FLOOD RESPONSE PLAN

Adopted October 2025

MINNEHAHA CREEK WATERSHED DISTRICT

QUALITY OF WATER QUALITY OF LIFE

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PURPOSE

INTRODUCTION AND BACKGROUND

The Minnehaha Creek Watershed District (MCWD) was established in 1967 in response to significant recurring flooding throughout the mid-twentieth century.

More than 50 years later, flood management and response remains an essential area of focus for MCWD and its communities.

Flooding at Methodist Hospital in St. Louis Park, following the 2014 flood of record.

Feb. 16, 1966: Residents along Minnehaha Creek ask for government action to control flooding. (Minneapolis Star)

Recent patterns of extreme weather and the associated hazards underpin this focus. In 2014, the watershed experienced a flood of record, and subsequently went on to experience the wettest seven years on record (2013 – 2019). Significant droughts in 2021 and 2022 followed this wet pattern. These swings between excessive rainfall and drought have stressed natural systems, damaged the built environment, and impacted the communities and people that call the watershed home.

In response to these recent experiences and to guide coordinated action throughout the watershed in managing future extreme weather hazards, MCWD adopted a Climate Action Framework (CAF). While acknowledging the need to reduce greenhouse gas emissions, the CAF is focused on adapting to the local impacts of a changing climate—specifically, the shifts in precipitation patterns that drive flooding and drought.

The CAF guides three action areas for MCWD to support its communities:

1. **Understand and Predict** vulnerabilities and risks through expanded data collection and analysis
2. **Convene and Plan** with partners to develop shared strategies for resilience
3. **Implement, Measure, and Adapt** high-impact projects and policies across the watershed

This Flood Response Plan advances work under the first of these pillars by defining MCWD's role in gathering, analyzing, and sharing real-time watershed insights, to support short-term flood forecasting and operational readiness. It complements, but does not replace, evaluation of longer-term systemic flood vulnerabilities and adaptation strategies, which will be a focus of MCWD's 2027 Watershed Management Plan, grounded in MCWD's Balanced Urban Ecology vision to address water resource issues through integration with land use planning.

FLOOD RESPONSE PLAN PURPOSE

MCWD's Flood Response Plan strengthens regional resilience by integrating real-time monitoring, predictive modeling, proactive communication, and coordinated action with public and private partners.

Effective coordination across partners is essential since flood preparation, impact, response, and recovery span many jurisdictions. MCWD, counties, cities, emergency managers, and residents all hold vital roles before, during, and after flood events.

To support effective coordination, it is necessary to understand the distinct roles and responsibilities of each entity. As such, the MCWD Flood Response Plan (Plan) defines MCWD's role and responsibilities in preparing for, responding to, and recovering from flood events within the broader emergency response framework of the watershed's cities, counties, emergency managers, and residents.

This Plan organizes MCWD's responsibilities into four action areas outlined in its Flood Response Framework, which guides day-to-day coordination across programs and scales actions as emergency conditions escalate.

1. **Forecast and Monitor**
2. **Communicate and Engage**
3. **Act and Enable**
4. **Evaluate and Adapt**

To clearly delineate MCWD's role relative to those established by its partners, MCWD held a Flood Response Summit in May 2025 with county and city emergency management staff from across the watershed. The data, roles, and responsibilities outlined in the Plan were directly informed by this engagement with MCWD's partners.

DEFINING ROLES THROUGH COORDINATION

FLOOD RESPONSE PARTNERSHIP BACKGROUND

Effective flood response within the Minnehaha Creek Watershed is anchored in a coordinated partnership among federal, county, municipal, watershed, and private stakeholders. Under Minnesota law, cities and counties are legally obligated to develop and maintain local emergency operations plans as part of broader emergency management responsibilities. These plans address all types of disasters, including flooding. Counties coordinate multi-jurisdictional preparedness and response; cities manage public safety, local infrastructure, zoning in flood prone areas, and emergency response; and residents and property owners experience and respond to flooding on the front line. Together, these emergency plans ensure the coordinated delivery of emergency response services before, during, and after flood events.

Within this established framework, MCWD plays a supporting and complementary role by acting as a provider of watershed data and information, not as an emergency manager or owner of municipal infrastructure.

MCWD strengthens local emergency functions by tracking real-time watershed conditions, anticipating and predicting flood risk, and issuing clear and timely communications. These services provide emergency management partners and affected residents and property owners with the specific information they need to make informed decisions before, during, and after flood events.

FLOOD RESPONSE PARTNERSHIP ROLES

MCWD works closely with the National Weather Service (NWS), U.S. Geological Survey (USGS), and Hennepin County Emergency Management (HCEM) to ensure local decision-makers have the most precise, timely, and relevant watershed data available. To support effective flood response, this partnership integrates:

- Tailored weather forecasts and briefings from **the NWS**
- Real-time local weather data from **Hennepin County's** MESONET sensor network
- Water level and flow data from **USGS** stations along Minnehaha Creek and on Lake Minnetonka
- Expanded water level monitoring data from **MCWD's** RESNET network across the watershed

By integrating these data sources with Gray's Bay Dam management decisions, MCWD is better able to anticipate watershed-scale outcomes of precipitation events and communicate localized flood risks to county and municipal officials, emergency managers, and the broader public. The timely delivery of this information supports the delivery of statutory responsibilities by cities and counties, and enables residents to make informed choices to protect their homes and families.

Table 1 summarizes the complementary roles of NWS, MCWD, counties, cities, and residents and property owners at the three phases of flood response: before flooding, during flooding, and after flooding.

Table 1. Flood Response Roles			
Partner	**Before Flooding**	**During Flooding**	**After Flooding**
National Weather Service	• Issue tailored 7-10 day weather forecasts • Produce short-term and long-range regional weather outlooks, including seasonal flood outlook • Coordinate with MCWD to refine 3-day watershed-specific forecasts	• Issue flood watches, warnings, and advisories to the public • Provide updated rainfall and flood forecasts • Support emergency operations with daily forecast briefings, as needed	• Update and enhance forecasting tools to improve accuracy • Collect data and share lessons learned with partners to strengthen future forecasts
Carver & Hennepin Counties	• Conduct hazard assessments and monitor conditions • Coordinate preparedness planning with cities and MCWD • Prepare and manage mitigation equipment and supply caches (e.g., barriers, pumps, other disaster resources) • Provide emergency management training and exercises • Issue preparedness alerts and briefings to local emergency managers and residents, as needed	• Mobilize countywide emergency resources (e.g., sandbags, pumps, crews) • Issue alerts and public warnings • Coordinate municipal emergency responses • Maintain situational awareness and share updates with cities, MCWD, and state partners	• Lead countywide damage assessments for disaster relief • Support affected property owners and municipalities with flood insurance claim processes • Coordinate recovery assistance across affected municipalities • Update county emergency protocols, training, and mitigation plans with lessons learned
Minnehaha Creek Watershed District	• Collect real-time watershed and streamflow data (RESNET/USGS) • Integrate NWS forecasts and MESONET data into flood forecasts • Operate Gray's Bay Dam under allowable discharge ranges • Communicate watershed-scale flood risk to local and county partners	• Continue real-time monitoring and Gray's Bay Dam operations • Maintain communication with partners on watershed-scale impacts and localized risks to partners and the public • Conduct situational awareness briefings and coordination with HCEM and municipal partners • Inspect, assess, and monitor field conditions for emerging issues and MCWD infrastructure	• Facilitate MCWD permitting for recovery and restoration activities • Communicate flood impacts at watershed-scale to partners and residents • Evaluate MCWD response and interagency coordination and document lessons learned • Update watershed models, key thresholds, and forecasting tools with event data • Monitor post-flood watershed conditions

Table 1. Flood Response Roles			
Partner	**Before Flooding**	**During Flooding**	**After Flooding**
Cities in the Watershed	• Monitor forecasts and flood risk • Maintain local stormwater infrastructure • Provide preparedness guidance and information to residents • Prepare protective resources (e.g., sandbags, barriers, pumps) • Participate in the National Flood Insurance Program • Enforce zoning and building standards in flood prone areas	• Direct operational response and deploy local protective resources (e.g., street closures, sandbagging, pumping) • Maintain emergency communications with community members • Provide shelter and evacuation routes, as needed • Coordinate with HCEM and MCWD for situational updates	• Repair local infrastructure • Document damages • Support residents with recovery services • Issue permits for repairs • Review and update local flood preparedness and response plans
Residents and Property Owners	• Understand flood risk by consulting available local, county, or federal tools (e.g., FEMA maps, city information) • Maintain key documents and protections such as flood insurance, elevation certificates, and floodplain permits (where applicable) • Implement household resilience measures (e.g., sump pumps, backflow prevention, drainage improvements, shoreline buffers) • Seek local resources in advance, if available (e.g., sandbags, factsheets, technical guidance, etc.) • Develop household emergency plans and maintain kits/go-bags	• Follow official alerts and instructions from municipal and/or county emergency management • Deploy protective measures as available (e.g., sandbags, shields, pumps) • Activate household emergency plans and evacuate if directed	• Ensure safety by pumping, cleaning, and ventilating flood areas to reduce health risks within structures • Document damage thoroughly for flood insurance claims and disaster relief assistance • Engage with local agencies as needed for permits, compliance documents, or other key documentation • Adapt homes and other properties with resilient repairs (e.g., elevated utilities, flood-resistant materials, landscaping).

MCWD FLOOD RESPONSE FRAMEWORK

In addition to guiding MCWD's coordination with external partners, the Plan's Flood Response Framework organizes MCWD's internal responsibilities to provide real-time monitoring, forecasting, communication, and operational support. This structure facilitates a consistent and scalable response by MCWD as flood conditions escalate, strengthening the support MCWD provides its counties, cities, and residents as they prepare for, respond to, and recover from flood events.

The framework is organized into four strategic action areas:

Forecast and Monitor	Collect and analyze watershed data, refine forecasts, and track real-time hydrologic conditions.
Communicate and Engage	Share timely, audience-specific watershed information with emergency managers, municipal officials, and residents to maintain situational awareness and ensure alignment.
Act and Enable	Carry out MCWD's direct operational responsibilities and align internal resources to ensure effective Gray's Bay Dam management, partner communications, field inspections, and expedited permitting.
Evaluate and Adapt	Capture lessons learned, refine models and processes, and integrate insights into future planning and strategies to build resilience.

In practice, MCWD continuously cycles through these four action areas, monitoring evolving watershed conditions, keeping partners aligned with timely information, carrying out operational tasks such as dam management and inspections, and then folding lessons learned into tools and procedures.

As conditions escalate, the pace and intensity of this cycle increases. During low-risk conditions, emphasis is placed on tracking current conditions and providing situational awareness. As conditions worsen and flood risk increases, MCWD expands operational support, targeted communications, and coordination with partners. Recovery is embedded in Evaluate and Adapt to ensure that after floodwaters recede, lessons learned are captured, models and practices are refined, and those insights flow directly back into preparedness and partner coordination. Appendix A provides additional detail on how responsibilities within each action area scale across tiers.

LEVELS OF RESPONSE

Depending on shifts in weather, flooding within the watershed can escalate from routine high water conditions to major, multi-jurisdictional events. To provide consistent and objective decision-making, MCWD has established five flood risk tiers, which help describe the level and significance of high water and flooding, as well as the associated actions MCWD takes in response to each. These flood tiers exist as guidelines to inform MCWD's flood response operations and were developed leveraging water level data from USGS and MCWD RESNET gauges.

By integrating these flood tiers with the Flood Response Framework's four action areas, the tiers ensure that MCWD staff share a consistent understanding of conditions and that MCWD's activities escalate appropriately.

Since precipitation totals and water levels often vary across the watershed, different flood tiers may exists for different areas of the watershed (e.g., upper watershed, Lake Minnetonka, and/or along Minnehaha Creek) during the same period. Appendix A provides definitions of each flood tier and a table demonstrating how MCWD's responsibilities within each of the four action areas intensify as conditions escalate.

FLOOD RESPONSE TEAM

Within the Flood Response Framework, which defines MCWD's role, the Flood Response Team (FRT or Team) provides the operational leadership to ensure MCWD's responsibilities are carried out consistently and at the right scale. This cross-program team leads internal coordination during the open water season, which is typically early spring through late fall. The Team meets regularly to monitor watershed data, determine current flood tiers, and align internal operations to observed conditions in the field.

The FRT is led by the Project Maintenance and Land Management (PMLM) Program Manager, who analyzes forecasts and watershed conditions, and then provides the Team with recommendations for management actions such as dam operations, inspections, and communications. The FRT, which includes the District Engineer, program managers from Research and Monitoring and Outreach, and the District Administrator, vets and refines these recommendations.

FLOOD RESPONSE TEAM WORKFLOW

BEFORE FLOODING

The Flood Response Team regularly reviews watershed conditions by monitoring forecasts, coordinating with the NWS on tailored 7-day forecasts for the watershed, refining as needed with 3-day forecasts, and integrating those forecasts with RESNET water level data. This allows the Team to assess the potential impact of predicted rainfall on water levels across the watershed.

This analysis, coupled with the Headwaters Control Structure Management Policy and Operating Procedures and the Gray's Bay Dam Discharge Zones protocol, guides Gray's Bay Dam operations, as well as the timing and content of communications to MCWD's partners and the broader public. The Team ensures the watershed's communities remain informed through real-time data dashboards on MCWD's website and the routine distribution of digital Water Level Update newsletters.

DURING FLOODING

The Flood Response Team determines when forecasted or measured changes in water levels require a shift in MCWD's internal response structure. For example, during Tier 4 or 5 events, the District Administrator may provide the PMLM Program Manager a broader span of control over the organization chart, to serve as central command across programs and ensure MCWD's flood response is appropriately resourced. In these instances, the PMLM Program Manager reports directly to the Administrator, who helps realign organizational priorities to ensure program resources are aligned to support the tiered actions described in Appendix A.

Key factors considered in determining when this organizational shift is appropriate include current water levels, forecast timing and intensity, flood potential (flood tier status), as well as partner and public interest.

AFTER FLOODING

As flood conditions recede, the Flood Response Team transitions to support recovery, and the organization may return to its normal command structure. During this time, the FRT documents lessons learned and refines processes, to strengthen and improve the watershed's response during future events. By meeting regularly, reviewing forecasts, and coordinating across programs, the Team carries out the daily tasks that keep MCWD's flood response organized, effective, and scaled to conditions in the field.

The Team's work is supported by the standard operating procedures and technical resources provided in Appendix B, as well as by the program-level responsibilities and organizational structure outlined in Appendix C.

PROGRAM ROLES AND ORGANIZATIONAL STRUCTURE

The PMLM Program Manager leads the FRT and serves as the central hub for coordination across programs, while reporting to the District Administrator. The Administrator provides organizational leadership, prioritizes and aligns staff resources, and maintains direct communication with the Board of Managers. Other programs continue routine operations until directed by the FRT and Administrator to shift priorities in response to elevated flood conditions.

Each MCWD program plays a distinct role in supporting flood response under PMLM's leadership. Appendix C illustrates how the FRT adapts MCWD's organizational structure to support flood response, including a detailed summary of program responsibilities before, during, and after flood events.

ORGANIZATIONAL ROLES

- **District Administrator** – Provides organizational leadership, emergency governance, and communication with the Board of Managers and external partners.
- **Board of Managers** – Coordinates with the Administrator to understand conditions, align resources, provide direction, and communicate with communities and partners.
- **Research & Monitoring (R&M)** – Provides data collection, analysis, and QA/QC to ensure accurate forecasting and communication.
- **Outreach** – Manages public and partner communications, media relations, and digital tools and resources.
- **District Engineer** – Advises on hydraulics, dam operations and impact analyses, and field surveying as needed.
- **Permitting** – Leads emergency permitting processes and provides oversight of active permit sites.
- **Operations** – Ensures continuity of MCWD infrastructure, staff safety in the field, and technology systems.
- **Project and Policy Planning** – Coordinates with cities and counties, supports recovery needs and opportunities, and integrates lessons into long-term planning.

POST-FLOOD RECOVERY AND DEBRIEF

Flood recovery begins once floodwaters recede and emergency conditions stabilize. It ensures impacts are understood, lessons learned are captured, and resilience is strengthened for the future.

MCWD'S ROLE IN RECOVERY

Recovery is a shared responsibility led by cities and counties, who manage infrastructure repair and community-wide assistance. MCWD's role is complementary by providing watershed-scale information, technical support, and coordination to help partners and residents recover effectively.

MCWD's recovery responsibilities span technical, operational, and communications work. They include conducting field inspections and surveys, archiving hydrologic data and imagery, coordinating findings with partners, providing recovery briefings to the Board of Managers and partners, and pursuing funding opportunities that strengthen long-term resilience. These responsibilities align with the Evaluate and Adapt action area of the Flood Response Framework (Appendix A) and build on program-specific roles (Appendix C).

In practice, MCWD contributes to recovery by:

Assessing Impacts – Documenting and evaluating damage to MCWD assets, infrastructure, and natural systems.

Communicating Findings – Sharing data and analysis with emergency managers, municipal partners, and the Board of Managers.

Coordinating with Partners – Engaging with counties and cities to align watershed considerations with broader recovery efforts.

Supporting Funding Opportunities – Tracking and pursuing grant programs or external resources that can aid recovery and resilience.

Documenting Lessons Learned – Integrating flood event data into predictive models, permitting practices, project planning, and long-term resilience strategies.

CONTINUOUS IMPROVEMENT

Recovery concludes with a structured debrief following a flood event, as well as annually after each open water season. The review, led by the FRT, evaluates organizational performance, partner coordination, and communication effectiveness. Insights are documented and used to update predictive models, refine staff workflows, and strengthen MCWD's resilience. These lessons inform both future updates to the Flood Response Plan and the development of MCWD's 2027 Watershed Management Plan.

The debrief process includes review of the tiered approach to actions outlined in Appendix A, as well as program-level responsibilities outlined in Appendix C, to ensure improvements are fully integrated into daily operations.

As part of this commitment, MCWD will continue to expand and refine Appendix B: Standard Operating Procedures, to capture detailed workflows for communications, permitting, dam operations, and partner coordination, ensuring recovery practices are continuously refined and institutionalized.

FUTURE RECOMMENDATIONS

The Flood Response Plan is a living document that will evolve annually as new data, tools, and partnerships emerge. In coordination with MCWD's partners, periodic updates will be prepared and reviewed by the MCWD Board of Managers. While this Plan establishes a strong foundation for MCWD's forecasting, communications, and operational readiness, it also outlines potential areas for future improvements that may continue to strengthen MCWD's ability to anticipate, respond to, and recover from flood events. These areas highlight possible opportunities for refinement that may be adapted or replaced as priorities and resources evolve.

DATA-DRIVEN DECISION-MAKING

MCWD will continue to expand and refine its technical capacity to understand watershed dynamics and anticipate flooding. Potential areas of improvement may include exploration or consideration of:

- Refining RESNET locations to provide higher resolution, real-time monitoring at key areas in the watershed
- Developing flood tiers at each RESNET site for broader coverage and a more detailed characterization of flood risk, integrating channel and infrastructure survey data
- Training and refining machine learning models to improve predictive capabilities
- Building a library of rainfall events and water level responses to inform future planning

COMMUNICATIONS

As a broker of watershed information, MCWD will continue to strengthen how flood information is delivered to partners and the public. Potential areas of improvement may include exploration or consideration of:

- An annual Flood Response Summit, convening partners to review operational protocol and early season forecasts for the year
- Audience-specific tools and guidance on translating technical data into clear, actionable information
- Developing a website dashboard that integrates forecasts, water levels, dam discharge, and RESNET in one location, and provides real-time notifications
- Developing a coordinated strategic plan for future improvements with Hennepin County and the NWS, informed by engagement with the watershed's communities

APPENDICES

APPENDIX A – FLOOD RESPONSE FRAMEWORK AND TIERS

Flooding within the Minnehaha Creek Watershed can range from routine high water conditions to major, multi-jurisdictional events. To provide a consistent and coordinated response, MCWD organizes its flood response work into four strategic action areas:

- **Forecast and Monitor** – Collect and analyze watershed data, refine forecasts, and track real-time hydrologic conditions.
- **Communicate and Engage** – Share timely, audience-specific watershed information with emergency managers, municipal officials, and residents to maintain situational awareness and ensure alignment.
- **Act and Enable** –Carry out MCWD's direct operational responsibilities and align internal resources to ensure effective Gray's Bay Dam management, partner communications, field inspections, and expedited permitting.
- **Evaluate and Adapt** – Capture lessons learned, refine models and processes, and integrate insights into future planning and resilience strategies.

These action areas provide the structure for how MCWD supports its partners before, during, and after flood events. Recovery is embedded in Evaluate and Adapt to ensure lessons learned from each high water or flood event are carried forward into preparedness and future planning.

FLOOD TIERS

To ensure MCWD's activities scale appropriately as conditions change, the Flood Response Framework is paired with a system of five flood tiers. The tiers are adapted from the NWS' hydrology terms and definitions, designed for areas where MCWD's RESNET sensors and the USGS' gages are located, and shaped by lessons learned from past events, including the 2014 flood of record.

Each tier describes the scale of conditions and the expected level of MCWD's response. This provides staff with a shared understanding of when and how actions should be taken. Since precipitation totals for any given event often vary across the watershed, and different areas of the watershed respond uniquely to precipitation, the Flood Response Team (FRT) may also designate different tiers in different locations of the watershed (e.g., upper watershed tributaries, Lake Minnetonka, and/or along Minnehaha Creek) during the same period. In such cases, monitoring, communication, and operational support are aligned to the tier in effect for that specific area.

TIER 1 – ROUTINE CONDITIONS

Definition: Normal water levels with no flooding concerns.

Examples of Conditions: Stream flows and lake levels within seasonal ranges; no impacts to infrastructure or property.

TIER 2 – HIGH WATER

Definition: Water levels elevated above seasonal norms but contained within natural or constructed channels.

Examples of Conditions: Saturated soils, standing water in low-lying areas, minor drainage issues.

TIER 3 – MINOR FLOODING

Definition: Water exceeds channel capacity, causing localized flooding. Impacts are generally limited and non-destructive.

Examples of Impacts: Flooding of parklands, trails, or minor roadways; temporary disruption to stormwater systems or adjacent public spaces.

TIER 4 – MODERATE FLOODING

Definition: Broader flooding that affects infrastructure, utilities, and some residential or commercial structures.

Examples of Impacts: Inundation of homes or public buildings; flooding of key roads and intersections; disruption of utilities or services; localized evacuations.

TIER 5 – MAJOR FLOODING

Definition: Severe, widespread flooding that significantly disrupts communities and essential infrastructure.

Examples of Impacts: Extensive flooding of neighborhoods and businesses; disruption of critical infrastructure (e.g., hospitals, schools, emergency services); major transportation shutdowns; broad evacuations and long-term recovery needs.

FRAMEWORK ACTIONS ACROSS TIERS

Table A.1 below outlines how MCWD's responsibilities within each action area intensify across the five flood tiers from routine operations to full-scale flood response and recovery. This scaling system ensures the Flood Response Framework is applied consistently in practice, and that MCWD's actions remain aligned with partner responsibilities.

Table A.1. Flood Response Framework – Tiered Actions and Responsibilities

Action Area	Lead Program	Tier 1 Routine Conditions	Tier 2 High Water	Tier 3 Minor Flooding	Tier 4 Moderate Flooding	Tier 5 Major Flooding
Forecast & Monitor	PMLM	Data Source Review & Interpretation				
		Weekly FRT Meetings	Ad-Hoc FRT Meetings		Daily FRT Meetings	
		Bi-weekly Dam Operations & Condition Updates	Daily Dam Operations & Condition Updates			Daily Dam Status & Condition Updates
	R&M	Monitor RESNET Equipment				
	Any Program	Field Inspections & Documentation at Key Reference/ Monitoring Sites (Photos)		Expanded Field Inspections & Documentation		Expanded Inspections & Monitoring Across MCWD Assets
Communicate & Engage	PMLM	NWS Briefings (as needed)		Daily NWS Briefings		
				HCEM Notification & Shift to Support as HCEM Leads	HCEM Briefings & Communication Coordination	
	Administrator	Board: Admin Reports		Board: Detailed Flood Briefings		
	Outreach	Seasonal Outlook Summit (as needed)	Tailored Updates to Emergency Managers in Vulnerable Areas		Tailored Emergency Managers Briefings	
		Monthly Water Level Update Newsletter	Ad-Hoc Water Level Newsletters			
		Real-Time Web Resources (dashboards, notifications banner)				
		Establish & Maintain Tracking Matrix for Requests/Calls	Track and Respond to Individual Requests (logged in tracking matrix)		Tracking Matrix Actively Managed Across Programs to Triage and Respond to Partner and Public Inquiries	
		Maintain Media Toolkit & FAQs	Prepare Media Toolkit & FAQs	FAQs, Media Messaging, & Social Media Updates		

Table A.1. Flood Response Framework – Tiered Actions and Responsibilities						
Action Area	**Lead Program**	**Tier 1 Routine Conditions**	**Tier 2 High Water**	**Tier 3 Minor Flooding**	**Tier 4 Moderate Flooding**	**Tier 5 Major Flooding**
Act & Enable	**PMLM**	Routine Gray's Bay Dam Operations	Intensify Dam Operations within Allowable Ranges	Ongoing Dam Operations Adjustments		
		Routine Inspection & Maintenance of MCWD-Owned Structures	Increase Inspection Frequency of Potentially Vulnerable MCWD Assets		Expand Inspections of MCWD Assets	
	Administrator	Determine Board/Administrator Emergency Decision Authority		Notify Staff & Reallocate Staff Workload to Support Flood Response (as needed)		Organization-wide Reallocation of Staff Resources (as needed)
				Activate Emergency Decision Authority (as needed)		
	Permitting	Prepare to Increase Permitting Inspections		Monitor Active Construction Sites for Compliance		
				Support Emergency Permitting Process	Provide Emergency Permitting Support	
	Any Program	Ensure Technology, Infrastructure & Safety Protocols Readiness	Ensure Continuity of Operations (e.g., IT systems, field logistics)	Intensive Field Inspections of MCWD Assets		Intensive Site Monitoring Across MCWD Projects
Evaluate & Adapt	**PMLM**	Conduct FRT Pre-Season Meeting to Revisit Previous Year's Lessons	Document Tier Escalation Decisions & Scale of Impact via Drone Photos; Debrief for Lessons Learned & Operations Improvements			
		Incorporate Ongoing Operational Improvements into SOPs				
		Review FRP & Update (as needed)				
				Coordinate Recovery with Partners (as needed)		
	Any Program	Refine & Update Predictive Models, Thresholds & Workflows	Prep for Drone Field Photos	Archive Hydrologic & Imagery Data		
				Document Impacts to MCWD Assets, Infrastructure & Natural Systems		

APPENDIX B – STANDARD OPERATING PROCEDURES

Effective flood response depends on integrating near-term and long-range forecasts with real-time watershed monitoring. These procedures guide the Flood Response Team (FRT) in carrying out this Plans' Flood Response Framework and ensures decisions are grounded in consistent information. While Appendix A shows how responsibilities scale across flood tiers, this appendix outlines the standard operating procedures and tools that structure the FRT's daily work.

Daily monitoring of water levels and weather forecasts to assess current conditions and inform Gray's Bay Dam operations:

- Monitor USGS Gauges and RESNET to establish current water level conditions and evaluate operational zone based on the "Headwaters Control Structure Management Policy and Operating Procedures" (Operating Plan).
- Monitor NWS 7-day forecasts and Third-Party private forecasts for the upper and lower watershed for initial identification of precipitation events.
- Use Weather Prediction Center's (WPC) Quantitative Precipitation Forecast (QPF) to perform initial refinement and verification of general weather forecast.
- Monitor Long-Range outlooks to track forecasted trends.
- Evaluate forecasts, projected water levels, and the Operating Plan to make decisions for dam operations, including discharge adjustments, timing of adjustments, and potential communications.
- Conduct routine dam operations and conditions monitoring.

Additional monitoring and forecasting for significant rain events or during elevated flood tiers:

- Schedule briefing between the NWS and the FRT to provide in-depth forecast analysis and framing for communications.
- Analyze WPC forecast tools and Weather models. Looking at short- and mid-term models for storm tracks, total precipitation, atmospheric convection, and precipitable water.
- Conduct calculations and use modeling to project how water levels will react to forecasts and overlay with the Operating Plan to determine a range of operating options.
- The FRT evaluates forecasts, projected water levels, and the Operating Plan to make decisions for dam operations, timing, and potential communications.
- Conduct dam operations, and monitor through USGS gauges and RESNET.
- The FRT monitors system response to determine if additional operational adjustments are needed, considering flood tier, forecast, and the Operating Plan.

Biweekly Operations and Conditions updates:

- Synthesize water level conditions and forecast into a report highlighting changes and forecasted impacts. Provide a review of current operations and make initial recommendations to be vetted through the FRT.

Weekly FRT meetings where current conditions and forecasts are presented and operations plan for the week is outlined:

- The FRT meets to review current operations, water level information, forecasts, and analysis.
- Discuss dam operational zone and projected transitions.
- Guides planned operations for the coming week.
- Reviews previous operations and water level changes.
- Discuss communication needs and responses.
- Additional meetings may be needed during periods of high water or flood risk, or in preparation for a significant event.

Monthly Water Level Updates to external stakeholders:

- Provide up-to-date information from MCWD and partners about water levels, the previous month's operations, and the near-term forecast.
- Provide baseline data and resources to public partners.
- Frame operations and water levels in context of previous high water, average, and drought conditions as needed.
- In addition to the monthly reports, Water Level Updates may be distributed before or after significant events to provide information on forecasted or actual event details.

Bi-annual operations review:

- Review previous year's operations and experienced weather to identify pain points and potential improvements or changes for future operations and engagement.
- Initial forecasting for early season flooding based on the best available information on long-term forecasts and snow-water equivalent present on the landscape.

CORE RESOURCES

The FRT uses a set of core resources to evaluate and understand forecasts and system responses:

National Weather Service (NWS)

- Forecasts for both the upper and lower watershed
- Near-term: 1–3 days forecast; WPC forecasts and tools
- Long-range: 7-day forecast, 6–10 days, 8–14 days, and 3–4 week climate projections.
- Used to refine precipitation and flood forecasts specific to Minnehaha Creek and Lake Minnetonka

MCWD RESNET sensor network and USGS gauges

- RESNET is MCWD's internal sensor network for tracking water level information throughout the watershed in real time. These monitoring locations include:
  - Inflows to Lake Minnetonka and water level at each of the Lake's seven major tributaries
  - Lake Zumbra
  - Lake Minnetonka
  - Fourteen level sensors along Minnehaha Creek
  - Four flow sensors in Minnetonka, St. Louis Park, Edina, and Minneapolis
- USGS gauges:
  - Level sensors above and below Gray's Bay Dam
  - Hiawatha Ave. gauge providing flow, level, and precipitation information
- Provides real-time hydrologic conditions across the watershed

Hennepin County MESONET

- Real-time and historic precipitation totals and weather data
- Soil moisture readings
- Offers key indicators of runoff potential and watershed sensitivity

Other Considerations for Dam Management

- Operation zone for Gray's Bay Dam
- Short- and mid-range weather models, accessed through College of DuPage and Pivotal Weather
- Internal mass balance model calculations, which take into account rainfall, inflows, evaporation, and dam discharges

These core inputs provide the FRT with a real-time picture of watershed conditions and near-term risks. To guide consistent use across the organization, Table B.1 summarizes the key variables, their preferred sources, and how they inform flood forecasting, dam operations, and communication with partners.

Table B.1. Key Variables and Preferred Sources		
Data	**Preferred Sources**	**Application**
Lake Minnetonka Water Balance Model	• RESNET • National Weather Service Lake Minnetonka model • Internal mass balance model	Used to anticipate storage changes and guide Gray's Bay Dam operations
Lake Minnetonka Water Levels	• USGS gauge and RESNET	Determines operating scenarios for Gray's Bay Dam and informs flood tier level for Lake Minnetonka
Gray's Bay Dam Discharge	• Calculated internally	Guides operational decisions and mass balance modeling
Minnehaha Creek Streamflow	• Gray's Bay Dam discharge • USGS gauge at Hiawatha Ave. • RESNET monitoring stations	Anticipates downstream channel capacity and flooding risk and informs flood tier level for Minnehaha Creek
Head Difference	• In-house Survey123	Helps assess effectiveness of dam operations
Precipitation Forecast	• National Weather Service • Weather Models – College of DuPage, Pivotal weather • Meetings with NWS, as needed	Provides guidance on potential likelihood of forecast to support anticipating watershed response
Long-Range Precipitation Outlooks	• National Weather Service – Climate Prediction Center	Provides early warning of potential extended wet or dry cycles
Weather Radar	• National Weather Service • Third-party weather applications	Verifies near-term/real-time storm movement and intensity
Actual Precipitation Total	• Hennepin County MESONET • National Weather Service	Provides cross check against predicted/modeled rainfall inputs
Soil Moisture	• **Hennepin County MESONET**	Indicates runoff sensitivity
Evaporation	• Internal mass balance model • National Weather Service	Reference for potential evaporation to guide dam management decisions
Wind	• National Weather Service • MESONET • Third-party weather applications	Potential to affect evaporation and lake surface dynamic
Snow-Water Equivalent	• National Weather Service • CoCoRaHs	Useful for spring flood forecasting

APPENDIX C – PROGRAM ROLES AND RESPONSIBILITIES

The Flood Response Team (FRT) determines flood tiers and directs programs to shift their roles accordingly during flood conditions. While each program continues its routine responsibilities, flood conditions may require reprioritization of staff time, coordination across programs, and additional tasks tied to assessing conditions, communications, and emergency management coordination.

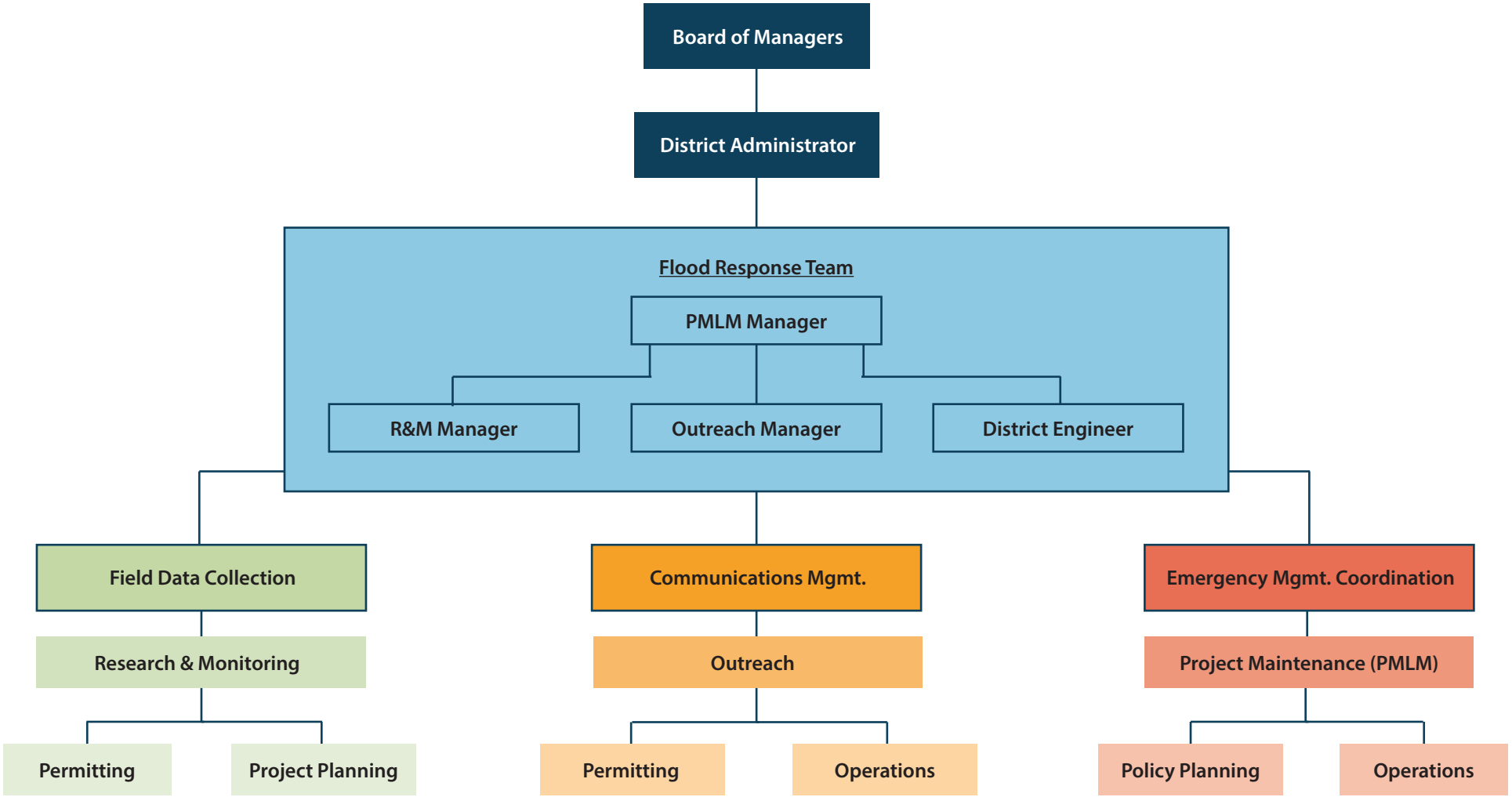

Table C.1 below summarizes program responsibilities before, during, and after flood events. It provides a reference for how each program supports MCWD's coordinated response.

Table C.1. Program Roles and Responsibilities			
Program/Roles	**Before Flooding**	**During Flooding**	**After Flooding**
Board of Managers	• Defines emergency decision authority (e.g., contract approvals, funding thresholds)	• Coordinates with the Administrator on emergency decisions	• Provides post-event governance support and oversight for recovery actions
District Administrator	• Oversees full implementation of the Flood Response Plan • Prioritizes work across programs • Coordinates with and supports program leads	• Acts as liaison with the MCWD Board • Serves as spokesperson, if needed	• Provides organizational leadership through post-event coordination and recovery efforts
Project Maintenance & Land Management (PMLM)	• Coordinates dam operations • Facilitates internal information sharing and leads internal huddles • Prepares dam documentation	• Leads centralized coordination across MCWD's programs • Leads increased coordination with external partners	• Leads post-flood debrief • Coordinates recovery with partners (e.g., FEMA, Hennepin County) • Tracks project impacts
District Engineer	• Advises on hydraulic risks and potential emergency needs	• Provides input on PMLM's analysis to support decision-making • Supports permitting and field surveying, as needed	• Supports post-flood site evaluations
Research & Monitoring	• Manages watershed data systems and QA/QC • Maintains flood risk dashboards • Oversees drone use protocols	• Collects field data • Provides analysis to support decision-making	• Continues internal communication and analysis of flood data
Outreach	• Develops and updates media tools, social media messaging, FAQs, and field crew communication resources	• Serves as central triage for media, public, and digital communications • Maintains timely public information	• Provides post-event impact updates • Leads communication debriefs and final follow-ups

Table C.1. Program Roles and Responsibilities			
Program/Roles	**Before Flooding**	**During Flooding**	**After Flooding**
Permitting	• Develops emergency permit guidance • Trains staff on emergency procedures	• Manages emergency permitting processes • Monitors active construction sites for flood impacts	• Adjusts permit terms for sites affected by flooding
Operations	• Maintains infrastructure uptime readiness • Manages internal communication flow planning • Develops legal and PPE checklists	• Oversees emergency meeting logistics • Provides technology and infrastructure support during events	• Supports recovery logistics and ensures communication systems are operational
Policy Planning	• Tracks grant opportunities • Develops GIS tools and mapping protocols	• Supports partner agency coordination and navigation of emergency response actions, as needed	• Leads post-flood grant submissions, as needed • Continues interagency coordination and recovery tracking
Project Planning	• Integrates flood response considerations into capital project planning • Maintains project dashboards • Prepares for design/construction pauses	• Provides project-level flood response coordination • Pauses design or construction, if needed, to reallocate staff to response efforts	• Supports post-flood mitigation planning • Updates project dashboards