in consideration of the differing levels of activation amongst provincial, regional and municipal EOCs	1A	Going forward, regions and municipalities should continue to be encouraged to activate their EOC and formulate their response based on their impact from the event. This will ensure effective management of resources.
BP #2	An informal network of municipal emergency management coordinators exists that share lessons identified and work to share best practices amongst participants to further enhance preparedness within their communities	2A	This network should be formalized and supported by the Province or the Region. The Province can lend support in the organization of this network to ensure all applicable members are involved and offer other support in its coordination and management as required.
		2B	Similar networks should be considered in each of the three areas of the Province. These networks should be used to share and discuss best practices in emergency planning preparedness and response.
BP #3	The involvement of critical infrastructure owners and operators in emergency response supported an effective operation	3A	Relationships should continue to be maintained with critical infrastructure owners and operators in non-emergency times to ensure their support and accessibility to resources.



Finding No.	Finding	Recommendation No.	Recommendation
	through the provision of resources and equipment		
BP #4	Public information was accurate and consistent in its messaging	4A	Key messaging should continue to be distributed via NBEMO so other agencies can share, copy and re-distribute.
BP #5	The use of the Trunked Mobile Radio (TMR) system was beneficial in supporting emergency response operations	5A	The TMR should continue to be leveraged and utilized in these large-scale events.
BP #6	The pre-identification of additional resources to support emergency operations is important to ensure sustained long-term operations	6A	Government of New Brunswick Senior managers should continue to engage middle management in the decisions to pre-identify resources to support emergency operations. Incentives should be provided to managers and staff who provide resources during an emergency. These incentives could be financial (e.g., overtime pay) or could be perks or internal benefits (e.g., vacation time priorities).
BP #7	Development of tools such as checklists is beneficial in supporting local level response	7A	A tool similar to a municipal "Playbook" should be developed for OPSA to support them in managing the impact of a flood on various critical infrastructure partners.
		7B	Municipalities should share existing tools such as the "Playbook" to create their own version or template that fits the needs of their community.



Table 3: Opportunity for Improvement Findings and Recommendations

Finding No.	Finding	Recommendation No.	Recommendation
OFI #1	Numerous individuals, agencies and departments are involved in responding to the spring freshet on an annual basis, yet no formal River Watch inter-agency program is in place	1a	The River Watch activities should be formalized into an official provincial Program that includes a dedicated budget, staffing support, and a formal education plan. A programmatic approach will ensure adequate funding, governance, education and monitoring needed to support these activities.
		1b	Existing programs should be researched and explored to determine how to best leverage this type of program within the Province of New Brunswick.
		1c	The program should include a public education / outreach program that is implemented within schools and communities across the province. This could be implemented similar to the existing fire prevention and smoke alarm campaigns and provide key messaging through various mediums.
		1d	As part of this initiative, volunteers should be sought and used to support the river watch functions. This could be performed similar to the current ice watchers but would be used to monitor water levels during the spring freshet and to validate information.
OFI #2	It was not evident that modifications to the Incident Command System (ICS) structure made by some of the involved	2a	Additional ICS training should be provided at the regional and municipal levels to get staff trained to ICS 200 or ICS 300. Managers involved in



Finding No.	Finding	Recommendation No.	Recommendation
	operations centres allowed them to fully respond in accordance to ICS requirements		emergency response should be trained to ICS 400.
OFI #3	The floodplain maps used to support land-use planning along the river are outdated and are inadequate in supporting current building activities	3a	Flood plain map updating needs to be prioritized in order to support land use planning decision making.
OFI #4	Flood maps are developed and used on a case-by-case basis by larger municipalities and limited coordination between responding agencies for sourcing and use often leads to duplication of effort	4a	Flood mapping should be performed on a provincial level with flood maps shared on a central database, allowing access by individual communities. Performing mapping flood impacts at a provincial level would promote consistency in the products used and the availability of information, allowing municipalities the option to opt-in, as required.
OFI #5	The interaction between municipalities, LSDs and REOCs is unclear and, at times, inconsistent	5a	Municipalities that are often requested to support an LSD during emergency events should be provided the authority to enact the required agreements, policies and processes needed to fully support the response and coordinate their own internal resources. This could be in the form of an official Memorandum of Understanding (MOU) between the municipality and the LSD.
OFI #6	The transition from response to recovery does not adequately support the coordination of immediate / early recovery activities	6a	The existence of a recovery team should be communicated with the various responders to ensure this level of support is adequately known.
OFI #7		7a	Non-essential staff should not be required to maintain round the clock operations, despite a



Finding No.	Finding	Recommendation No.	Recommendation
	Staffing levels within the regional operations centres was, at times, managed ineffectively		full EOC activation. Position designated cell phones that can be used to maintain on-call staff can be used to support the capacity requirements while allowing for breaks, fewer staff and preventing burn-out.
		7b	In areas requiring lower levels of activation within their EOC, teleconferences could be used to support response operations. Teleconferences could be used to coordinate resources and exchange objectives and strategies while still promoting business continuity. These types of teleconferences were successful during the 2018 flood response in some REOCs.
OFI #8	A misalignment in priorities for public information dissemination exists between the response agencies and technical support	8a	ELG should provide NBEMO training on the nuances of forecasting and the importance of certain data to support the emergency response decision making process. This will allow NBEMO staff to fully understand the outputs of the ELG forecasts and the information included within water level predictions.
		8b	Forecasting results displayed on the River Watch Mobile site should include an expected time of the next update so members of the public can anticipate when additional information will be available, thus decreasing the number of requests to NBEMO.
OFI #9	The scope of the roles and responsibilities of municipal resources within regional	9a	Regional Incident Command Posts should be organized, coordinated and managed by regional (i.e., REOC) staff. Resources may be



Finding No.	Finding	Recommendation No.	Recommendation
	Incident Command Posts (ICP) was not always clear and / or consistent		requested at the municipal and local levels to support, but ultimately the REOC should be in control of these Incident Command Centre.
		9b	A formalized process should be implemented that outlines how municipalities will recover costs incurred while providing support to an LSD and / or the Region during emergencies.
OFI #10	Varying levels of experience amongst the REMCs and vacant REMC positions within several regions, resulted in coordination issues with some of the affected municipalities	10a	All 12 REMC positions should remain filled and replacements should be found as soon as possible when positions become vacant.
OFI #11	Liaison Officers were not fully leveraged to support emergency operations and the exchange of information between responding organizations	11a	For severe events, municipalities should send a Liaison Officer to the REOC once it is activated to assist in information exchange and coordination efforts. Conversely, if sufficient resources are available, the REOC could send a Liaison Officer to the affected EOCs of the affected municipalities.
OFI #12	Information exchange between organizations was sometimes hindered, resulting in possible safety concerns for responders	12a	Privacy legislation should be reviewed and considered in terms of an emergency context. Supporting the emergency response and helping residents in danger should take priority and secure systems could be developed so information can be shared with first responder organizations (e.g., fire department, police).
		12b	A system should be leveraged to allow residents to voluntarily provide information to first responders. The two-way alerting method



Finding No.	Finding	Recommendation No.	Recommendation
			through Sentinel or a data gathering survey such as Survey123 could be used to allow members of the public to provide information to first responders indicating if they need help, have access to power, are at risk or have already been evacuated.
OFI #13	Despite concerted efforts from the Province (i.e., 72-hour preparedness public education), there is still disparity regarding the scope of responsibilities of homeowners, municipalities, regions and the Province in an emergency	13a	<p>Consensus on what the level of responsibility is at each level (i.e., provincial, regional, municipal, homeowner) should be attained by the Province in terms of flood prevention, mitigation, protection and remediation for private residences.</p> <p>Messaging regarding these responsibilities should be developed and shared by the Province and included as part of an overall public education program.</p>
OFI #14	Very few resources were provided to support pet owners and evacuees transporting pets	14a	Additional consideration should be placed on engaging organizations that can support pet evacuations (e.g., Canadian Disaster Animal Response Team (CDART)). Applicable agreements should be put into place prior to an emergency to ensure the prompt availability of their services.
OFI #15	The process for information flow from critical infrastructure owners and operators to government representatives was not always clear or efficient	15a	A policy should be developed that outlines how resources are distributed at a regional level between LSDs and municipalities. Priorities should be identified and considered when resources are required in numerous locations.



Finding No.	Finding	Recommendation No.	Recommendation
<p>OFI #16</p>	<p>Processes and plans are not widely available to support the management of donated resources</p>	<p>16a</p>	<p>Best practices should be assembled and documented in a formalized donated resources management plan. These resources will be used to support personnel responsible for coordinating donated resources during emergencies (e.g., Operations Chief, Incident Commander, etc.).</p>
		<p>16b</p>	<p>Formalized mutual aid agreements should be put into place with companies, agencies and organizations who donate resources in an emergency. These agreements will ensure that in an emergency, the safety requirements, insurance requirements, proper PPE, etc. have already been considered.</p>
<p>OFI #17</p>	<p>Communications Staff did not leverage the Joint Information Centre (JIC) to develop and deliver consistent messaging to the public</p>	<p>17a</p>	<p>If the event does not warrant the activation of a JIC, other tools should be used to ensure the collection of relevant information from applicable departments and organizations. This could be performed through the use of a messaging template that is sent to relevant critical infrastructure partners, provincial departments, etc. who can provide input into the key messaging being released from the Province.</p>
		<p>17b</p>	<p>Additional provincial plans such as the Point Lepreau Nuclear Off-Site Emergency Plan [8] should be reviewed for identifying how the requirements for JIC activation could be considered within other applicable emergency</p>



Finding No.	Finding	Recommendation No.	Recommendation
			plans, such as the All-hazards Plan and Flood Contingency Plan.
OFI #18	A lack of regular briefing cycles hampered the information exchange between the provincial, regional and municipal responses	18a	Regular briefing cycles should be set between the REOCs and the municipalities that allow for the collection of information prior to the PEOC briefing. These scheduled briefings would then allow municipalities to coordinate their own briefing schedule and ensure information is available in a timely manner for briefing up through the chain of command.
		18b	Virtual communications could be enhanced through the use of technology. The use of WebEx, Skype, or similar conferencing capabilities could be leveraged to allow for verbal exchange of information as well as real-time viewing of maps or other data during the call.
OFI #19	Details on road closures and transportation routes affected by flooding were not presented to the public in an effective manner	19a	The existing 511 automated system could be updated and divided into zones to facilitate a user's interaction with the system and promote better access to pertinent information. Additionally, DTI should have a live call centre activated during emergencies that could be used to answer the public's questions about accessibility and road closures.
		19b	The DTI website could be updated to promote ease of access to information and more clarity in information for the user. Inputs from



Finding No.	Finding	Recommendation No.	Recommendation
<p>OFI #20</p>	<p>Use of the Ops Account as a communications tool is ineffective in a response environment</p>		<p>municipalities should be sought to ensure the improvements meet the local requirements.</p>
		<p>20a</p>	<p>Additional training and discipline in using the Ops Account should be provided to limit the amount of unnecessary information being sent. An email use protocol should be developed to support this training.</p>
		<p>20b</p>	<p>Emails should be labeled based on their priority level. Labeling as <i>Information</i>, <i>Request</i> or <i>Urgent</i> within the subject header will help individuals identify and prioritize the information coming in. Additionally, labeling who the email pertains to (e.g., All, REOC 9, etc.) could also support the prioritization of information.</p>
		<p>20c</p>	<p>The requirements and intent of the Ops Account should be evaluated. Depending on these requirements, new or additional tools should be considered. For example, tools that are designed for chats could be leveraged if that is the intent of the system or other information management systems could be leveraged if the intent is for overall situational awareness.</p>
<p>20d</p>	<p>Regardless of changes in the use of the Ops Account, planning for a dedicated Admin personnel should be considered for each REOC to support the sorting and prioritization of information, to allow the REMC to focus on decision making and operational requirements.</p>		



Finding No.	Finding	Recommendation No.	Recommendation
<p>OFI #21</p>	<p>Additional information could be shared with the public to maximize public confidence</p>	<p>21a</p>	<p>The River Watch website should be revised to allow for a one-stop shop of all applicable flooding information. The website should be divided into sections for pre-flood, during and post-flood. The available information (e.g., disaster fund assistance, health advisories, warnings, alerts, etc.) should be clearly divided into these bins to improve accessibility and management of the site. This could be performed through additional tabs, designated sections or another means of visual separation.</p>
		<p>21b</p>	<p>Any additional data available through other partners or organizations should be made available on the River Watch website. This could include the barrel data regarding ice jams available via NB Power.</p>
		<p>21c</p>	<p>Additional public information should be provided as federal resources are being requested and highlight how they are helping. For example, highlight how the Coast Guard was requested for assistance at a federal level and are providing boats and resources to support evacuations and wellness checks.</p>
		<p>21d</p>	<p>When the flood risk is elevated, if NBEMO is able to provide more current data than what is available through public information tools (e.g., federal websites), they should be seeking this information on a regular basis (e.g., hourly) and</p>



Finding No.	Finding	Recommendation No.	Recommendation
			sharing this directly with the public via the River Watch website.
		21e	Information available at a municipal level should also be linked via the River Watch website. Data such as the City of Fredericton webcams may be useful to members of the public located outside of the city to improve their situational awareness of the situation.
		21f	Live web cam feeds should be made available for different areas along the river. These could be co-located with the gauges to allow for the real-time viewing of the gauge values, and the feeds should be accessible via links on the River Watch website.
OFI #22	Existing tools are not conducive to sharing real-time information (reports, maps, data, pictures, etc.) among responders and multiple levels of government	22a	A Common Operating Picture should be deployed on a wide-scale to promote accessibility for all levels of government. This tool should be web-based and allow for easy access to information (e.g., maps, sitreps, resource request status, etc.) needed for emergency response and planning. The existing Common Operating Picture could be modified to meet this purpose or other tools could be explored such as ArcGIS Online or similar tools. Access permissions should be implemented to maintain security of information at appropriate levels. Training should be provided to all users upon deployment.



Finding No.	Finding	Recommendation No.	Recommendation
		22b	The deployed Common Operating Picture should include all the information the current sitrep contains. For example, a spot can be designated to list the EOC activation levels and each area will be responsible for updating their information as appropriate. The program should then be used to collate this information and create a report that can be disseminated on a daily basis.
OFI #23	Public alerting tools are applied on a case by case basis by municipalities and limited coordination between responding agencies for sourcing and use leads to duplication of efforts	23a	A common public alerting system should be sourced and purchased at a provincial level. Municipalities should then be able to opt-in and purchase access to this system as required. This system should be linked across the involved municipalities to ensure information can be tracked and accessible by the Province as required.
OFI #24	Monitoring of public communications was sometimes lacking in its effectiveness for control and identification of misinformation	24a	Digital volunteer groups should be leveraged for the identification and managing of misinformation on social media. Existing digital volunteer groups within North America to support emergency responses should be considered in identifying how to coordinate a digital volunteer within the provincial emergency response.
OFI #25	Municipalities did not receive adequate direction and guidance from the REOCs to support their response	25a	Please refer to recommendations 10a and 18a.
OFI #26	Public education is required to develop understanding amongst the public as to	26a	On the River Watch Mobile website, guidance should be provided for cases where the



Finding No.	Finding	Recommendation No.	Recommendation
	the complexities involved in the development of flood forecasts		information appears to be blank. In cases where the information is not available due to ice coverage or other factors, this should be listed to minimize the public perception of missing data.
		26b	Guidance should be provided on the River Watch Mobile site to assist the public in understanding the forecasting numbers. Warnings and clear labels should be provided for the four (4) and five (5) day forecasts if their values are less reliable than the one (1) to three (3) day values. Additionally, clarity should be provided that these values are forecasts, similar to the weather forecasts on which they are based.
OFI #27	Public communications regarding the potential long-term health effects of the flooding were inadequate	27a	Additional messaging should be provided to the public in terms of the long-term health impacts following a flood, especially as it relates to mental health. Tips on coping with stress, helplines and locations of support groups should be provided in government communications.
OFI #28	Leveraging methods of communication with the public beyond web-based methods and social media is important to raise public awareness	28a	REMCs should engage the local community social media leaders and create links and relationships so that information can be shared directly. This would promote accuracy in the information being shared through community associations and networks.
		28b	Flyers containing flood information should be printed and displayed at local venues such as building stores, coffee shops and gas stations. Some municipalities have leveraged the



Finding No.	Finding	Recommendation No.	Recommendation
			distribution of flyers in the past to share information with the public prior to the spring freshet season. These flyers could include key messaging for preparedness, safety tips and priority phone numbers.
		28c	A telephone hotline number should be engaged that plays current standard messaging about the current flood situation on a loop, similar to the information available on the front page of the River Watch website. This messaging should include the time of the last update and the timing of the next expected update.
		28d	A radio channel should be designated during the spring freshet season to allow residents access to up to date information. This could be done economically through coordination with journalism and broadcasting students or through the involvement of volunteers.
		28e	In addition to the daily press conferences, short videos (i.e., 3 minutes or less) should be produced by NBEMO that are aimed for public consumption and contain key information about the evolving situation. Social media platforms (e.g., Facebook Live, Twitter, Instagram) could be used to share these videos in near real-time.
		28f	The River Watch website should have a designated application (app) that users can download for easy accessibility on their phones.



Finding No.	Finding	Recommendation No.	Recommendation
		28g	An NBEMO staff should be deployed to the communities which are severely impacted by the floods. These individuals should be available at a local community centre and be available to talk to the public, share information and answer questions. This would increase the presence of NBEMO in the affected communities, provide an accessible and designated source of information and would also help minimize the number of calls into the Admin Desk.
OFI #29	Resourcing within the ELG Hydrology department is insufficient to support the forecasting requirements of the spring freshet season	29a	Additional resources should be hired, and time should be dedicated to training to ensure multiple trained personnel are able to meet the forecasting requirements for spring freshet with back-up support.
OFI #30	Available data accessed by the ELG Hydrology department is insufficient to support the emergency operations requirements during the freshet season	30a	Equipment modifications that are required for twice daily forecasts should be identified and equipment should be updated accordingly to meet this need.
OFI #31	Additional emergency management personnel are required at the provincial and regional level to support emergency planning and response	31a	A dedicated logistics capability should be hired to support the emergency response and preparedness activities required for procurement, agreements and sourcing.
		31b	A training and exercise coordinator should be hired to provide a consistent training and exercise program across all the regions.
		31c	A dedicated planning position should be implemented to work with REMCs across the



Finding No.	Finding	Recommendation No.	Recommendation
			Province and to improve the emergency plans at a local level.
		31d	Through the hiring of additional REMCs to support each region, REMCs should continue to work with smaller communities on improving and updating their plans as well as identifying other available resources including volunteers, lodging, food, etc.
OFI #32	Training and experience are required to allow REMCs to fully support other regions within various functional roles	32a	A deployment plan should be created for the REMCs. It should describe the path in which REMCs will be chosen to deploy to assist in affected areas. It will list the primary back-up REMC and a secondary individual in cases where the region of the first individual is affected or they are otherwise occupied. A plan of this nature will allow REMCs to plan and develop required relationships and train for this deployment.
OFI #33	Modifications to infrastructure are required to mitigate the impact of flooding to areas that are known to be prone to flooding	33a	A flood audit program should be developed where homeowners can have a member of the government check their home and provide recommendations to mitigate and reduce flood impact prior to a flooding situation. These recommendations could include large projects such as raising the home, medium projects such as moving the electrical panel or small projects such as picking up items from the basement floor.



Finding No.	Finding	Recommendation No.	Recommendation
		33b	Roadways which have the potential to be impacted by flooding on an ongoing basis should be built up permanently to reduce the need for temporary fixes and minimize the impact of the flooding to infrastructure going forward. Some municipalities have already embraced the idea of permanent build ups rather than temporary ones to sustain response operations.
OFI #34	Additional public education is required on River Watch, the government's involvement and available supporting resources	34a	Each year, communities that will be potentially affected by the spring freshet should hold flood preparation meetings. These should be coordinated between the REMC and local community groups. These meetings should allow an opportunity for first responders (including NBEMO) to talk about flood preparedness. It will aim to increase personal preparedness, increase public confidence in the response and allow community members to share best practices amongst themselves as well.
OFI #35	Lessons identified from previous flood responses have not been fully leveraged or acted upon to improve future operations	35a	While progress was made to address lessons identified immediately after the spring freshet 2018 flooding, a detailed review of all event AARs, including this report should be undertaken to develop an improvement plan for the Province.



7. CONCLUSION

The overall response to the 2018 spring freshet floods was considered a success from the public's point of view [4] as well as that of the responders and response agencies. The response was coordinated amongst multiple levels of government with information being passed from the Province to the regions, to the municipalities, and to the responders to support informed and effective decision making. However, the findings of this report can be used to improve existing plans and processes, improve communication linkages and increase preparedness for the Province in responding to this type and other kinds of emergency situations in the future.

The main finding from this AAR process was the identification of a lack of an official government program to support the annual River Watch preparedness, planning, response and recovery activities. The implementation of an official program could serve to support the main elements of the response including budgets for additional resources both within NBEMO and in supporting departments, opportunity for more formal and structured public education and formalization of processes in support of inter-agency communication and information exchange. The formalization of the River Watch Program could also support year-round preparedness and prevention activities including floodplain mapping and supporting municipalities in zoning requirements as well as mitigation measures for existing infrastructure including the potential use of flood audits.

While overall, information was managed, and response activities were coordinated amongst multiple response agencies, some processes for coordination of activities were not clear, were inconsistent or require modifications to maximize their efficiency. Some of these inefficiencies have already been addressed through the hiring of additional REMCs to support the development and fostering of relationships within their region. Others require more formal guidance from the Province along with applicable processes and possible changes in legislation.

Critical infrastructure owners and operators provided a tremendous benefit to the response by providing resources and equipment to support boat operations, evacuations and other response activities. However, plans and processes for interacting with these partners during an emergency as well as identifying, managing and allocating resources should be modified or implemented to support an efficient and consistent approach to emergency operations.

The Province worked hard to ensure consistent and accurate messaging for the public. However, the tools implemented at the municipal level to communicate and share information with the public were inconsistent and not always accessible. The implementation of public alerting tools and flood mapping software at a provincial level could be used to further support consistency in the information being disseminated to the public, while reducing duplication efforts at a municipal level and potentially obtaining economical savings if purchasing on a larger scale.

Finally, it was determined that although efforts were taken to share information with the public regarding the flood risks, preparedness activities and forecasting results, the public and local



decision makers still sought additional information. Visual images of flood waters along the river, gauge data and any applicable data available from critical infrastructure partners were all identified as possibilities to be included in public information websites. Guidance in understanding the forecasting results and additional information regarding long-term health effects were also identified as being important in terms of information sharing with the public. An opportunity for improvement also exists in the methods and mediums in which the information is shared with the public. Leveraging public meetings and distribution of paper-based flyers should be considered in addition to the social media tools and government websites.

While several actions to improve emergency preparedness and response were taken immediately after the 2018 Spring Freshet, these improvements need to continue. Taking actions on the recommendations found within this report will help mitigate issues in future responses and will serve to support efficient and effective operations in similar flood responses.



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ANNEX A. EVENTS TIMELINE

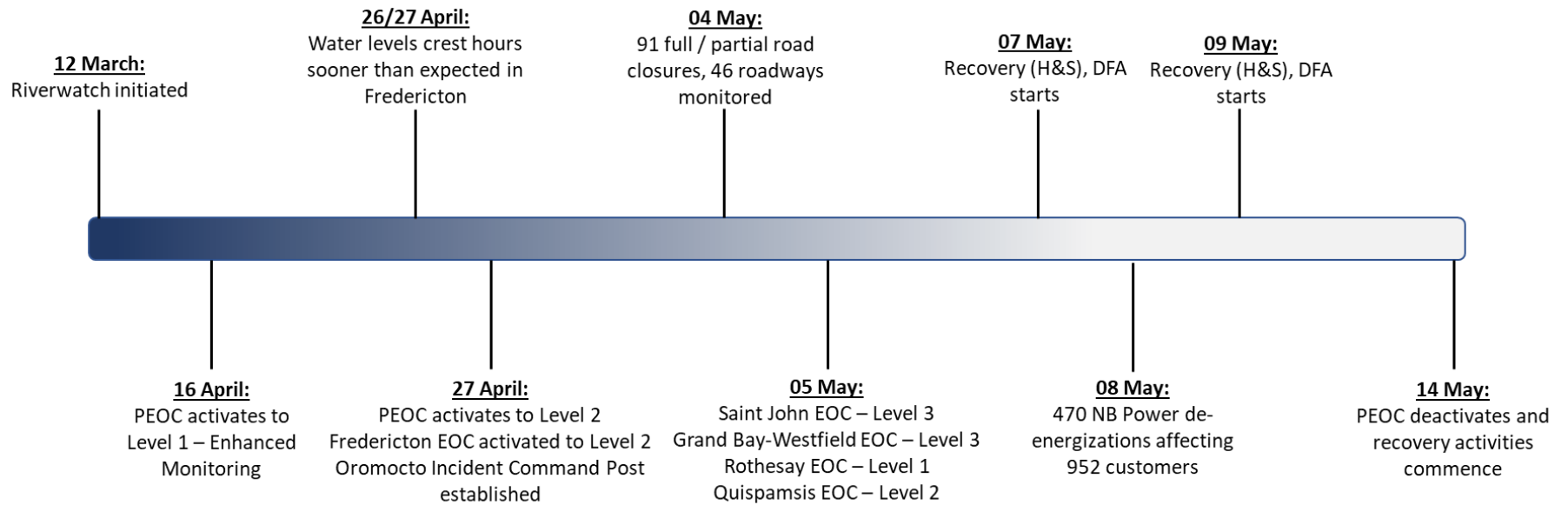



Figure 11: 2018 Floods Key Event Timeline



ANNEX B. WEB SURVEY QUESTIONS

The following survey questions were included in the web-based survey distributed to representatives from provincial, regional, and local operation centres who participated in the response to the 2018 floods.



New Brunswick Spring Freshet 2018 Flood Survey

[Welcome Page](#)
Welcome to the New Brunswick Spring Freshet 2018 Flood Survey.

Background

In spring of 2018, parts of the province of New Brunswick experienced historic flood levels. This resulted in the activation of the Provincial Emergency Operations Centre (PEOC), five Regional Emergency Operation Centres (REOC) and several municipal emergency operation centres (EOC). The province of New Brunswick is conducting a review of the emergency preparedness, mitigation and response in relation to the Freshet Flood situation.

The purpose of this review is to explore the effectiveness of the emergency operations and not to evaluate the performance of a single organization, a single individual or group of individuals.

This Questionnaire

The questionnaire will be available from March 13 to 20, 2019.

The estimated time for completion is approximately 20 minutes. There is no maximum time limit for completion however all answers must be entered in one single session.

Your anonymity will be protected; only a compilation of the feedback during the survey will be used for final reporting and documentation purposes. All survey responses will remain secure.

If you have questions regarding this survey, please contact Alicia Armitage at a.armitage@calian.com or 613-599-8600 ext. 2349.

1



New Brunswick Spring Freshet 2018 Flood Survey

Introduction

* 1. Which Operation Centre(s) / functional role did you participate in during the 2018 Spring Freshet Flood operations? (select all that apply)

- Provincial Emergency Operations Centre
- Mobile Command Post
- Regional Emergency Operations Centre
- Reception Centre
- Local / District Emergency Operations Centre
- Non-Governmental Organization (NGO)
- Incident Command Post
- Other (please specify)





New Brunswick Spring Freshet 2018 Flood Survey

Processes

* 2. The province of New Brunswick has three levels of EOC activation which include:

Level 1 – Enhanced Monitoring – includes dissemination of information to interested parties when an emergency is anticipated and allows for a warning period. No intervention required at this time.

Level 2 – Partial Activation – occurs when impacts of the situation are evident. Interested parties are briefed and support management of the response.

Level 3 – Full Activation – occurs when interested parties are actively engaged and continuous coordination and full response are required.

Please rate your agreement with the following statements:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
The Provinces' escalation to EOC activation Level 3 during the 2018 Spring Freshet Flood operations was timely and appropriate to support this emergency.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My operations centre escalated to an appropriate level and within a timely manner.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Comments:

3



* 3. During the 2018 Spring Freshet Flood operations, were you located at an operations centre (Incident Command Post, Emergency Operations Centre) where the Incident Management System (IMS) or Incident Command System (ICS) structure was implemented?

Yes

No

Comments:

4





New Brunswick Spring Freshet 2018 Flood Survey

Processes

* 4. Please rate your agreement with the following statement: "All required Incident Management System (IMS) / Incident Command System (ICS) functions were appropriately assigned".

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree
- Not applicable
- Not observed

Comments:

5



New Brunswick Spring Freshet 2018 Flood Survey

Processes

* 5. Please rate your agreement with the following statements:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Affected municipalities and unincorporated areas had the required emergency plans in place to support the conduct of emergency operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local emergency plans are aligned with the requirements of the Province of New Brunswick Emergency Measures Plan and other supporting plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments:	<input type="text"/>						

6



* 6. Were response operations negatively impacted due to consequences of the flooding (e.g., road closures, risk of flash floods, building damage)?

- | | |
|-----------------------------------|--------------------------------------|
| <input type="radio"/> None | <input type="radio"/> A lot |
| <input type="radio"/> Very little | <input type="radio"/> Not applicable |
| <input type="radio"/> Some | <input type="radio"/> Not observed |

Comments:

* 7. Please rate your agreement with the following statement: "Planning and emergency response operations were adequately conducted at the local level."

- | | |
|---|--------------------------------------|
| <input type="radio"/> Strongly disagree | <input type="radio"/> Strongly agree |
| <input type="radio"/> Disagree | <input type="radio"/> Not applicable |
| <input type="radio"/> Neutral | <input type="radio"/> Not observed |
| <input type="radio"/> Agree | |

7





New Brunswick Spring Freshet 2018 Flood Survey

Processes

* 8. In which ways could the local emergency response have been improved? (select all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Additional personnel resources | <input type="checkbox"/> Additional requests for support (e.g., mutual aid) |
| <input type="checkbox"/> Additional equipment | <input type="checkbox"/> Additional communication with the Province and Regional Coordinator |
| <input type="checkbox"/> Modifications to current emergency management plans | <input type="checkbox"/> Different methods for communicating with the Province and Region |
| <input type="checkbox"/> Additional emergency management plans | <input type="checkbox"/> Additional public messaging |
| <input type="checkbox"/> Other (please specify) | |

8





New Brunswick Spring Freshet 2018 Flood Survey

Processes

* 9. Please rate your agreement with the following statement: "The transition period from response activities to recovery activities was handled in accordance with plans and procedures."

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree
- Not applicable
- Not observed

Comments:

9



New Brunswick Spring Freshet 2018 Flood Survey

Inter-agency coordination

* 10. Please rate your agreement with the following statements: "Preparedness, mitigation and response actions were appropriately coordinated between my operation centre and the following supporting agencies:"

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
The Province	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Municipal Emergency Measures Organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional Emergency Action Committees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-governmental organizations (e.g., volunteer organizations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:

* 11. What level of situation awareness did you maintain during your time supporting emergency operations? (i.e., how well did you understand the current state of affairs? Did you feel 'in the loop' relative to the developing situation?)

None Average

Very little Above average

Some Exceptional

Comments:

* 12. Please rate your agreement with the following statement: "Sufficient information of a technical nature (e.g., hydrology, meteorology) was available at my operation centre."

Strongly disagree Strongly agree

Disagree Not applicable

Neutral Not observed

Agree

Comments:

* 13. Please rate your agreement with the following statement: "The use of software was effective in supporting the management and dissemination of information (e.g., event logs, imagery, maps, resource requests, road closures, weather conditions) between responding agencies".

Strongly disagree Agree

Disagree Strongly agree

Neutral Not applicable

Comments:




* 14. Please rate your agreement with the following statement: "Volunteer services were appropriately coordinated by the applicable emergency response department."

- | | |
|---|--------------------------------------|
| <input type="radio"/> Strongly disagree | <input type="radio"/> Strongly agree |
| <input type="radio"/> Disagree | <input type="radio"/> Not applicable |
| <input type="radio"/> Neutral | <input type="radio"/> Not observed |
| <input type="radio"/> Agree | |

Comments:

12





New Brunswick Spring Freshet 2018 Flood Survey

Critical Infrastructure

* 15. Please rate your agreement with the following statement: "Critical infrastructure owners / operators were aware of the potential impact the situation could have on their infrastructure."

Strongly disagree Strongly agree
 Disagree Not applicable
 Neutral Not observed
 Agree

Comments:

* 16. Please rate your agreement with the following statements: "Information was readily shared between critical infrastructure owners / operators and other response agencies to support:"

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Coordination of response actions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:



* 17. Please rate your agreement with the following statement: "Critical infrastructure owners / operators took appropriate actions to mitigate risks in order to ensure the availability of their systems, services and products."

- | | |
|---|--------------------------------------|
| <input type="radio"/> Strongly disagree | <input type="radio"/> Strongly agree |
| <input type="radio"/> Disagree | <input type="radio"/> Not applicable |
| <input type="radio"/> Neutral | <input type="radio"/> Not observed |
| <input type="radio"/> Agree | |

Comments:

* 18. Please rate your agreement with the following statement: "The policies in place were adequate to support the receipt and use of private sector donations (e.g., boats, trucks, excavators, personnel)."

- | | |
|---|--------------------------------------|
| <input type="radio"/> Strongly disagree | <input type="radio"/> Strongly agree |
| <input type="radio"/> Disagree | <input type="radio"/> Not applicable |
| <input type="radio"/> Neutral | <input type="radio"/> Not observed |
| <input type="radio"/> Agree | |

Comments:





New Brunswick Spring Freshet 2018 Flood Survey

Communications

* 19. Please rate your agreement with the following statements: "Information concerning the situation was freely shared between my organization and the following supporting agencies:"

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
The Province	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Municipal Emergency Measures Organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional Emergency Action Committees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-governmental organizations (e.g., volunteers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:

* 20. Please rate your agreement with the following statements regarding information exchange between operations centres:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
Information was exchanged using common terminology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information flowed through the correct chain of command	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information was consistent, concise and current	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information was delivered at regular and expected intervals at my operations centre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:

* 21. Please rate your agreement with the following statements: "Objectives, strategies and tactics were well defined and communicated":

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
To responders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Between operations centres	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To Critical Infrastructure partners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To other response agencies including non-governmental organizations (NGOs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Within my operations centre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:

* 22. Please rate your agreement with the following statements regarding the release of



information to the public:	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Warning information regarding the severe weather and potential risks was shared with the public prior to the emergency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information concerning the severe weather and immediate danger was shared with the public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information concerning immediate response efforts was shared with the public (e.g., debris removal, road closures, search and rescue, casualties, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information concerning ongoing response efforts was shared with the public (e.g., reception centres, support centres, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information concerning psycho-social support was shared with the public (e.g., helplines, reassurance, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information to the public was shared in a timely manner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17



	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Information to the public was accurate or appropriately corrected if required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information was shared on platforms (e.g., radio, social media, community announcements, text messages, door to door visits) accessible to all members of the public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information was shared with the public in an easily understood and digestible format	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments:							
<input type="text"/>							
* 23. Please rate your agreement with the following statement: "Information released to the public from all responding agencies was consistent in its messaging".							
<input type="radio"/> Strongly disagree				<input type="radio"/> Strongly agree			
<input type="radio"/> Disagree				<input type="radio"/> Not applicable			
<input type="radio"/> Neutral				<input type="radio"/> Not observed			
<input type="radio"/> Agree							
Comments:							
<input type="text"/>							



New Brunswick Spring Freshet 2018 Flood Survey

Preparedness

* 24. Please rate your agreement with the following statement: "I felt confident and comfortable in my role and responsibilities during operations".

- Strongly disagree Agree
 Disagree Strongly agree
 Neutral Not applicable

Comments:

* 25. Please rate your agreement with the following statement. "I felt that during the operations for the 2018 Spring Freshet Flood, response agencies had appropriate personnel resources required to maintain operations for the following circumstances:"

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Preparedness activities (i.e., forecasting, warnings, monitoring)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Immediate response operations (i.e., initial activation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Long-term operations (i.e., prolonged response)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintaining regular day-to-day services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:



* 26. Please rate your agreement with the following statement: "My service area had adequate equipment to support response operations for the following requirements:"

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Not observed
Rescue operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communications (e.g., radios)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public response operations (e.g., sandbags, sand)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General response operations (e.g. repairing washouts, blocking flooded roadways, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
First responder operations (e.g., Personal Protective Equipment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments:

* 27. Please rate your agreement with the following statement: "New Brunswick's overall emergency preparedness public education program provides pertinent information to residents that enabled an educated emergency response".

Strongly disagree Agree
 Disagree Strongly agree
 Neutral Not applicable





New Brunswick Spring Freshet 2018 Flood Survey

Preparedness

* 28. What additional information could be provided to improve the public's preparedness to future flooding events? (select all that apply)

- Possible indicators of flooding
- Physical household preparedness
- Sources of official information
- Personal emergency supply levels (e.g., 72 hours)
- Other (please specify)

21





New Brunswick Spring Freshet 2018 Flood Survey

Preparedness

* 29. What future training would help you to carry out your duties more effectively in another emergency response situation? (select all that apply)

- Function-specific training
- Operations Centre-specific training (e.g., Incident Command Post, service area Command Centre, Emergency Operations Centre)
- All Hazards emergency operations training
- Other (please specify)
- Training on service area emergency plans, procedures and processes
- Tips for effective multi-agency communication
- Simulated emergency exercises

* 30. What do you feel could enhance operations for future situations? (select all that apply)

- Address gaps in emergency plans / procedures
- Cross train employees on multiple roles within their operations centre to enable employees to fill multiple functional roles
- Review and / or formalize procedures for coordination with Critical Infrastructure partners
- Other (please specify)
- Pre-identify resources available from Critical Infrastructure partners that could be drawn upon during emergencies
- Increase resource and personnel capacities at the local level

22





New Brunswick Spring Freshet 2018 Flood Survey

Conclusion

31. What did you consider to be the most successful aspect(s) of the operations in response to the 2018 Floods?

32. What did you consider to be the least successful aspect(s) of the operations in response to the 2018 Floods?

33. Please provide any additional comments.



New Brunswick Spring Freshet 2018 Flood Survey

Conclusion

Thank you for completing the New Brunswick Spring Freshet 2018 Flood Survey.

Your participation will provide valuable input to the evaluation process. The information gathered will support the development of follow-on data collection opportunities and will assist in identifying key findings, best practices and opportunities for improvement to support future multi-organizational operational response efforts.

Please contact Alicia Armitage at a.armitage@calian.com if you have any questions or concerns regarding this questionnaire.



ANNEX C. INTERVIEW QUESTIONS

The following questions were used to guide in-person interviews with representatives from various provincial, regional and local-level operation centres who participated in the 2018 flood response.

Introduction

Name:	
Position(s) for the incident response:	
Operational centre(s):	

Processes

1.	A.	Was the Province’s EOC activation level (Level 2) for the flood response appropriate? (Consider the number of affected municipalities and organizations involved in the response)	
1.	B.	Were there any conflicts or confusion with regional and municipal EOCs activating to different levels? (e.g., REOC 11 activating to Level 3 as of 27 April, Quispamsis Municipal EOC activated to Level 1 throughout)	
1.	C.	Optional: Was activation of EOCs done in a timely manner?	
2.	A.	Within your area of response, what challenges, if any, did you face in meeting staffing requirements?	
2.	B.	Optional: Were any additional positions or personnel required to support preparedness activities (i.e., forecasting, warnings, monitoring)?	
2.	C.	How did you address the challenges in staffing	



		requirements and what could be done to mitigate these issues in the future?	
2.	D.	Optional: Are there any specific actions that could be implemented to sustain long-term operations? (e.g., cross-training staff)	
2.	E.	Since the flooding event, additional regional emergency management coordinators have been hired and vacant positions have been staffed. What affect, if any, do you anticipate this will have on future operations?	
3.	A.	Were the emergency preparedness and response plans at the municipal level sufficient in supporting the level of response required to address local flooding?	
3.	B.	Did you observe any misalignment between municipal and provincial plans? If so, what challenges did this create? How were these challenges minimized or overcome?	
3.	C.	What changes to municipal plans are required to ensure alignment with Provincial response operations in the future?	
3.	D.	Optional: What factors did you observe which contributed to the success of the response operations at the local level?	
4.	A.	Considering the reoccurring nature of the New Brunswick spring freshet flooding, what plans and processes could be prepared in advance to minimize the negative effects of the flooding on emergency response (e.g., Business Continuity Plan)?	
4.	B.	What physical mitigation measures (e.g., improvements to infrastructure) could be implemented to mitigate any negative effects of the flooding on emergency response?	



Inter-agency coordination

5.	A.	Did you experience any issues with coordinating activities throughout the response? If yes, what were they?	
5.	B.	How could these coordination challenges be prevented in the future?	
6.	A.	How (by whom) were you receiving information of a technical nature (e.g., hydrology, meteorology)?	
6.	B.	Optional: Would a group, working at the Provincial level, dedicated to receiving, analysing and disseminating technical information benefit decision makers?	
7.	A.	What tools were used to support the management and dissemination of information?	
7.	B.	Were there any challenges in using these tools?	
7.	C.	Could any improvements be made to the existing tools or could additional tools be used to support these functions?	

Critical infrastructure

8.	A.	What kinds of information was shared between CI operators and response agencies?	
8.	B.	How did this information support the response?	
8.	C.	What could be done to formalize these information sharing processes and further enhance CI integration in provincial / regional / local response?	
9.	A.	The use of private sector boats was identified as a key	



		benefit for some aspects of the response. What other private sector resources might be considered for use during future flooding events?	
9.	B.	How could pre-arranged agreements (e.g., preferred supplier lists, contracts, volunteer management system) be used to support the provision of these resources for future events?	

Communications

10.	A.	Did you observe any instances where communication was a challenge with other responding agencies? If so, how were these challenges overcome?	
11.	A.	How were incident objectives, strategies and tactics communicated amongst response agencies? (e.g., SitReps, Incident Action Plan, teleconferences, etc.)	
11.	B.	Optional question: Was any information missing that was required to support decision making at your operations centre?	
12.	A.	How was public confidence monitored during operations? In other words, how were you checking to see if the official messaging was well received by the public?	
12.	B.	In your opinion, what additional actions, if any, could have been taken by response personnel to ensure / optimize public confidence? (e.g., public education)	
13.	A.	How were local level public communications coordinated with the official messaging from the Province?	



Preparedness

14.	A.	Within your operational area, was anyone tasked with activities or assigned a role that they may not have received adequate training to perform?	
15.	A.	Did your service area have the required equipment to support response operations and public needs? If not, what additional equipment was needed to support these functions?	
16.	A.	What additional information could be provided to the public via public education programs to better prepare them for flooding events?	
16.	B.	How should this information be shared with the public (e.g. community workshops, brochures, commercials, social media, etc.)?	



ANNEX D. ACRONYMS

The following acronyms can be found within this report.

AAR	After Action Review
BP	Best Practice
CDART	Canadian Disaster Animal Response Team
CI	Critical Infrastructure
DTI	Department of Transportation and Infrastructure
ECCC	Environment and Climate Change Canada
ELG	Environment and Local Government
EOC	Emergency Operations Centre
GOC	Government Operations Centre
ICP	Incident Command Post
ICS	Incident Command System
IMS	Incident Management System
JIC	Joint Information Centre
LSD	Local Service District
LSM	Local Service Manager
NEBMO	New Brunswick Emergency Measures Organization
NGO	Non-governmental organization
OPI	Opportunity for Improvement
OPSA	Office of the Provincial Security Advisor
PEAC	Provincial Emergency Action Committee
PEOC	Provincial Emergency Operations Centre
PPE	Personal Protective Equipment
REAC	Regional Emergency Action Committee
REMC	Regional Emergency Management Coordinator
REOC	Regional Emergency Operations Centre
SO	Supporting Observation
SOP	Standard Operating Procedure
SSARR	Streamflow Synthesis and Reservoir Regulation
TMR	Trunked Mobile Radio

