

S.O.P #: TACTICAL OPERATIONS MANUAL #23

SUBJECT: SWIFTWATER FLOOD OPERATIONS

STANDARD OPERATIONAL PROCEDURE

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Objective: To serve as a guide for all Fire Department personnel operating around and in swiftwater/flood environment during emergency and non-emergency operations.

Section 1: Purpose

- A. This SOP is to be followed by all Fire Department personnel to assist in tactical decision making and strategy development while conducting operations around and in swiftwater/flood environment. Operations include emergency situations such as rescue and rescue evacuation, and non-emergency/recovery situations.

Section 2: Definition

- A. Swiftwater is an environment where water is moving fast enough to produce sufficient force to present a life and safety hazard to a person entering the water. These conditions can exist in streams, creeks, and rivers during normal flows. In addition, other areas can become inundated during large snow melt or heavy rains and become severe. These swiftwater conditions may occur in concrete lined channels, storm drains, roadways and communities. Flooding shall be defined as waterways overflowing their banks and inundating roadways and communities. Swiftwater conditions can also exist in tidal areas during a hurricane/tropical storm/ nor'easter causing storm/tidal surge.

Section 3: Notification and Response

1. Due to the fact that swiftwater/flood events are dictated by weather, the Fire Department will follow four levels of response/action during these types of emergencies.

Level 1: (Normal Operations)

This mode is designed for normal day to day operations not related to a severe weather event, such as a reported incident in a non-tidal stream/river. Should the initial report from 911 or units on location present any aspect of the conditions of swiftwater/flood incident, the appropriate response profile shall be alerted and dispatched.

2. Level 2 : (Heightened Awareness Phase/Pre-Alert)

Level 2 is defined as Baltimore County being placed under a Flood/Flash Flood Watch, or as impending or continual weather-related events dictate. Immediately upon entering Level 2, the ADO will notify the officer in charge of USAR Station 17 as well as the Swiftwater Rescue Team Stations of 35 (Arbutus) and 48 (Kingsville). Operational personnel should advise team members of the potential for possible deployment as well as gather maps and other pertinent information. Teams should inspect all water rescue-related equipment to ensure it is in a ready state and place the equipment in more accessible areas. Members, once notified, will remain in communication to ensure the proper flow of information and to allow for resource and logistical support from all companies.

3. Level 3: (Adaptations due to Active Swiftwater/Flood Incidents)

If Baltimore County is placed under a Flood/Flash Warning, or the potential for severe flooding exists or is occurring, the ADO will notify the on duty Division Chief, ATR 1, the Officer in Charge of USAR Station 17 and the Swiftwater Rescue Team (SRT) Stations of 35 (Arbutus) and 48 (Kingsville). The on duty Division Chief shall consider any alterations in swiftwater running assignment based on the need at that time.

In addition, the on duty Division Chief may cause to deploy "Swiftwater Strike Team," which will be comprised of a minimum four person team from Stations 17, 35, or 48 with the appropriate training and equipment of engage in

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swiftwater rescue. The purpose of the team is for them to become a force multiplier and to be strategically placed/utilized and respond to incident as needed in Baltimore County. If flooding develops at a known problem area, the station in the affected district should proactively investigate the vulnerable location. The Company Officer on the piece of apparatus will relay any pertinent information back to Fire Dispatch regarding existing or potential water related problems and the need for road closures.

4. Level 4: (Advance Pre-Planning Mode)

If Baltimore County is forecasted for an event of major significance such as a hurricane, tropical storm, or nor'easter that will impact tidal and/or inland water areas or infrastructure with flooding, the advanced Pre-Planning Mode will be implemented by the BC/DC of Special Operations. If indicated, the BC/DC of Special Operations will consult with ATR 1 and other resources to develop an Incident Action Plan for anticipated needs. In addition, these resources will work with the Office of Homeland Security and the Emergency Operations Center (EOC) to support overall operations, as needed.

(a) Mutual Aid request deployments outside of Baltimore County will approved by the duty Division Chief if Baltimore County Fire Department is in the Advance Pre-Planning Mode.

(b) Any requests beyond those consistent with mutual aid agreements (Maryland Emergency Management Agency Compact (MEMAC) or Emergency Management Agency Compact (EMAC) must be approved by the Chief of the Department or his designee. During such a request, a roster and an equipped team will be maintained in Baltimore County during the deployment.

Section 4: Safety

A. Command and Control

1. To ensure the safety of all personnel, the Incident Command System will be used on all swiftwater/flood incidents regardless of whether they are emergency or non-emergency. Command will implement the following:
  - a. Request a swiftwater/flood rescue assignment.
  - b. Establish Level II accountability.
  - c. Assure that all personnel within the hot and warm zone are wearing the proper PPE. This PPE does not include any component of structural firefighting gear.
  - d. Appropriate PPE shall include approved Type III or Type V Personnel Flotation Device.
  - e. Personnel entering the Hot Zone will be equipped with a Type V PFD, a water rescue helmet, and thermal protection. The Incident Commander will increase the level of protection required relative to the risk of exposure to responders in flood conditions. This level of protection requires personnel to be in a dry suit with hand and foot protection.
  - f. Unless appropriately trained and directed by the Incident Commander/Rescue Branch Director, personnel are not to tie or otherwise attach themselves, such as with carabiner, to fixed rope and make entry into the hot zone. Trained technicians are permitted to do so only when utilizing a Type V PFD with a "Blowout" belt feature.
  - g. Personnel shall not utilize boats or other watercraft unless trained and equipped to do so in the swifterwater/flood environment.
  - h. Under no circumstances will any fire department vehicle drive into any water that encroaches halfway above the tires.
  - i. During incidents of rescue/recovery of victims submerged in the swiftwater/flood environment, the decision to utilize SCUBA will be determined only after the Rescue Branch Director, Assistant Safety Officer Rescue, and Incident Commander have determined (after a Hazard Assessment) that all other options have been exhausted and the conditions and environment are safe to do so.

2. The Incident Commander should continually monitor existing and potential environmental conditions during these events, and take appropriate action with regard to staffing. The Incident Safety Officer shall continually monitor the condition of all personnel. Additional positions to be filled within the command structure for this type of incident shall be as follows:
  - a. **Assistant Safety Officer** – This position is in addition to the Incident Safety Officer. This position will be responsible for the safety of personnel in the Hot and Warm zone.
  - b. **Rescue Group Supervisor/Branch Director** this position will be responsible for the rescue/recovery operations in the Hot and Warm Zone.
  - c. **Swiftwater Team Leader** –This position will be responsible for the four (4) swift water technicians assigned to his/her team and reports directly to the Rescue Group Supervisor/Branch Director.

#### Section 5: Rescue/Recovery Operations

##### A. Strategic Priorities (Strategy)

1. Most often in swiftwater/flood rescue and recovery operations the strategic priorities are the same. They are:
  - Locate
  - Access
  - Stabilize
  - Transport

Each phase shall be approached as an individual challenge with efforts directed toward making a smooth transition between them. Resources shall be made readily available that is specific to the task.

##### B. Tactical Considerations

1. The Officer in Charge must fully understand that elements may affect their ability to function safely. The acronym **T.E.M.P.O.** below can help in the decision process.
  - a. **T**ime of day and water **t**emperature.
  - b. **E**nergy of the water and available **e**quipment.
  - c. **M**ovement and measurement of the water.
  - d. **P**ersonnel capabilities and plan.
  - e. **O**perations and **o**perational period.

##### C. Tactics

Rescue and recovery operations for swiftwater/flood emergencies shall begin with low-risk/low-tech options. Obviously these options shall be exhausted before the high-risk/high-tech options are utilized. Three other factors that shall be considered include; the time it takes to set up and operate a system, availability and location of resources, and the training and experience of on-scene personnel. The tactics are:

- a. TALK                      The victim should receive specific instructions and information.  
**(Awareness Level Provider)**
- b. REACH                    Pike Poles, shovels, inflated fire hose, and ground ladders.  
**(Awareness Level Provider)**
- c. WADE                     Wading into the environment as a group to reach a victim  
**(Operations Levels Provider)**
- d. THROW                    Throw bags, rope, or some other flotation device.  
**(Operations Level Provider)**
- e. ROW                        Boat operations may consists of line operations, padding the craft, or operating under motor power.  
**(Technician Level Provider and Boat Operator/Boat Bowman)**

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- f. GO/TOW Trained and properly equipped personnel shall perform this only after all options have been exhausted.  
**(Technician Level Provider)**
  - g. HELO Request for and use of helicopters shall be jointly agreed upon between the Incident Commander, the Rescue Group Supervisor/Branch Director and the Swiftwater Team Leader due to the high-risk option. **(Rescuers on hoist-Helicopter Search & Rescue Technician)**
  - h. ROPE Access to victims for rescue/recovery utilizing high-line rope systems **(Technician Level Provider)**

3. Anytime rescuers are involved in a rescue/recovery, a downstream backup team shall be deployed and equipped prior to operations in the hot zone. This team will have communications with the **Rescue Group Supervisor/Branch Director** and will advise of any hazards or other relative information that could have a positive or negative effect on the operation. This team will develop an action plan that includes two different rescue options in case the initial incident site decompensates.

4. Upstream spotters will be placed in position a minimum of 300 ft. upstream of the incident as soon as staffing permits. Before placing this component consideration must be given to the urgency of the rescue and the rate/speed of the water. This team will have communications with the **Rescue Group Supervisor/Branch Director** and will advise of any hazards or other relative information that could have a negative effect on the operations downstream. If a severe hazard is approaching, i.e., a tree, truck, car or large object, the unit will notify command and activate the emergency evacuation signal.

#### Section 6: Special Problems

##### A. Vehicles

1. First ask yourself if this **is a true emergency or is the passenger inconvenienced.**
2. The use of a heavy wrecker should be considered to possibly assist with the extrication.

##### B. The Urban Environment

1. In the urban environment, below ground storm water systems may be overwhelmed by continual rainfall. These systems when full may blow off manhole covers and hide storm drain openings causing an entrapment hazard. Water on the surface will appear to be ponding, however, will continue to flow often with speed and great force along its intended path. Therefore, only trained personnel shall enter ponding water that is deeper than one (1) foot in depth. Extreme caution must be used when conducting operations in streets and parking lots.

#### Section 7: Hazardous Materials

- A. All flood emergencies can pose potential exposures to civilian and fire department personnel from contaminants in the water. Typical contaminants include, but are not limited to: fecal matter, parasites, pesticides, and hydrocarbons. During a flood emergency the Rescue Group Supervisor/Branch Director in conjunction with the Assistant Safety Office Rescue and the **Incident Commander** must assure that any exposed personnel and equipment will be decontaminated if necessary. Information should be obtained as needed from Haz-Mat 114 and the Infection Control Officer to develop the appropriate care and record keeping for any exposure.

#### Section 8: Demobilization

- A. Once the rescue/recovery is complete, the **Rescue Group Supervisor/Branch Director** and the Assistant Safety **Rescue** shall confer with the **Incident Commander** as to an appropriate demobilization plan.
  1. They will ensure that all information gathered from the incident has been properly documented.
  2. They will ensure that a complete inventory of all equipment that has been used in completed.
  3. They will ensure that initial steps are taken for the proper decontamination of all personnel and equipment, if warranted.

### **Definition Page**

**Assistant Safety Officer Rescue:** This position is in addition to the Incident Safety Officer. This position will primarily be concerned with the scene and personnel safety in the Warm and Hot zone.

**Awareness Level Provider:** A provider that has received formal training in Swiftwater/water rescue and is able to identify hazards.

**Boat Bowman:** A Swiftwater/Flood Rescue Technician- *Boat Bowman* is an entry-level position within a Swiftwater/ Flood boat rescue team that can assist a boat crew with in-water and boat-based (paddle and/or powered) rescues, while meeting the requirements to be a Swiftwater/ Flood Rescue Technician.

**Boat Operator:** Swiftwater/Flood Rescue Boat Operator is an entry-level position within a Swiftwater/ Flood rescue team that operates a boat to affect in-water and boat-based (paddle and/or powered) rescues while meeting the requirements to be a Swiftwater/ Flood Rescue Technician. This position is considered the “boat captain” and has the ultimate responsibility for boat operations. The Boat Operator must also possess a Maryland State Safe Boater Card.

**Cold Zone:** Outside the Warm Zone.

**Downstream:** Where the water is going.

**Hot Zone:** Defined as the water or in a watercraft.

**Incident Commander:** This person is responsible for all aspects of an emergency response; including quickly developing incident objectives, managing all incident operations, application of resources as well as responsibility for all persons involved.

**Operation Level Provider:** This person is a provider that has received formal training in Swiftwater Rescue and who identifies hazards, uses equipment and applies limited techniques specified in the NFPA 1006/1670 standards.

**Rescue Group Supervisor / Branch Director:** This position will be responsible for the supervision of all assets involved in rescue/recovery operations in the Hot and Warm Zone.

**River Left:** The left-hand side of the river or stream as it would appear to an observer who is facing downstream.

**River Right:** The right-hand side of the river or stream as it would appear to an observer who is facing downstream

**Swiftwater Team Leader:** This position is a supervisory-level position within a water rescue team that manages rescuers on searches and rescues from shore and in the water while operating in the swiftwater/flood environment.

**Technician Level Provider:** This is a provider who has received a certification from the Professional Qualifications Board in Surface Water or Swiftwater Rescue and who identifies hazards, uses equipment, and applies advanced techniques specified in the NFPA 1006/1670 standards.

**Upstream:** Where the water is coming from.

**Warm Zone:** Generally within 10 feet of the water

## SWIFTWATER- FLOOD RESCUE TACTICAL CARD

<input checked="" type="checkbox"/>	Arrival Sequence	UNIT NUMBER	INITIAL TACTICAL GUIDELINES
	<b>1<sup>st</sup> arriving piece of equipment</b>		<input type="checkbox"/> Establish COMMAND <input type="checkbox"/> PPE: Type III or Type V PFD – <b><u>NO TURNOUTS</u></b> <input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Identify River Right, River Left, Upstream and Downstream. <input type="checkbox"/> Witness statement on point last seen <input type="checkbox"/> Victim at risk or inconvenienced? <input type="checkbox"/> Request a swift water/flood assignment if not dispatched. <input type="checkbox"/> Establish Hot , Warm , and Cold zones <input type="checkbox"/> Establish level II accountability <input type="checkbox"/> Recon from shore/bank best access
	<b>RECON Group</b>		<input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Identify River Right, River Left, Upstream, Downstream <input type="checkbox"/> PPE: Type III or Type V PFD – <b><u>NO TURNOUTS</u></b> <input type="checkbox"/> Coordinate resources to canvas the banks to identify the location of potential victims.
	<b>Downstream Division</b>		<input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Identify River Right and River Left, Upstream and Downstream <input type="checkbox"/> PPE: Type III or Type V PFD – <b><u>NO TURNOUTS</u></b> <input type="checkbox"/> Monitor for victims or responders who may travel downstream <input type="checkbox"/> Identify measures to take to catch any victims or responders, if indicated
	<b>Upstream Division</b>		<input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Identify River Right and River Left, Upstream and Downstream <input type="checkbox"/> PPE: Type III or Type V PFD – <b><u>NO TURNOUTS</u></b> <input type="checkbox"/> Monitor and identify objects that can become a danger to victims and rescuers (debris, trees, vehicles, etc). <input type="checkbox"/> Notify Command of any potential hazardous situation
	<b>Swift Water Units</b>		<input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Identify River Right and River Left, Upstream and Downstream <input type="checkbox"/> PPE for HOT ZONE: Type V PFD, water rescue helmet, thermal protection <input type="checkbox"/> Do not tie yourself unless equipped with a Type V PFD with “blowout feature.”

Tempo: Time of day and water temperature, Energy of the water and available equipment, Movement and measurement of the water, Personnel capabilities and plan, Operations and operational period.

GENERAL SAFETY ITEMS and DEFINITIONS	
Hot Zone	Defined as the water; Technician / Specialist level trained rescuers only
Warm Zone	Generally within 10 feet of the water – Operations level rescuers and Awareness providers that are properly equipped.
Cold Zone	Outside the Warm Zone; this is where non-trained and non-equipped rescuers and civilians must be located
River Left	The left-hand side of the river or stream as it would appear to an observer who is facing downstream.
River Right	The right-hand side of the river or stream as it would appear to an observer who is facing downstream.
Upstream	Where the water is coming from.
Downstream	Where the water is going.

**Under no circumstances will any fire department equipment drive into any water that encroaches halfway above the tires.**

**RESPONDER ACTIONS:**

- TALK:** The victim should receive specific instructions and information. (Awareness Level)
- REACH:** Pike Poles, shovels, inflated fire hose, and ground ladders. (Awareness Level)
- THROW:** Throw bags, rope, or some other flotation. (Operations Level Provider)
- ROW:** Boat operations may consist of paddle to power. (Technician Level Provider)
- GO/TOW:** Trained and properly equipped personnel shall perform this only after all options have been exhausted. (Technician Level Provider)
- HELO:** Request for helicopters shall be jointly agreed upon between the Incident Commander and the Rescue Branch Director / ASO Rescue due to the high-risk option.
- ROPE:** Access to victims for rescue/recovery utilizing high-line rope systems. (Technician Level Provider)

